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David Bernstein, editor

Executive Summary

David Bernstein

I. Introduction

Because of the Soviet Union's heavy emphasis on military prowess and capability, the military-industrial sector in the Soviet Union (and Russia) was larger than its counterparts in other industrialized societies. In addition to military equipment, it produced almost all civilian products with technology content such as appliances, electronic equipment, and aircraft.

With the ending of the Cold War, support for the military production from this sector was radically deemphasized. The necessary adjustment of the military enterprises to this demand shock has been embedded in far more comprehensive economic reforms. As the country has moved to a market economy and privatized much of its economic potential, the managers of the enterprises have found it necessary to convert most of their output to nonmilitary products and services as well as to restructure the enterprises. In going through this major transition, the challenge for Russian defense enterprises, and for the state, has been to address several partially conflicting and interdependent goals, including:

- To redistribute ownership from the state to managers, employees, and outside investors.
- To utilize the assets of the enterprises to increase efficiency, revenue, and profits from both state and nonstate customers.
- To maintain operational control of the enterprises in hands sympathetic to the continued operation of the enterprises.
- To provide employment and social services for the employees.
- To remove the burden of support from the state and impose hard budget constraints.
- To maintain the technological and industrial base required for national security.

- To reduce the degree of industrialization and militarization of industry and thereby increase both the civilian production and service sectors of the economy.
- To liberalize prices.
- To demonopolize the supply chain.

The three major areas of restructuring are (1) the relationships of the enterprises with their owners, (2) the internal organization and operational procedures of the enterprises, and (3) the relations between the enterprises and the employees. The degree of success of the national economic reform program and the health of the economy will depend substantially on the degree of success of the defense enterprises in utilizing their residual assets (human, technological, and physical) to generate profitable economic activity.

This report deals with this economic transition, primarily at the enterprise level. We have met the directors of more than forty defense enterprises and worked with approximately ten of them in considerable detail and six in more detail, having spent between one quarter and one person year with managers from each of the six. Notwithstanding this amount of contact, there are still problems with the reliability of our data. The researchers in our group do not always agree on some aspects of the situation at a given enterprise, and of course many of the conditions are changing over time. This coupled with the absence of periodic financial reports complicates the data gathering and evaluation process. (The last data for this report were collected in early September 1994.) We have not attempted to reach consensus on all aspects of the data, and hence different views are expressed by the various contributors.

The report contains case studies of these six enterprises as well as cross-cutting chapters on four critical aspects of enterprise restructuring—privatization, organization, accounting, and social services. These have emerged as the key factors governing the strategies of the enterprises, and they will be some of the primary determinants of the success or failure of an enterprise.

In analyzing the factors that will determine the success or failure of the transition at a given enterprise, we find it impossible to isolate individual factors, such as leadership, product line, markets, and foreign investors that combine to determine success or failure; they are interdependent. Therefore we do not expect to be able to draw precise conclusions about the relative importance of these key factors, nor do we expect the relative importance to be the same for all enterprises.

By success we mean transition to a sustainable, and ultimately profitable, enterprise functioning in a market economy. The market economy does not yet exist in Russia; many of the military-oriented enterprises have not as yet been permitted to privatize; those that have privatized and converted are still undergoing many changes; and the political environment has not yet stabilized. Therefore it is not yet realistic to deem any enterprise successful. The most that one can do is note the success or failure of interim operations, restructuring steps, and strategies. The degree of success to date is not necessarily the indicator of long-term success. Although profitability will be a primary long-term indicator of success of any business, short-term financial performance is not a very good discriminant because of the inadequacy of accounting standards and records and the artificiality of costs for supplies and administrative functions supplied by the state.

In the absence of measurable outcomes, we rely on indications of progress. Not all of these indicators are easily comparable between cases. Finally, there may be very important, conceivably even dominant, influences on the success or failure of enterprises for which we

have little or no data. One such factor could be future political influence. Given all of the above, this report should be read as work in progress.

Financial sustainability is an important measure of intermediate-term performance. At the same time that the enterprises are working toward structures suitable for participation in a market environment, they are also making the necessary adjustments to survive in the transitional economy. There is frequently a tension between these two objectives.

In this report we have assumed a future of a functioning, expanding market economy. Other futures are, unfortunately, also possible. One is a reversion to a command economy, possibly including the renationalization of some property; this looks increasingly unlikely as reforms, especially privatization, continue to expand. Another is a long continuation of the current stagnation and lack of progress. A third, which appears all too possible, is an economy in which the fear and financial burden of organized crime stifle economic expansion and investment. Enterprise directors recognize the uncertainty of the future and frequently, perhaps prudently, take defensive moves to accommodate these other possible futures. This hedging may set back their preparations for the more optimistic futures. Our research has been biased by the assumption of a market-oriented future in that we have not spent much time beyond preliminary interviews with enterprise directors that prefer to depend on state subsidies and appear to be waiting for a return of the old command system. This bias seems to be more valid now (September, 1994) than it did earlier in the research, but this assumed future is by no means a certainty in our minds.

In examining the restructuring process through American eyes, one must remember that Russian and American understandings of the processes, structures, and objectives are quite different. This is most apparent in privatization since the concept of private ownership of the means of production is probably the most foreign one to the Soviet tradition but is virtually intuitive to Americans. Finally, it is important to remember that there are many substantially different meanings of markets and different approaches to ownership in the industrialized capitalist countries. The most appropriate approach for Russia may be a synthesis of several of these approaches tailored to fit the circumstances and culture in Russia.

II. Conversion

Conversion has been both active and passive. The enterprises have actively undertaken the development, production, and marketing of nonmilitary products and services. The active conversion includes the tacitly sanctioned utilization of state enterprises' facilities and labor to establish private business ventures, so-called "spontaneous privatization." In addition passive conversion has occurred as many skilled employees have left the military enterprises for better paying jobs in the growing commercial sector. The active conversion is leading to production of civilian products, and the passive conversion is primarily building up the service and trade sectors. The enterprises have borne the major burden for conversion and restructuring without much organized assistance from the state.

The decline in industrial production has been measured and publicized, but the increased economic activity that has occurred in parallel is only partially monitored and tabulated. The active conversion portion is observable, but it is hard to quantify for lack of a quantitative baseline. The results of spontaneous privatization are largely in the gray economy, the extent of which, by definition, is not accurately known. It is also hard to quantify the portion of

buildup of the service sector that can be attributed to passive conversion. Field interviews at the enterprises in our study qualitatively confirm the extensive spontaneous privatization and the defection of skilled personnel from the enterprises to the commercial sector. The enterprise managers view the latter form of passive conversion as a detrimental brain drain.

III. Enterprise Case Studies

Chapters II through VI of the report contain case studies of six Russian enterprises whose personnel were previously engaged primarily in military design and production activities. Four of them, Impuls, Mashinostroenie, the Saratov Aviation Plant (SAP), and the Central Aerohydrodynamic Research Institute (TsAGI), are medium to large enterprises that have existed for many years. The other two, MCST and ELVIS+, which are treated in a single case study, are small, relatively new enterprises that were formed from a small portion of older, larger enterprises. The basic characteristics of these six are presented in the summary table at the end of the executive summary.

Here again our study is biased toward those enterprises committed to reform. The managers of these enterprises, and many others that we have not followed as closely, clearly refute the assertion that managers from the Soviet era are incapable of reform and should be replaced wholesale. On the contrary, while their challenges are in my opinion far greater than those faced by their American counterparts, they have far less relevant training, and far fewer resources, they have sustained their operations against strong odds.

Impuls

Impuls was engaged in the research, development, and prototype production of high-technology components for advanced weapon systems. Its main fields of expertise were electronics, electro-mechanics, and electro-optics. Its output was almost exclusively military. Since it did not produce end products and produced virtually nothing for the civilian market, it seemed of all the enterprises studied to have the greatest task in conversion, as it had to develop new products, introduce production capability, and find new markets. It has had reasonable success in conversion although its primary civilian product is a relatively low-technology machine for counting currency notes. Production and sales of this product have expanded continuously since its introduction in 1993. Impuls continues to get about 30 percent of its revenue from military orders.

Impuls has recently privatized as an open joint-stock company under the GKI Option One, with the state retaining a substantial minority position. The state allows the general director to vote its shares. The general director has instituted a decentralized management structure with a matrix organization in which several division managers have responsibility for financial performance, product development, and marketing and sales. He has also instituted cost reduction policies.

Impuls has also been very active in attempting to attract foreign investment partners and penetrate foreign markets; however, this approach has not had much payoff as yet. The enterprise's current financial status seems stable; however, it is in need of additional investment capital for new product and market development.

Mashinostroenie

Mashinostroenie is a large design, production, and systems integrator whose main business has been the development and low-volume or prototype production of space and missile systems. The military is still a major customer, accounting for about one-third of its revenue. Its primary conversion success has been in the marketing of data from satellite missions. Mashinostroenie also produces a variety of other civilian products ranging from direct outgrowths of its base business, such as television antennas for satellite reception, to totally new products, such as sailboats.

Even though Mashinostroenie has been removed from the list of enterprises not permitted to privatize, it has decided not to privatize for the time being. It has chosen instead to keep its basic space business in the core state-owned enterprise, while spinning off subsidiaries to pursue conversion activities. Mashinostroenie has also decentralized much of its management structure and placed financial and product responsibility on division managers. The enterprise has a conversion fund to which managers can apply for support of conversion projects.

SAP

The Saratov Aviation Plant (SAP) is a medium-sized producer of aircraft designed by the Yakovlev design bureau. It started shifting from an even split of military and civilian production to entirely civilian production in 1988 and completed the shift by 1991 when the enterprise was privatized as a collective enterprise by the Soviet government. It subsequently made the transition to an employee-owned joint-stock company and had this transition approved by the Russian government. The process of conversion was comparatively straightforward since it was already manufacturing commercial aircraft.

SAP has had considerable financial difficulties, most of which were caused by attempting to do business with or through the Russian government on a commercial basis. The government, as represented by Aeroflot, was unwilling to negotiate competitive prices for airliners, but instead tried to revoke the old central control process of dictating the terms of orders. SAP was quite successful in selling jetliners to China, but the payment was delivered through the Russian government, which delayed and appropriated a portion of the payment. In addition, SAP has undertaken many new aircraft development projects using retained earnings without having obtained adequate financing. As a result the payment delays have depleted its working capital and caused the enterprise to shut down production temporarily.

TsAGI

The Central Aerohydrodynamic Research Institute (TsAGI) was the primary Soviet facility for aerodynamic testing of all aircraft, missiles, and space systems. It is the largest such facility in the world. It suffered a decline in orders to test all categories of equipment, including civilian aircraft. TsAGI has taken a two-track approach to conversion—selling testing services to foreign aircraft manufacturers and developing new lines of business, many of which are based on the core technologies of its research and testing facilities. The marketing of testing services has had a quicker payoff, and it helps the enterprise maintain its core capability. The development of new business lines is conducted largely through more than thirty subsidiary companies. The amount of ownership of these subsidiaries available for outside investors is inversely related to how close the particular business is to TsAGI's core technologies.

TsAGI is not allowed to privatize, but the state has designated it as a state science center. This assures it of some level of funding from the Ministry of Science and the utilization of intellectual property developed during its research. It is also permitted to establish additional subsidiaries, which are permitted to privatize as joint-stock companies.

ELVIS+ and MCST

The two new, smaller enterprises, ELVIS+ and MCST, are both privatized high-technology companies formed primarily to pursue nonmilitary business. Both are engaged in business ventures with Sun Microsystems. ELVIS+ specializes in wireless communication technology. Its staff was involved in developing equipment for satellite communications and is now trying to market research, development, and prototype construction for commercial applications. In the meantime it is providing a high-speed fax service (faxgate), which covers a considerable portion of its operating costs. ELVIS+'s operations are within the facilities of ELAS, the enterprise of which it was formerly a division, although ELAS does not own any equity in ELVIS+. This is a contentious and unsatisfactory relationship, but it has been necessary because of the high cost and/or lack of availability of satisfactory alternative facilities. Sun has a small minority interest in ELVIS+, has funded research projects, and is helping ELVIS+ to locate a strategic partner for wireless communication applications.

MCST is a new company formed around a high-technology market opportunity, to perform research and development of computer hardware and software for Sun Microsystems, with personnel from the Institute for Precision Mechanics and Computing. The institute and the state retain a 45 percent equity interest in MCST, and they provide the facilities and some administrative services. Sun does not have an equity position. This relationship is also not satisfactory, but attractive alternatives are not available.

While the products MCST produces are very different from those its personnel produced previously, the technical skills of the enterprise's key personnel were very adaptable to these new products. The software products in particular do not require many of the functional capabilities needed to manufacture hard products. MCST-developed technology is already being introduced into Sun software products.

IV. Privatization

The four major enterprises in this study have taken four different approaches to privatization:

- SAP was privatized much earlier, under the Soviet regime, and it has chosen to become an employee-owned, closed joint-stock company.
- Impuls has chosen to privatize by Option One to maintain control through internal ownership, friendly investors, and retention by the state of a substantial minority interest, with a voting proxy to the general director.
- Mashinostroenie has chosen not to privatize at this time, relying on state ownership to maintain control and preserve the basic nature of the business, while diversifying by spinning off subsidiaries, which may be privatized.

- In the case of TsAGI, the state has established the basic testing facilities as a state-owned science center which is forbidden to privatize. Commercial applications at Mashinostroenie and TsAGI will be conducted through privatized subsidiaries.

Ownership is the ultimate mechanism of control of a corporatized entity. Prior to privatization, in the Gorbachev era, the managers of the defense enterprises had started to gain a substantial degree of control of the operations of their enterprises. As the central control apparatus disintegrated, the control of the managers was increased and solidified. Formal ownership (by the state) became less and less of a factor of operational control. In addition, there was “spontaneous privatization” in which the managers utilized state-owned facilities for the conduct of private business. As ownership was changed through the process of privatization, the relative importance of ownership and the de facto control established by the managers has become an issue. In many cases new owners such as employees and voucher investors have not attempted to exercise active control over the managers. This is not that different from the passive attitude of many investors in the United States, except in those cases, the shareholders can place more confidence in the board of directors and government regulatory bodies to protect their interests. As the profits of some enterprises start to grow and stock markets are more broadly established, shareholders of such enterprises will begin to recognize that their shares have a monetary value. And shareholders of less successful enterprises may be stimulated to exercise their control more actively. However, shareholders’ attitudes toward their shares and toward management are difficult to predict purely on the basis of Western experience.

In most cases, including SAP and Impuls, privatization has not been accompanied by adequate capitalization so it is likely that the later introduction of investment capital will alter the de facto operational control that the managers currently exercise. In particular, large investors will frequently come in with specific ideas about the business objectives, and their investments can be expanded to exercise more active control. Outside investors are also apt to crack down on the utilization of company assets for personal business pursuits. Mashinostroenie and TsAGI are developing commercial activities through the creation of subsidiaries that are privatized, sometimes with majority outside equity.

It is too soon to tell how the issues of ownership and control will evolve. Whether owners will exercise greater control or whether the managers will further consolidate their power is difficult to predict, and the situation will vary from case to case. The approach of most general directors to consolidate their power and to discourage unsolicited outside investors can have at least two sets of motivation. It could be for the power, prestige, and financial gains. Alternatively it could be to prevent hostile takeovers that could lead to asset stripping and the demise of the enterprise. Various general directors undoubtedly have different combinations of these motivations, and it is difficult to distinguish between them on the basis of their behavior to date.

V. Organization

The organizational structure of state-owned enterprises was not designed to function in a market economy. On the contrary, qualitative and quantitative decisions about output were dictated by the state. The state also performed many of the operational functions normally

handled within a Western corporation, such as distribution, purchasing of inputs, and finance. Thus the organization of the enterprise itself was incomplete as a functioning business.

In addition the state was in an inherent conflict in that it was both owner and sole customer of the enterprise. Many decisions were made from the customer's perspective even though these were contrary to the efficient operation of the business. Many enterprises were highly vertically integrated. They performed many functions within the enterprise that could have been provided far more efficiently by outside suppliers and subcontractors if such existed.

As the state's role has been withdrawn and competitive market forces are emerging, the boundaries and organizational structures of the enterprises are being redefined. Many of the functions previously performed by the state are being internalized. Other functions not required in the command economy, such as marketing, are being instituted. Large organizations are being decentralized for purposes of cost control and efficient operation along product lines. In some cases the decentralization is being accomplished by the creation of internal divisional cost and profit centers, in other cases by the establishment of subsidiaries. The choice depends on many factors, including availability of investment capital, concern over maintaining the control of the central enterprise, control and protection of intellectual property rights, utilization of facilities, and availability of trained managers.

In the enterprises studied herein, the main factor driving organizational decisions is the selection of which products to produce:

- SAP's production is concentrated in the production of large system products—civilian airliners—so it has restricted the freedom of operation of any subsidiaries that are necessary for the central products of SAP.
- TsAGI's main business is aerodynamic testing, and the enterprise's organizational structure is being modified to optimize the performance of this business. In addition TsAGI has created many subsidiaries, but it has kept majority control of those necessary for the core testing activities.
- Impuls has avoided the establishment of subsidiaries at this time, but it has placed considerable operational and financial responsibility on its divisions. It has created a matrix organization with production emphasis assigned to product line divisions, and new product development assigned to research divisions.
- Mashinostroenie has created commercial subsidiaries, and it has also placed operational and financial responsibilities on its internal divisions.
- MCST and ELVIS+ are still too small to have encountered many organizational issues.

VI. Accounting

In the restructuring of internal operations to function in a market economy, many basic operations must be modified. One of the most important is accounting because it affects almost all internal and external interactions of the enterprise. It is now necessary for some financial information to be transmitted to all parties that do business with the enterprise or make decisions about the governance or operations of the enterprise. In the Soviet era, the

primary user of enterprise financial data was the state, whose main requirement was to monitor production output and employment. Soviet accounting systems were designed basically to provide data of this type. In fact, there may have been a conscious effort to suppress other data, such as the real costs of inputs.

To function in a market economy, financial data is required for external relations with shareholders, creditors, government agencies such as tax authorities and customs officials, potential investors, and other organizations doing business with the enterprise. Accounting data are also needed internally for cost control, overhead allocation, plans for financing, inventory control, pricing, personnel records and planning, evaluation of investors, and virtually all other management functions.

Assembling the necessary data in turn requires not only methods for collecting and processing financial information in a timely manner, but also requires a complete consistent method of treating this data—standard accounting procedures. These procedures obviously affect the form and content of the balance sheet and income statements, but they also affect all of the cost accounting systems within the enterprise because these must be consistent with the aggregate records of the balance sheet and income statement.

This is one of the most costly and difficult restructuring steps for many enterprises. The situation is complicated by the lack of recognized stable standards at a national level. As various aspects of the commercial legal structure evolve, they will impact and change the accounting standards. This is true in the West as well, but changes occur less often since the basic structure has been stable and in place for many years.

VII. Social Services

Every country has its own system of providing a variety of social services to its citizens. Even in long-standing capitalist countries, the content, delivery form, and method of financing these services frequently change. In the Soviet Union all social services were ultimately provided by the state; however, the industrial enterprises were the immediate deliverers of many of these services. If the state continued to be the sole customer for industrial output, this system could probably endure, but enterprises are now competing, partly on the basis of price, with producers in other countries, so it is desirable that their prices reflect real costs. Therefore the enterprises are adopting various strategies to shed some of these social services, transfer some to local governments, and turn some into self-sustaining business ventures.

It can be argued that the fundamental problem is not one of the best form of delivery but of the lack of adequate funds, regardless of source. In addition the true costs of some of the services are no better known than were other elements in the command economy. The accounting problems cited above pertain here as well.

The issue is further complicated by the fact that the enterprises did not simply supply the funds for these services to be procured from an external provider. The enterprises actually “owned” (carried on their balance) many of the facilities, including apartment buildings, clinics, and kindergartens, and were responsible for their operation and maintenance. Many enterprises are converting some of these services to business entities in the hope of selling the services to other enterprises (or their employees) as well. Those that we have studied are

planning to charge these outside customers more than they pay internally for their own employees. Our impression is that many enterprises are trying this approach, and very few are planning to buy the services. There may, however, be a market for these services in the rapidly growing service and trade sectors of the economy.

VIII. Conclusion

In this study we have looked at some of the most important elements of restructuring that are involved in the attempt to generate a viable civilian industrial sector from the assets of the military-industrial complex. There are many other reform activities that must be implemented at the national level to create the environment and infrastructure necessary for the functioning of the restructured industrial sector. We have not addressed these here, but they are important and equally difficult to implement. Another issue that we have not addressed is the pandemic presence of organized crime, which is a huge financial “tax” on economic activity as well as a disincentive to entrepreneurship and investment. I join those who believe that this is the largest single problem threatening the economic stability of Russia today.

Perhaps the most difficult challenge is that all of these reforms must evolve simultaneously. The industrial changes are being attempted in the presence of one of the greatest (if not the greatest) systemic economic shifts in history. And all of these reforms are interdependent. On the face of it, the task appears virtually impossible, but the results are far more encouraging than this scenario suggests. The enterprises in our study, and many others that we have observed, are not only surviving, but they are beginning to take a longer-term perspective and plan for the future. There are, of course, many enterprises that are not surviving, but this is virtually inevitable in the light of the previous overindustrialization.

The burden of enterprise conversion and restructuring will continue to have to be carried primarily by the enterprises themselves. In the long run this is probably good. While the state could assist more in providing the legal environment and infrastructure, it would probably be a disaster for the state to get involved in the enterprise restructuring per se, even of the state-owned enterprises. In addition, the enterprise managers are proving to be adaptable, and they will be far more capable once they have solved these problems themselves.

A key element of the new industrial structure should be a sector of small high-technology companies that will more easily shed the legacies of the Communist system as well as provide the innovation and jobs, as does the equivalent sector in the United States.

The achievements of the enterprises studied, the means of reaching those achievements, and the lessons learned are applicable to other enterprises in similar circumstances. However, many of these cannot be applied to enterprises with vastly different circumstances. Enterprises determined to rely on state subsidies will not find these lessons of much value. They will only succeed in a different future than the market-oriented one that we, and more importantly the enterprises studied, are assuming.

I. Introduction

David Bernstein

A substantial portion of economic reform in Russia will not succeed without the restructuring of the Russian military-industrial complex. By the end of the 1980s, the military-industrial complex accounted for more than 25 percent of the Soviet gross national product, consuming the best human and capital resources available. While the rest of the Soviet economy approximated Third World standards, the Soviet military-industrial complex propelled the USSR to superpower status. Russia inherited 80 percent of the Soviet Union's military-industrial complex—1,100 production associations and enterprises as well as 920 research and development organizations in which more than 9 million were employed.¹ The military-industrial complex (VPK, Voenno-Promyshlennyi Kompleks—or MIC) comprised most of the industrial capacity of the Soviet Union and virtually all of its technological capability. Thus it is impossible to conceive of economic reform without substantial conversion.

It is not only the size of the military-industrial complex but also its structure and organization that makes restructuring of this sector of the Russian economy essential for overall economic reform. Soviet military enterprises and research organizations were large, concentrated, and vertically integrated. Small subcontracting firms, a major engine of most Western market economies, were nonexistent. Of all segments of the economy, the Soviet military-industrial complex was least exposed to market principles or hard budget constraints. On the contrary, military enterprises, especially those involved in the development and production of strategic weapons, also enjoyed almost unlimited access to financial credits, natural resources, equipment, and machinery.² Budgets for the Soviet economy were structured around the needs of the military-industrial complex, not the other way around.

Reductions in state orders have forced the Russian military production enterprises and research institutes to reduce their military output, to find ways to convert to nonmilitary products and services, and to compete in a market economy. External conditions such as

high rates of inflation and disruption of supply channels followed from the economic collapse and the macroeconomic reform process. In short, the command system was largely dismantled, but the state was still a monopsonist so a market system has been slow to evolve. The situation was exacerbated by the loss of interrepublic and COMECON trade following the breakup of the Soviet Union and the Warsaw Treaty Organization. Meanwhile the government is debating and modifying the macrostructure of the country's economy and industrial policy as well as the structure of the military-industrial complex in particular.

Under state ownership, the state had a conflict of interest (by Western standards) as it was both the owner and the customer. This conflict prevented the management of an enterprise from deciding on the business the enterprise would engage in; the business was dictated by the customer/owner, who may not have always been motivated in its decisions to act solely in the best economic interests of the enterprise. This conflict is coming to light as an increasing number of enterprise managers do not want to accept military orders because they are less profitable and less reliable than commercial orders.³ The state's conflict of interest was far more complex as it also was the manager, distributor, etc.

The primary objective of this report, and the four years of research leading up to it, is to analyze the transition of the Soviet/Russian military industry. This transition involves policies of price liberalization, privatization, and marketization at the national level and conversion and restructuring at the enterprise level.⁴ A secondary objective is to provide guidance to enterprises engaged in this transition.

The research has been undertaken as case studies at six enterprises in which the personnel were previously engaged primarily in military R&D or production. The Saratov Aviation Plant (SAP) had been producing military and civilian aircraft, stopped producing military systems, and was privatized very early (January 1991). The Central Aerohydrodynamic Research Institute (TsAGI) operated large testing facilities used for all aerodynamic systems produced in the Soviet Union and is working toward a decentralized configuration that will have state-owned and privatized components. Mashinostroenie was (and remains) a systems integrator for space systems and is diversifying into nonmilitary activities. Impuls was engaged in the research and development of high-technology components (primarily electro-optical) for military systems and is diversifying to the design and production of civilian products. The Moscow Center for SPARC Technology (MCST) is a new private company formed by staff members of the Institute for Precision Machinery and Computers. Its personnel previously developed supercomputers for military applications, and they are now working almost exclusively on commercial software and hardware development for Western companies, primarily Sun Microsystems. ELVIS+ is a small spin-off electronics company, also working with Sun Microsystems, that is trying to diversify from military (space) communications systems to wireless communications systems for civil applications. MCST and ELVIS+ are treated together in one case study. The case studies are contained in Chapters II through VI. In addition to these six, we have conducted research at several other enterprises. While this research is not yet adequate for additional case studies, we will use this data selectively to illustrate specific points.

We have met periodically with the enterprises both in Russia and the United States. The longest ongoing cooperation has been with Mashinostroenie, whose general director, Herbert A. Yefremov, we first met in February 1991. The meetings with all of the enterprises in the case studies have been carried out over at least two years. We have focused exclusively on high-technology enterprises in Moscow and other major industrial cities, such as Saratov. The six enterprises were selected for their qualitative differences (e.g., production or re-

search; degree of vertical integration; product/service line; size; stage of and approach to privatization; restructuring plan; foreign interactions; markets). Even so our case studies are concentrated in the aerospace and electronics sectors. There are major segments of the MIC that are not addressed such as shipbuilding, armor, ordnance, and nuclear weapons. A great deal of our research data comes from interviews with the general directors of the enterprises and a few of their top managers. The one exception has been TsAGI, where most of our meetings have been with a deputy director rather than the general director. The study suffers from having limited data from middle managers, and in particular from managers of small enterprises and divisions. The last data for the report were collected in early September 1994.

In this report, we deal with three major elements of restructuring: (1) the relationships of the enterprises with their owners, (2) the internal organizations and accounting procedures of the enterprises, and (3) the social services provided to the employees. We believe that these have emerged as the key factors governing the strategies of the enterprises, and that they will be some of the primary determinants of enterprise success or failure. Various aspects of government policy are discussed in the context of these three areas of restructuring; however, we have not systematically addressed all relevant aspects of government policy such as taxation, which has had a role in the drop of production.

Much of the early emphasis on enterprise restructuring in Russia has been on privatization. Since this involves a change from complete state ownership to partial or full private ownership, the state has been a major actor in this element of restructuring, and the outcome of political power struggles has had a direct bearing on the rules of privatization and their implementation.

The state's role has been to provide policies for the formation of joint-stock companies as the form of privatized industrial enterprises; the allowable distributions of ownership among insiders; the governance and relationships between the owners and the board of directors; and the accessibility of ownership to the general public. These elements of restructuring are analyzed in Chapter VII including a comparison of the four relevant cases (Impuls, Mashinostroenie, Saratov Aviation Plant, and the Central Aerohydrodynamic Research Institute). The other two enterprises studied in this project (MCST and ELVIS+) are spin-offs, but we have not studied the privatization or organization strategies and activities of their parent enterprises. Therefore we will not analyze the ownership issues of MCST and ELVIS+ comparatively with the other four enterprises.

The second element of enterprise restructuring, vital to achieving independent economic viability in a competitive market economy, is the restructuring that deals with the internal and external operations and interactions of the enterprise. This includes organizational form, product/service selection, personnel policies, marketing, finance, legal, purchasing, accounting, and other administrative functions. A great deal of the internal organizational structure is driven by the selection of products/services pursued by the enterprise. The internal organization is addressed in Chapter VIII. As an example of the complexity of reorganizing, Chapter IX describes the differences between Russian and American accounting systems.

There is not a clear demarcation between ownership and organization issues in two major respects:

(1) Ownership bears heavily on control and hence on organizational structure, and (2) product and organizational strategies can include the establishment of additional legal entities, such as subsidiaries and joint ventures, or the introduction of additional investors

and mergers, divestitures, and acquisitions, which can change the ownership distribution of the enterprise.

A third element of restructuring involves both internal and external interactions with individuals (past and present employees), other organizations, and government at various levels. This is the approach to dealing with the social assets (and liabilities) of an enterprise. Most analysts recognize this as a key factor in the potential success of a privatized enterprise. This is addressed in Chapter X, and the approaches of all six of the enterprises we have studied are considered.

We have attempted to identify and analyze the primary factors that will determine the success or failure of the transition at a given enterprise. It is impossible to isolate the key factors (such as leadership, product line, markets, and foreign investors) determining success or failure; they are interdependent. Therefore we do not expect to be able to draw precise conclusions about the relative importance of these key factors, nor do we expect the relative importance to be the same for all enterprises.

By success we mean transition to a sustainable, and ultimately profitable, enterprise functioning in a market economy. The market economy does not yet exist in Russia; many of the military-oriented enterprises have not as yet been permitted to privatize; those that have privatized and converted are still undergoing many changes; and the political environment has not yet stabilized. Therefore it is not realistic to deem any enterprise successful as yet. The most that one can do is note the success or failure of interim operations, restructuring steps, and strategies. The degree of success to date is not necessarily the indicator of long-term success. This, of course, introduces an element of speculation into the work, but this is all that is justified at this time. Although profitability is a primary long-term indicator of success, short-term financial performance is not a very good discriminant. Even though the accounting data and books were and are available, financial analysis is distorted by legacies from the past system, such as artificial administrative prices, artificial values of the current and fixed assets, depreciation rates, cost accounting concepts, and profit calculation and reporting. (Intangible assets are included from 1988; however, goodwill is not included, but it is not important, and it is excluded in some other Western countries as well.) Furthermore there is no adequate auditing system in Russia. At present auditing is a sort of tax consulting and tax inspection, which does not respond to the needs of the domestic financial market.

In the absence of measurable outcomes, we are forced to rely on measures of progress and consider the possible outcomes from there. These measures of progress are not easily comparable between cases. For example, one enterprise may be behind another in some area of progress, such as privatization, but it may be building a stronger base for benefiting from privatization later by such processes as organizational restructuring, divestitures or spin-offs, or product development. Nonetheless financial sustainability is an important measure of intermediate-term performance.

Given the poor state of the Russian economy, its excessive industrialization, and the outdated methods and equipment of many of the enterprises, the road to success will undoubtedly not be consistently upward. For example, the best strategy for some enterprises could even be to go through bankruptcy, to divest of major segments of their business, and/or to be acquired. In these cases lack of success in the near term could lead to longer-term success.

Finally, there may be very important, conceivably even dominant, influences on the success or failure of enterprises for which we have little or no data. One such factor could be future political influence. Given all of the above, this report should be read as work in

progress.

In this report we have assumed a future of a functioning, expanding market economy in Russia. Other futures are, unfortunately, also possible. One is a reversion to a command economy, possibly including the renationalization of some property; this looks increasingly unlikely as reforms, especially privatization, continue to expand. Another is a long continuation of the current stagnation and lack of progress. A third is an economy in which the fear and financial burden of organized crime stifle economic expansion and investment. Enterprise directors recognize the uncertainty of the future and frequently, perhaps prudently, take defensive moves to accommodate these other possible futures. This hedging may set back their preparations for the more optimistic futures. Our research has been biased by the assumption of a market-oriented future in that we have not spent much time beyond preliminary interviews with enterprises that prefer to depend on state subsidies and appear to be waiting for a return of the old command system. This bias seems to be more valid now (September, 1994) than it did earlier in the research, but this assumed future is by no means a certainty in our minds.

In examining the restructuring process through American eyes, one must remember that Russian and American understandings of the processes, structures, and objectives are quite different. This is most apparent in privatization since the concept of private ownership of the means of production is probably the most foreign one to the Soviet tradition but is virtually intuitive to Americans. As Americans study, assist, or invest in Russian enterprises in the transition to joint-stock companies, they generally come to realize that much more is involved than the creation of a new legal entity with distributed private ownership. The Russians, for their part, will take some time to understand the relevance of the Western form of organization and governance for doing business in a market economy, especially in the international economy. Finally, it is important to remember that there are many different meanings of markets and different approaches to ownership in the industrialized capitalist countries, and that they differ substantially from country to country. The most appropriate approach for Russia may be a synthesis of several external approaches tailored to fit the circumstances and culture in Russia.

Notes

¹ Julian Cooper, *The Conversion of the Former Soviet Defence Industry* (London: Royal Institute of International Affairs, 1993), 1.

² Christopher Mark Davis, "The Exceptional Soviet Case: Defense in an Autarkic System," *Daedalus*, Fall 1991, pp. 113-134; Peter Almquist, *Red Forge: Soviet Military Industry Since 1965* (New York: Columbia University Press, 1990); interview with Major General Vladimir Tsarkov, president of the State Center of Conversion for the Aerospace Complex, in V. Khrustov, "Tsentri Konversii: Ot Pervyikh Proektov k Natsional'noi Programme," *Rossiiskie Vesti*, No. 22 (191), February 3, 1993, p. 3. This kind of resource allocation was confirmed in the authors' interviews with Nikolai Ryzhkov, former Soviet prime minister (Moscow, June-August 1992).

³ Julian Cooper, "Transforming Russia's Defence Industrial Base," *Survival*, Winter 1993-94.

⁴ In this report, conversion refers to the utilization of some of the assets (human, technological, or physical) of an enterprise rather than the wholesale conversion of the enterprise.

II. The Central Aerohydrodynamic Research Institute (TsAGI)

David Bernstein and Jeffrey Lehrer

I. History

A. Background

The Central Aerohydrodynamic Research Institute (TsAGI) was established in Moscow in 1918, and grew to become the largest aerospace test center in the world. Its facilities were moved to Zhukovsky, outside of Moscow, in 1939. Zhukovsky is today a city of 100,000 people. Prior to World War II, the All Union Institute of Aviation Materials, the Central Institute of Aviation Motors, and the Tupolev Design Bureau were split out from TsAGI. The Flight Research Institute and test field, a pilot training school, the Aircraft Equipment Research Institute, and other organizations related to aviation also are located in Zhukovsky.¹

Teams of specialists led by CISAC have worked with TsAGI since 1992, including meetings at TsAGI in September 1994 and a session in Washington in July 1994. During these sessions the CISAC teams met with a group of technical and managerial personnel to discuss issues of organization, corporatization, and privatization, as well as diversification and various aspects of functioning in a market economy. In the early meetings there was considerable skepticism among the middle managers and technical personnel about changing from the old ways of doing business, but later there was increasing recognition that changes were necessary to survive in the new macroeconomic conditions.

TsAGI has been involved in the design and testing of every major Soviet and Russian military and commercial airplane, helicopter, and spacecraft. It also engages in flight simulator design and training. Its facilities include wind tunnels for subsonic and supersonic aerodynamic tests as well as chambers for thermal strength testing. Some of these facilities

are the most advanced in the world. TsAGI also has extensive software development and computational capabilities and prototype manufacturing facilities that are used for producing test instrumentation and experimental models.

Previously under the Ministry of Aviation Industry, TsAGI is now in principle subordinated to the Committee for the Defense Industry and the Ministry of Science.

TsAGI's state orders have declined dramatically in the last few years, and its workforce has dropped from about 15,000 in 1988 to around 9,000 in January 1994. TsAGI is trying very hard to retain its technical staff, as the enterprise sees this as key to its future business. The drop in state revenues to TsAGI has been more or less mirrored at the other aviation-oriented enterprises in Zhukovsky, so the entire local economy has been seriously affected by the cutback in military orders.

B. Organization

TsAGI had a typical organizational structure in the Soviet period: it was a single legal entity with one bank account. Although TsAGI is undergoing reorganization, this structure continues to operate at TsAGI's core facilities.

At the top of TsAGI's organizational hierarchy is General Director German I. Zagainov. Directly under Zagainov are four functional heads: the commercial director and head of commercial and conversion programs, the deputy director of economic and planning programs, the deputy director of social programs, and the head of international business development. Six other deputy directors head technical divisions in aerodynamics and flight dynamics, aerothermodynamics and gas dynamics, aerostructure strength and aeroelasticity, advanced aerospace vehicles, advanced experimental equipment, and engineering service. A separate Moscow branch includes subdivisions on aeroacoustics, hydrodynamics, industrial aerodynamics, and scientific and technical information and publications.

C. Finances

The sources of income in TsAGI's budget are displayed in Figure 1. In 1988 TsAGI's orders were all from the state with 70 percent of them being for defense (which included the Soviet space program). Since then, defense orders have dropped precipitously, falling to just 0.2 percent of TsAGI's budget in 1993, and TsAGI has moved to reorganize and broaden its product and customer base. Nonstate domestic orders were important in the early years of reform, but these orders have fallen off in the past couple years. Foreign orders have grown tremendously in a short time, making up 40 percent of TsAGI's budget by 1993. Despite the fall in defense orders, overall state spending has stabilized at 50 percent of TsAGI's budget since 1991. In 1993, basic research funded by the Ministry of Science made up 25 percent of TsAGI's contract activity and civil aviation supported by the Committee on the Defense Industry was 28 percent. Most of TsAGI's commercial work in 1994 will be related to aerodynamic testing.

In 1988 TsAGI's budget was 175 million rubles, equivalent to about \$500 million per year.² By 1994, TsAGI's income had fallen to 60 billion rubles, equivalent to \$100 million dollars taking into account purchasing power parity.³ In analyzing these figures, one should note that it is difficult to compare Western and Russian estimates of profit. Many expenses

that are computed before profit in the United States come out of profits by the Russian (Soviet) accounting system.

TsAGI has gained increasing financial independence in recent years, becoming a “khozraschotnoe” (self-financing) enterprise in 1986 and consequently responsible for meeting its own expenses. As state orders declined, the overhead rate rose to 70 percent,⁴ which forced TsAGI to raise prices on many of its services. As a consequence TsAGI lost a number of long-standing clients. The enterprise circumvented this problem, at least temporarily, by pursuing a policy of decentralization. Several small enterprises were formed within the TsAGI hierarchy with an overhead rate of 10 percent or less. Compensation for TsAGI personnel, equipment, and technology was not always fully covered. This approach was successful in recapturing some of the lost customers, but clearly this rather extreme marginal costing can only work for a small percentage of the overall business, and even then only for a limited time. Nonetheless, disaggregation has given TsAGI the flexibility to introduce different pricing structures for different markets.

Like many Russian enterprises in the defense sector, TsAGI has problems with nonpayment by the government. Despite delays and failures in paying for orders, TsAGI is unable to refuse to fulfill certain state orders. TsAGI also has problems with interenterprise debt. Overall, accounts receivable exceed accounts payable.

Taxes are a large burden on TsAGI. Currently, tax rates of more than 75 percent hamper the expansion of commercial activity. TsAGI's tax burden, including taxes on the number of employees, on wage levels, and on turnover, is in the millions of rubles. These taxes, combined with high import duties, raise overhead to the point that international contracts cannot be competitive or profitable. There are, however, tax deductions for provision of social services (discussed below), and the creation of subsidiaries has had some tax benefits as well. Russian tax law provides for two years of operation free from income taxes for certain types of new small enterprises.⁵

TsAGI is in the process of revamping its financial planning system. Several years ago, TsAGI used a command economic approach to financial planning. Now the enterprise forecasts planned expenditures and revenues generated from contracts. Learning from the capricious cuts in state orders and nonpayment of contracts, TsAGI has created special funds to support a base level of salary during periods when orders or payments are slack. TsAGI is working on converting its books to a Western-style financial accounting system.

II. Conversion

As with many defense enterprises, TsAGI's selection of new products and services is heavily based on its core competencies and technologies rather than on an analysis of market needs. This is almost inevitable given the lack of investment capital. TsAGI is pursuing as many as fifty different diversification possibilities. These include design and operation of testing facilities for hypersonic vehicles, development of gas re-aeration technology, development of heterodyne laser systems, experimental assessment of air pollution, production of high quality wooden furniture, and a technology demonstrator complex for wireless transfer of microwave signals.⁶ These proposed projects range widely in degree of technological con-

tent, relationship to TsAGI's traditional technologies and markets, and the extent to which they represent products, components, or services. Nevertheless, of all of TsAGI's ambitious conversion ideas, only five or six have reached any substantial stage of realization.

TsAGI's main advantages in converting to nonmilitary products and services are its aircraft testing facilities and the technical know-how associated with them. These facilities and know-how are unique in the Russian aerospace industry, and they offer services that are highly competitive in world markets. Consequently, the state has guaranteed some assistance to maintain core facilities, and foreign customers are providing an increasing market.

In addition, some aerospace technologies developed at TsAGI have applications to non-aerospace products and services. While some research on these new applications is being carried out at TsAGI's core facilities, most development of these technologies, production of new products, and provision of services is carried out at the subsidiary level. Moreover, TsAGI is utilizing underemployed facilities and personnel for products and services that involve low-level technologies which are completely unrelated to the core business of the enterprise. These diversification efforts are closely related to TsAGI's system of subsidiaries and are discussed at length below in the section on reorganization.

A major disadvantage that TsAGI faces in its conversion program is that it has neither the experience nor the facilities for serial production of end products, though it does have prototype production capability. The models and prototypes that it has built in conjunction with its testing work have been designed for conformance to military specifications rather than in consideration of market demand and price. Developing and marketing viable commercial products may be very difficult for TsAGI. Another disadvantage is that TsAGI was almost entirely dependent upon military orders and did not have a civilian product/service line as many defense enterprises did.

A. External relations

As a research institute, TsAGI lacks production facilities in its core areas of expertise. Consequently, outside of the services it provides TsAGI must join with other organizations to bring its technologies to market. In the military aerospace area, its aircraft designs were routed through the Committee for Defense Industry to the major aerospace design bureaus, including Sukhoi, Ilyushin, Mil, and Myasischev, which then passed the designs to production organizations. This was the path for bringing into production TsAGI's designs for the Su-27, MiG-29, and other aircraft; MiL-26 and other helicopters; and the Buran space shuttle. Despite the collapse of the formal ties of the command system, TsAGI maintains some of these links with design bureaus, though not under the most advantageous of arrangements. While the design bureaus have begun to build profit margins into the pricing of their output, TsAGI continues to be paid at cost, as was customary under the Soviet system. With the general shortage of cash, TsAGI is unable to raise its rates.

TsAGI has also been seeking to forge new partnerships, especially in areas of conversion outside its traditional markets. TsAGI, with three Russian partners, is establishing a new Center for International Telecommunications in Zhukovsky, which will operate a satellite downlink to provide TsAGI and other enterprises in the Moscow Oblast with international communications. This project currently provides telephone and fax communications, and in the future will provide international high speed data links and mobile telephone service.

TsAGI also recently initiated the formation of the RONA-COMPLEX Open Joint-Stock Company, an association of military enterprises in the Moscow Region which began operation in March 1994. German Zagainov, director of TsAGI, is chairman of RONA's board of directors. There are 13 enterprises in the association,⁷ providing a variety of products and services including mechanical technology, radio equipment, measuring equipment, aircraft, flight testing, electronics, and banking. Joint cooperation in technology has produced potential conversion projects in the fuel-energy sector, the oil and gas industry, medicine, agriculture, and other areas.⁸ While some of these projects are far afield from the enterprises' traditional core products, RONA's activities also include the development of new aircraft, aircraft equipment, and flight testing procedures. Moreover, RONA aims to create a worker retraining program, including foreign participation. In addition, RONA aims to attract funding for conversion projects. It should be noted that thus far RONA has merely generated ideas for conversion; it has yet to produce any concrete projects.

RONA recently opened a central office and staff located at TsAGI to help coordinate activities among its members, and it plans to conduct market analysis, maintain databases, and provide employee education and training. In addition to finding technical synergies, TsAGI plans to use RONA to pair its technologies and know-how with other companies that already know the markets.

TsAGI has long had strong links with the region's educational institutions. These institutions both supply TsAGI with highly qualified personnel and benefit from TsAGI's knowledge. (General Director Zagainov is himself a professor at the Moscow Institute of Physics and Technology.) Educational institutions closely tied to TsAGI include Moscow State University, the Moscow Aviation Institute, and the Moscow Energy Institute.

B. International projects

In 1993, TsAGI had 64 contracts and 118 special projects with 30 companies in 20 countries. Revenues from international deals amounted to \$4 million in 1993, and about \$7 million is projected for 1994 as a result of these projects. International interest in TsAGI has risen to the point that 400 delegations visited the enterprise in 1993.

A large part of TsAGI's reorganization has been directly geared toward promoting foreign contracts and investment. In 1990 TsAGI Export was created as a vehicle for the sale of technology and services abroad. The TsAGI International Affairs department was formed in 1992. In this department, the International Business Department handles commercial contracts, markets technologies, provides legal services, and conducts hard currency transactions. Another branch of the International Affairs Department, the Office of International Scientific Affairs, deals with grant contracts, pursues academic and scientific projects, organizes scientific conferences, and provides public relations. In addition, TsAGI has formed a wholly owned American subsidiary in Seattle called TsAGI International. TsAGI International intends to provide protection for TsAGI's intellectual property under U.S. and international intellectual property rights laws, facilitate access to foreign banks, establish a U.S. contact for future business development, and create a legal foundation for establishing a U.S. sales office. For now, TsAGI International is involved in information exchange, but it plans to open an office and begin official operations in November 1994.

TsAGI's largest contractor is probably Boeing.⁹ Since September 1993 the Boeing Technical Research Center (BTRC) in Moscow has contracted with TsAGI, the Central

Institute of Aviation Motors, and several other Russian defense firms to conduct joint aerospace research. The BTRC has contracted for more than 100 Russian scientists and engineers from these institutes to work on twenty different projects in such fields as aerodynamics, materials research, flight safety system design, and navigational equipment improvement. TsAGI has been involved in a project on computational fluid dynamics, and further work will relate to wind tunnel studies to predict noise caused by airflow over airplane fuselages. While some scientists work on-site at the BTRC in order to make use of Boeing's sophisticated computers, much of the work is conducted at the facilities of the Russian institutes involved.

These projects are conducted by establishing contracts with the Russian institutes. Boeing does not take an equity stake in any of these ventures, so they do not constitute joint ventures or spin-offs.¹⁰

Since 1990, TsAGI has been working with British Aerospace, the Antonov Design Bureau of Ukraine, and several other enterprises on the development of the Antonov An-225 Mria/HOTOL spaceplane. According to plans, the HOTOL (Horizontal Takeoff and Landing Vehicle) would be air launched from a modified Antonov An-225 transport plane. TsAGI has been actively involved in using its wind tunnels and thermostrength and thermovacuum chambers to test models and full-scale objects and components of the proposed aircraft. TsAGI is also providing technology and know-how to develop new air propulsion systems for the project. The proposed vehicle would be able to launch payloads into low-altitude orbits at a reduced cost.¹¹

In addition to these cooperative efforts, TsAGI has contracts with General Dynamics and McDonnell Douglas, and it is negotiating with NASA for a contract. TsAGI is partner with a Canadian firm in establishing the Center for Creating Aircraft Simulators. Also, Dassault (a French company) contracts with TsAGI for thermodynamic experiments, and the U.S. Air Force provides grants for fundamental aerospace research. (TsAGI has contacts with the Wright Patterson Air Force Base in Ohio and the Arnold Engineering Center in Tennessee.) TsAGI cooperates with Lockheed, Rockwell, Aerospatiale and ONERA (French companies), Deutsche Aerospace (DASA), the Fraunhofer Institute for Surface Phenomena and Bioengineering Technology (IGB) (Germany), and others in China, South Korea, and India.

C. Personnel

Because much of TsAGI's competitive strength is in its technical know-how, its ability to maintain and efficiently utilize its personnel resources is critical to TsAGI's restructuring efforts. TsAGI's workforce as of January 1994 can be broken down as follows: of the 8,305 employees of core facilities, 49 percent are engineering specialists, 10 percent are scientists, 5 percent are managers and supervisors, and 36 percent are workers (there are also another 700 employees at social service facilities who are not counted in these figures). Of the scientists and engineers, 8 percent hold doctorates, 60 percent have master's degrees, and 32 percent have bachelor's degrees. The scientific community at TsAGI is quite distinguished, with 270 award-winning scientists.

TsAGI has a commitment to retaining key personnel. Although the workforce has declined from 15,000 employees in 1988 to 9,000 in January 1994, only about a dozen key employees have departed. During this period, no employees were laid off, about 100 were fired for job-related reasons, and of the rest, half retired and half left voluntarily to enter

business. Of these departing workers, most went to work in banks, trade, and services, and about 20 percent went into other production work. TsAGI's management continues to feel responsible for the welfare of even departing workers. Only now that Zhukovsky's commercial sector has developed to the point that it can absorb dislocated workers is TsAGI willing to contemplate larger layoffs. One manager estimated that the enterprise would benefit from a 10 percent layoff this year, though this view was not universally held. The collective labor agreement for 1993 and 1994 restricts layoffs to no more than 5 percent per year, however, and in fact no layoffs have taken place. TsAGI's salary costs currently are about 20 percent of total expenditures on production.

TsAGI salaries, averaging 100,000 rubles per month in February 1994, are lower than in non-state private enterprises, though above average for military state enterprises. Thus there is financial incentive for some personnel to leave. Nevertheless, TsAGI provides other benefits in an effort to retain key employees. TsAGI offers a conducive environment for people committed to scientific research, and it has begun to give bonuses and salary increases based on professional and academic qualifications. Legal specialists, for example, and employees who participate in outside private orders receive exceptionally high salaries. The general director occasionally steps in to raise salaries of key personnel to entice them to stay. In addition, the industry union asks for salary raises for all employees every few months. Usually these requests are granted, because the union representatives are perceived by management as being more sensitive to social tension or dissatisfaction among employees. In any event, the wage system changes 4-5 times each year due to inflation. At the subsidiary level, employees' wages are set directly by the board of directors, and there are no labor contracts. Although TsAGI has had some delays in paying salaries, these have never extended beyond two weeks.

Moreover, some workers supplement their income from TsAGI with outside work, including with spin-offs from TsAGI. One of the challenges of restructuring is to organize contracts in such a way that such job sharing does not create conflicts of interest, and that intellectual property rights are respected.

Generous social services provide added incentive for employees to stay at TsAGI. A wide array of health, childcare, and other services is provided to the employees at minimal cost. If an employee were to leave the firm, he/she would be forced to pay the full cost of these services. It should be noted that housing, which is also subsidized by the firm, is less of a problem for departing workers, since they are permitted to retain their apartments at low government-regulated rates.

Finally, managers have additional incentives to obtain outside contracts. They receive salary bonuses based on the amount of outside contracts generated, and they are able to charge finders' fees when they obtain contracts for others.

TsAGI managers mentioned "difficult" relations with their trade union over salary issues. Workers are reluctant to accept large wage differentials between employees. For example, under the restructuring plans being developed by managers, some personnel will receive guaranteed (but lower) state salaries and work at the science center, while others will work for higher but riskier salaries in commercial subsidiaries (and some employees will work in both—see below). The Workers' Council (soviet trudovogo kolektiva or STK) is very active on issues relating to changes of ownership, entitlements of the general director, enterprise restructuring, and social service expenditures. Management has communicated the general concepts of restructuring to the STK, but the STK has not yet approved this. Nevertheless, management is going ahead and developing the details of the restructuring

without the STK. Management believes that the STK would interfere with their restructuring plans, and plans to put the program to a yes or no vote when it is completed. Still, it seems misguided to leave workers out of the planning process, and risks confrontation at a later date.¹²

D. Reorganization

Reorganizing is more complex for TsAGI than it is for many other enterprises because of the nature and scope of its facilities and activities. TsAGI consists of major test facilities, such as the large wind tunnels, and many smaller shops and R&D groups (small enterprises). The major facilities, which comprise about 70 percent of TsAGI's assets and facilities, are a unique national asset, and are logically thought of more as a national laboratory than as a business. The same is true of comparable facilities at NASA Ames or the Arnold Engineering and Development Center in the United States. Nevertheless, the CISAC team believes that the groups at TsAGI responsible for commercial activities, as distinct from the part of the institute strictly serving state interests, will best function in a market economy and attract commercial investment if they corporatize, and eventually privatize.

In March 1994, the state granted TsAGI the status of a State Science Center, which means that the government will ensure a certain level of orders, and that TsAGI in turn is obligated to fill them and to maintain its level of technical competence. The TsAGI State Science Center, which comprises the core facilities of the enterprise, will remain wholly owned by the state and is forbidden to privatize, although TsAGI's subsidiaries may be privatized. TsAGI has been assigned various fields in which to carry out basic and applied research. It is authorized to participate in international aerospace cooperation, and it is responsible for training highly qualified specialists. The state commits to giving TsAGI priority for funding from the Ministry of Science and Technology Policy, and for other state support for key aerospace technologies, dual use technologies, and conversion projects.¹³ State Science Centers are also exempt from land taxes.

This agreement acknowledges the state's role in providing support for basic research, identifies potential sources of funding, and clarifies the state's management responsibilities toward TsAGI. It must be noted that in the past few years the state has not met previous commitments to place and pay for orders or to fund conversion. The value of the state's commitment to support the state science centers, therefore, is not clear. Nevertheless, Russian Prime Minister Victor Chernomyrdin has been pushing for concrete measures of support, including tax abatements, removal of restrictions on commercial activity, and repayment of state debts (including unpaid salaries) to the state science centers.¹⁴

TsAGI has already established more than 30 subsidiaries. These subsidiaries vary in forms of organization (state-owned enterprise, closed joint-stock company, partnership with limited liabilities), activity (aerospace, aerospace-related, totally unrelated), and in the TsAGI State Science Center's degree of ownership, capital contribution, and involvement in the venture. In fact, TsAGI has developed three categories that guide the relationships between the state science center and the subsidiaries (see Figures 2 and 3).

Category I enterprises utilize TsAGI's core competencies, and the TsAGI State Science Center (TSSC) typically has 100 percent or near total ownership of the subsidiary. In exceptional circumstances, outsiders will hold some shares, but TsAGI will maintain controlling ownership. Legally, these subsidiaries are mostly state-owned enterprises and some

closed joint-stock companies. Typically, the subsidiary pursues work that grew out of projects begun at the science center and funded by the state. Subsidiaries utilize state-owned equipment, state technology, and state know-how. The purpose of having a separate subsidiary is that it may conclude contracts with non-state customers. Moreover, the Category I subsidiary has more independence in carrying out its activity, and has more flexibility in setting prices for technologies or services in order to remain competitive. In many cases, Category I subsidiaries market science center services on a marginal pricing basis for domestic aerospace customers unable to afford the higher costs of working directly with the science center. Though this practice may not be sustainable for large portions of business or in the long run, it is a temporary, but very significant, expedient for attracting and retaining important clients. Category I subsidiaries tend not to earn profits; they aim merely to generate enough revenue to pay for their employees' wages and to maintain a high level of technical competence in areas deemed important by the science center and the state.

Virtually all employees in Category I subsidiaries are TsAGI employees. Category I subsidiaries offer temporary contracts to their employees, with few bonuses. Managers as well as researchers (often the same people) are drawn from the science center. As commercial functions grow, the subsidiaries will need to attract outside and professionally trained business managers. As TsAGI employees, workers are entitled to the full range of social services.

Subsidiaries in this category include a helicopter plant, facilities for producing measurement instruments, testing-equipment supply and testing services, and a software firm. Aerospace technology has been reapplied by enterprises in this category to produce automobile testing equipment and medical equipment.

The second category of subsidiaries consists of those subsidiaries that utilize technologies developed at the TSSC, but for new applications. These subsidiaries are formed at the initiative of individual entrepreneurial scientists to undertake activities outside of the TSSC's core activities. The TSSC usually assumes about a 50 percent ownership stake, commensurate with its contribution in technology, equipment, telecommunication, other funds, and personnel. The TSSC may take less of a stake; for example, a venture that repairs and certifies foreign aircraft has tens of millions of dollars in capital, with eight foreign partners (including companies from the United States and Great Britain), and the TSSC holds only 15 percent ownership. Where a venture lacks outside capital, on the other hand, the TSSC may assume up to 100 percent ownership.

Because the technologies in Category II enterprises are derived from core TSSC technologies, the TSSC aims to maintain control over their use via majority ownership. Other legal remedies may be available to accomplish this, however, while permitting more outside investment to flow into the subsidiary (see below).

Usually about half the personnel of Category II subsidiaries are TsAGI employees, who work on temporary contracts with the subsidiaries. The rest are full-time employees of the Category II subsidiaries. Non-TsAGI employees (i.e. full-time subsidiary employees) at these subsidiaries have access to TsAGI social services but must pay for them at cost. As with Category I, the scientist-innovators tend also to be the managers.

In the past, employees, particularly the leading scientist/managers, often received substantial ownership shares in the enterprise. By September 1994, however, because of concern that manager-owners of subsidiaries were expropriating TsAGI's intellectual property, all individual share ownership in Category II subsidiaries was ended.¹⁵ Only corporate shareholders remain.

The commercialization strategy of Category II enterprises can be understood by examining one enterprise in greater detail. An enterprise that specializes in solar collectors grew out of a research group at TsAGI that was working on commercializing technical processes developed at the institute. Initially focusing on prefabricated building materials, the group utilized a flexible thin metal sheet developed by TsAGI. Later the group turned to the development of solar panels. The metal sheet technology enabled the group to develop piping for the panel which was cheaper and more efficient than the traditional copper models. TsAGI's aerospace technology in surface coverings was also applied to the solar panel to increase its absorptive capacity and diminish energy release. While the solar project was initially oriented toward developing a solar water heater, TsAGI researchers last year developed applications in air conditioning, desalinization, drying equipment, and other areas.

In 1992, TsAGI received a proposal to manufacture exteriors for solar panels. Two of the authors of the solar technology (TsAGI employees) organized a small enterprise to carry out the work, brought on several other TsAGI employees, and hired 15-20 outsiders. Given the risky nature of the venture, TsAGI took only a 5 percent stake, with the remaining ownership distributed among the employees. TsAGI provided facilities, technology, and, for employees of TsAGI, access to the full range of TsAGI's social services. (Non-TsAGI employees may gain access to social services, though they must pay for them at cost.) As the enterprise has become more established, TsAGI has assumed 50 percent ownership.¹⁶ Of the remainder, 60 percent is owned by the two founders and 40 percent by 15 other employees. Overall, the enterprise now employs about 200 people, including 30 TsAGI employees, and there have been 150 short-term contracts for TsAGI employees for work at the subsidiary. The firm has received some orders from the Moscow regional government and the State Committee on the Defense Industry. Foreign companies have expressed interest in parts of the solar panel, excluding the heat exchanger.

Other enterprises in this category include a firm that utilizes a vacuum chamber for thermal strength testing, a producer of wood processing equipment, and a subsidiary that markets flight simulator services.

The third category of subsidiaries are those that work in areas technologically unrelated to the TSSC's core areas. The TSSC may contribute buildings, equipment, and occasionally funds to these subsidiaries, and receive an ownership stake that ranges from 5 to 100 percent. In the United States this utilization of idle space and equipment would be handled via a rental agreement rather than an equity transaction. Under Russian law, by contrast, the more solid control over property via the creation of the subsidiary enables joint ventures with foreign companies to obtain business property more easily.

Within this category, there are some enterprises for which the highest priority is job creation and retraining. These enterprises retrain and employ the lower-qualified workers who are no longer needed by the TSSC. An example of this is the wood-processing enterprise. Other Category III subsidiaries provide services, including management training, transportation, and the cafeteria, for the science center. Finally, there is a group of subsidiaries that are primarily profit-making ventures. These include a shoe factory and a cargo storage firm.

Since these are low-technology ventures, the TSSC is not overly concerned with achieving control over Category III subsidiaries via ownership. Rather, the TSSC's share of ownership depends primarily on whether outside investors are involved. Where outsiders are involved, such as the management training program (cofounded with Moscow State Univer-

sity and the University of Michigan), the cargo storage firm, or the shoe factory, the TSSC is content with minority ownership (25-35 percent in these cases). Where there are no outsiders, the TSSC holds 100 percent ownership. Shares in Category III subsidiaries may be held by individuals as well as by corporate shareholders.

Wages in Category III subsidiaries are lower than in Category I subsidiaries, but bonuses may be much higher—in some cases bonuses exceed total salary. This is commensurate with Category III's riskier, but often more profitable character, relative to TsAGI's core business. This creates incentives both for entrepreneurial activity among managers and for increased worker productivity as employees all have an increased stake in their firm's success.¹⁷ Of course the risks of staking the bulk of one's income on a firm entering new markets with new products in a new subsidiary are great as well, especially in the Russian context.

Many of the subsidiaries across the three categories were originally established to support the work of the major test facilities, and it is essential that they continue to be available to do so. However, as other enterprises have discovered, it is difficult to maintain this availability and simultaneously pursue the best business interests of the small enterprises.¹⁸ TsAGI has relied largely on ownership control of certain subsidiaries to maintain control over intellectual property and business agendas. Given the evolutionary state of Russian corporate law and the lack of reliable enforcement processes, this was a logical intermediate approach. However, it does constrain TsAGI's ability to raise outside investment capital. In the future TsAGI should rely more on employment contracts that combine suitable incentives and compensation for key scientists with stipulations that delegate all intellectual property to the company and prohibit employees from joining or forming companies that compete in the same industries as TsAGI ("golden handcuffs"). Also, licensing agreements and performance contracts with subsidiaries should be used to protect the TSSC's position while requiring less ownership control.

Control of any sort over subsidiaries is impeded, however, by the central management's lack of information about subsidiaries' activities and finances. Adequate and reliable accounting methods (including audits by outsiders) and operations information systems must be established to provide information to central management. Also, better defined management roles in the context of reorganization would help. Relationships between subsidiaries and the Science Center, and among different subsidiaries, should be systematized and formalized, to regulate activities in a way that provides adequate flow of information and pooling of certain tasks (e.g. shared legal, marketing, and other services), while maintaining flexibility.

TsAGI must continue to provide a variety of incentives to retain key staff. Beyond salary, it can offer special incentives for performance, employee stock ownership, and access to social services. The Category II solar enterprise discussed previously is illustrative of the way employee stock ownership can encourage entrepreneurial scientists to remain within TsAGI as a whole and actively develop and commercialize the science center's technology. Recently, TsAGI has ended the practice of providing incentives to employees through stock ownership in subsidiaries. Should TsAGI consider resuming and expanding employee ownership, it must decide whether to base the amount of ownership on seniority, position, or other criteria, and it must balance the desire to provide incentives for employees with the need to attract foreign investment.

The commercial utilization of TsAGI's technology by subsidiaries or outside companies requires control over intellectual property and its licensing. These were not important issues before, but are now perhaps the most demanding and important issues facing TsAGI.

Previous intellectual property laws vested some share of the intellectual property rights with the inventor, so that leakage through departing staff is a serious problem. TsAGI is somewhat better positioned than many enterprises in that the utilization of much of the technology is tied to its unique capital facilities, and new technology is constantly being generated. Therefore the control of old intellectual property is not as critical as setting up mechanisms for controlling new intellectual property. Conducting an inventory of TsAGI's intellectual property, designing mechanisms for its protection (e.g., "golden handcuffs" agreements with scientists and licensing agreements), and establishing procedures and mechanisms for commercializing technology are essential for reorganization. TsAGI has received legal assistance from the Seattle law firm of Heller, Ehrman, White, and McAuliffe directed primarily toward the development of a comprehensive system to protect TsAGI's intellectual property rights.

The creation of new subsidiaries requires a new team of managers. The numerous commercial functions may be beyond the managerial capacity of the research scientists who have traditionally managed many of the subsidiaries. Therefore, management training programs must be established, new managers must be hired, and a career ladder for management must be established within the organization parallel to that for scientists. Already, many TsAGI employees are attending the Open University (UK) School of Business in Zhukovsky, a joint-stock company cofounded by TsAGI. A University of Michigan–Zhukovsky Physics and Technical Institute partnership is also working with TsAGI on business training.

Despite TsAGI's efforts to provide incentives for managers and scientists in subsidiaries to stay, it is almost inevitable, however, that the managers and/or key personnel of some small enterprises will eventually decide that it is in their interest to start an entirely new company. The less they are dependent upon capital facilities, the more tempting it will be to break out and start a new company.

While this breakout may be very undesirable from TsAGI's standpoint, this is a common occurrence in market economies. From the standpoint of the overall economy this is probably a beneficial factor as it stimulates competition and innovation.¹⁹ The lack of a small, high-technology company sector in Russian (Soviet) industry was one reason for the industry's overall inefficiency. There is a strong likelihood that market forces will stimulate many high technology start-ups in the future.

E. Social services

The town of Zhukovsky was founded by TsAGI when the enterprise moved from Moscow in 1939. For its first decade or so, therefore, all of Zhukovsky, including housing, health facilities, and schools, was on the TsAGI balance. In the 1950s, part of TsAGI was separated out to form the Flight Research Institute, and many buildings and other facilities were constructed and put on the new institute's balance. Then, in the 1960s and 1970s, more consumer goods and services/social sphere facilities were built, and a small municipal authority was created to organize and own some of these new structures. Currently, the scientific enterprises are transferring many social facilities to the municipality. TsAGI is retaining (and continuing to build) those structures which it deems necessary to attract good staff.

Expenditures on the social sphere have averaged around 6 percent of production costs. In 1993, utility prices skyrocketed, tripling the costs of social assets. After the transfers of assets to the municipal government, social expenditures will once again fall in the range of 6-8 percent of production costs, with 2 percent recouped through private side agreements (e.g., payments to the hospital for other companies' employees). TsAGI also receives a 12 percent tax write-off to pay for social services (in other words, social services would have amounted to almost 20 percent of revenue without the deduction from taxes). Social service costs include materials, salaries for social service workers, subsidies for food service, and additional support for employees in need of financial assistance.

TsAGI has transferred to the municipality such social assets as the town's heating and water systems, all roads, and more than 145 buildings, most of them apartment houses. The institute has opted to keep the three buildings that house the institute's actual work space, twelve apartment houses and dormitories for employees, nine kindergartens, a seven-floor polyclinic/hospital, educational facilities, a stadium, sports club, and several vacation facilities. The institute has also retained a cafeteria, which operates as an independent small enterprise, though TsAGI subsidizes the cost of meals for employees and pays for all maintenance, repair, and equipment.

TsAGI's social sphere expenses also include a buildings/maintenance division, which maintains all physical facilities and is now building three large new buildings at a cost of three billion rubles. These projects may be partially funded by the state payments for TsAGI as a State Science Center, or else via the advance sale of private apartments (about five of the 97 apartments in the first building were privately sold, with the remainder reserved for employees²⁰).

Many social structures could support themselves through private contracts, but this would limit access for TsAGI employees. While managers are permitted to make outside commercial arrangements and retain these profits for building maintenance and staff salaries, not all of them have taken advantage of this opportunity.

As it reorganizes, TsAGI must address the issue of eligibility for free or at-cost use of social services. According to TsAGI rules, employees who spend at least 5 percent of their time working for the TSSC receive full social benefits. Non-TSSC employees working at subsidiaries have access to TsAGI facilities under terms negotiated between the subsidiary and the TSSC. In these circumstances, the employee usually must pay for the cost of the service. Given that mere access to such facilities as the hospital and kindergartens is at a premium in the underdeveloped city of Zhukovsky, these benefits, even if at a cost, are highly prized by employees.

Initially TsAGI owned the building and equipment used by the polyclinic, but clinic employees were paid by the state. After some conflicts with the municipal administration, TsAGI assumed control and financial responsibility for the polyclinic. The polyclinic has some contracts with outside enterprises, including small firms. TsAGI also owns and operates the hospital. The hospital similarly has been making side agreements with other companies to serve their employees. Medical care costs TsAGI 64,000 rubles per person per year on average, so it charges other enterprises 83,000 rubles per employee per year.²¹ Still, TsAGI provides free utilities and repair service, as well as additional funds, to the hospital. TsAGI employees receive free access to medical care at both the polyclinic and the hospital.

TsAGI has arrangements with a number of kolkhozes. The kolkhozes provide food at low cost to the enterprise; in exchange, the enterprise provides technical assistance for equipment and machinery.

The cost of the kindergartens is covered 80 percent by TsAGI, 20 percent by parents. When the mother is an employee, TsAGI pays the parental contribution as well.

In accordance with Russian labor law, the workers' collective votes once a year on budgetary allocations to various social services (as a percentage of enterprise profits). The council of the workers' collective approves changes to these allocations during the year. The trade union committee sets social benefit criteria and allocates these benefits.

Many of these social structures will become independent companies after privatization. Management, however, has been ambivalent about whether these assets properly belong to social service employees, all TsAGI employees, or the Russian people at large. Consequently, privatization of social assets may be quite complicated.

III. Conclusion

Some elements of TsAGI's approach to decentralization and disaggregation are applicable to other enterprises in Russia. But there are five attributes of TsAGI that are not shared by many defense enterprises. The first is that the state recognizes the need to maintain some base level of support for staff and research in order to maintain this national capability. The second is that TsAGI's strongest potential future products and services are qualitatively the same as they have always been, albeit largely for new markets. Third is that many of its large capital facilities are still world class, although maintenance and modernization will become an increasing problem. Fourth, TsAGI has world-class technology that is suitable for new products and services through licensing to outside companies or through internal commercialization. And fifth, the enterprise has the right to utilize excess facilities suitable for commercial activities. Many other enterprises share some, but not all, of these attributes.

This combination of attributes makes it feasible for TsAGI to diversify by establishing subsidiaries, with selective use of outside investors, while maintaining both equity control where desirable and control over its technology. By splitting the subsidiaries into the three categories, TsAGI has been able to make significant use of outside capital with minimum impact on the control of both ownership and intellectual property or on the basic scientific work. At the same time it is making economic use of its facilities and staff, and retaining its most essential employees. Elements of this approach seem applicable to other research institutes that share some of these basic attributes. A core business, with unique facilities and good control over intellectual property rights, can be the basis for profitably spinning off subsidiary businesses that utilize these facilities and technologies while attracting outside capital. At the same time, the core business can be retained within the parent enterprise.

The five attributes are significant contributors to TsAGI's apparent success in spinning off subsidiaries. However, TsAGI management has worked hard to understand the relevant issues and formulate a feasible strategy. The importance of this cannot be underestimated. Without this careful, strategic planning, the specific attributes alone would probably not be sufficient.

It is interesting to note the proportion of equity that has been negotiated by TsAGI in exchange for its contributions to various subsidiaries. In those cases where TsAGI's basic contributions are facilities and utilities, but not capital, technology, skilled personnel, or

know-how, the enterprise has managed to retain far more equity than would probably be possible in the United States. This is undoubtedly a result of the rights of utilization of property and the lack of a commercial real estate market. There are trade-offs in this arrangement. A rental arrangement might be more beneficial for a parent than a large equity stake when a subsidiary is only marginally profitable and does not pay dividends. The potential benefit of high dividends from a very successful spin-off, however, might make this option more attractive. While it is not clear that many potential Western partners would agree to such an arrangement, other enterprises spinning off subsidiaries should consider how much equity to retain.

Also, the TsAGI case illustrates the role employee ownership can play in retaining key personnel. Stock ownership can provide incentive for entrepreneurial scientists to stay within subsidiaries (rather than breaking with the company entirely), develop and commercialize technology, and generate revenue which is shared with the parent.

Finally, decentralization may provide vehicles for relieving the parent of the burden of social services. At TsAGI, the transportation subsidiary, management training subsidiary, and even perhaps the hospital may generate enough outside revenue to be self-sustaining and profitable. Similar social services at other enterprises also might prove profitable if these enterprises are able to conclude contracts with outsiders at market rates.

TsAGI has made headway in obtaining foreign contracts, and it is also moving forward in creating strategic alliances domestically. TsAGI's cooperative efforts not only aim to provide salable products and services, but to enhance the local infrastructure and skills base that will contribute to future economic development.

Many challenges remain. Although many of its policies promoting innovation are more ambitious than those at other enterprises, TsAGI needs to continue creating incentives for entrepreneurial behavior, whether through employee ownership, bonuses, or an innovation fund of the type operating at Mashinostroenie. TsAGI must continue to develop a system for regulating interactions between subsidiaries and the Science Center. A mechanism for more capital to flow into subsidiaries also should be developed. A system for utilizing and protecting intellectual property should be designed and established. Employees should be involved to a greater degree in reorganization decisions, as their support will be necessary for future development. If these steps are accomplished, the science center could then rely less on percentage of ownership to protect its interests.

Despite these difficult challenges, TsAGI has made remarkable progress in restructuring, commercializing technology, and developing the capacity to operate in a market economy. TsAGI remains an important model for other research institutes undergoing conversion and restructuring in Russia.

Notes

¹ This paper draws, in part, on research presented in David Bernstein and Jeffrey Lehrer, *Restructuring of Research Institutes in Russia: The Case of the Central Aerohydrodynamic Research Institute* (Stanford, CA: Center for International Security and Arms Control, 1994).

² Note that at the prevailing official exchange rate, the figure would be about \$288 million. The discrepancy may reflect TsAGI's estimate of purchasing power parity.

- ³ At early 1994 exchange rates, the figure would be about \$30 million.
- ⁴ Cost allocations between direct costs and overhead are not totally clear to us since TsAGI does not have a Western standard cost accounting system.
- ⁵ Russian Federation Law on the Tax of Profits of Enterprises and Organizations. December 27, 1991 No. 2116-1. Inclusive of all changes and updates through August 27, 1993. The tax deduction specified in Article 7 Part 4 includes enterprises engaged in agriculture, the production of consumer goods, construction, repair, and the production of construction materials. Therefore, it would seem to apply to Category III subsidiaries.
- ⁶ Defense Conversion Projects, Prepared by the TsAGI Office of International Scientific Affairs, May 1994.
- ⁷ Participating organizations include the TsAGI Instrument-Making Scientific Research Institute, Mashinostroenie, the Avionics Scientific Research Institute, the Mil' Helicopter Plant, the M.M. Gromov Flight Research Institute, the Ramenskoye Instrument-Making Design Bureau, the Scientific Research Center of the Central Institute of Aero-Engines—"Ramenskoye Instrument-Making Plant" Joint Stock Company, the Belozerskaya Division of the State Scientific Research Institute for Aviation Systems, the "Zvezda" Scientific and Production Enterprise, the "Agat" Moscow Scientific Research Institute, the Experimental Machine-Building Plant, the Central Propulsion Institute, and the International Bank for Scientific and Industrial Investment—Escom-Bank.
- ⁸ For a list of RONA-COMPLEX's conversion projects, see the U.S. Department of Commerce Russian Defense Business Directory Special Edition 1994 p. 4-104-106.
- ⁹ Private communication with Michael Friend, Boeing Technical Research Center, Moscow, October 1, 1993.
- ¹⁰ David Bernstein, "Spin-offs and Start-ups in Russia: A Key Element of Industrial Restructuring," in Michael McFaul and Tova Perlmutter, eds., *Privatization, Conversion, and Enterprise Restructuring*, to be published by Westview Press in 1994. "Russia: Boeing Moscow Center Reports Progress in First Year," Reuter Textline PR Newswire, September 14, 1994, NEXIS. Igor Ivantsov, "U.S. Boeing Company Gets a Foothold on Russian Market," ITAR-TASS, January 11, 1994, NEXIS.
- ¹¹ "Europeans Pursue Air Breathing Technologies," *Aerospace America*, February 1994, NEXIS. "Soviets To Conduct Wind Tunnel Separation Tests on HOTOL Launch System," *Aviation Week and Space Technology*, Vol. 136, No. 1, January 6, 1992, p. 58, NEXIS. "British Aerospace, Soviets to Study Launching HOTOL from An-225," *Aviation Week and Space Technology*, Vol. 133, No. 11, September 10, 1990, p. 23, NEXIS.
- ¹² On the usefulness of management-labor cooperation, especially during restructuring, see Chapter II of the Commission on the Future of Worker-Management Relations, Fact Finding Report (Washington, DC: U.S. Department of Labor, U.S. Department of Commerce, May 1994). On the positive role employee-owners can play during restructuring, see Michael Higgins and David Binns, "The Role of Employee Ownership in Russian Privatization," conference paper presented at the Bonn International Conversion Center/CISAC Workshop on Conversion of the Defense Industry in Russia and Eastern Europe, August 1994.
- ¹³ Russian Government decree, On the Realization of the Edict of the President of the Russian Federation from June 22, 1993, No.939 'On State Science Centers of the Russian Federation,' March 29, 1994, No. 247. Russian Government Regulations, On Conditions for the State Support for the State Science Center of the Russian Federation—TsAGI, March 29, 1994, No. 247. Council of Ministers of the Government of the Russian Federation Decree, On Urgent Measures for Supporting the Activity of the State Science Centers of the

Russian Federation, December 25, 1993, No. 1347. Edict of the President of the Russian Federation, On the State Science Centers of the Russian Federation, June 22, 1993, No. 939. Order of the President of the Russian Federation, On Conferring the Status of State Science Center of the Russian Federation, June 22, 1993, No. 939.

¹⁴ "Russian Premier Victor Chernomyrdin has ordered that the ministries of Sciences, Finance, and the Economy work out concrete measures aimed at supporting Russia's state-owned scientific research centers within a week." Tass, July 20, 1994.

¹⁵ It was unclear how employees' share ownership in subsidiaries was reduced, whether by TsAGI buying them out or by other means.

¹⁶ It was not clear in our meetings how much of this additional equity was based on financial investment and how much on technology and facilities.

¹⁷ This pattern is reminiscent of the "share economy" described in Martin L. Weitzman, *The Share Economy* (Cambridge, MA: Harvard University Press, 1984). Yevgeny Kuznetsov pointed out the relevance of Weitzman's insights to the Russian case in "Adjustment of the Russian Defense-Related Enterprises in 1992-1994: Implications for Government Policies," paper presented at the Bonn International Conversion Center/CISAC Workshop on Conversion of the Defense Industry in Russia and Eastern Europe, August 1994, p. 12.

¹⁸ Michael McFaul, editor, *Can the Russian Military-Industrial Complex Be Privatized? Evaluating the Experiment in Employee Ownership at the Saratov Aviation Plant* (Stanford: Center for International Security and Arms Control, 1993).

¹⁹ David Bernstein, "Spin-offs and Startups in Russia: A Key Element of Industrial Restructuring," *op cit*.

²⁰ About one-fourth of apartments under construction will be sold privately. The extreme shortage of housing enables the sale of just a small number of apartments to fund the whole building. A two-bedroom apartment in Zhukovsky costs \$30,000.

²¹ Estimate made in February 1994.

III. ELVIS+ and the Moscow Center for SPARC Technology (MCST)

David Bernstein and Elaine Naugle

I. Introduction

The other case studies in this report describe medium to large enterprises that have existed for many years. One option for them in the transition process is movement toward a decentralized approach to organization. In this case study of two small, new private companies, decentralization is examined from below rather than from above. Both the Moscow Center for SPARC Technology (MCST) and ELVIS+ are examples of the reorganization of small portions of large enterprises into independent companies. Some analysts believe that this form of conversion and privatization will eventually play a major role in the creation of a high-technology civilian industry, as it has in the United States.¹ In both cases considered here, the leaders of the spin-offs were motivated primarily by the desire to keep highly qualified technical teams intact and to pursue both civilian and military orders with much more initiative than the management of their parent enterprises.

ELVIS+ originated from a much larger research and production organization, ELAS (Electronic Equipment Production). MCST came out of the Institute of Precision Mechanics and Computer Technology. It is instructive to analyze the cases in parallel, as both are small, high-technology, R&D spin-offs of larger organizations. There is no formal connection or working relationship between ELVIS+ and MCST, but the U.S. company Sun Microsystems is working with both. The most important differences between the two are the following:

- The history and distribution of ownership is different. MCST was formed specifically to be able to work with Sun, and its parent institute retained a substantial portion of ownership (45 percent), while Sun did not take an equity position. ELVIS+ was established

and privatized prior to the relationship with Sun, and its parent organization did not take any equity, but later Sun took a 10 percent equity position.

- ELAS, the parent organization of ELVIS+, has been subdivided entirely into many separate small enterprises, whereas the parent of MCST is still a large undivided institute. ELVIS+ has a variety of technical and business interactions with other former components of the old ELAS, whereas there are no analogous entities in the case of MCST.

II. ELVIS+

A. Description of the company and its primary activities

ELVIS+ is a private company located in Zelenograd, the electronics capital of the Former Soviet Union. The company was founded in November 1991 from the computer and communications division of a very large state-owned institute (see below) by six principals, who own most of the stock. The key areas for ELVIS+ today are in wireless technology: antenna development, radio and digital modems, systems integration, and communication services. The company employs 54 people, ten of whom are administrative/support workers, and the rest engineers who work on the design and development of wireless communication systems for both space- and ground-based applications. The group's nucleus, led by director Alexander Galitsky, has been working together for more than fifteen years.

Approximately half of the ELVIS+ employees originally were working on projects for Sun Microsystems. This work comprises complete systems, including computer design, radio software, and antenna design. Sun and ELVIS+ have been working together on a cooperative product development project, a wireless communication system for use with Sun workstations. ELVIS+ will be responsible for the development of the communication module in adherence with specifications provided by Sun. ELVIS+ has also been developing software for local area networks (LANs) and the Internet with SunSoft, a Sun Microsystems division, as well as PC software for the Internet Commerce Group in Sun Microsystems Laboratories, Inc. The market that ELVIS+ plans to serve, both globally and in the Commonwealth of Independent States (CIS), will include fax transmission, wireless, local area network, space communications, and image processing and transmission segments of the telecommunications market. Each party will have marketing rights and will earn royalty revenue from sales by the other party. Both Sun and ELVIS+ realize that they also need a third strategic partner in the radio business to help with the development, financing, marketing, and systems integration of their products. ELVIS+ managers feel that the overall communications market in Russia is huge. This is another argument for finding a substantial third partner because many others have identified this market, and it will be difficult to compete with the major firms in this area.

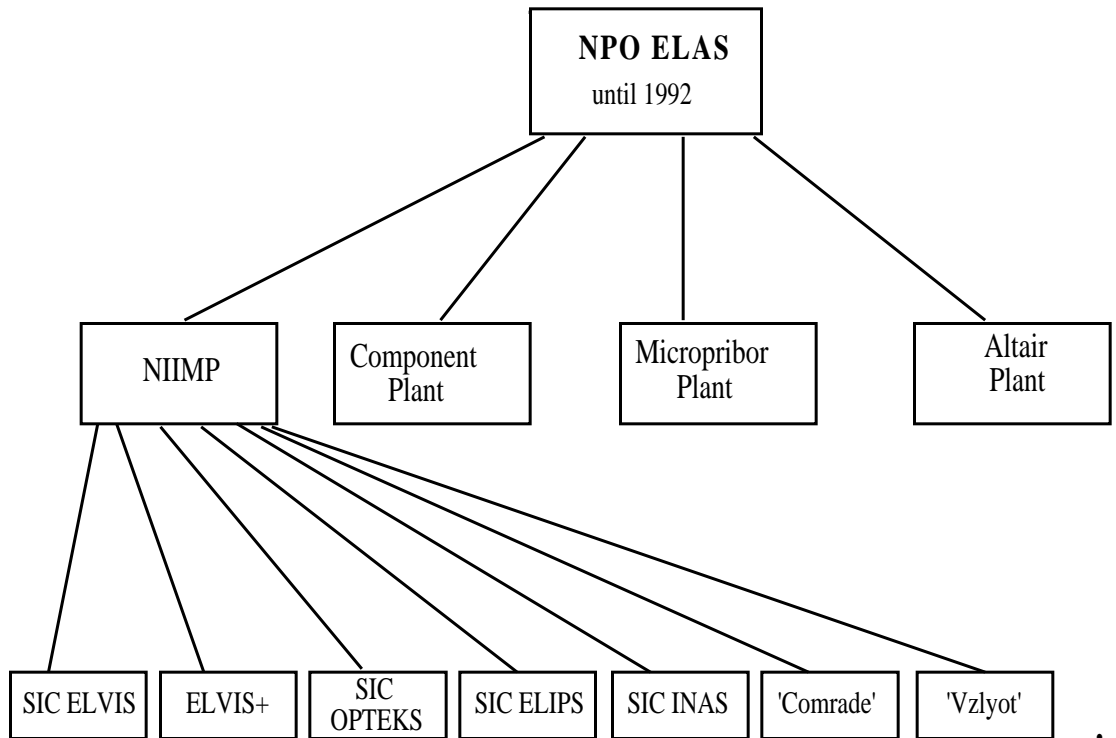
Other projects include work on commercial contracts, including in-house fax and Internet (with mobile capability) services that will allow the transfer of images and Russian text. ELVIS+ also works for government ministries. For example, Galitsky considers the enterprise's state infrastructure project² significant in order to maintain some ties to the

government. He is currently working on a proposal to create an information network in Zelenograd.

ELVIS+ has identified a potential domestic market for the creation of LANs using wireless communications. There will be a substantial need for this in Russia because most old buildings cannot be rewired easily or inexpensively. The KaMAZ truck manufacturer is a possible client for this process. It is a huge factory (60-70,000 workers, 10 x 5 km area) with eighteen different facilities. It desperately needs a good Western accounting system, which it is planning to develop, but even then the factory will not have an efficient way of getting the necessary input and output data between facilities within the factory. Currently it lacks funding for this project. Another use for this technology is the communication of operational and maintenance data related to the remote operations of the oil and gas industries. A third example is a project proposed by the GUM department store in Moscow for development of a network for its end-users. ELVIS+ is working with British and Argentinian companies to bid for this contract.

ELVIS+ has another business that is already producing significant revenue. In 1992 the company started a fax service that can transmit data, text, and images and uses imaging rather than a digital system. This faxgate service is different from the system used by Sprint in that it can transmit Russian data. Currently ELVIS+ allows other Russian enterprises to use this service at the ELVIS+ facility and is now providing mobile access as well. The profits from the service are used to cover worker salaries, and other costs such as for electricity, space, and communications. The fax service, although not the main intended field of activity for ELVIS+, and one which will become increasingly more competitive in Russia, is generating enough funds to allow the enterprise to actively pursue other areas for applying its technical expertise.

ELVIS+ does not do serial manufacturing. For prototype production (and some other jobs) the enterprise utilizes consultants who are moonlighting from other enterprises or institutes (usually state-owned).³



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B. History

To understand the history of ELVIS+ (the name is an acronym of *Electrono-Vychislitelnye i Informatsionnye Sistemy*, or *Electronic Computer Technology Systems*), we must look at the large state-owned enterprise, ELAS, that was its progenitor, and the city of Zelenograd, where ELVIS+ is located. Zelenograd was built 50 kilometers outside Moscow in 1961 by the military-industrial complex to be the major center of electronics research and production in the Soviet Union. Highly skilled scientists from the Soviet Union were brought to work at the institutes in Zelenograd. By the end of the 1980s, Zelenograd was a city with some 3,500 enterprises and a population of 150,000, of which 37,000 worked in the electronics industry. Today it has a population of about 4,000 companies, some of which are private but use government space and materials, as does ELVIS+.

ELAS was formed in 1965 when two of the major enterprises in Zelenograd were combined. ELAS, headed by General Director Gennady Guskov, was involved in R&D and manufacturing of computer and communications systems, radio communications, radar systems, and optical electronics, and was responsible for designing and building all computing and communications equipment placed aboard Soviet spacecraft. In the late 1960s, because the bulk of its work focused on miniaturized radio systems for the Soviet space program, ELAS shifted its emphasis almost exclusively to space applications. Formally ELAS

was under the Ministry of Electronics, but also worked under the Ministry of General Machinebuilding for space applications.

Until about 1989, when the lack of state investment led to a decline in this status, ELAS was known by world standards as a leader in electronic communications. The main institute for ELAS was the Scientific Research Institute for Micro-Instruments (Nauchno-Issledovatel'skii Institut Mikro-Priborov, or NIIMP), which employed approximately 4,500 workers. ELVIS+ was originally a spin-off of NIIMP.

The history of NIIMP is important for an understanding of the evolution of ELVIS+. NIIMP was a key computer supplier for Russian space manufacturers and received orders and funding for ELAS, the majority of which came from the Ministry of General Machinebuilding. NIIMP then distributed these funds as necessary to the experimental factories in ELAS. The director of NIIMP received orders by approaching the commission of the military-industrial complex with proposals for projects, as opposed to having projects delegated to the enterprise by the ministry. Until 1991, NIIMP controlled one bank account and balance sheet for its own finances, and separately, another shared account, for all the plants associated with it. In mid-1994, NIIMP had approximately 1,200 workers. NIIMP has been given permission to privatize but, not wishing to lose its ties to the state, is proceeding reluctantly.

In the late 1980s, ELAS, which had 12,000 employees, suffered a drastic reduction of military orders, without guidance or funding for conversion. NIIMP started keeping the incoming funds for its own activities rather than distributing them to the other factories as in the past. Conflicts arose among the factories over the lack of funds and government-mandated low salaries. These factors forced ELAS to seek new business structures,⁴ establish independent bank accounts for several of its subdivisions, and develop different working relationships among the components. ELAS split into 37 different companies, ranging in size from five employees to 400. Each of these had a collective form of ownership (a Gorbachev-era legal status), which has since been nullified by the Russian government since collective enterprises are not provided for by the December 1990 Law on Enterprises and Entrepreneurship.⁵

In March 1990 NIIMP reorganized its various divisions into four companies, which include the following Scientific Industrial Centers:⁶

(1) SIC ELVIS, "Electronic Computing and Information Systems," which employed 400 workers mainly in military applications for state orders and was formerly directed by Alexander Galitsky. (As of September 1994 SIC ELVIS had downsized to 130 workers, and halted manufacturing.)

(2) SIC OPTEKS, "Optical Electronic Devices and Systems," which employed 800 workers from the optical electronics division and worked on satellite communications technology.

(3) SIC ELIPS, "Electronic and Software Systems," which employed 50 workers from the radio and communication division.

(4) SIC INAS, "Information and Automated Systems."

The following companies were later added to this group: SIC Spurt, SIC KOMRAD, and SIC Sisvap. In June 1994, six of NIIMP's companies had also been granted independence by the GKI.⁷

This legal formation was intended to improve the functioning of the ELAS system and keep technical teams together.⁸

SIC ELVIS was formed in March 1990 as collective property of its workers. Much of the production at SIC ELVIS has both military and civilian applications, specifically work for spacecraft: design of microcircuit systems, and computers based on microschemes and software. Most work is for state orders.

In 1991 Yeltsin decreed that all small enterprises were state property,⁹ which meant that although SIC ELVIS workers thought that they owned their company collectively, the law did not recognize this concept. SIC ELVIS could be an independent company, but it was still a state enterprise and has had to balance the desire to privatize against the concern that it might not receive further state orders if it did privatize, and would be unable to privatize physical assets.

In October 1990 SIC ELVIS managers established contacts with Sun Microsystems, which wanted to work with a non-state enterprise in creating a low earth orbit communications system. In order to do business with Sun, a new company, ELVIS+, was created with 100 percent private ownership in November 1991. ELVIS+ personnel came mainly from the computer and communications division of NIIMP.

A lack of funds and cumbersome export controls led to the abandonment of the initial project that sparked creation of ELVIS+. Despite this, Sun continued working with ELVIS+ in developing a wireless communications system. ELVIS+ differs from SIC ELVIS not only in its ownership, but also its concentration on wireless communications, while SIC ELVIS specializes in computer systems and chip design.

C. Privatization and ownership issues

Since ELVIS+ was founded as a new private company, it does not face complicated issues of ownership and privatization. Initially, Galitsky owned 50 percent of ELVIS+, and five other principals owned the remaining 50 percent. These six make up the board of directors. A U.S. advisor was later also granted an equity share in ELVIS+. In March 1993, an agreement was reached in which Sun bought ten percent equity, and all the owners' shares were reduced proportionately.

Ownership is thus generally clear within ELVIS+ itself, which is an independent legal entity. The company still has close technical links to SIC ELVIS, however, and also has to cope with the efforts of the leaders of NIIMP to regain some control over its activities. Therefore, the fate of ELVIS+ may depend in some measure on the outcome of privatization discussions in these three entities. ELVIS+ pays either the state or NIIMP for services and some utilities; however, the enterprise has an independent source of electricity to ensure working phone lines in the event that the electricity is shut off due to lack of funds.

Ownership of SIC ELVIS

SIC ELVIS, which is state-owned, is now proposing to privatize under Option Two. In early 1990, SIC ELVIS started moving toward privatization by paying the government one million rubles for some equipment. However, this process has slowed due to ownership issues and percentage of state funding. The enterprise has continued to pay ten percent of its income to ELAS, which is state owned. ELVIS+ is currently hiring workers from SIC ELVIS, and plans

to acquire it after it is privatized. The companies are closely linked in management as members of the board of directors of ELVIS+ are also high level members at SIC ELVIS. Galitsky is both the former director of SIC ELVIS and the president of ELVIS+. There are also contractual relations between ELVIS+ and SIC ELVIS, with Galitsky involved in the decision making in both companies, particularly on technical issues.

Some of the managers and employees of ELVIS+ have rights to purchase stock in SIC ELVIS by virtue of their former employment in SIC ELVIS. They purchased additional vouchers on the open market for this purpose. As a result the percentage of stock in hands friendly to ELVIS+ will be well in excess of 50 percent.

Ownership of ELAS and NIIMP

Although Guskov initially agreed to the formation of smaller groups out of ELAS, he has tried to maintain tight control over the groups without a legitimate legal basis for doing so. ELAS was divided in the late 1980s into 22 smaller units. Fifteen of the 22, which employ about 4,000 people, are in related technologies and have formed a loose alliance. They include NIIMP, the four Scientific Industrial Centers and other groups; fifteen founding organizations in all. These founders have signed an agreement to recreate a company called Stock Company NPAO ELAS, on April 1, 1993, directed by Guskov, who is currently the director of ELAS and NIIMP and was formerly in charge of other founding enterprises of ELAS Ltd.¹⁰ This company has no legal relation to ELAS and most of the fifteen units are still state owned. This enables ELVIS+ to rent state-owned equipment that is under the care of one of the other companies.

The formation of the "Joint-Stock Company ELAS," which is essentially an amalgamation of NIIMP companies, has not changed the structure of the constituent groups. This 'renaming' is a formality and a mechanism for bringing the companies under one unit again, though the 15 NIIMP companies do not desire to come back into this group.

NIIMP, the current alliance, cannot exercise any legal control over the 15 organizations that make up NPAO ELAS. The intention is that the fifteen will eventually be privatized and will enter into a more formal alliance, but there are no concrete plans for this. Some of them are proceeding in privatization by Option Two.

D. Social services

Splitting off from the state-owned parent enterprise was easier for SIC ELVIS and ELVIS+ than it may be for many other divisions of large enterprises, because in Zelenograd all social services were managed by the local government, rather than through enterprises. This meant that employees were not sacrificing access to these services by moving from ELAS to one of its spin-offs.

Although the municipal authorities are currently hard-pressed to support the social services at an adequate level, workers at private firms are at no disadvantage compared to state employees. Their higher wages may even give them additional access, if private services begin to be available. Basic medical services, for example, are provided free of charge by the state, but patients must pay for higher quality care or special services. Aside from giving employees better wages to handle such costs, ELVIS+ is also seeking an outside insurer for the workers. The enterprise contributes to a government medicine fund as a part of worker

salaries though it does not provide medical benefits. Although they have some concern for their workers' social benefits, ELVIS+ management bars trade unions from the company.

E. Future plans

Charting its future course is a difficult task for ELVIS+. It requires an integration of product/marketing plans, interactions and alliances with other enterprises in the Russian electronics and communications industries, ownership distribution (of ELVIS+ and of strategic alliances), and relationships with Western interests. ELVIS+ wants to be basically a design house that would carry products through to the prototype stage but not undertake production.

In the near term, Galitsky believes there is no acceptable electronics production capability in the FSU. What capability does exist is overpriced because the state-owned enterprises are trying to support their entire operations on the minimal commercial orders that they can get. Galitsky prefers offshore production. In the longer term, ELVIS+ would welcome support to establish manufacturing capability, but this would require a substantial investment, since much of the equipment required is Western.

ELVIS+ is continuing its work with Sun. There are software projects in process, one that may involve hiring engineers from outside the company. ELVIS+ is free to enter into development contracts with other Western companies, but the company will avoid any projects that would be in competition with Sun. Sun is not able to provide some expertise that is needed for other types of projects, and therefore Galitsky is pursuing other partners that will not create conflicts of interest. Competition for wireless projects abroad is fierce, and logistically the Russian market provides many opportunities for ELVIS+. Thus Galitsky is particularly interested in pursuing LAN development and systems integration within Russia to meet this demand and provide support to domestic enterprises.

Managers recognize that their ability to find Western partners depends on demonstrating the capability of their technical team and the application of their products. The products that have been developed with Sun are waiting for patents and this process is hindering ELVIS+ in its search for partners. One near-term focus for management is to better market ELVIS+ products to Western companies that may be familiar with the capabilities of the enterprise's technology but not know the direct applications. ELVIS+ is vulnerable to exploitation by a large strategic partner, especially if its intellectual property is not adequately protected. Managers might consider being acquired if the price is right.

Overall, ELVIS+ is continuing to develop the Sun partnership while pursuing Western alliances that would relate more closely to its technical expertise and its need for network specialists. Interested companies include Motorola, Northern Telecom, Rockwell International, and some Korean companies. The faxgate and Internet service provide necessary funds to keep the ELVIS+ technical team intact as the enterprise faces the competitiveness of the Western market and the ensuing need to define its products in terms of market demand.

Another potential project would involve creating a transportation control system for a large manufacturing company. This is not particularly in line with the director's goals for the company, but will allow ELVIS+ to maintain its technical group.

Galitsky would eventually like to find a partner to work with the firms. The project with Sun would work on computers, a second joint project would work on radio technology, and a third would bring all together to collaborate on wireless technology and remote access to

the Internet. He is presently working on a World Bank proposal to design a model for the creation of satellite links between Moscow and satellite cities near Moscow, based on their existing network link between Moscow and Zelenograd.

III. MCST

A. Description of the company and its primary activities

MCST is a new private company that was formed in March, 1992 by Boris Babaian, who is a leading figure in computer research and development in Russia. Babaian was motivated by his concern that the computer industry in Russia has been virtually destroyed by Western competition.¹¹ The company was founded for the purpose of entering into commercial contracts with Sun Microsystems, which has contracted for both hardware and software development work. Sun has no equity in MCST.

MCST has 124 employees, most of whom, like Babaian, came from the Institute of Precision Mechanics and Computer Technology, part of the Russian Academy of Sciences. Babaian, the president of MCST, is involved mainly in technical issues but also wears many other hats, such as project leader, marketing manager, etc. Babaian is also a division head of 250 employees in the parent Institute, which is headquartered in Moscow. One of the other principals, General Manager Alexander Kim, is in charge of all administrative functions and has also started other MCST ventures distributing and leasing Sun systems. MCST is also Sun's distributor in Russia for hardware and software.

B. History

Another primary motivation for founding MCST was to obtain funding to keep intact the core of a technical team, composed of employees of the Institute, in the face of drastic reductions in government funding. The 112 technical personnel (72 on the hardware and 40 on the software contract) have been working together for many years at the Institute in Moscow, St. Petersburg, and Novosibirsk. The Institute is engaged in both computer development and application simulations for weapons and space programs. In addition to its own projects for the state, it worked on many projects for other state-owned enterprises engaged in the development and manufacture of weapons systems. The Institute developed the Elbrus 1 and Elbrus 2 computers, and the Elbrus 3 computer, designed under Babaian's stewardship, was to have been the most advanced Russian supercomputer. This computer has not been completed but is currently serving to demonstrate Sun architecture. The Elbrus 2 is also underutilized because of poor reliability, energy consumption, and cooling water problems.

Babaian spent three years searching in Korea, Taiwan, Europe, and the United States for a strategic partner. He found that it was quite difficult to interest a very large company, such as IBM or Siemens. Sun, which is considerably smaller, was more receptive to his proposals, since Sun's top management is conversant with the technical issues of the company. The

many difficulties of interaction can also be handled much more easily working with a smaller company such as Sun.

SunPro, a division of Sun, has initiated several projects at MCST employing Russian software engineers. Complete teams like Babaian's, which have been working together for years, are rarely available in the United States labor market, and if they were, would be far more costly to hire. Sun has been able to retain the engineers by paying high enough salaries to compensate for the risk these workers face in the event that the contract with Sun dissolves.

SunPro visited MCST (in Moscow and Novosibirsk) in June 1992 in order to propose contracts with the Russian engineers. At this meeting, three areas—FORTRAN, compiler optimization, and Pascal—were chosen to make use of SunPro's software development on existing products.¹² A framework outlining the principles of the working relationship and the type of products involved was set up to deal with logistical problems in working with a Russian company.

The first projects were low risk in that they were peripheral to existing Sun products and were to be constructed with little guidance from the American side. As of summer 1994, these first projects were all either nearing the completion stage or complete. The software that MCST has developed surpasses the original specifications in ways that Sun had not even considered. This illustrates an advantage of utilizing personnel who have worked in a different technical environment.

C. Ownership of MCST

The state owns 45 percent of the equity in MCST (25 percent by the Institute, and 20 percent by the parent ministry of the Institute). The other 55 percent is owned by five founding individuals. Notwithstanding the minority ownership by the Institute, communications between MCST and the Institute about the operations of MCST are minimal. The Institute does not even know the salaries that are paid by MCST. This would be inconceivable in a U.S. corporation; it is a logical interim step in Russia, however, in the transition from total government ownership. Currently, MCST is a partnership with limited liability and in the future Babaian hopes to transition to a joint-stock company.

MCST has no capitalization, and works on a contract basis for Sun. It is reasonable to assume that the state would be willing to sell its equity to an investor (or the employees) at such time as the residual development programs for the Institute are completed. Since MCST has essentially no tangible assets,¹³ the price of this equity would presumably be based on some evaluation of expected future returns; this is something that is not well established in Russian accounting practices as yet.¹⁴

D. Relations with the parent institute

MCST is in transition. It not only is still housed at the Institute, but also pays the Institute for administrative services. Some of the personnel of MCST, including Babaian, have residual responsibilities and technical interests in some of the Institute's development projects. This has led to several problems.

One is that some of the Institute employees who are not working for MCST are jealous of the salaries, projects, and prospects of those who are working for MCST. In addition to his position at MCST, Babaian had nearly 1,000 Institute employees reporting to him as of early 1994. As is currently the case in many Russian businesses, most of them are not paid every month. Babaian has a deep sense of responsibility toward these people, but this commitment to the Institute and its personnel may hinder MCST's performance and development. The number of workers of the Institute has fallen from 2,500 a few years ago to less than 1,500 in mid-1994.

Initially Babaian had investigated the option of privatizing portions of the Institute, but it proved to be easier to establish a new (private) company. However, Babaian still hopes to see the institute privatized eventually. The Institute voted 58 percent in favor of privatization; however, as it needed a two-thirds majority, privatization has not yet started. It may be better to privatize only those departments that are not engaged in military projects.

Difficulty arises in attempting to determine reasonable reimbursement rates to the Institute for administrative services. In the absence of a good cost accounting system, there is no established basis for these charges. Given the dire financial condition of the Institute in the wake of government procurement cutbacks, there is pressure to maximize the charges to MCST. Babaian believes that the Institute's charges for administrative services are excessive because the Institute has tried to retain all employees rather than striving for higher efficiency. These fees that MCST pays are no longer given directly to the director, but some of them go to the non-MCST staff at the Institute. The mechanics of such transfers are not clear. Another problem is that MCST frequently needs light administrative services quickly, but it is almost impossible to get a rapid response from the Institute. A conversion fund also exists, but as of September 1993 it was used instead to pay salaries. In 1993, the Institute received from the state only 10 percent of the budget needed to keep it running. Additional though insignificant support is given by various ministries. Babaian believes that the contract with Sun gives the Institute added credibility, which should assist it in gaining support from the Russian government.

Clearly there are strong arguments for MCST to move out of the Institute and to sever the administrative ties. Babaian feels that eventually MCST needs to have its own administrative structure, though due to the dual responsibilities and utilization of facilities, it is not a simple matter to accomplish this. MCST has resisted leaving the Institute in favor of its own facilities for several reasons: (1) The Institute provides MCST's only tie to the state, which could be crucial in the event that reform fails. (2) MCST feels it has a right to the space. (3) Some employees still have responsibilities that have nothing to do with Sun; for example, the development of Elbrus 3. Elbrus 3 has little commercial appeal due to its unreliability and large power requirements, and the project is impeded by the lack of state funding. Even so, Babaian is strongly committed to finishing it. Although Elbrus 3 is the only substantial project left at the Institute, some groups there make PC boards that may have a chance in the world market. (4) If it left, MCST would lose access to Institute equipment, which would have to be replaced. (5) Renting facilities is extremely difficult due to the scarcity of commercial space and the difficulty of getting the right to use state property. (6) Overall, MCST does not want to leave the Institute because of the commitment to its staff. The Institute hopes that MCST can eventually provide customers for the Institute and at some point be able to support the entire staff.

E. Social services

The Institute provides MCST workers with vacation pay and vouchers. There is also a clinic for Institute employees, and access to a hospital. Sun has also paid for MCST to have a corporate membership for its employees' medical care at the American Medical Center in Moscow. Management is still working on guidelines to determine which services should be covered for employees.

At this time, there is no provision of housing by either MCST or the Institute. Many MCST workers do not live in Moscow and therefore commute into the city by train. There have been instances of MCST employees being robbed and beaten while commuting. At the same time, Moscow's apartment shortages and high rents make it impossible for them to move closer to work. MCST has therefore considered investing in some housing near the company.

In general, Babaian does not intend to invest a lot of funds and management energy in providing social services to employees. Instead, he feels that any of the workers' needs are more easily met by their relatively high salaries.

F. Future plans

For the future, MCST has several goals: (1) To build commercial computer hardware that might eventually be customized. (2) To expand its development work in other areas that would be noncompetitive with Sun. (3) To lease Western computers for Russians, which will be possible under the new export controls regulations. (4) To expand its production into areas of packaging, printed circuit boards, and CAD. (5) To expand sales and service of SPARC stations throughout Russia and possibly other newly independent states. (6) To perform system integration involving SPARC stations. (7) To find a source in the United States for banking purposes. Such an organization would aid the flow of dollars back and forth and keep better track of transactions between MCST and Sun.

Babaian and Kim are now looking for additional contracts for MCST. This search is partially due to Sun's desire that MCST not be totally dependent on Sun. SunPro has had preliminary discussions with other U.S. companies interested in contracting with MCST or having Babaian assist in the negotiation of contracts with additional personnel or the formation of additional companies.

One American company, EnergyLine Systems, is currently planning to start a project that would initially utilize five MCST workers for software development. Babaian and his associates also have other work with the Compass Company in Florida. This work, which is to develop software for IBM machines, is more routine programming rather than innovation as in the work with Sun. In order to minimize any potential conflict, a separate company (Compass-Elbrus) was formed, with fifty employees, rather than contracting for this work through MCST. Sun and Compass both agreed to this structure.

Babaian's group, regardless of the formation of multiple companies, clearly has the structure, expertise, and access to highly skilled personnel that would enable them to expand their business in a manner similar to that of contract research organizations or software producers in the United States. Thus, an opportunity exists for MCST to work with a U.S. company in the contract research business. This could create an alliance that would market the Russian expertise and labor rates in the United States as well as in the long-term market

the U.S. company's capabilities in Russia. Some of the funds that are now being used to pay wages of additional Institute personnel could be used to develop a marketing program.

IV. Comparison of MCST and ELVIS+

These two companies provide insight into ways in which larger enterprises may decentralize in the future. From the standpoint of technology and potential markets, the growth potential of both MCST and ELVIS+ appears to be quite large. However, there are many barriers to translating this potential into business success.

MCST could build a substantial business doing contract research. The desire of the leaders of ELVIS+ to make the company a hardware design house requires them to form somewhat different alliances with companies that manufacture and sell the hardware.

In addition to relations with the Institute, MCST also has problems with the government tax laws. Half of the money received from Sun must be changed into rubles; as of late 1993, the bank took months to do this, however, and then made the exchange at the old rate, disregarding inflation. Sun transfers hard currency into the bank, but MCST cannot easily withdraw it.¹⁵ Between the Institute charges for administration; social services; and government tax, the employees get at most 30 percent of the Sun money that was intended for them. MCST is looking at various options such as establishing a Western company or having Sun employ the staff directly, but a better alternative has not yet been found.

The transfer of funds from Sun to ELVIS+ is not subject to all of the banking problems of the MCST case, because some of these funds are equity money, which is exempt from some of the most troublesome regulations. Both enterprises have trouble using equipment on loan to them by Sun, as the Russian government charges an import duty after two years. The government assesses this duty based on original retail value rather than on the current market or depreciated value.

In order to capitalize on their potential, both companies would have to make changes in their business strategy:

(1) They should develop greater marketing capability. This could best be done by forming a strategic alliance with a Western company. While Sun could be this company, a company in the professional services business may be more appropriate for MCST, whereas a product company (or companies) would be more appropriate for ELVIS+. In addition to research and development work, both could also be marketing representatives for Western companies in Russia, as MCST now is for Sun workstations. This has advantages beyond simply expanding their business; if the products are sold for hard currency, this can be used as an offset for the contract funds from Western customers to obviate some of the bank transfers.

(2) Both enterprises should modify their ties with the parents. Further work with the parent enterprises could be done on a contractual basis from a separate location. Both MCST and ELVIS+ are hampered by being resident in their parent facilities. MCST's relationship is more complicated by the ownership tie, while ELVIS+ is affected more by the contractual and technical interactions with other elements of NIIMP and ELAS.

(3) Another major problem for both companies was CoCom (the Coordinating Committee for Multilateral Export Controls). Export control regulations, which were apparently

straightforward, were incredibly cumbersome and anachronistic. They not only related to things like multiprocessor hardware shipped from Sun, but technical advice as well—if Sun commented on the work performed by MCST, its comments were considered technical data and hence were also subject to export control. Sun was also only permitted to ship obsolete equipment to MCST, which prevented MCST from developing any new products on current Sun machines and deterred it from increasing its technical capabilities. The regulations also prevented MCST's use of any workstation connected to the Sun Wide Area Network (SWAN). Obtaining the necessary approvals from the U.S. government sometimes was possible, but this delayed the work considerably. Until September 1993, U.S. government concerns regarding national security prevailed over recognition of the importance of expediency in bringing commercial products to market. With the recent changes in export controls policy,¹⁶ Sun should soon be able to send most of the necessary technology and equipment to both MCST and ELVIS+.

(3) In both cases, stock could be issued for investors or for employee incentives, but in MCST's case the priority should be placed on buying out the shares owned directly by the state, and by the Institute.

(4) Both companies will have to build more of an internal business infrastructure as they grow. They are now basically technical project teams. As discussed above, neither has adequate marketing capability, especially for marketing in the West. They also lack accounting systems that are compatible with Western standards and that could provide acceptable cost or financial accounting records. At the present time, Sun helps MCST work through many of its administrative problems; however, customers will not in general expect to do this.

Notwithstanding the difficulties of doing business in Russia, many American companies see a net advantage to utilizing skilled Russian labor, especially in fields like software development that are not capital intensive and have limited risks. The labor rate disparity is stunning, and even with inflation, it should persist for some time to come. As the disparity decreases, Russian firms should be able to compete based increasingly on their capabilities alone.

Notes

¹ William J. Perry, "Soviet Defense Conversion: Problems and Opportunities" (Stanford: Center for International Security and Arms Control, 1992); Kenneth L. Adelman and Norman R. Augustine, "Defense Conversion: Bulldozing the Management," *Foreign Affairs*, 71, 2:26-27, 1992; David Bernstein, "Spin-offs and Start-ups in Russia: A Key Element of Defense Conversion," in *Privatization, Conversion, and Enterprise Reform in Russia* (Stanford: Center for International Security and Arms Control, May 1994).

² The state had proposed a project to integrate the communications network in Zelenograd with that in Moscow. ELVIS+ completed this project initiated by the government.

³ This is not uncommon in Russia, whereas it would be scrutinized much more closely in the United States. If nothing else, it could raise serious questions about intellectual property rights.

⁴ During this time, one strategy managers used to get around salary caps for state employees was to hire outside cooperatives, which in turn subcontracted back to the managers and their workers to perform the work. This took advantage of regulations that allowed cooperatives to pay higher salaries.

⁵ See Kathryn Hendley, *Steps on the Road to Privatization: A Preliminary Report on the Saratov Aviation Plant* (Stanford: Center for International Security and Arms Control, 1992).

⁶ Scientific Industrial Center or SIC in Russian is abbreviated "NPT" for "Nauchnyi Proizvodstvennyi Tsentr."

⁷ These companies were:

1. SIC OPTEKS —800 employees working on satellite communications
2. SIC ELVIS
3. SIC Spurt —400 employees working on satellite design
4. SIC KOMRAD
5. SIC ELIPS
6. SIC Sisvap

⁸ The ministries did not always recognize the legitimacy of this restructuring. In many cases the ownership was not clear because the physical assets were still state property, but utilization of those assets was made available to the new units, and they were able to realize the profits from this utilization. This is a classic example of the "spontaneous privatization" process that was quite common at that time in the USSR. See Michael McFaul, "Agency Problems in the Privatization of Large Enterprises in Russia," in Michael McFaul and Tova Perlmutter, editors, *Privatization, Conversion, and Enterprise Reform in Russia: Selected Conference Papers* (Stanford: Center for International Security and Arms Control, 1994).

⁹ RSFSR Privatization of State and Municipal Enterprises Act, Presidential Decree of the Russian Federation, July 3, 1991, NEXIS.

¹⁰ The list of these founding companies includes NIIMP, Special Design Technology Center Vzlyot, SIC ELAS Polyot, SIC OPTEKS, SIC ELVIS, SIC KOMRAD, SIC Spurt, Scientific Technological Center Micropribor, SIC Silici, SIC SINIS, SIC Sisvap, Poligrafcenter Company, Altair Plant, and SIC ELSOP. SIC ELSOP was added later than the previous thirteen.

¹¹ Babaian attributes the technical deficiencies of the Russian computer industry to the fact that too many decisions about technology development are made at high bureaucratic levels rather than by technical experts. Computer production in Russia has virtually stopped, since Russian computers cannot compete in performance, software, reliability, or price with

Western computers. As a result, some of the best computer scientists are trying to find jobs elsewhere. Software development for Russian-built computers is hampered by the small installed base of Russian hardware. There is not much of a market for applications software except for Western platforms.

¹² Six initial tasks were proposed for the joint projects:

- A FORTRAN 77 verification program (Novosibirsk)
- A FORTRAN 90 test suite (Novosibirsk)
- FORTRAN 77 bindings to C libraries (Novosibirsk)
- Pascal maintenance and development (St. Petersburg)
- IR—Intermediate Representation used to communicate between various compiler front-ends and the common back-end tool development (Moscow)
- SPEC Analysis and Optimization Prototyping (Moscow)

¹³ Sun provides equipment for MCST to use in its research, but the ownership of this equipment remains with Sun. The revenue from the Sun contracts is distributed in wages or paid to the Institute for services, so there are essentially no retained earnings. This could change in the future if MCST develops its own products, obtains royalties for licensed technology, or sells substantial Sun hardware in Russia, or decides to retain some profits instead of supporting additional Institute personnel.

¹⁴ See Chapter IX on accounting practices.

¹⁵ These are typical examples of how the inadequacy of the banking system is killing opportunities for foreign investment and hindering the performance of existing investments. Large interenterprise debt and the lack of bank reserves cause much of the problem. See Barry W. Ickes and Randi Ryterman, "The Interenterprise Arrears Crisis in Russia," *Post-Soviet Affairs*, October-December, 1992, pp. 331-361.

¹⁶ A series of reforms from September 1993 to March 1994, initiated by the Clinton administration, significantly increased the quantity and quality of computers that could be exported to civilian end-users in Russia. Because of this, U.S. companies such as Sun are able to ship computers that are not obsolete. (See the *San Jose Mercury News*, September 30, 1993, p. 1A and *The New York Times*, March 31, 1994, p.A1.)

IV. Impuls

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I. Introduction

Since 1992, the CISAC Defense Conversion Project has been working with the Moscow-based Impuls. Impuls is a medium-sized firm with expertise in control microdevices for the military, such as control heads for guided bombs and detection equipment for various weapon systems. Currently Impuls is working aggressively to break into several commercial high-technology markets.

A. Brief history and general description

Impuls was founded as a research-production enterprise (NPO) in the 1970s, when, in response to the development of radio fuses in the United States, a production plant established in 1901 merged with a research institute created in 1946. The institute worked on development and experimental production of military microsystems.

The research institute and the plant are on the same property. Under the Soviet system, the institute operated entirely on funds provided out of the state budget, while the plant could use both state funds and the profits it earned from production. It was therefore advantageous for the two structures to keep their budgets separate, since the institute's state funding would be reduced by the amount of any money given it by the plant. As state regulations changed, this ceased to be an advantage, and by 1992 this separation was abandoned. Both enterprises formerly reported to the USSR Ministry of Defense Industry, where Impuls operated under the Department of Ammunition and Special Chemistry of the Department of Industry of the Russian Ministry of the Economy. As the command economy mechanisms were phased out, Impuls went through some transitional steps in which it maintained ties to various state agencies and personnel.

Impuls not only engages in research and production, but in instruction and teaching as well. Its facilities include Moscow State Technical University's research laboratory of autonomous control systems, as well as laboratories of the Moscow Physical-Technical Institute and the Moscow Energy Institute.

Impuls's main product was microsystems for use not only as components for large systems but also as complete subsystems on a very small scale, integrating complex electronic and mechanical parts. The end product for the research divisions is documentation, which then goes to Impuls's own production lines, so the two sides are tied together. There are also some cases where the enterprise sells its documentation to other companies, usually when the projects require large-scale production.

One competitive product is its satellite communication system, which was developed in a very short time. Impuls managers claim that their system can track and keep contact with a moving satellite better than comparable systems. For example, Crosna, a well-known satellite communication firm in Russia, produces only the receivers for its system and purchases all the other components from other enterprises, while Impuls produces the complete system.

Another product developed and produced by Impuls for the military is an autonomous optical guidance and control system for bombs. Bombs guided by this system hit their target from an altitude of 20 kilometers without any control by the pilot. According to Impuls managers, Western military pilots who saw the system were impressed.

Impuls also developed a system for stabilizing laser-guided ordnance missiles during flight. Whereas competing systems require that missiles be launched at less than maximum speed, Impuls's solution can be used at any speed, allowing greater launch acceleration. The internal technology is also less complex and therefore less prone to failure than competitors' systems.

B. Organization

Alexander Grigoriev has been the general director of Impuls since February 1992. Grigoriev first tried to become director in 1988, when for the first time the director was chosen by a vote of the workers' collective. Grigoriev was at that time commercial director for the enterprise, and he lost to one of the former director's deputies, a scientist whose expertise was on the technical side of operations. This director was not very effective at coping with the new demands of the changing economy, so a few years later when the company was faced with a financial crisis, Grigoriev ran against him again and the employees elected Grigoriev. Grigoriev is respected by the employees because he is knowledgeable about both business and commercial transactions, and also has scientific/technical training.

Immediately under Grigoriev are two deputy directors for science and technology, who divide their work along scientific and technical lines; one deputy director for economic and financial affairs; one deputy for production; and the commercial director (who is also at the deputy director level). The heads of marketing, personnel, and supplies are also members of Grigoriev's primary team, which is analogous to a Western management council.

C. Finances

By September 1993, Impuls's financial situation had stabilized as production and sales of new products reached profitable levels. The enterprise has good relations with the banks.

Although interest rates are very high, Impuls has managed to repay its liabilities, including interest payments, and does not have overdue debts. As of November 1993, the state owed Impuls about 800 million rubles, including 600 million rubles for military state orders and 200 million for knitting machine control systems. All the enterprise's debts to suppliers are short-term debts resulting from difficulties with cash flow.

Impuls was audited by the Russian Federal Tax Commission in March 1993, and by the World Bank in May 1993. Both said the enterprise had an excellent balance between salary and volume—unlike most defense enterprises, which have taken out large loans to cover salaries without having contracts to ensure their ability to repay them. In April 1993, a decree was issued giving government aid to defense enterprises because of the rise in energy prices, but Impuls did not get any because its books were balanced; Grigoriev considered it ironic and unjust that the enterprise's relative success deprived it of 30 million rubles in state support.

By June of 1993, Impuls restored its production volume to the level it was at before conversion began in 1991, and by October of the same year, the rate of production doubled. This financial success was due primarily to three products described below: electronic bill-counting machines, teletext devices, and satellite television systems. It was not obvious to the CISAC researchers in September 1993, however, whether the enterprise's profit margin was adequate.

In the beginning of 1994, the enterprise achieved a ratio of current assets to liabilities of 1.26:1; Grigoriev hoped to make this ratio 2:1 by the end of 1994. The company finished 1993 with profit. However, the first six months of 1994 have produced no profit due to large payments for utilities. In 1994, Impuls has had a 10 percent increase in sales per month. From June–September 1994 the production level increased by 40 percent.

Because of soaring energy costs, and lack of profit from the beginning of 1994, Impuls has had difficulty maintaining design work. Grigoriev is seeking funding but is not interested in loans because of past experience with paying high interest (130 percent) to banks. Despite these difficulties, salaries are being paid on time.

II. Conversion

Over the past three years, defense contracts at Impuls have dropped sharply. In December, 1991, they accounted for 96 percent of the enterprise's production; in 1994 this figure is hovering around 30-35 percent, and Grigoriev does not think that the level of defense production will change in the next several years. The main advantage Impuls had in its quest to use its scientific and technical competence in the civilian sphere was its diversity. The enterprise's specialty is electronic control systems, which can be infrared, laser, radio, television, or ultrasonic. This technology has applications in a variety of industrial areas, such as medicine, metallurgy, coal mining, aviation, agriculture, satellite television, communications, ecology, and food processing.

Conversion requires funds, however, for reorganization, the purchase of new equipment, market analysis and marketing, and for working capital until new projects make a profit. Since Impuls's military products were components and not whole weapon systems, weapon sales are not a potential source of income over which Impuls has any control, or to which the enterprise can look to finance conversion.

Grigoriev and his team do not want to depend on state financing or state contracts, because of delays and the unreliability of state payments. In 1993, 73 percent of the institute's funds came from state budget financing, both defense and civilian, with defense contracts accounting for 70 percent of that amount. In other words, 49 percent of the total volume of the institute's work was defense (for the enterprise as a whole, including the production side, less than 30 percent of contracts were defense). This level of state financing was much lower than in 1990-91, but still too high in the opinion of top management. Many of Impuls's middle managers, however, still want to be oriented toward state financing.

Impuls has carefully worked out a competitive pricing policy. From November 1992 through March 1993, the enterprise increased its commercial product prices by only 200-250 percent although prices for energy and supplies increased by 600-700 percent. This was possible because during that period management reduced overhead by 30 percent and storage costs by several hundred percent, by moving products quickly to customers.

The main aim of the enterprise now is market expansion. A marketing department was organized in the beginning of 1993, and it is now carrying out market analysis for new products, including market segmentation by geographical area and client type.

A. Products

Before conversion, Impuls supplied control components for large systems. During the transition to the market, however, the enterprise's managers consider it risky to produce only components. Impuls developed a control system for planing equipment, for example, but the only factory that produced this type of machinery is no longer capable of making payments, so Impuls is stuck with 110 million rubles' worth of components. One of the enterprise's goals in conversion, therefore, has been to produce more end products, rather than just components. It is currently successfully producing a series of such final products. The enterprise will not stop producing components entirely, but the planned ratio of components to full products will be about 50-50 (the actual ratio was already coming close to that figure in early 1994).

The enterprise has started producing several new civilian products, including a fiber-optics television system, black-and-white and color camcorders, and a microprocessor control system for pile drivers and for the textile industry. Eight other Russian firms make consumer products similar to those Impuls produces, but the domestic market for complex industrial and consumer electronic products is large enough that the management team does not expect excessive competition in the near future. Its most successful product to date has been an electronic bill counter, a relatively low-technology device that does not have any discrimination capability except on the basis of optical density. Impuls's product is competitive with comparable Western machines, and there has been a great demand for these machines on the domestic market. In February 1994, Impuls began production on the third model of the bill-counter, and a fourth was planned for June or July 1994. Managers were confident that this fourth model would be equivalent to the world's best (Swedish and Japanese), but could sell at lower prices.

The enterprise has also had success with a satellite television system. In September 1993, the system was being evaluated in Jordan and Cyprus. At that time, Impuls leaders thought their system was technologically superior but too costly. They felt that they should reduce their labor costs and go abroad for components, which in Russia are quickly growing prohibitively expensive. Nevertheless, Impuls has sold 30-40 systems in Russia, and the

demand is fairly high. By the end of 1993, the enterprise expected to need additional personnel in manufacturing to meet its requirements for these products.

Another product Impuls has developed is a teletext device, which uses a technology for compressing information to transmit it by television broadcast. In five minutes of TV time, 120,000 pages of information can be transmitted. Though Impuls is a monopoly supplier of this device, it has not been able to sell this product. In September of 1993, the enterprise ceased production on the teletext device, but was still looking for viable markets. In February 1994, managers explained that when they did the initial market research, they didn't realize that there were not many business information sources to fill the Russian TV airwaves. In January 1994, however, Impuls did start negotiations with a large company for the use of the teletext device, and Grigoriev expected that production would start again in April or May.

In the beginning of 1994, the enterprise was planning several new products for the new year. One product planned for 1994 is a welding transformer, which was exhibited at trade shows in England and Australia. In February 1994, Grigoriev expected to start significant production on this project within a month. Another major product is an electronic control system for fuel injection in automobile engines. By 1995, Impuls management plans to be able to produce 250,000 such systems per year. Impuls will develop the project and start production, but for mass production the enterprise will sell the documentation to a larger enterprise. Impuls currently has an arrangement with a large company to produce large numbers of knitting machines according to an Impuls design. The production company provides warranty/servicing, while Impuls supplies spare parts as needed. Grigoriev expects a similar arrangement for the fuel injection systems.

Also in 1994, Impuls will be ready to produce radio transmission lines with an 8-millimeter wavelength. These are very useful for remote regions like mountainous territories, because they require no special cables but allow line-of-sight communication through the air up to 20 kilometers between stations.

B. External environment

According to Grigoriev, Impuls's progress is hindered by several external factors. The first big problem was the government/legislative context. The reforms have not moved forward, and laws have not been passed to stimulate production. One bit of legislation in particular puts manufacturing enterprises at an extreme disadvantage compared to energy producers: energy enterprises are legally entitled to take money owed to them directly from their customers' bank accounts, while manufacturers have no such ability to collect from their debtors. Grigoriev also blames the government's economic policies for two other difficulties: the instability of the ruble, and the punitive tax regime, under which 90 percent of revenues goes to the government. In May 1994, President Yeltsin signed a series of decrees reducing enterprise taxes, which may help some.¹

The second large external threat is the sharp rise in energy prices since the middle of 1993. Grigoriev noted that he understands that this is necessary for Russia to be integrated into the world market, but explained that the "turnover" time from investment in materials to recouping money through a finished salable product at Impuls is longer than the time from investment to profit in a purely trading non-manufacturing commercial company. Impuls therefore has trouble passing on the excess energy costs to its customers. Over eleven months in 1993, Impuls's output increased by 541 percent, but Impuls increased its use of

energy by only 146 percent in a deliberate move toward greater energy efficiency. Over the same period of time, however, energy prices went up 1,100 percent.

Perhaps Impuls's most important external tie is its ownership of one percent of a consortium called Vneshttradeinvest. The consortium's co-owners include six Russian firms (including Impuls), an Austrian company, a Panamanian company, and a company from Cyprus. Vneshttradeinvest has existed for five years. Impuls joined in March 1992; in exchange for one percent ownership, the enterprise contributed a building that was on its balance sheet. Part of the benefit for Impuls of belonging to Vneshttradeinvest is that the consortium buys Impuls's products. Vneshttradeinvest sells fertilizers, and Impuls makes control systems for the machines that produce the fertilizers. As of February 1994, Vneshttradeinvest had given Impuls 40 million rubles' worth of orders. Although this relationship is not active today, cash flow from the tie with Vneshttradeinvest was critical in helping Impuls survive the financial crisis at the beginning of Grigoriev's term as general director.

Impuls was also involved in at least two other joint ventures. One of them, Suimtech, was founded for design and production of mini-plants for foam-concrete production. Other owners of the company include the scientist who invented the design, a Russian-Yugoslav joint venture, and the Kalinin plant in St. Petersburg, which was to produce the mini-plants in mass series.

The main merit of this mini-plant was supposed to be continuity of on-location production of foam-concrete given extremely precise specification of proportions. As of June 1993, however, Impuls's commercial director Yevgeny Serebrennikov said that the Suimtech invention turned out to be inefficient. Although the venture had been working on it for four years, it was not yet near production. The first plant was completed in August 1994 and manufacturing is expected to continue. Impuls is not heavily invested in the project; however, the enterprise's main contribution is to provide space on its territory for the project at low rent.

Another potential collaboration, a commercial company called Favorit, was organized a few years ago with Impuls as owner of 35 percent, but it has also generated no profits as yet and receives very little attention from Impuls managers.

Impuls has also established a joint venture with a Russian bank. The bank will rent space in Impuls facilities in exchange for a share of ownership. Impuls is hoping that the bank will buy shares in Impuls in the future. Renting out space to outside companies appears to be favorable for Impuls although Grigoriev maintains that there are issues with this arrangement that need to be faced, such as the difficulty in renting on a short-term basis, the lack of information about prospective renters, etc.

C. International negotiations

Impuls has had several contacts with American firms to discuss projects for automatic bill-counting machines for banks, ecological technology, civilian aircraft improvement, and others. At the end of 1992, a contract to sell satellite television systems was concluded with Jordan. In 1993 equipment was sent in accordance with the terms of the contract. In February 1994, similar contracts were close to conclusion with companies in Cyprus and Finland, and Impuls is also negotiating with companies in Malta and Argentina.

The Malta/German joint venture was completed in June 1994. Impuls provided television satellite equipment to this joint venture. Impuls also provided some of its shares and

received additional technology needed to produce the equipment. Because this company did not participate in Impuls's stock auctions, Impuls postponed its agreement with the company and is considering organizing a new agreement for future work. The total volume of all the satellite systems contracts together will allow Impuls to increase its production to 3,000-4,000 units per year.

In addition, the American company Failure Analysis Associates was considering buying a system from Impuls for monitoring dangerous cargo transport (e.g., ground transport of nuclear weapons), and Erickson Air Crane was interested in television guiding systems for hoisting and cargo placement. All of these projects have helped to stabilize the personnel and production structures, and have maintained liquidity of the accounting balance. All international contracts are negotiated by the science deputies and the commercial director, and are paid for in hard currency.

Impuls wants to increase its activity in the international market. In 1993, promotional descriptions of the enterprise and its capabilities were published in European Government, Global Management, and Global Investment Management. Impuls's commercial staff is working actively with the press, including the Western press. (For example, Impuls received some coverage in the San Francisco Examiner.) The enterprise has taken part in a number of international exhibitions/trade fairs, including some in Malta, England, and Jordan in 1993, and one in Australia in February 1994. Impuls currently holds patents for its products in the United States, Japan, France, Great Britain, Germany and other countries. Impuls has also submitted three proposals to receive Nunn-Lugar funds, and Grigoriev visited potential American partner companies in the spring of 1994 to pursue this possibility. Impuls is currently working with the Agar company in Texas and has another project with a cargo transportation company for the management of river transportation.

Through a project with Pepperdine University and the U.S. Committee To Assist Russian Reform, Impuls has made Western contacts for more than ten projects. In all, Impuls has submitted 36 projects to the U.S. Committee To Assist Russian Reform for help with finding Western partners. The enterprise has also established contacts with a Canadian company interested in satellite systems and other companies in North America and South Korea.

Impuls does not have an established foreign division since it is not very well known overseas. The civilian markets that the enterprise is trying to enter are very competitive. Grigoriev hopes that developments such as the contracts provided by Nunn-Lugar funds will help Impuls's competitiveness in the international market.

D. Personnel

In 1992, Impuls employed about 3,000 people, of whom 55 percent were research engineers, 25 percent production workers, 10 percent managers, and 10 percent not categorized. About 1,900 employees worked in the institute, including 80 with Ph.D.s, and the rest worked in the plant.

By the end of 1993, the workforce was reduced by 1,200 employees. Over the same period, from 1991 to the end of 1993, the enterprise's output volume increased by 20 percent. After an initial reduction in both design and manufacturing staff, the manufacturing division is growing in response to increasing orders, and the number of production workers was back up to 980 in February 1994. In September 1993, the total number of employees at Impuls was 1,600.

Impuls management has had trouble keeping its best staff, because the enterprise cannot afford to keep salaries high. Impuls cannot afford to take out loans to raise pay because the commercial interest rates are so high, despite the fact that the enterprise gets special rates from four of the five banks it deals with due to its good financial situation. It was particularly difficult for Impuls to compete for employees with private commercial enterprises, because these companies have not been regulated as strictly by state salary caps.

During 1993, Impuls kept wages in line with sales rather than inflation. While this was not a popular measure, it was a way to manage costs without actually firing people, and meant that Impuls could pay wages on time. This, in turn, has given the enterprise good relations with the banks, which is crucial if it is to secure working capital.

The enterprise managed to reduce personnel by implementing a strict budgeting policy. The wage fund of each division was determined by the volume of contracts of the division. The top managers then decided how to divide money among their employees. This led, as a rule, to growth in real wages for the most active “core” employees of each division. Less active employees, however, had only minimal salary adjustments in the face of high inflation, which worked as an incentive for them to leave the enterprise.

E. Restructuring

Impuls has been adjusting to the decline in state orders through the reorganization of its divisions and departments in an attempt to streamline its R&D and manufacturing areas.

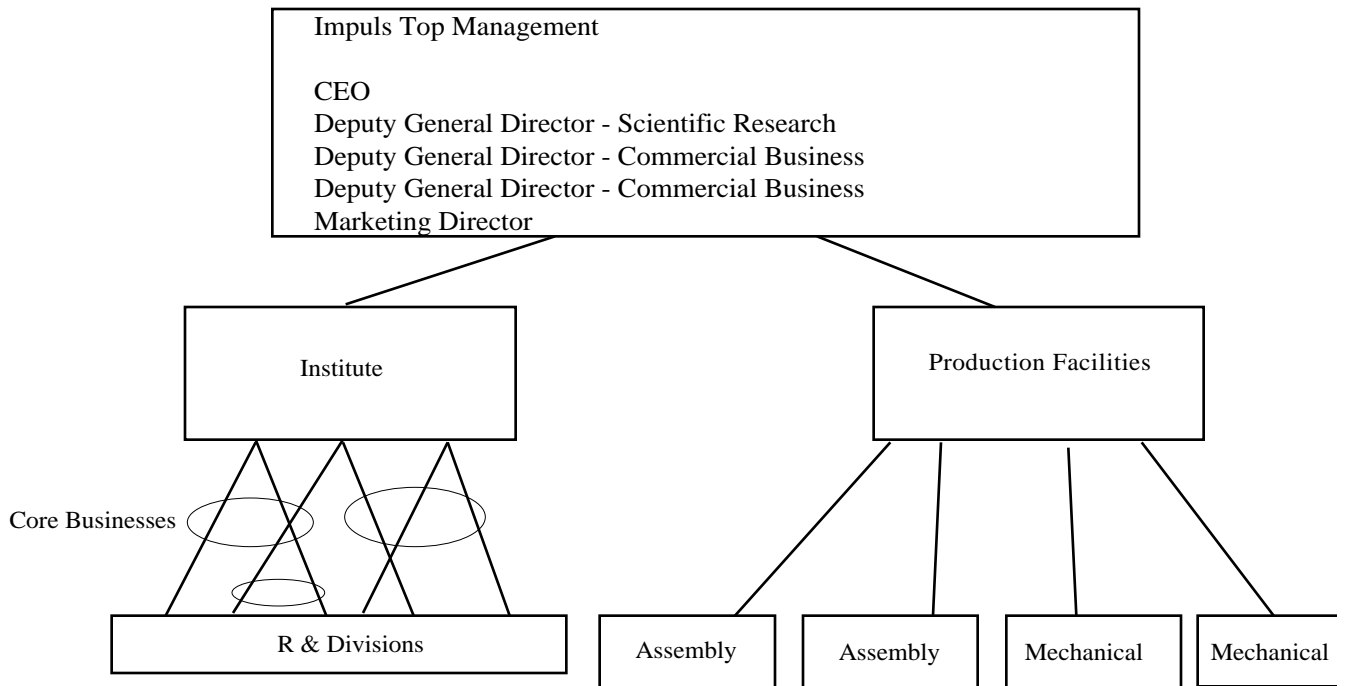
Management tried to forestall the possibility of losing divisions by setting up conditions so the enterprise could function as a diverse privatized entity in a market economy. Connections between the enterprise’s departments were established on a contract basis. The divisions are economically self-sufficient, but also integrated according to Impuls’s own management mechanisms.

A number of departments that had been productive under state budget conditions became too much of a drain for the enterprise in a freer market, and had to be disbanded. Impuls used to have some divisions, for example, in which only a small fraction of work was for Impuls, while most of the parts produced went to other enterprises. Under the state budget, Impuls could afford to house these groups and pay their overhead and administrative costs; now, however, it is to the enterprise’s advantage to contract out or buy components, so that it pays only for the work it needs.

Although top managers seem to be adjusting to operating in market conditions, many of the middle managers, especially those in research and development, were unprepared to take on the new level of responsibility. Many of these managers still believe the state should continue to support the enterprise. Grigoriev worries that Impuls will not have enough capable managers to handle the growth he hopes for, although the managers are now seeing the need for end products as well as R&D and components.

Beginning in July of 1993, Grigoriev created new units in the scientific-technical complex, organized according to core competence, such as television measurement systems and satellite communications. (See Figure 1.) These core businesses were established to utilize workers from any or all divisions. Each unit was made responsible for defining its own products and controlling its costs and wages. These division managers generally have a significant amount of decision-making autonomy and are increasingly more involved in issues of marketing and product selection. Several old units were left intact and were made responsible for generating their own business. The intended result of this restructuring was

Figure 1. Impuls Organizational Structure



to decentralize responsibility, and more specifically to reduce staff, providing work for the remaining employees and making earnings dependent upon their efficiency. At the beginning of the summer of 1993, there were seven units. On their own initiative, employees formed two more units. Grigoriev thinks that the scientific and research units may undergo some further restructuring to increase independence and profit responsibility. It is not yet clear whether this grouping will be successful, as many businesses have been dissolved.

One example of these units is the Scientific Research Division. The division is divided into eight laboratories with little decentralization of decision-making to the labs. Ninety-nine percent of marketing and business issues are the responsibility of the division head. Approximately 90 percent of the work in this division comes from external contracts that are negotiated by the division head while the remaining contracts are orders provided by Impuls. Salaries for this division are also set by the division management.

The production divisions have a different level of management and decision-making ability than the research divisions. Grigoriev's approach is not to force middle managers in manufacturing to change but to create a supportive environment for innovation. Independent units are being set up to handle repair and maintenance. The production units do not have decision-making autonomy as in the Institute and managers seldom deal with marketing issues. Their autonomy is somewhat limited to the distribution of wages. These units are also faced with losses of employees to the trade sector.

The Assembly Division produces a variety of products with its main product the bill counter. Production is carried out by mechanical engineers, design engineers, and manual laborers. 100 percent of the orders for this division comes from Impuls, though again, the division management is responsible for allocating salaries among workers. In this division no

decision-making is done regarding investment, product lines, profits, marketing, or contracting.

Since reorganization, each middle manager is in charge of a product line. According to Grigoriev, only about 10 percent of them on the design side are capable of working in market conditions. The rest are top specialists, but do not now have the experience necessary to cope with the market. There is a similar percentage on the production side, but Grigoriev feels that it is not as critical that the managers be ready for the market on the production side as it is in R&D. He explains this as follows:

Impuls's primary competency is radio electronics systems. Nevertheless, under the old system, the enterprise had to have departments to do everything: all kinds of support functions and manufacturing as well as the R&D core. Now, the management team is trying to increase Impuls's own facilities only in the core competencies; in other areas, whatever weaker managers are unable to produce that is needed to increase overall production will be purchased from outside the enterprise. Thus there are three possibilities for the weaker sectors on the production side: a manager from another Impuls division would be brought in to assist; an outside manager would be invited in to take over the division, working on Impuls territory; or such divisions would shrink or close, and the enterprise's assets invested in outside companies of similar profiles. This means that managers on the production side who cannot keep up with changing conditions are dispensable.

On the R&D side, however, any manager that can't adapt and therefore has to be let go will be lost to the enterprise as both a manager and a technical specialist. Managers who are skilled scientists/engineers cannot be replaced so easily by outsiders. This is a real problem for Impuls. It may make sense for the enterprise to consider creating parallel career ladders for scientists and managers.

As Russia's economy changes, with increased opportunities for small businesses, Impuls has faced the threat that the heads of small divisions would want to split these off into independent businesses. The high diversity of the enterprise's operations increased the risk that it would dissolve into a number of separate entities. Grigoriev and his team have opposed such a development; Grigoriev compared it to the Commonwealth of Independent States, meaning it would be ineffective and not truly unite its members.

F. Social assets

Before the reforms began, Impuls owned many buildings and facilities for the social needs of its employees. These included more than a dozen apartment buildings, two kindergartens, a dacha and summer camp for children, family vacation facilities, and a sports complex (including a gym with fitness classes, a small swimming pool, a sauna, and ski equipment). There was also a small medical clinic on the enterprise's territory, with specialists in several fields, which was connected to local hospitals. Although the enterprise did not own or manage any agricultural property, it did provide nearby farms with technical services in exchange for low prices on food for Impuls workers.

As part of management's effort to address the administration of these social assets, a new position was created in the beginning of 1994: deputy director for social issues. Ludmila Povolotskaya, who was formerly the head representative of the trade union at Impuls, was appointed to take charge of this sphere.

Impuls turned over all its housing to the prefecture (local districts within Moscow) in the fall of 1993. It decided to do this on the principle that it should focus on its core scientific

areas, and not be responsible for every aspect of employee life. Another factor was the fact that the state does not subsidize the enterprise for housing expenses such as energy, while the prefecture does get state subsidies. The enterprise's agreement with the prefecture includes a provision that Impuls employees will get housing priority in case of "extreme situations." This agreement to help Impuls has no definite term, nor are there specifications as to what counts as "extreme," but Povolotskaya expects that since the prefecture works closely with Impuls, the officials will take the enterprise's word as sufficient evidence that a case deserves priority.

Impuls also transferred the kindergartens to the prefecture in 1993. Impuls signed over the property, the buildings, and all maintenance responsibilities, but under an agreement that Impuls employees would get priority for places for their children (no specific time limit was set for this condition). Impuls always paid for employees' children that attended other kindergartens (if they lived elsewhere in Moscow, for example), so it still pays for employees' children's fees. The enterprise's share depends on the family finances, but it pays at least half the fee for each child.

The camp facilities, including the dacha, are closed for renovation. Impuls can't afford the necessary repairs, so it is looking for a private partner to invest. Meanwhile, the enterprise is still paying to send employees' children to other camps. Impuls also still pays for about 60-70 percent of the cost of employees' vacations/recuperative trips.

The sports complex works exactly as it always has: Impuls employees use it free of charge, and the leftover time is rented out to other organizations/enterprises. Payments by outside users cover the cost of keeping the complex in operation.

The clinic's services, including consultations with ear, nose, and throat; gynecological; lung; and dental specialists, are all completely free to employees. This costs the enterprise a great deal of money, including the costs for physical maintenance of the facilities, energy costs, and salaries. Sometimes there is extra capacity; a neighboring enterprise pays Impuls for allowing its employees to use the services. Despite the expense of the medical services, Impuls management does not plan to try to transfer the clinic to the prefecture.

In addition to the on-site health care, Impuls also pays for medical insurance for its employees for major procedures, such as surgery. The enterprise pays an insurance company a fixed sum every quarter, and the insurance company is committed to covering all such major costs. In 1994, the total yearly premium will be about 5 percent of payroll.

The workers' collective votes once a year on how to allocate funds to various social programs. If there is an urgent reason to violate this budget, the deputy director has the authority to pay for whatever is necessary and simply report afterward to the council of the workers' collective.

Clearly, the enterprise is still contributing large sums for the social needs of its employees. In 1993, Impuls spent around 100 million rubles on the social sphere; because this was too much for the enterprise to keep up in the future, the housing and kindergartens were transferred. Nevertheless, although Impuls has legally shed these responsibilities, the managers (particularly Povolotskaya) still consider themselves responsible for helping employees solve problems and get service in this sphere. In general, Impuls would like to maintain the current level of social assistance (of all kinds) to employees, or to increase it.

III. Privatization and Legal Restructuring

Initially, the 1992 State Program of Privatization divided enterprises into five groups with different requirements for privatization. Since Impuls designs and manufactures weapons systems, it fell in the group that could be privatized only by permission of the Government of the Russian Federation or governments of republics within the Russian Federation. On August 19, 1993, however, Yeltsin signed a decree allowing the privatization of certain defense enterprises that had been excluded from privatization.² Impuls acted quickly, hiring expert consultants on privatization and preparing its privatization papers.

In December 1993, a government decree was signed for the privatization of Impuls.³ It gave the enterprise the right to privatize using any option, with the only constraint being that the government would retain a “golden share” (which does not allow for day-to-day interference, but would prevent the shareholders from any fundamental change of profile, the sale of the capital assets, or any other major change). Essentially the golden share has no voting voice, only veto power.

Initially, Impuls was considering privatizing under Option Two, but in the end chose Option One. Management discouraged the workers’ collective from selecting Option Two because it would give 51 percent to the workers, and managers believed workers would sell all their shares to outsiders within a few days. This risk was particularly salient because besides the 2,000 current employees, an additional 4,000 people were eligible to buy shares in the closed subscription (former employees who retired or resigned from Impuls, but who retain the right to employee privileges according to the privatization legislation). Thus, about two-thirds of the stockholders would not necessarily be committed to the survival of the enterprise. Option One posed less of a threat from this point of view, because the 25 percent given to the workers is non-voting, and thus would be less attractive to outsiders trying to gain control over management. Option One does provide for sale of an additional 10 percent of voting shares to the workers through closed subscription, but this is a small enough amount that it may not interest outsiders trying to gain control. Five percent of the shares belongs to top management, and sixty percent is distributed as follows: twenty-nine percent for private vouchers and thirty-one percent to the GKI.

Grigoriev was concerned that the second option could lead to the general director being stranded among a group of worker-owners who have no common strategy and do not consider the interests of the enterprise the way shareholders should. He felt that it would be easier for the board of directors and the general director to come to agreement with the government’s representatives concerning dividends and reinvestment than it would be for those directors to negotiate with a large group of shareholders who don’t understand the concept of property. Furthermore, Grigoriev hoped that the government would give him voting rights over the government shares.

Besides letting management keep greater control of the enterprise, Option One was also a way to compromise with the government. Specifically, Impuls will have benefits in terms of state orders and a 50 percent tax reduction. The state will retain its golden share for a period of three years and will initially appoint two of four members to the Impuls board of directors (the size of the board will increase to seven at the initial shareholders’ meeting). The board of directors consists of Grigoriev, a member of the GKI, a local government official and a representative from the trade union.

On June 6, 1994, Impuls became a privatized open joint-stock company with Grigoriev as Chairman and CEO. In addition to the 25 percent of preferred shares, employees were

allowed to purchase an additional 10 percent at a discounted price. However, because many employees had already spent their privatization vouchers, only 8.3 percent of the stock was sold. Management bought an additional 5 percent at full price.

Twenty-nine percent of the shares was sold on the voucher auction market in three offerings. First, 9.7 percent was bought in its entirety by a voucher investment fund, a real estate fund. The following offerings were purchased by small investors. The remaining 31 percent plus the 1.7 percent left unsold from the employees' subscription are scheduled to be sold at a cash auction. Grigoriev indicated that two U.S. firms had expressed serious interest in purchasing Impuls shares and was confident that he should be able to attract good potential partners for Impuls as a result of that auction.

Under Russian law, Impuls must conduct the cash auction and hold its first shareholders' meeting within one year of registering as a joint-stock company. Grigoriev expects the shareholders' meeting to take place sometime around March 1995 though legally the meeting can be held after 50 percent of the shares are sold. As of September 1994, 42.3 percent of the total shares had been sold. Grigoriev plans to work out the management structure before this meeting occurs.

For the future, Grigoriev believes privatization will help Impuls secure business. At one point, the enterprise had a large order from a South Korean company, which later cancelled the contract after learning that Impuls was still a state-owned enterprise.

IV. Conclusion

Impuls has achieved a considerable amount in the direction of conversion but continues to maintain a significant mix of defense and civilian work. The enterprise has shifted to production of more finished products rather than predominantly producing components. Management's focus for new products is on taking advantage of the enterprise's core technical capabilities. Another important movement has been restructuring the enterprise's organization to emphasize new functions, such as marketing, and to decentralize profit and loss and business development responsibilities.

Impuls's philosophy is still to decentralize financial responsibility of divisions without creating legal subsidiaries, and Grigoriev's team is currently working to educate staff and middle management in this area. In particular, Grigoriev and his team are trying to explain that employees need other incentives besides salary. Although the educational process is slow, members of the CISAC team have observed an increasing understanding of these issues on the part of middle managers. Employees, however, do not view cost control, positive cash flow, and meeting bank obligations as positive signs of success. Rather, they view the lower than average wages as a sign of failure. Nonetheless, senior managers believe the new ideas are making headway and are optimistic about the company's prospects for the future.

Notes

¹ Steve Liesman, "Yeltsin Moves to Cut Business Taxes," The New York Times, May 26, 1993, C14.

² Presidential Decree No. 1267, August 19, 1993, On the Special Features of Privatization and Supplementary Measures of State Regulation of the Activity of Enterprises of the Defense Sectors of Industry, NEXIS.

³ Private meeting with Impuls managers, January 1994.

V. The Mashinostroenie Enterprise

Tova Perlmutter, Michael McFaul, and Jeffrey Lehrer

I. Introduction

Starting in the winter of 1991, the project on Industrial Restructuring and the Political Economy in Russia at Stanford University's Center for International Security and Arms Control (CISAC) has provided technical assistance to Mashinostroenie, a large aerospace enterprise engaged in research, design, experimental production, and systems integration of a broad variety of space vehicles and equipment. Officially known as NPO Mashinostroenie,¹ the firm is one of the most prestigious enterprises in the Russian military-industrial complex, with world-class, state-of-the-art technology. The enterprise brings together many of the country's best scientists and engineers, along with management systems to execute their ideas.

Mashinostroenie managers feel that their enterprise is unique and that the products and services it provides are essential. What makes the enterprise special, they believe, is that it organizes and coordinates very large, complex projects in space, with hundreds of subcontractors and many different types of technology. This requires not only a system of coordinating these subcontracts, but also highly skilled managers with experience with this kind of project. The enterprise used to not only execute the design, development, production, and testing of all its systems but also supervise their actual use, including monitoring up to the final operation of the product.

Management would like the enterprise's space projects to remain the basis for civilian contracts; the task ahead for the enterprise is primarily not, therefore, conversion in the sense of totally new products, but rather transition, education, and adjustment to the requirements of market operations.

II. Brief History and Description

Mashinostroenie was founded in 1955 in Reutov, a small town outside Moscow, by Vladimir Nikolaevich Chelomey, often referred to as “the Russian von Braun” for his work on rocket technology during the Second World War. Beginning on 37,000 square meters with about 215 collaborators (including many of his own pupils from the Bauman Higher Technical School of Moscow), Chelomey quickly expanded his design bureau, adding experimental installations with vacuum chambers, anechoic chambers, static and dynamic structural test benches, and metal and nonmetallic treating production facilities. By 1960, Chelomey’s bureau had designed a whole system of satellites and rockets. The enterprise employed more than a thousand engineers, most of whom were trained at well-known aircraft design bureaus.

The 1960s were a period of energetic expansion and development for Mashinostroenie. New facilities were built, industrial territory expanded, and production area increased tenfold. One of the best-known products of this period was Poliot-1, the world’s first automatic satellite to maneuver while in orbit, which was a precursor for automatic docking in orbit. Later, the enterprise developed the Proton heavy launch vehicle, which put into orbit the Proton heavy automatic space station. The Proton rocket became the principal launcher for all heavy space stations in the USSR, and is considered one of the most reliable heavy launchers in the world. Chelomey’s team also designed, developed, and constructed the three manned space stations launched in the Salyut series.

Chelomey’s successor, Herbert A. Yefremov, came to the firm as a young specialist in 1956. He was involved in all the enterprise’s major projects and is the director of Mashinostroenie today. Throughout the 1980s, Mashinostroenie continued to research, design, and develop new space systems for gathering optical and radar information and generating images of the earth from orbit, as well as a new type of space station, Almaz, which was launched in 1987. This station is considered one of the best vehicles for gathering radar information about the earth’s surface, information with a wide range of military and civilian applications.

Mashinostroenie now reports to the government through the State Committee for Defense Industry, which is headed by Victor Glukhikh. The state committee interferes very little.

Mashinostroenie has been a center for defense research both under the Soviet regime and now for the Russian state. Mashinostroenie officials would not give details on their defense work, but they confirmed that Mashinostroenie was involved in the design and development of Soviet naval ballistic and cruise missiles as well as the country’s strategic defense system.

As of September 1994 Mashinostroenie employed 6,000 workers. At the same time the center’s annual sales volume is hundreds of millions of rubles in 1991 prices, and ten to twelve billion rubles in 1992 prices. Multiplied by the appropriate exchange rates, these figures are in the range of 10-50 million dollars, but it is inaccurate to consider this the actual dollar value of production, since Mashinostroenie’s technology has been sold almost entirely on the Russian market at prices far below what it could command in the West. Until now, Mashinostroenie’s revenues have not reflected the true value of the firm’s output.

III. Organization

Mashinostroenie has two main sections, the design bureau and the experimental production plant. The whole enterprise is led by Yefremov, a very powerful leader with both technical expertise and personal authority. Yefremov's title is General Director and General Designer, reflecting his position at the top of both administrative and scientific structures.

Yefremov is assisted by three First Vice General Directors: L. E. Makarov, Anatoliy Khromushkin, and Victor Viter. Makarov and Khromushkin are primarily responsible for administrative affairs, while Viter heads the scientific/technical hierarchy (his title is Chief Designer). All have extensive technical background, however, and maintain interest and awareness of the enterprise's overall direction and activities. In particular, although Khromushkin and Makarov divide their administrative responsibilities roughly along the lines of external and internal affairs, Khromushkin is involved in major decisions throughout the organization.

Under these top four men, the enterprise's structure continues hierarchically. The design bureau, for example, is divided into 15 sections, which are mostly distinguished by their technical subject matter. These divisions are further divided into departments, which specialize in such fields as design approaches to large general questions, theory, design-specific prototypes, and experimental laboratories. Each division may employ hundreds of people, including scientists, technicians, and "direct" workers to carry out the specialists' ideas. Departments may have from 20 to 60 or more employees, and are often broken down still further into the smallest management units, "sectors."

Aside from the technical hierarchy, there are support divisions, including one for finance and legal affairs, a commercial marketing section, and the personnel department. Other administrative units include a special "scientific-engineering center" and a center for conversion, neither of which has a clear position in the hierarchy. Finally, the enterprise has founded about 20 joint-stock companies, referred to by managers as "daughter companies," in which it retains majority ownership (see below). Still, the daughter companies are not part of the administrative system and enjoy a certain amount of autonomy.

Our team has spoken with managers at several levels, including Yefremov himself as well as Khromushkin. Another major source has been Vice General Director Vyacheslav Martynov, who is responsible for international relations and also serves as director and part owner of the Almaz Foreign Trade Company, one of the enterprise's daughter companies.

IV. Finances

Mashinostroenie's financing has changed significantly over the past few years. Until 1989, 100 percent of the enterprise's financing came from the state for work on large, secret defense contracts. The amount of defense work has steadily declined to 95 percent in 1990, 80 percent in 1991, 65 percent in 1992, and 35 percent in 1993. By September 1994, military contracts' share of revenue had increased slightly to 45 percent.

Finance and Economics Agency Chief Valery Bunak, who heads the finance department's 100 employees, described the sources of funds for groups no longer supported by defense contracts (he called these departments "self-financing") in 1993. First, there are "external"

contracts with other enterprises, which made up about 22 percent of the enterprise's total 1993 business. Second, there are projects supported by government credits specifically designated for conversion; these funds are officially "loans," but the interest rate (13 percent in 1993) is effectively negative under current inflation. Such "conversion" projects were about 18 percent of the total 1993 budget. Finally, the enterprise allots some of its own profits to an internal "innovation fund" to encourage initiative among employees. This fund, which comprises about 10 percent of Mashinostroenie's annual budget, is allocated by a special council of high-level specialists, who review applications including business plans and oral presentations. Before coming before the committee, applicants must go to the finance department for help developing a business plan, which must include projected income figures, costs, possible sales figures, suggested prices, etc. If the finance department feels the project is unrealistic, the plan may die at this stage, without being submitted to the committee.

In July 1993, Bunak expected ten billion rubles in revenue for all of 1993, just for the enterprise's "paper" R&D projects (the overall volume of what is actually produced by Mashinostroenie and subcontractors would be about ten times more). Mashinostroenie collects the full payment and passes payments on to the subcontractors. In addition, Mashinostroenie receives a significant amount of state subsidies. In 1993 about 15-20 percent of overall revenue was profit, while the rest went to costs—materials, taxes, etc. The enterprise was taxed 32 percent on profits, plus a social insurance tax of 39 percent of payroll. These taxes, together with several other applicable taxes, added up to about 25 percent of revenues (gross).

The picture was slightly different as of September 1994. By then, 45 percent of revenues came from military orders, 15 percent from aerospace, 18 percent came from defense conversion credits, and 22 percent from commercial civilian projects. Taxes equaled 40 percent of revenue, while social service costs accounted for 30 percent of revenues. No income was being generated by social services (although the state did help subsidize the kindergartens).

Although the state is very strict about monitoring expenditures using its funds, it transfers funds very late. Delays of two to three months began in 1992. This means that Mashinostroenie is forced to delay payments, which causes problems for the roughly 400 subcontractors that depend on the enterprise's payments. As of July 1993, Mashinostroenie owed other Russian enterprises about 300 million rubles, while the government owed Mashinostroenie 800 million rubles in payments past due for contracts.

Mashinostroenie has its own internal bank, and deals with five of Russia's biggest commercial banks: Promstroibank, Unikombank, MIR, AVIA, and Agribank. Mashinostroenie is a shareholder in Unikombank, which is one of the seven largest banks in the country. These banks are used essentially to provide lines of credit for maintaining cash flow and meeting payroll. As of July 1993, the enterprise owed Unikombank 200 million rubles, and owed the state bank (Gosbank) 100 million rubles for conversion loans. Bunak and his deputies have asked the government to pay the interest on the loans Mashinostroenie was forced to take out because of the government delays, but the government has not responded. None of the enterprise's debts has been written off.

V. Conversion—General

Before reforms began, Mashinostroenie received all its orders in the form of very large contracts from the government, through the Ministry of General Machinebuilding. The enterprise allocated each project's scientific design questions to its own divisions and specialists, and managed the execution of these designs through its own experimental production plant, as well as through subcontracts with hundreds of other enterprises. By definition, all personnel were considered to have a full workload, since staff size, recruiting, and salaries were all determined by the ministry, which was also the main customer.

With the sharp decline in government orders, however, state contracts are not sufficient to keep the enterprise alive at anywhere near its former size. Managers at the division, department, and even sector level have to find external commercial contracts to make up the difference and keep their workforces busy. Different groups have had varying degrees of success in these efforts, partly due to different levels of energy and marketing skills on the part of the scientists and managers involved, and also partly due to the fact that some types of equipment and expertise are in much greater demand than others.

Money that comes in from external contracts must be submitted to the central enterprise management, but then is redistributed to the divisions and departments that generate it, where managers use the funds for salary. Employees who work in areas with many lucrative commercial contracts, especially if they hold responsible positions and were active in pursuing the commercial business, may earn four or five times as much as employees who have less drive or work in areas less in demand.

In 1989–1990, Yefremov began to think about conversion. He announced a new policy to the entire workers' collective, both at the annual meeting and every month through official announcements. To start conversion at Mashinostroenie, he gave everyone the opportunity to come forward with proposals. Some of the upper managers today are people who started out at lower levels, but who brought conversion ideas to Yefremov and convinced him that they were worthwhile.

By 1994, Yefremov was telling his managers to work with the expectation that 20 percent of all orders would come from the state; they were to try to get commercial orders from the market to fill the remaining 80 percent of their capacity. According to Martynov, however, although Yefremov has announced this goal the general director realistically expects the best scenario to be 50 percent state, 50 percent commercial orders; the higher number is an effort to motivate managers to find orders. Managers still want to keep 30-40 percent of their business in defense orders in order to maintain their technological level; and lingering attitudes showed when one manager explained that "of course" the ideal would be to have 100 percent well-paid, guaranteed state orders. Even when he was asked, "But when government contracts are not being paid, aren't they a weak point rather than an aid to stability or a strength?" this manager still felt that government orders are better because they allow the enterprise to plan longer term. That is, even if they are "bad" government orders (i.e., orders that are not paid on time or at all), they permit management to set long-term directions.

VI. Conversion—Space Projects

Through 1989, Mashinostroenie made a very small amount of civilian products, but most of its production was in space-related technology. Until 1991, only the military conducted space research in the Soviet Union, so all information concerning space was classified and unavailable for commercial purposes. Thus, by definition, all of Mashinostroenie's main activities were defense projects. In 1989, Mashinostroenie management got permission from the necessary military-industrial officials and the Council of Ministers for commercial distribution of data from the Almaz space station, which was then being built. Almaz-1, the satellite that generated the enterprise's first commercial projects, was launched in March 1991, and was in orbit almost two years. The data that resulted were extremely useful.

The enterprise's most developed conversion activities are connected with the sale of information from the Almaz satellite. Mashinostroenie managers believe that the successful marketing of information generated by Almaz will be the bread and butter of the company's future. Data from the satellite is useful for oceanology, geology, cartography, geophysics, agriculture, forestry, and environmental management and protection. This project has both commercial and government financing; the enterprise started work without expecting any contribution from the government, but when the government learned of the project, state funds were also forthcoming. Other commercial projects include a telecommunications satellite, and various small-scale projects.

The enterprise is now working on Almaz-1b and Almaz-2, which will use the experience of Almaz-1 to meet customers' needs better. For example, Almaz-1 used only one radar wavelength, a high-resolution wavelength of 15 meters. Not all projects require this high a resolution; indeed, some are better suited to a lower resolution, which allows more area to be visible at a time, and can require less exposure time and processing. For the next generation, therefore, Mashinostroenie specialists are developing a radar system with several different wavelengths, to serve different customers' needs.

Mashinostroenie would also like to develop, as a conversion project, the ROUSLAN geostationary communications satellite. This satellite would provide voice, data, fax, and video transmissions over 33,000 channels.² The cost of development, however, appears to be prohibitive, and Mashinostroenie is seeking a foreign partner. Mashinostroenie is also developing and producing satellite communications antennas.

VII. Conversion—Non-Space-Related Projects

Through 1989, nearly 100 percent of Mashinostroenie's production was devoted to space technology. In 1990, non-space-related production grew slightly, to around 5 percent of total production, but it was in 1991 that the ratio of civilian to defense production began a significant shift. Even now, the enterprise's space information systems are the main focus of its attempts to find a market niche. Mashinostroenie does have other sectors, however. Like most other Soviet military enterprises, Mashinostroenie was forced to start production of consumer products in the 1980s by order of a CPSU directive. As long as the enterprise received sufficient funds from the state, its management was not very interested in the civilian goods, and they were distinctly second priority. Now, however, this sector is one of

the firm's main sources of cash, so work has increased on complex civilian products and consumer goods development, such as fiberglass sailboat construction.

As part of their strategy for initiating small commercial operations and businesses, Mashinostroenie's directors have actively encouraged lower-level managers to seek contracts with other enterprises, both at home and abroad. For instance, one partnership was concluded with the Italian firm Paletta to produce equipment for the leather industry. For many years, Mashinostroenie has been a supplier of technologies and equipment for leather treatment to factories within Russia. Paletta's interest in the venture is as a means for gaining access to the Russian leather market. After two years of negotiations, production began in 1992. In developing this project, Mashinostroenie managers sought not only to exploit new sources of hard currency, but also to obtain know-how relevant to entering the leather market. They hope eventually to serve the Russian market on their own, and if possible, to enter the foreign market as well.

Mashinostroenie has also been involved in providing equipment for food processing facilities. It has also branched out into food storage, using a nitrogen air mixture technique first used for applications in outer space. The firm has a program for developing solar energy units, wind-power stations, oil-extraction equipment, and other energy units. Other civilian products, at various stages of development, include a business-class aircraft, optical character recognition for use with computer scanners, weapons for individual self-defense, water purification equipment, yachts, furniture, telephones, and bakery machinery. In addition, Mashinostroenie has broadened its scientific research outside the aerospace arena. Current projects include work connected with medical experiments and computers.

While recognizing the utility of these non-space-related ventures, Mashinostroenie's management remains focused on preserving, maintaining, and eventually expanding high-technology products and phasing out the production of items such as saucepans. Though forced to pay attention to the market and to maximize profits, Mashinostroenie managers are still scientists by training. Decisions about diversification and product lines, therefore, are not made solely on rational economic calculations; science also plays a role. The more science, the more appealing the product, even if it may mean less profits.

VIII. International Projects

The most lucrative contracts to distribute data from Almaz were concluded with Western customers. At first, Mashinostroenie could only make contact with foreign businesses through the government's foreign trade agency for space deals, called GlavKosmos, which had been founded in 1985. Through GlavKosmos, the enterprise began negotiations with the Texas-based Space Commerce Corporation. By 1991, however, when Mashinostroenie was launching its Almaz-1 space station, the political and economic situation in Russia had changed dramatically. Though the Soviet government lacked a comprehensive plan for conversion, individual companies were allowed greater liberty in making decisions about production and commercialization of technologies. Mashinostroenie seized this opportunity to develop civilian, private-sector uses for Almaz-1, and signed an agreement with Space Commerce Corporation. By the time the deal was finalized in 1991, Soviet legal requirements were relaxed, and prevailing business practices allowed enterprises to conclude

contracts independently of GlavKosmos. Consequently, in this case, the two main parties to the contract were Space Commerce and Mashinostroenie, with GlavKosmos as a third party.

In 1992, after Almaz-1 fell out of orbit, Mashinostroenie negotiated another deal with the Hughes Corporation to distribute Almaz information. Through Hughes, Mashinostroenie data were sold to British Petroleum and other large companies. The enterprise has also sold data to American universities and the U.S. government. Sales have not been limited to the most recent Almaz information; much of the enterprise's archival material from the past is non-classified, and these photographs have been distributed both domestically and internationally.

In early 1994, Mashinostroenie became a candidate for funds from the U.S. Department of Defense's program to assist defense diversification in the Former Soviet Union. Two such funding programs are in process so far. One is a \$20 million project to build housing for military officers in Russia. Four Russian enterprises were selected to propose projects for funding under this housing program. The second program provides a total of \$20 million for use in Russian conversion projects that involve American partners (these U.S. partners must also invest their own money); there were four Russian candidates for this program also. Mashinostroenie was the only Russian firm on both lists. As of October 1994, the housing construction program had yet to begin operation. As part of the second program, during Prime Minister Victor Chernomyrdin's visit to Washington in June 1994, the U.S. government announced an award of about \$5 million to the Double-Cola Company of Chattanooga, Tennessee to work with Mashinostroenie in building a soft drink bottling facility. Double Cola expects to employ about 200 people on the project.³ The agreement between the parties is still in negotiation.

Mashinostroenie's initial moves toward the market benefited greatly from the contact with Space Commerce Corporation. Working on this project, managers at Mashinostroenie learned valuable lessons about the commercial uses of space, including advertising methods, consumer service, market research, and construction of the station itself. Martynov explained that working for a cash-paying customer is different from working to fulfill state plans. Management is starting to understand that for commercial space contracts, the whole production chain—development of equipment for the station, methods of collecting and processing information, techniques for exhibiting the products, etc.—must be planned according to the needs of the client. This contract with a foreign customer also required changes in construction of the space station, and in the equipment used to produce and service the product. Most significantly, the size of the bulky Almaz station was scaled down to cut the cost of individual launches. Space on the station was also reconfigured. Originally, the designers created large spaces to accommodate military equipment. While military projects are still conducted on the space station, more space has been allocated to commercial projects.

This kind of change at Mashinostroenie is not merely conversion of a production process or of the products themselves, but conversion to a new view of how to apply the space hardware produced to a new, market-directed philosophy for its development. Consumer-oriented tasks (e.g., how to present information for the consumer, how to expedite delivery, and how to add new options in supplying information) call for constant, up-to-the-minute communication throughout the technological chain. In the past, the commercial client was a third priority consumer, after military and science applications. Now, radical changes in development priorities must inevitably lead to significant alterations in the structure of the enterprise and of all its units.

IX. Personnel and Productivity

As its sources of revenue have shifted, and as the need to respond to market demand has required greater flexibility, Mashinostroenie has undergone some de facto reorganization. Where there were once ten basic areas, by the summer of 1993 there were about 300 sections with separate foci. According to finance director Bunak, work is carried out using a matrix organizational structure; each project must go through five “thematic” areas: design, modeling/development, experiments and testing, technological development, and production. Bunak said there are five large sections, each employing 300-500 people, while the rest are quite small, employing as few as two or three people.

Retaining personnel is a high priority for Mashinostroenie leadership. In 1989, Mashinostroenie had 10,000 employees; by 1993, the total was only 9,000. By September 1994 employment dropped to 6,000, with 2,500 people working in research and development, 2,000 in service, 1,000 in production, and 500 as managers. The 1,000-employee drop from 1989 to 1993 was achieved through attrition and retirements. In contrast, of the 3,000 employees that left between 1993 and September 1994, 1,000 were transferred to other enterprises and 2,000 were laid off. Eight hundred of the four thousand employees who left worked in the social services.

Despite financial pressures, managers are not pleased about the departure of 40 percent of their workforce, and are anxious lest more top specialists leave. Space technology requires a large, highly educated labor force to complete even one project. However, government regulations on state contracts and payments make it difficult to raise salaries enough to keep these highly trained people. Meanwhile, the emerging private sector offers new and profitable opportunities. These talented experts can find work with small high-tech private businesses and joint ventures that pay several times their salary at the state enterprise.

Each section of the enterprise has drawn up a list of its top people, the loss of whom would significantly hurt the whole enterprise (the total number on all the lists is about 500). Salaries and other benefits are constantly adjusted to try to keep these key individuals. In fact, by September 1994, the enterprise was paying top scientists 12 times minimum salary. (See the section on the social sphere, below.) Mashinostroenie also grants “veterans’ benefits” to employees who have worked for twenty years or more.

Managers fear not only the loss of particular key people; they would like to keep all personnel at current levels. In 1993 Martynov said that staff reduction had not affected output significantly; however, he added that a reduction in personnel of 30 percent or greater (like the one that occurred in 1994) would lead to a significant drop in production.

This inconsistency reflects a more general difficulty for Mashinostroenie management in trying to run a very large operation with both R&D and experimental components, using large and expensive equipment that requires a high level of expertise yet is only in demand for very specialized use. It was very difficult for managers we interviewed to assess the workload of their divisions. When one manager was asked whether his department was working at 100 percent capacity, he answered that it couldn’t be measured in that way, since one scientist may work on a given task for two weeks, while another would solve it in two days.

One way managers compare productivity of departments is in terms of how much revenue they are generating. In June 1993, for example, the average monthly salary at the enterprise was 27,000 rubles (for comparison purposes, the mid-year average salary was

34,567 rubles⁴ and a monthly food basket of necessities cost around 18,000 rubles). So a division was considered to be “fully used” if it earned 27,000 rubles per employee (combining revenues from both commercial and government/“internal” orders). As may be evident, however, this measure is rather arbitrary and inconsistent with accepted measures of productivity. If the enterprise as a whole loses orders, the average salary could go down (in real terms; in the inflationary environment, salaries must go up just to retain stable purchasing power) and any given department would have to earn less to be considered fully used. Such a department would in fact be less productive, but its workload would still be considered “100 percent.” At the same time, those departments that have succeeded in attracting many lucrative commercial contracts are earning quite a bit more than 27,000 rubles per staff person—as much as 50,000 rubles or more. Although no doubt their staffs are working hard to take advantage of the opportunities, it does not make sense to describe their workload as, for example, 180 percent.

At the same time, many departments may have few or, at times, no assignments that require the highly sophisticated and expensive equipment and the advanced training of their scientists; some rent out their space as warehousing to store consumer goods (in short-term contracts only, so as not to interfere with any scientific work that may come up), or they contract their people and facilities for small-scale workshops to assemble appliances. Through such contracts divisions try to use their mechanical equipment to the fullest extent possible; examples include contracts building sailboats and a venture with a German turbine manufacturer.

For the long run, however, the enterprise will have to come up with more general, reliable solutions to the problem of inconsistent demand. It does not make sense for highly educated, creative scientists to be working on telephone assembly; but unless some other system can be devised, many of the scientists will have little choice.

X. External Relations

Another issue that will affect management’s planning for the future is the enterprise’s ties to other firms. With the collapse of the central command economy, Mashinostroenie’s relations with production facilities that can reproduce the enterprise’s designs in series are also in jeopardy. The Khrunichev plant used to produce the space stations and vehicles according to Mashinostroenie designs. For now, Mashinostroenie has no major orders pending for space station design and construction, and when another such contract comes along, Khrunichev will no longer be obligated to accept the enterprise’s order, since the state does not control their relations any more. Mashinostroenie’s managers will face the challenge of negotiating appropriate terms that will be attractive to Khrunichev or searching for a competent substitute.

The issue of intellectual property rights can also complicate relations with other enterprises. Both Khrunichev and Energiya have been using Mashinostroenie designs without paying any royalties or permission fees. Mashinostroenie also has conflicts over intellectual property rights with its own subsidiaries. Since research and creative design are two of Mashinostroenie’s major profit-making activities—the enterprise claims that 80 percent of its revenues result from these activities—Russia’s lack of a law on intellectual property rights

that recognizes these transitions severely constrains the enterprise's ability to survive and make a profit.

For a while, Mashinostroenie put some effort into "associations"—joint-stock companies founded jointly with other enterprises in the same industry to work on common projects and/or to form supply networks.⁵ The enterprise still owns small shares (usually 3-5 percent) in several such associations, but management no longer considers them a high priority. More important to the enterprise now is its share of ownership in banks. For example, Mashinostroenie owns 33 percent of the Reutov branch of Unikombank; this is very important, as it ensures an advantageous interest rate (135 percent in June 1993). Having some influence at the bank will also help if the enterprise sets up a holding company structure.⁶

XI. Resistance to Spin-offs

Like many other large enterprises with highly educated personnel, Mashinostroenie is facing the challenge of employees and lower- or mid-level managers who would like to be independent of the large administrative structure of the enterprise and to keep their division's revenues for themselves. Departments that can produce items in high commercial demand without input from the rest of the enterprise have the strongest incentive to break off from the main enterprise.

One department of Mashinostroenie that would like to be independent is the section that produces satellite antennas (dishes). The division claims to have the expertise and equipment to produce the best antennas in the country. For the internal purposes of the enterprise, however, it used to be kept busy only a small part of the year. When commercial demand grew, the antenna section started mass production for the market. The employees of this section no longer want to make the experimental antennas the enterprise needs, since they can make more money in an hour of commercial production than in a whole day of work on government contracts.

One manager pointed out that the technicians in this section could not produce the lucrative antennas if they had not been given the original documentation and design by the enterprise's design specialists. Management is willing to let this division develop its own commercial projects when there is time left over after fulfilling the enterprise's requirements, but as this source explained, "The general director has a contract with the state and he is obligated to provide these results. If this section becomes independent, they would never do what we need."

The antenna example effectively illustrates the fact that, in general, management is against splitting off parts of the enterprise. Khromushkin expressed great pride in Mashinostroenie's achievements, and emphasized that such success would not be possible if the complex were to be split up into several smaller firms. Another manager claimed that splitting off subdivisions would not make sense because a small enterprise can't maintain the large equipment. For example, the enterprise includes a very large facility for testing and experimental production. Khromushkin claimed that keeping it on-site and under the overall enterprise management ensures that designers can test their ideas with no waste of time. He also explained that the Almaz satellite, for example, involved 400 different subcontractors,

and that Mashinostroenie has developed the most efficient systems to manage all these smaller projects while keeping track of the bigger picture.

Their belief that the current system is the best possible method of coordination is not the only reason top managers give for wanting to keep all subsections within the larger enterprise. In each massive project, it was explained, some stages take longer than others, and some cost more than others; since the variables of time, effort, and cost do not necessarily correspond, the task of the enterprise leadership is to plan assignments and payments so departments whose services are in less demand don't lose out. Managers do not dispute that if departments were allowed to become independent, some would prosper—but they are “100 percent certain” that others would not even be able to support themselves. Khromushkin believes that there are tasks that have long-term value for the state that must be accomplished, whether they are profitable in and of themselves or not. He pointed out that even in the United States, test labs are supported by the government.

Khromushkin gave another reason management is against spinning off any of the departments. Some of the sections that would like to be independent are quite small, with staffs of just two or three people who are top specialists in their field. His concern was that if these specialists leave the enterprise and are in business for themselves, the enterprise will not have any employees with the expertise to monitor the quality of work that these newly independent specialists contract with the enterprise.

Although Mashinostroenie managers do not want any of the enterprise's capital assets, especially its expensive equipment, to be privatized separately, they have met some of the demand for autonomy by setting up about 20 small, private businesses on the territory of the main enterprise. Mashinostroenie owns between 45 and 100 percent of the equity in these companies, but always enough for a controlling block. Mashinostroenie also retains control by requiring a two-thirds or three-fourths vote to decide “strategic issues.”

The joint-stock company Almaz Foreign Trade Company (FTC), for example, was organized to market commercial uses of space information received from Almaz stations. Martynov was the company's director. He no longer holds this position. He had twelve permanent staff, and could bring in others, sometimes hundreds of temporary workers, from the main Mashinostroenie employee pool. The firm was founded with 85 percent Mashinostroenie ownership, 15 percent private. The starting capital was 50,000 rubles at the end of 1991. By the end of 1992, the company had a net before-tax income of \$80,000, from trade—buying and selling. In July 1993, Almaz FTC opened a wholesale outlet in Moscow for Mashinostroenie products, such as satellite dishes, medical equipment, and sailboats. Mashinostroenie provides only about 10 percent of the company's contracts, however; most customers are foreign.

The legal founders and stockholders of this profitable daughter company, besides Mashinostroenie and other state organizations, include a number of private individuals, many of whom are top managers of Mashinostroenie. Thus, senior managers have been receiving a share of Almaz's profits from the sale of images from space, but these profits do not benefit the scientists and workers who developed and produced the Almaz station. Changing this arrangement could provide an incentive for key personnel not to leave the enterprise.

The creation of small enterprises also functions as a strategy to cope with the prospective brain drain. While government contracts are scarce, scientists can earn a living through their commercial operations. Fixed capital costs, rent, overhead, and a whole range of social expenditures are de facto covered by the state enterprise. In return, the management at

Mashinostroenie aims to keep the core of the enterprise's scientists and engineers together, in case new contracts materialize for its space vehicles—whether from the Russian state or an outside customer. Above all, the management at Mashinostroenie does not want to allow the breakup of the enterprise as a whole.

Project management related to the subsidiaries is organized on a matrix system, providing flexibility depending on the type of project. Directors of special projects are also free to pursue other opportunities utilizing their own specific technology.

During the current transitional period, while the enterprise is not carrying out any major projects because of the lack of governmental support, the specialists' work on commercial projects addresses two problems at once. If scientists work in small commercial enterprises in Mashinostroenie's facilities, it will always be possible to gather them together again if a new big project is initiated. Meanwhile, any high-tech projects initiated in the small enterprises may also help Mashinostroenie diversify as the beginning of a broader process of vertical and horizontal diversification.

Nevertheless, the leaders are willing to offer some autonomy to lower levels as an incentive for hard work. Employees who work on commercial contracts are making up to ten times more than those who work on government contracts. The profits are sent back to the division that generated them as a reward, and as further incentive to motivate them to pursue commercial projects.

In July 1993, Yefremov described management's four strategies to prevent breakup. First, they have assigned work on defense orders to every division, so no division will be legally entitled to privatize separately, as they will all fall under regulation for strategic interests. Second, he said that management uses the enterprise's general funds to support weaker departments; at some point in the future, he claims they intend to give divisions separate accounts, but not yet. Even when the accounts are separated, they plan to keep all of them within their own bank or their own bank branch—and he said openly that this would enable top management to retain control over the separate divisions' accounts.

Third, the enterprise's management has a special fund to use as an incentive for groups to remain with the enterprise. This "innovation fund" is open to all divisions, and allows budding entrepreneurs to develop their scientific ideas without having to find capital and risk their own livelihood.

Finally, Yefremov pointed to the social services the enterprise provides for employees. These are not new programs, but the same benefits that existed under the old system. Nevertheless, the potential loss of these benefits serves as a constraint on employees or departments considering leaving the larger enterprise.

XII. Social Assets

Beginning in 1992, the government has not covered the expense of social services, so the enterprise has to spend a large portion of its profits on supporting its social assets (as aforementioned, approximately 30 percent of 1994 revenues went to social services). Management therefore rethought its policy on the social sphere starting in January 1993, and turned over most of these structures to the city of Reutov. They retained some social assets because, as one manager said, "We understand that we have to help our staff."

Mashinostroenie turned over the assets in four stages. Management signed an agreement with the city to transfer the structures, but to continue paying for their maintenance for three months after the transfer. This was to cover the time needed for the city to get an administrative structure set up and to get funds from the oblast to cover costs. The transfers are significant: Mashinostroenie built approximately two-thirds of all of Reutov's housing.

In 1993, Mashinostroenie transferred about 70 buildings, eight kindergartens, a swimming pool, and a children's club. It kept a dormitory and a hotel (the enterprise rents out hotel rooms at a profit to people who come to work with it as temporary subcontractors). It also kept a stadium, a "palace of culture," a clinic, a vacation resort on the Black Sea, a sanatorium, and a children's vacation camp (with room for 500; Mashinostroenie is developing it to make it profitable).

Mashinostroenie has its own clinic, with doctors who are paid by the oblast, but Mashinostroenie pays the salaries of specialists. At this clinic, Mashinostroenie employees get free care, as well as at local hospitals according to agreements between the hospitals and Mashinostroenie. Mashinostroenie also pays 50 percent of the cost of any necessary drugs. This medical care is quite costly.

Mashinostroenie augments the mandatory government entitlements for childbirth, death, and maternity leave. For example, upon the birth of a child there is an official government one-time benefit of five times the minimum monthly salary; Mashinostroenie gives the same amount out of the enterprise's own profits. Special assistance to a family after a death is also government mandated at five times the minimum salary, and Mashinostroenie also matches this payment. In addition Mashinostroenie pays special supplements called "fellowships of the general director" to highly qualified specialists.

Other social sphere expenses include aid to the enterprise's pensioners. Mashinostroenie gives pensioners not only free medical care, but also help with phone bills and other utilities and even cash assistance when needed.

Currently, Mashinostroenie keeps 60 percent of the "places" (capacity is measured in person-spaces) at each social structure, and 40 percent are at the structure manager's disposal to make side agreements for profit. The manager gets to keep the revenues on those 40 percent to use within his group. In the future, each manager will have control over all the use of his structure (100 percent time).

Although the enterprise only just managed to get rid of the huge expense its housing represented, Yefremov is continuing current construction and intends to initiate even more. The enterprise has the area on which to build as well as all necessary governmental permissions. He explained in July 1993 that he hoped to use apartments to attract and keep top specialists; the enterprise would give employees housing in exchange for their signing a contract to stay with the enterprise for a specified number of years. At the end of the time, the apartment would be transferred to the employee for free (Yefremov mentioned as a possible agreement twenty years' service for a three-room apartment). If the employee wanted to own the flat sooner, the plan would allow her or him to privatize it immediately by paying the enterprise the market price—an almost impossible requirement given the cost of housing.

By February 1994, one apartment building was finished and people were moving in, and a second had been built and was to be ready for tenants in April or May. These buildings are owned entirely by Mashinostroenie. The issue of individual privatization of the apartments by employees is still under discussion.

Yefremov planned to build 2,000-2,500 apartments over the next six or seven years.

Mashinostroenie does not, however, have enough money to finance such a big project. It is therefore looking now for a partner to invest. According to management, their plan is to build a very large building with three or four floors of commercial space and the rest apartments. Since commercial firms cannot get access to land or the necessary building permits, they will pay enough for their space to cover the cost of the rest of the building.

In the planned holding company structure (see below), one daughter company will be created to deal with the social sphere. In the beginning, it will need to be subsidized by the rest of the enterprise (holding company), but later managers hope/expect it will be self-supporting or profitable.

XIII. Privatization and Restructuring

Yefremov and his team have long held an ambivalent attitude toward the government's privatization program. Although at one time the enterprise seemed prepared to privatize, as of September 1994, the enterprise was planning to corporatize as a 100 percent state-owned joint-stock company, but not undergo privatization. While on the one hand, privatization was appealing as a measure to secure the enterprise from government diktat and other outside interference, to attract investors (particularly foreign finance), and to motivate the workers, ultimately Yefremov became convinced that this alternative presented risks he was unwilling to take. In explaining their decision not to privatize, Mashinostroenie managers expressed their fears that the mafia would purchase large blocks of shares, and they cited the myriad of other problems experienced by privatizing companies.

A. Initial plans for privatization

Mashinostroenie established a group in the beginning of 1992 to study privatization by considering the experience of other similar enterprises. The group came to the conclusion that none of the options in the government program would be appropriate for Mashinostroenie. Managers wanted to maximize their control over the enterprise, because they did not trust either the state or outside investors to have the interests of the enterprise, its employees, and its scientific aims at heart.

The privatization programs of 1992 and 1993 forbade Mashinostroenie through several articles to privatize (the enterprise could have incorporated, but only as a 100 percent government property). For the enterprise to be privatized, the government had to issue a special decree outlining the process and approving it. Management therefore worked through the League of Defense Enterprises to lobby for a special decree for Mashinostroenie. Mashinostroenie's working committee on privatization submitted a draft version of a decree to the appropriate government structures.

The government issued a decree about Mashinostroenie on December 11, 1993, just a few weeks before confirming Yeltsin's privatization decree of December 24, 1993; this latter edict established the new privatization program for 1994. Mashinostroenie had been waiting throughout 1993 for this final clarification. The new program moved Mashinostroenie from the list of enterprises forbidden to privatize to the list of enterprises that could privatize only

after receiving permission from the government's executive branch (pravitel'stvo). The December 11 decree gave much more specific guidelines for Mashinostroenie in particular, however.

This decree forbade Mashinostroenie to privatize in 1994, unless the enterprise could devise a plan that would be approved by the State Property Committee, the State Committee on the Defense Industry, and the government. Mashinostroenie management had already completed a plan by August 1993, but they revised it to meet the provisions of the new program for 1994. It turned out that much of what they had sought in their initial plan was in fact provided for among the alternatives laid out by the new program. The enterprise had hoped, for example, to keep a controlling block of shares in government ownership for a period of three years. The new program provided three ways to do this: 51 percent, 38 percent, or 25.5 percent government ownership. Revision of the Mashinostroenie plan to meet government approval therefore involved no major changes, except in the methods of implementation.

Mashinostroenie's original plan involved creating, in two stages, a holding company. The first stage was to be restructuring the enterprise. The enterprise would turn existing divisions into daughter firms and initiate separate privatization of these firms, with the controlling block in each belonging to the parent company. Mashinostroenie favored Option One of the government's privatization program for the daughter companies, but Option Two for the parent firm. The idea behind this initial plan for a two-stage process was to give the maximum number of shares to employees while minimizing the number sold at auction. This plan would have meant that 50 percent of all shares would go to the workers' collective, 38 percent to the government, and only 12 percent to auction.

Management changed the plan somewhat after the new government decrees were issued. From the beginning of 1994, the enterprise's privatization committee (which includes Khromushkin and other high-level managers) began evaluating the situation. They decided to request permission to privatize as a whole, without restructuring as a holding company. Management therefore proposed Option One to the workers' collective, with the restriction that 38 percent of the shares are to remain in government ownership for three years.

The committee's plan in February 1994 was as follows: as in Option One, 25 percent preferred shares would go free of charge to the workers' collective, 10 percent voting shares would be sold at a discount to the workers' collective, and 5 percent voting shares would be sold at face value to the managers. An additional 10 percent of the stock was to remain in the FARP (the Fond Aktsionnerovaniya Rabochikh Predpriyatiya or Stock Fund for the Enterprise Employees), where it will remain undistributed until it is issued to employees at some unspecified future date. This 10 percent to the FARP was 5 percent more than the standard plan of Option One. The larger deposit to the FARP would have allowed management to keep 5 percent more of the shares from being immediately sold to the public, while at the same time they would not be distributed to employees who might have sold them to outsiders. The plan further provided for the government to retain 38 percent ownership, with some portion of this stock, the committee hoped, to be controlled through a trust under the control of the general director.

This process of corporatization and initial allocation of shares was just the first stage of the enterprise's plan for privatization and restructuring. For Stage 2, management was still planning to set up a holding company. This model called for the enterprise to divide its assets and staff into several smaller companies, which will be organized according to type of production. This allowed the enterprise's military projects and space projects to be separated

from commercial projects and other work with no strategic implications. The experimental plant would be one company, for example, as would the design bureau. A priority was to structure the status of the experimental base so that it continues to receive state support. These “daughter” firms would be 100 percent owned by the parent firm, at least at the beginning, although later, managers of the daughter firms might have been given the opportunity to buy stock as an incentive.

When the holding company structure was first in place, government ownership would be the same (38 percent) in all the daughter firms, because no new shares would be issued. The first stage in creating the holding company would be taking five or six parts from the enterprise’s internal organization, plus some of its existing external daughter firms. Only the best of the daughter firms would be brought into the holding company; Mashinostroenie would remove its investment from the rest. At the beginning of 1994, the enterprise owned part of about forty companies, but management was evaluating all of these to determine which were worth keeping a stake in.

Thus, following privatization, Mashinostroenie would consist of a set of daughter companies joined in a closed joint-stock holding company, with the state a significant but not majority stockholder. The subsidiary joint-stock companies, however, would not necessarily have to be permanently closed, nor have the same distribution of ownership as the parent holding company.

Following this, in the more distant future, Mashinostroenie envisioned transforming the whole holding company structure into a financial-production group, by bringing in new financial partners. At this point, Stage 3, it would have used shares in the various daughter companies to attract new partners. The enterprise wanted to create the structure for the financial-production group within three years, so that when the government gave up its 38 percent ownership, Mashinostroenie would have had the resources/partners to gain control over these shares. Potential partners that managers had mentioned favorably include enterprises and institutes Mashinostroenie has worked with, commercial agents, and even foreign investors.

In 1992, Martynov said that senior managers were against majority employee ownership because they feared workers would opt for short-term dividends at the expense of long-term investment. As the privatization program took shape at enterprises around them, however, it seems that management decided that outside ownership was the greater risk. By proposing Option One to the workers’ collective in early 1994, they aimed to maintain maximum control by distributing non-voting shares to employees; by adding 5 percent more to the FARP and proposing 38 percent ownership for the government, they would have prevented any outside investor from having an opportunity to gain majority ownership.

The working committee on privatization met with workers and managers at all levels of the enterprise, as well as with representatives of the trade union; meetings to explain the plan were announced over the enterprise’s public address system. In February 1994, the committee was preparing an official proposal, formal evidence of the enterprise’s official value, and all other necessary documents to submit to the government bodies. The enterprise’s personnel department was preparing a list of those eligible to receive shares (current employees, pensioners, etc.). The details of various procedures and privileges for different groups of people were still being worked out, but management expected that the necessary documents would have been ready by the end of February.

Victor Voronin, the head of Mashinostroenie’s trade union and of the STK (Soviet Trudovogo Kollektiva or Council of the Workers’ Collective), was on the privatization

committee. He said that in general the workers do understand that changes have to be made to survive in the market. They are worried, however, because they have seen cases of failure. For example, the neighboring textile factory privatized early and collapsed. According to Voronin, in February 1994 about half of Mashinostroenie's employees were for privatization, while half were not ready or did not understand why it is necessary. Nevertheless, Voronin said he expected this to change soon, because the committee was starting a major public relations campaign to persuade the employees that management's plan was in their interests (they did not put any effort into this previously because they lacked permission to privatize). Voronin felt that the workers' suspicion was understandable; he himself only recently came to understand the necessity of privatization.

The STK also has a role in the approval of new subsidiaries. Only in rare cases, however, does it exercise this power and disagree with the general director. Moreover, the STK must approve the appointments of top managers nominated by the Ministry. Thus, management must work out agreement with the workers not only for their privatization plan, but for reorganization as a whole.

B. Current plans for corporatization and restructuring

As of September 1994, Mashinostroenie plans to corporatize as a 100 percent state-owned joint-stock company. This will entail new autonomy vis-à-vis the state. A board of directors will be formed, consisting of three government representatives from the Ministry of Defense, the Committee on the Defense Industry, and the State Property Fund, and three management insiders. Management wants to retain full authority to oversee strategic issues. At the same time, they hope to convince the state to continue investing in the enterprise.

Management also intends to create a holding company structure on the basis of the ownership it already has in a number of subsidiaries. This holding company will include 50 "daughter" affiliates with separate bank accounts, 10 "intermediate" subcontracting divisions (in such areas as transportation and construction), and 150 small divisions.

The daughter enterprises typically combine the financial and technical resources of Mashinostroenie with outside firms on specific projects. Income and expenses are shared, with 90 percent of income going to the parent. Mashinostroenie retains 45-100 percent ownership in these daughter companies. Since daughter companies, by their charters, require a two-thirds vote for "strategic" decisions, the parent retains veto authority.

Management feels that this structure optimizes their control over the enterprise, while avoiding the risks created by privatization. By moving to a state-owned holding company structure, Mashinostroenie's leadership has indicated that they prefer to rely on profit-sharing and bonus incentives for employees rather than stock ownership and the prospect of capital accumulation and/or dividend income. Also, although remaining state-owned complicates the enterprise's ability to attract foreign investment in core facilities, joint ventures may still be formed with Mashinostroenie's joint-stock daughter companies.

XIV. Conclusion

Mashinostroenie has many resources, in fixed assets, institutional experience, technology, and personnel. The enterprise occupies a large amount of land not far from the capital, owns sophisticated and diverse equipment, and has mastered many modern technologies. Its scientific staff is highly qualified, and its managers are forward-looking. Mashinostroenie has also managed to gain effective control over these assets and begun to corporatize, although it has chosen to forgo privatization for now.

Mashinostroenie is encouraging innovation and diversification internally. The innovation fund seems to be a well-designed program for promoting entrepreneurship within the confines of the enterprise. Some joint ventures with foreigners are providing increased revenue while diversifying the firm's activities.

Nevertheless, while Mashinostroenie has a range of prospective projects and a competent team of engineers and scientists to realize these projects, lack of financing is a serious, almost insurmountable impediment. Without state subsidies, the enterprise must try to get long-term credit from commercial banks; and current interest rates of 130 percent and higher, though barely keeping up with inflation, are extremely threatening in light of the uncertain future.

Mashinostroenie's experience and structure mean that it depends heavily, for at least the near future, on the prospect of large space projects. Competition will be fierce and opportunities limited to attract customers who can afford such contracts, whether state or private, Russian or foreign.

Notes

¹ NPO is the abbreviation for Nauchno-Proizvodstvennoye Obedinenie or Scientific-Production Association; Mashinostroenie translates as machine-building.

² Information on the communications satellite provided in Defense Nuclear Agency DNA 001-94-R-0029, "Defense Transformation for the Russian Federation," Attachment No. 3, p. 17.

³ "Russians Provide Fizz to Conversion Efforts," Defense News, June 27, 1994, NEXIS.

⁴ Guy Standing, Labour Market Dynamics in Russian Industry in 1993: Results from the Third Round of the RLFS, (ILO-CEET: Budapest, February 1994), 33.

⁵ One such association is the RONA Joint-Stock Company. RONA is described further in the case study of TsAGI.

⁶ "In their drive to obtain scarce financial reserves, many enterprises have resorted to establishing their own commercial banks. This action provides the founder with priority access to Central Bank credit. Typically, enterprises participate in the founding of one of two types of banks. First, they may participate in the transformation of a former branch bank of Gosbank into a commercial bank. Second, they may participate in the founding of an association bank. Association banks are commercial banks that are founded collectively by a former ministry and its associated enterprises. Some of the association banks are capture banks (members of the association are forced to use them for all banking services), while others do not bind members to use bank services. Association banks appear to pursue two goals. They try to obtain credit from the Central Bank for their member enterprises and they cross-subsidize enterprises (by providing differential interest rates on deposits and differential access to loans) in the industry to facilitate its survival." Barry W. Ickes and Randi Ryterman, "The Interenterprise Arrears Crisis in Russia," *Post-Soviet Affairs* 8 (4) (Oct-Dec 1992): 347.

VI: The Saratov Aviation Plant

John Battilega

I. Introduction

Toward the end of 1988, the Saratov Aviation Plant (SAP) began the long process of defense conversion (reducing military production from 55 to 6 percent in early 1992), privatization, and economic restructuring. It was supported in its early endeavors by the Soviet government, which in 1991 turned ownership of the plant over to the enterprise's workforce, thus making it the first enterprise of its size to be privatized.¹ In February 1993, the enterprise completed its transition to an employee-owned joint-stock company. During 1993 and 1994 SAP has also, to a certain extent, become entangled with some of Russia's political, economic, and social crises.

This section briefly reviews the history of the plant's restructuring, from privatization in 1991 under special conditions granted by the Soviet government to full incorporation as a closed-stock company.² Finally, the paper identifies several issues and obstacles experienced by the Saratov Aviation Plant that may surface in many Russian enterprises undergoing similar transformations.

The Saratov Aviation Plant, founded in 1931, is located in the city of Saratov, about 800 kilometers southeast of Moscow,³ and is one of three former large defense enterprises in that city. The plant initially produced agricultural machinery. In 1938, to meet war needs, the plant began to produce fighter aircraft designed by the Yakovlev Design Bureau. More than fifteen basic types of aircraft and helicopters and over forty modifications have been produced. SAP also produces commercial aircraft for both domestic and foreign use. The Yak-40 is a small, light, short-range passenger airplane, and the Yak-42 is a medium-range, midsized aircraft. These planes have been sold in 21 countries.

SAP also produces non-aviation consumer products, such as kitchenware, bicycles and tricycles, children's toys, sports training equipment, agricultural equipment, and machines for packing powder products.

In 1988 SAP employed 13,000 workers and occupied about four million square feet of production space. Operations were divided into 57 different production shops/units in fifteen separate physical plants. SAP, like many major Russian enterprises, also owned facilities to accommodate the social needs of its workers.

In 1988, SAP's general director, Alexander Yermishin, made a decision to convert production from military products to civilian aircraft and consumer goods.⁴ Since then, production of fighter planes and cruise missiles has been phased out, and the capacity of the plant has shifted principally to the production of improved versions of the Yak-42.

SAP expanded the volume of its Yak-42 production, and in 1991, it sold Yak-42 aircraft to Cuba and China, and received strong expressions of interest from Italy, Iran, Israel, Egypt, Yugoslavia, and other countries. Technical and economic estimates by Russian research institutions suggested that a significant global market exists for the type of light and medium aircraft SAP can produce. As a result, over the next ten years SAP's plans called for an increase in the production of the Yak-42 aircraft (as well as production of some newer versions), reopening the production line for the Yak-40 aircraft, and, when financing becomes available for production equipment, production of a third aircraft, the T-401, a small, six-passenger airplane suitable for corporate use and patrols. SAP planned to expand its plant capacity to be able to produce approximately 50 Yak-42, 300 Yak-40, and 250 T-401 aircraft per year by the year 2000. SAP also planned to double its production capacity for consumer goods.

SAP developed and started to execute a comprehensive plant modernization and development plan.⁵ Military lines were dismantled. An independent assembly complex and an additional mechanical plant were built, and a separate agro-industrial firm was formed. Over 1990-91, modern computer-controlled machinery was introduced into production shops, completely financed by hard currency generated by SAP. In addition, the State Scientific and Technical Committee developed a comprehensive plan for SAP to fully automate many aspects of aircraft production as soon as investment capital could be secured. Detailed financial plans to the year 2000 were prepared for discussion with potential investors.

SAP hired and trained marketing staffs for foreign aircraft sales. Arrangements were made with Ukrainian research institutes to develop better software for production scheduling, and to help streamline the internal management processes. SAP also developed a staffing plan to expand its workforce by 5,000 employees by the year 2000. SAP management estimated that it would take seven to ten years to complete its expansion plans and achieve fully profitable operation. SAP also began to aggressively pursue joint ventures with foreign firms worldwide, and initiated attempts to secure investment loans from international funds.

Finally, SAP management took steps to gain experience in market-based operations. In early 1991, five of the specialized production units were made independent legal entities and allowed to operate as separate small enterprises, serving SAP aircraft production needs, but also producing consumer goods for independent sales.⁶ This step gave SAP managers experience producing and selling consumer goods at market prices for hard currency.

II. Privatization (1988–92)

A. Initial privatization via formation of a collective enterprise

Part of the initial SAP strategy was to privatize through employee ownership. As a first step, SAP representatives negotiated with the Soviet government for plant ownership by the workforce in the form of a collective enterprise.⁷ Work began toward the transition from a state to a collective enterprise in 1988,⁸ with the official authority to proceed eventually granted in 1991. Resolution 19 of the Council of Ministers of the USSR, dated 10 January 1991, granted the SAP workforce outright ownership of selected assets of the plant.⁹ These assets included a) the collective farms, housing complexes, and health care and educational facilities that served the workers; b) those production facilities whose value had depreciated by at least 70 percent; and c) any new production facilities acquired as a result of profits generated after the plant began to operate under collective ownership. These assets were considered to account for 54 percent of the enterprise's worth. The workforce was also to be allowed to purchase the remaining assets of the plant, with payment on an installment schedule. The first payment was due in the first half of 1991; subsequent payments were not scheduled.

To determine the cost of the portion to be purchased, the plant was valued using standard formulas provided by the Ministry of Aviation Industry.¹⁰ This method assessed the value of SAP assets at 250 million rubles in early 1991 prices. The Soviet government transferred 54 percent of SAP to the collective enterprise outright, and sold it the remaining 46 percent for the book value as assessed by the formulas. Thus the collective enterprise incurred a debt of 115 million rubles to the Soviet government.

SAP management¹¹ then decided to divide the ownership of the collective enterprise into shares valued at one ruble each, and distributed them as follows: 46 percent was reserved as a guarantee against the debt from the government, 30 percent (which was equal to the formula-assessed value of the housing complexes) was reserved for further economic separation of the housing assets from the main aircraft production, 6 percent was held in reserve to use as special incentives, and 18 percent was distributed directly to the SAP labor force. Each employee was given 500 shares, plus an additional number based on a formula that considered length of service, professional qualifications, and five-year salary history. Individual share certificates were not issued; instead, the number of shares received was recorded in each employee's workbook. No formal internal market for trading shares was established, but employees were free to buy and sell from each other at whatever price they could negotiate. Employees were also offered the opportunity to buy additional shares from the SAP reserve for one ruble each, and were given two additional shares for every one purchased, subject to a minimum purchase of 400 rubles and a maximum purchase of 4,000 rubles. By this method, SAP collected 1.1 million of the 1.5 million rubles due to the government on the first installment, and was able to make the first payment to the state in 1991.

B. The transition to an employee-owned joint-stock company

In 1991, SAP management decided to move as quickly as possible from the collective ownership structure to that of an employee-owned joint-stock company, for several reasons. They believed that the joint-stock company would: (a) give employees a greater sense of ownership than the collective enterprise did, thus motivating them and increasing productivity; (b) provide a means of obtaining investment capital from the employees and possibly from other sources for plant modernization, product development, and marketing; (c) provide a recruiting incentive for new employees from the Saratov region; and, most of all, (d) provide a better financial basis for the firm and its workers to help compensate for the inadequate external economic infrastructure. These beliefs were reinforced by the success of the experiment in which five SAP production shops operated as separate small-enterprise legal entities, enabling them to receive their economic profits directly, and distribute them to their workers.

1. Securing Western help

CISAC sent a team of American and Russian specialists to provide technical assistance in January 1992. In April 1992, four senior SAP managers came to the United States to meet with the CISAC team to discuss progress that had been made since January.¹² Six draft documents were being developed for an employee meeting planned for June 1992, at which employees would be asked to formally authorize a new joint-stock company to replace the collective ownership structure, along with the implementation of revised corporate management, financial planning, and personnel methods. Three of the documents were required by Russian law: a charter, a founding contract, and bylaws (or “decree”) of the shareholders. Three others had been developed as management documents: bylaws of the board of directors, bylaws of the chairman of the board, and bylaws of the committees/officers. The “founding contract” is unique to Russian law, with no equivalent required for the establishment of a U.S. corporation. The charter does have a U.S. counterpart. The other four documents normally would be contained in the bylaws of a U.S. company.

The structure and contents of the draft legal documents demonstrated a significant evolution in the understanding of SAP managers about the concept of a Western-style corporation. In the January sessions, many SAP managers believed that charter documents must contain the details of all aspects of company structure and operations, and that those details must be voted upon by the employee-owners. The later draft documents reflected an improved understanding of the real purposes, and inherent simplicity, of charter documents, and of the differences between the responsibilities of a corporate board of directors and a corporate management council responsible for company operations.

Groups also renewed other issues including corporate management procedures, personnel management, financial and stock accounting computer systems, corporate financial and administrative staff structures, stock valuation and distribution methods, incentives, and industrial security procedures.¹³

2. Forming a joint-stock company

In May 1992, SAP retired its outstanding debt with the Russian government and received a full certificate of ownership in exchange, thus becoming the first fully privatized defense enterprise of its size in Russia. SAP had planned to complete the final transformation to an

employee-owned joint-stock company in June; however, continuing changes to Russian law delayed the changeover.

In July, as an interim step, SAP made the transition from collective ownership to a partnership with limited liabilities. This change was necessitated by a new Russian law that prohibited collective ownership. In the meantime SAP developed procedures for distributing full ownership to the employees and pensioners, created an initial board of directors,¹⁴ refined the new management structure, and created procedures for stock accounting and for the operations of an internal stock market.¹⁵ SAP management also initiated a program to communicate with, educate, and discuss the proposed change with SAP workers¹⁶ and continued to discuss the proposed changes with the local trade unions.

SAP management focused their attention on two difficult issues. The first was distribution of ownership in the new joint-stock company, a complex issue for several reasons. First, the original share distribution to the employees in 1991 excluded the assets used to secure the outstanding note to the Soviet government. Once SAP repaid the debt, the 115 million shares corresponding to this portion of the plant had to be distributed. Second, SAP had performed a more refined valuation of the assets. Third, procedures were needed for distributing ownership equitably between long-term employees, recent hires, employees about to retire, and pensioners. Finally, Russian law required that the full ownership of the company be distributed to the employee-owners as a part of the incorporation process. As a result, the shares previously held as a management reserve for incentive programs also had to be distributed.

The second critical issue was the roles, rights, and responsibilities of the five small enterprises. These enterprises savored their independence, but were also necessary parts of the main aircraft-manufacturing production chain. SAP senior management concentrated on these two issues in order to work out compromises acceptable to all parties. In addition, there was continuing concern about whether to incorporate as a closed or an open joint-stock company. In the end, the final decision was to incorporate as a closed-stock company in order to gain some operating experience,¹⁷ while reserving the option to become an open-stock company at some time in the future.

In October, a conference of SAP worker delegates approved a process for distribution of property and for the establishment of the management structure of the new joint-stock company. The final charter documents and the management and ownership structure were presented to a congress of the SAP employees on February 6, 1993.¹⁸ The change in ownership structure was approved by a 95 percent vote. Alexander Yermishin, general director, was elected to the new board of directors by a 98 percent vote, and subsequently was elected Chairman of the Board. Three other new board members received the minimum 75 percent vote required by Russian law.

III. Restructuring and Business Operations During the Process of Privatization

SAP's transformation took place concurrently with the operational transformation to function in a market-economic mode. In retrospect, it is apparent that SAP leaders' aggressive-

ness in moving into market-based business practices had a direct and favorable influence on the attitudes of the workers facing a totally unfamiliar form of ownership.

As 1992 began, SAP confronted many problems associated with the transformation to market-based operations. Principal challenges included finding reliable suppliers (taking into account time, quality, cost, and reliability); negotiating reasonable prices for aircraft sales to the Russian government; obtaining a fair economic valuation of SAP in order to make good investment decisions; establishing SAP's social welfare sector (housing, farm, education, and health facilities) on a self-supporting basis so as not to handicap the aircraft sector; understanding and complying with international aircraft quality control standards; obtaining marketing help; improving production efficiency; and training SAP managers at all levels in free market corporate operations, privatization, conversion, and employee-ownership principles.¹⁹

V. Gorbunov, vice director, identified as additional problems SAP's lack of modern production technology based on computer-aided design/computer-aided manufacturing (CAD/CAM) methods, and a parallel lack of modern information processing systems.²⁰

SAP's director of personnel, Yu. Kovshov, pointed out such specific problem areas as the difficulty in retaining highly skilled workers, the need for adequate housing, the necessity of a wage scale consistent with those of other Saratov enterprises, and the lack of an internal labor market within SAP.²¹

In January 1992, SAP did not have modern financial planning and accounting software systems, nor modern production scheduling software. Also, dealings with SAP suppliers suffered from the lack of competition and incentives for the suppliers. With the market and the economy unstable, the firm needed surrogate measures of profitability and performance to guide financial planning. SAP did not have methods (such as progress payments) to manage cash flow that were suitable for operating in a market economy. The CISAC advisors also saw a need to review employee fringe benefits versus individual employee responsibilities, and a need for education and training in Western cost-accounting methods. Finally, they advocated retaining independent financial and legal advisory firms familiar with Western methods and practices and with the current state of Russian law.

By October 1992, SAP had made substantial progress in most of its major problem areas. It now had more than 1,600 reliable suppliers who understood and responded well to incentive payment arrangements. SAP also had continued to modernize plant facilities including increased usage of computers.

SAP also made some needed initial management and restructuring changes by appointing an executive director, analogous to the chief operating officer of a Western corporation, to run the company on a day-to-day basis,²² and by establishing the new position of deputy director for sales to handle both domestic and international sales. Other progress involved steps toward the separation of the ownership and operations of some of the social welfare facilities.²³

During 1992, SAP also substantially improved its economic situation. During that year, overall production in Russia declined by 20 percent, but SAP production increased by 30 percent, and profits increased by 50 percent.²⁴ SAP also established good marketing relations with China, India, Cuba, and Israel. The general aircraft development plan prepared two years earlier proceeded according to schedule.²⁵ Foreign investment in general modernization had not yet materialized, but investors in Europe had agreed to finance the development of specific new aircraft projects.²⁶ One SAP-developed idea for a new aircraft design—a “flying plate” based on screening and hovering effects—received serious attention abroad as

a major new development project. The plant did well enough to add a second shift of 2,000 workers. The one negative component to the SAP economic picture was reflected in the sale of consumer goods: kitchen products continued to sell, but sales of toys and other consumer goods had decreased.

SAP salaries were tied to an inflation index based on prices of goods in the local Saratov market.²⁷ A basic automated personnel management system was also developed. Furthermore, SAP began to focus on other important issues, such as environmental problems.²⁸ The aggressive move to privatize via employee ownership appeared to have a direct effect on its growth.

IV. Restructuring and Business Operations of the Joint-Stock Company (1993 to mid-1994)

SAP's activity in 1993 was driven by the first year of operation as a new joint-stock company and external events that included the deteriorating economic and political situation in Russia.²⁹ The most significant characteristic was the dramatic reversal in SAP's short-term economic situation compared with 1992.

At the start of 1993, SAP was in a good financial position. Early in 1994, however, SAP decreased production, withheld wages for periods of time, and in March initiated a three-day workweek in order to keep production lines open as long as possible. In late May, the board of directors issued a directive, printed on the front page of the factory newspaper,³⁰ declaring June to be a month of vacation for all workers, and announcing that production would be virtually stopped for the months of July and August. The basic problem was the lack of adequate operating funds, which resulted from the following circumstances:

A. SAP Sales and Products³¹

1. Domestic sales

In 1992 SAP secured orders for eleven Yak-42 aircraft from Aeroflot. These orders were completed and delivered. However, payments were not forthcoming in 1993. It is not exactly clear who was responsible for payment for the aircraft, since SAP entered into a contract with the Department of Aviation, which itself is subordinate to the Russian Ministry of Transportation, with a responsibility to act as a broker between SAP and customers within Russia. As of January 1994, SAP received only partial payment for four aircraft. In 1994 SAP is concentrating on foreign customers until the internal payment issues can be satisfactorily resolved. SAP did expand its sales to the other former Soviet republics in 1993, selling two aircraft to Ukraine and four to Kazakhstan. In these countries, SAP has contracts with non-government aviation companies, but in fact these companies must also apply to their own governments for funds.³²

2. International sales

SAP's principal international customer in the last three years has been the People's Republic of China. In late 1992 a Yak-42 aircraft crashed on takeoff in China. In 1993 the Chinese government held up payments for aircraft already delivered and the placement of new orders pending the outcome of the crash investigation. It took many months for this situation to be resolved. Yermishin tried to be as responsive as possible to the Chinese, while patiently waiting.³³ He did not stress to the Chinese government that the crash was actually the result of pilot error, and he did not demand a statement of absolution from the government. There have been no claims against SAP as a result of the crash, and in late 1993 China finally placed orders for five new Yak-42s, with delivery scheduled for 1994. However, SAP cannot complete the sale until the Russian state signs an intergovernmental agreement with China, which as of June 1994 was not yet signed. Once the agreement is signed, SAP expects to receive goods, rather than cash, from the Chinese for the sale of these airplanes.

In 1993 SAP sold eight aircraft to private commercial companies abroad, and is currently in the process of negotiating to lease two aircraft to private companies for use in the Middle East. This leasing arrangement will also provide a new base of operations for SAP in the Middle East. One of the companies is a Russian company, Dakono, and the other is a Middle Eastern company, Pesh Air. SAP has no financial interests in these companies. SAP has also initiated marketing in Singapore and South Korea, searching for financial and technological partners for new developmental projects.

SAP is considering several proposals to enter the European market, but is proceeding cautiously, as it views Europe as a solidly Western market. SAP believes that it must be well prepared to enter that market by first developing close contacts with European firms. SAP is making gradual progress, with definite interest from European firms in the development of several new aircraft types as well as the new flying plate project. Also, one Yak-42 has been leased in the former Yugoslavia. An accident involving a Yak-42 belonging to the Saratov Civil Aircraft Company occurred in Macedonia in November 1993, but there were no equipment problems, and no claims against SAP have been made.

SAP also continues to try to develop business initiatives with the United States. SAP is also currently negotiating to produce in 1995 its first aircraft for the United States. In addition to Yermishin's general initiatives with the U.S. aviation industry, SAP has several agricultural initiatives. There have also been several visitors from the United States expressing interest in the industrial development of the Saratov region, including industrial companies, banks, insurance companies, and housing projects. SAP is currently somewhat frustrated with the difficulties in establishing partnerships and securing investments from U.S. partners, feeling that Americans are taking a far too cautious approach. There is also frustration with the delays in U.S. technical assistance pilot projects for the Saratov region that SAP had hoped would be forthcoming as a result of an earlier series of visits by American representatives.

3. New developmental aircraft initiatives

SAP continues to develop new aircraft programs on a broader scale than initially envisioned in 1991.³⁴ In the original conversion plan, SAP commercial aviation products were concentrated in three lines: the Yak-42 and its modifications, the Yak-40, and the T-401. Now, in addition to the Yak-42 follow-on and successors (e.g. the Yak-142, which is the same kind of aircraft as the Yak-42, but has new avionics, new cockpit display, and new passenger conveniences), there are several other new programs under development. These include the

Yak-48 (an eight-seat passenger plane), the Yak-54 (a small trainer), the Yak-130 (a larger trainer), the Yak-77 (a midsize passenger plane), the Yak-242 (a larger passenger plane), and the EKIP flying plate. The EKIP is an all-surface saucer-shaped vehicle that will be about the size of a Boeing 767 jet and capable of carrying up to 400 people, or equivalent cargo, at speeds up to 400 mph.³⁵ SAP has stopped development on the T-401, after 60 percent completion, due to lack of financing.

SAP currently has two production lines, one for the Yak-42 and its modifications, and a new one for the Yak-54. The Yak-42 line has a maximum production capacity of 40 airplanes per year (currently underutilized). The company also is continuing its aggressive program to use computers in production. SAP already has computer production control systems; now the company is working to install computer-aided design and simulation systems. Many new kinds of systems for production are needed to support the developmental projects. For example, SAP currently has three-axis production tooling machinery, but will need five-axis machinery for the planned new projects. SAP's goals are to invest in preparation for production for the new systems and to have flexible production capability to allow switching products easily. The company hopes to be able to sell not only the main aircraft products, but also technology and instrumentation. SAP eventually wants to secure customers for both the aircraft and the design.

4. Consumer goods

SAP continues to produce consumer goods (kitchenware and toys), and is attempting to expand the types and quantities produced for these goods.³⁶ SAP now also produces candles, and plans on making 100,000 bicycles in 1994.

5. SAP economic strategy

SAP is attempting to hedge its plans in order to be prepared for whatever economic situation actually develops. There are several strategy variants:

1. If SAP can sell the Yak-142, it will generate funds to proceed with the other developmental projects. It will take a bit longer to complete the developmental projects, and SAP also has direct competition from Boeing in China, and from European companies in the Middle East and in Europe.
2. If SAP cannot sell the Yak-142, it will stress its other projects. It hopes to sell the Yak-54 and Yak-130 trainers in Italy, and the Yak-48 in Israel.³⁷ It also hopes to interest U.S. companies in both projects.
3. If the economic situation in Russia becomes so bad that aircraft production is canceled because SAP can't replace its 1,600 suppliers with foreign ones, SAP will try to produce even more consumer goods. For example, SAP is now trying to contract with the Chinese for the manufacture of consumer goods.

SAP also intends to increase aircraft leasing as a part of its overall economic development strategy. The leasing arrangement is an effective way to introduce the Yak-42 aircraft to new regions. There are several possible leasing variants. One variant is the sale of SAP planes to a charter leasing company in Saratov. SAP has already used this method for several years. However, this approach may cause problems for future aircraft sales if the charter company prices the use of the aircraft too low. Or, SAP could lease the airplanes itself, and in fact has already leased two aircraft to Iran and three to the Philippines by this method. This variant injects risks due to product liability. A third leasing variant involves the use of a private

charter company in Moscow to gradually build a market for the future sale of Yak-42s. Yermishin currently favors this approach.

B. Internal SAP operations

1. SAP workforce

In 1993 SAP lost about 1,500 employees (about the same number as it hired in 1992)³⁸ and another 1,500 during the first half of 1994. Inflation was a principal cause. About 1,400 workers left for higher paying jobs; 170 were released. In order to keep especially qualified workers, SAP raised their wages. The highest salaries in Saratov are being paid to police forces, energy enterprises, the commercial structures, and the city administrators. The energy sector receives first payments.³⁹

2. Stock company operations

During 1993, the board of directors⁴⁰ began to learn how to operate, and started to differentiate board responsibilities from those of a management council. Yermishin is now Chairman of the Board and SAP General Director. During the first year, the board of directors met seventeen times, dealing mostly with organizational and management issues.⁴¹ Within the board, SAP has tried to create a structure parallel to that of Western companies. SAP has appointed a secretary of the joint-stock company (Irina Klimova) who prepares the agenda for the stockholders' meetings, prepares the documents, and sends out the information to shareholders. The Board also has three committees: Stock Company Affairs (headed by Yu. Kovshov), Shares Policy (M. Mordvinkin), and Ethics (A. Popov). Kovshov's committee organizes the work of the other committees, and is now actually running the company. Kovshov's committee also plans the work of the board of directors.⁴² SAP plans on reorganizing the board of directors in a year or so, when the enterprise expects to seek outside board members in certain areas (e.g., financial).

The management council has not yet become a fully operational entity. Yermishin's deputy, Executive Director Dubrovin, is in charge of the management council. There are also functional and branch directors on the management council, but the exact roles and responsibilities of the council have not yet been worked out. The management council has no committees, and in 1993 they met only once per quarter. The council decided to meet twice a week during 1994.

SAP held its first annual shareholder's conference on March 25. During preparation, several procedural issues arose, some of which were referred to the CISAC advisory team for discussion. Typical questions were: When should stock trading stop relative to the date of the stockholders' meeting so that there is stable information to send to the shareholders? Is information released on who has control of how many shares? What are the procedures for running for the board of directors? (Russian law says that board members should be shareholders with some minimum number of shares, to be determined by the shareholders.)

As a part of the preparations, the board of directors also met frequently to discuss proposed changes in the bylaws, charter, and annual report. The board tried to make the documents more exact, to simplify them, and to expand them in certain areas as necessary. Some of the current general bylaws were to be dropped as they were no longer applicable.

The proposed changes were published for shareholder review about a month prior to the meeting.

Preconference meetings and local plant radio shows were scheduled for management to discuss important issues with stockholders. SAP hoped this would reduce the tensions at the annual meeting. Senior SAP managers felt that the workers, in spite of the difficulties, were very patient. They seemed to realize that SAP cannot develop separately from Russia, and they understand the basis for the conditions in Russia. The workers also could see that other factories around them have been shut down while SAP was still operating.

SAP also was concerned that criminal elements may try to gain a controlling interest in the corporation. Even though SAP is a closed-stock company, the wage issue has become so critical that it is possible that criminal elements could give money to employees to buy shares on their behalf.

As in 1993, the shareholders' meeting itself was accompanied by an extensive program of written and graphic information about SAP, its operations over the previous year, and the questions that had been voted on by the shareholders before the meeting. During the meeting, questions were asked about social benefits, about back pay for February and March, and about layoffs. Yermishin's responses acknowledged the possibility of future layoffs, and heavily emphasized the lack of current operating funds.

3. Internal stock trading

As a closed-stock company, SAP initiated an internal trading market.⁴³ The market is managed and operated by a SAP manager, Nadia Akhmanova, who two years ago was a relatively junior financial specialist. She also will have management responsibility for the operation of the new SAP pension fund. SAP may also have to create a new company to operate the internal market. A new Russian law requires a separate company to conduct all trades and maintain the shareholders' database. This law may soon also be applied to closed-stock companies. The SAP trading department may soon be incorporated as a bank to meet this requirement, or perhaps as a financial investment company.

Initially, SAP issued and fully distributed 30,000,000 shares of stock valued nominally at 100 rubles/share. During 1993, SAP shareholders traded 727,000 shares at an average trade price of 65 rubles. About 1,000 shareholders were involved in these trades. SAP also traded 1,550,000 shares at the nominal price of 100 rubles from shareholders who were leaving or joining SAP. By Russian law, the "free shares" must be sold back to shareholders within a year. Shareholders leaving SAP could sell their shares back to SAP for the nominal price of 100 rubles at the next designated quarterly trade, or sell at market price immediately. Considering the rate of inflation, selling at 65 rubles was generally considered to be of greater value than selling three months later at 100 rubles.

According to the bylaws, the nominal price of a share is established by the board of directors with the help of financial and outside market specialist advisors. The nominal price was also held constant in order to be consistent with the financial situation at the plant. Also according to Russian law, property re-evaluation was required to take place as of 1 January 1994, effective as of the shareholders' meeting on March 25. After that time, a new nominal price could be established.

Procedurally, SAP has created a computer database that records the shareholders and how many shares of stock each owns. If a shareholder wants to trade, he lists on a form the amount and the price he wants. He can also fill out a second part of the form with an alternative price if he wants to sell quickly. Stockholders cannot trade directly with one

another. They have to go through SAP as an intermediary. Each trade application is assigned a number. The application is then posted on a bulletin board. Potential buyers look at the offers, and decide if they want to buy. It is a blind trade. The application, once offered, must remain open for three days. After the transaction, the shareholders involved are given new certificates, and the transaction is recorded in the computer database. SAP used to have 15,000 shareholders; it now has 13,000. The average number of shares per shareholder is increasing, with twelve persons now up to the limit of shares allowed by the Charter. (The percentage limits of stock ownership specified in the Charter are: Chairman of the Board, 0.2 percent; other board of directors members, 0.15 percent; and ordinary stockholders, 0.01 percent.)⁴⁴

At present SAP's greatest technical problem is the determination of the price of shares in the market. The current market stock price is published in the SAP newspaper, along with information as to how many shares are on sale.

SAP managers felt that, during 1993, about 50 percent of the sales were made by employees to supplement current income, and about 50 percent of the purchases were made for longer-term gains. The managers were very encouraged by this fraction, feeling that if there were people who would buy shares under current conditions, there will be even more buyers when the plant is in a better financial position. SAP is considering initiating a program by which its employees can sell their shares directly to SAP when they want to buy housing or educate their children.

SAP also decided to offer a selected number of outsiders who have worked closely with SAP the opportunity to become the first outside shareholders of SAP. That decision, and the specific individuals (including some foreigners) who received the invitation, were approved by the stockholders at the annual meeting in March 1994. This was based on a provision in the SAP charter that allows outside ownership for individuals with a close personal relationship with SAP.

4. New pension fund

A new challenge confronting SAP is the establishment and operation of a non-government pension fund.⁴⁵ The pension fund is being created for people who retired before the creation of the joint-stock company in 1991. The shareholders voted to authorize the establishment of the fund with 150 million rubles from SAP's 1993 profits. SAP employees who become pensioners after 1991 can either retain their stock or join the pension fund. They can do both if they make contributions to the fund. If they join the fund, their shares will be sold back to SAP and the proceeds from the sales will be placed in their individual accounts in the fund.

The process for actually setting up the fund has required SAP to break new ground. There is currently no law on pension funds in Russia, and there is only one relevant governmental decree, dated September 1992. There are several recommendations from the government, but unfortunately the government has not yet made any decisions. Only one prior experimental pension fund has been created in Moscow, with SAP being the second enterprise allowed by the government to create such a fund. SAP has studied 50-60 regional and enterprise funds that are currently being formed elsewhere. According to Russian law, a pension fund cannot be established as a commercial organization such as a bank, but there also must be a specialized company to run the pension fund. SAP may have to create a new company specifically for this purpose.

The SAP fund is in the process of being organized. It has been registered, a fund director has been chosen, and the methods of allocating the funds among pensioners have been set.

The procedure for initially allocating the fund will be the same as that used in 1991 to distribute SAP shares. An account will be set up for each pensioner, and SAP will place the appropriate amount of money directly from the profits into the account as working capital for the pensioner. The pensioner can either keep the funds in the account in cash, purchase stock with the funds, or designate that the funds be put in the bank in the pensioner's name. Interest will be paid to the pensioner's account, and can be distributed to the pensioner once per quarter or not at all, depending on the pensioner's wishes. There will be several options to choose from. The pension fund will also be opened to others as well, with both outsiders and insiders able to contribute and participate.

SAP is investigating several alternative options for investing the fund's resources (e.g. bank deposits, commercial structures). Since the current pensioners cannot wait for long-term payments, the fund needs to invest for immediate cash returns. When people who are 40 years old or under decide to invest, then the fund will begin to provide investments with longer-term returns. SAP plans on protecting the fund assets from inflation by the rate of interest charged for the use of the funds.

C. Corporate restructuring

SAP continues to develop restructuring initiatives. One area of restructuring focused on the small enterprises. These have now been drawn back into the main corporate structure as independent branches, without financial independence. As the separate profit center structure becomes established, the small enterprises will have that status. SAP is continuing to try to work out an appropriate compromise that balances the interests of the plant with the interests of the small enterprises. If the overall SAP economic situation develops in a way that places even greater emphasis on non-aircraft consumer goods, the independence of the enterprises will increase. If this happens, SAP plans to allow enterprises that split off to receive help only when they need it, with the enterprises themselves deciding how much assistance they need. Consumer goods production has already received some separation from the other work of the factory. In 1991, consumer goods were produced by shops that also supported aircraft production; however, these goods are now being made by a separate production unit concentrating only on consumer goods.

A second area of restructuring focused on improving SAP's overall technical and marketing capabilities. SAP is now a partner in a new closed joint-stock company, the Yak Aircraft Corporation, formed by the Saratov Aviation Plant, the Yakovlev Design Bureau, and the Smolensk Aviation Plant (one-third ownership by each). Yermishin is president of the company, and Alexander Dondukov, general designer of the Yakovlev Design Bureau, is chairman of the board. This company will produce the Yak-142. The company will gradually incorporate financial and marketing departments. The operating concept is to allow the company to draw on the three owners to carry out production, with centralized financial operations, marketing, and distribution of profits. There are certain procedural issues that have not yet been worked out, since SAP is an employee-owned company, while the other two enterprises are only 49 percent owned by the employees and are still in the process of privatization. The full scope of the new company, once in operation, may go beyond the Yak-142 and include other new developmental projects.

SAP has also created an international marketing organization, AviaImpex, as an internal subdivision. AviaImpex currently employs 42 people, organized into four departments: a department of protocol, a department of negotiations, a sales department handling advertis-

ing, and an export department. The head of this company is now the lead SAP representative to China. Yermishin has authorized him to sign contracts, even though Yermishin himself still conducts many of the negotiations. AviaImpex is also trying to sell consumer goods to the Chinese.

Another restructuring initiative focuses on the mechanism for financing further spin-off companies. Yermishin is creating a financial-industrial group (BusAvia Financial-Industrial Group) to create a cheaper way to secure loans for SAP and for its spin-offs or other daughter companies. The government currently lends money at 300 percent interest. A new bank to be created as a part of the financial-industrial group will be able to make loans at 10 percent. The financial-industrial group will help with the loan, and protect the company from criminal structures.⁴⁶ The overall strategy calls for the growth of smaller companies up to the size at which they can decide for themselves if they want to become totally independent or integrated into the overall SAP structure.⁴⁷ The financial-industrial group as envisioned will also have an international component to facilitate signing contracts with foreign partners and handling international funds transfers. This capability will facilitate aircraft development and production as well as the development of new commercial ventures.

SAP also has a number of restructuring activities focused on the social sphere assets. SAP is in the process of establishing a wholly owned housing joint-stock company, AO Zhil'e. The full set of procedures has not yet been completed, but the legal entity has been created. The entire housing apparatus (houses, materiel base, maintenance, security) will be turned over to Zhil'e, but SAP will also give it a subsidy for energy, gas, oil, and water. Some of the buildings also contain some stores that will eventually start to make money. It will be a long time before this new company will be profitable, since SAP still has to train the company management about ownership and operations. With this step SAP will be able to show investors that new funds will be invested only in production, and not in the social sphere. Additionally, some of the housing burden is gradually being removed from SAP since people are starting to buy their own housing now that it is being privatized.

The collective farms are also continuing the restructuring process initiated in 1992. Two are still wholly owned, and three have been converted to joint-stock companies with SAP retaining 30, 5, and 2 percent ownership. Employees (and others) buy products from the farms at market prices. SAP is planning to invest even more money in these stock companies. These investments are not grants. SAP will gain land from the investment, and the price of land is rising. SAP also is continuing to invest in agricultural development. In 1993 SAP constructed two granaries for agricultural storage (and protection against theft). SAP is also creating private agricultural enterprises with foreign partners. For example, one separate private enterprise was created for corn production; SAP gave the enterprise corn in exchange for shares of stock. Similarly, SAP has given corn to a pig breeding company in exchange for stock. Once the BusAvia Financial-Industrial Group is created, it will buy these stock companies, and invest in new technology for them. SAP has concluded that new technology is required to attract foreign investment in these agricultural enterprises. English and American companies visiting the pig breeding farm, for example, did not feel it was worth their investment due to the difficulty of implementing modern pig farming methods with the existing technology. Agricultural restructuring continues to be an area of high priority.

The restructuring initiatives for educational facilities have been mostly successful. SAP currently pays only for the maintenance of the schools. Kindergartens are now self-sufficient. However, SAP still gives grants directly to employees who have children: a family in which

one parent is a SAP employee receives 50 percent of the school costs; if both parents are SAP employees, SAP pays two-thirds.

Finally, SAP has also undertaken restructuring initiatives to improve the security of its commerce. Three stock companies have been established to provide physical security and to insure transportation of products and money to and from Saratov. The companies are staffed by former members of elite military units (Alpha Units, Spetsnaz), KGB, and former athletes. SAP believes that it can provide the most effective security for Western partners and customers if SAP assumes responsibility for security of goods and shipments within Russia.

D. Major problems and issues (1993–94)

The greatest problem facing SAP in 1994 is the restoration of adequate operating funds. Over the past year and a half, however, SAP has encountered a number of external situations beyond its direct control that are slowing the pace of change.⁴⁸ The principal external problems cited by SAP leadership are:

Lack of payment for completed orders. As 1994 began, SAP was owed 60 billion rubles for orders delivered to or through the state.

Government taxation structure. The taxation structure makes it difficult for an enterprise to simultaneously provide realistic costing of products as the basis for pricing, and the maintenance of a competitive price structure. The tax structure also precludes adequate capital formation for investment.

Inflation. The 1993 rate of inflation, coupled with SAP's overall revenue situation, makes it impossible for SAP to maintain competitive wages. The rate of inflation in Russia also leads to an excessively high bank interest rate, currently on the order of 400 percent.

Supplier reliability. The lack of payments to SAP has threatened the supplier reliability that SAP established in 1992. Suppliers demand to be paid in advance for their products to avoid their own financial problems.

Interrepublic costs. Current high customs tariffs between the former Soviet republics are making it difficult to profitably sell products to those countries. An additional complexity is the recent switch to different currencies in many of the former republics, which removes a certain amount of financial flexibility.

Crime. SAP now has to explicitly consider security precautions in the conduct of its business. SAP now guarantees safety and provides guards as a part of its business, drawing on its new subsidiaries established for security purposes. SAP also fears that criminal elements may become proxy-like owners by financing the purchase of SAP shares by existing employees.

The dichotomy between SAP's steps to set the stage for longer-term success and SAP's current circumstances is but one indication of the complexities of economic transformation in Russia today.

In addition to the restoration of its operating funds, and relief from externally-generated problems, SAP also has a number of other internal problems and priorities. These include modernizing production; making the management system more efficient and profitable; improving engineering efficiency through greater automation; and developing investment funding for new projects. In earlier years, these kinds of issues would have been among the

most pressing, but, given the turn of events in 1994, they are now subordinate to the restoration of financial stability in the short term.

V. Issues and Obstacles: An Assessment

Since 1988, SAP has assumed a leading role in Russia as it works through the practical problems associated with defense conversion, privatization, and restructuring. SAP's experiences to date provide some insight into the issues and obstacles that will eventually be faced by the other defense enterprises undergoing similar transformations. This section summarizes what appear to be some of the main issues that will confront all enterprises, and that will have to be dealt with on the path to successful industrial demobilization and transition to a market-economic mode of operation. Issues relating to defense conversion, privatization, and restructuring are discussed separately, followed by discussion of some overall cross-cutting issues.

A. Defense conversion issues and obstacles

In this discussion, "defense conversion" is used in the narrow sense of the term. It refers to product shift and directly related topics as opposed to the entire transformation of the defense enterprise. Specific issues, generalizable from the SAP experience, include initial product selection, pricing versus taxation structures, international certification and quality control, and residual armament production for short-term benefits.

1. Initial product selection and market adaptivity

The principal initial product lines selected by SAP for conversion all were in the civilian aviation area as a direct continuation of SAP's previous work. Even though SAP began to produce consumer goods, these were always considered to be secondary products, although hopefully profitable ones and sources of both management experience and revenue. SAP has a distinct advantage in being able to apply its core defense competencies to the civilian market. By starting with a market analysis developed by the Aviation Ministry in 1991, SAP chose three main aviation product lines, to be developed over a seven-year period, as its main conversion effort. However, SAP has also shown a high degree of adaptivity to market conditions over the last three years. SAP's current production lines include one aircraft, the Yak-54, that was not even in the original development plan. The current developmental projects also mostly consist of promising new programs that have been identified from continuous market analysis and responses to market-generated opportunities. An adaptive strategy like this will probably be required for many defense enterprises undergoing conversion during the initial several years or more of their efforts, until such time as their new product lines and markets start to stabilize. It will thus be important for the enterprises to stay engaged with their prospective markets, and to remain as flexible as possible in their ability to shift products within their areas of technical competence. This approach is a new requirement for enterprises used to following long-range plans in specific, relatively narrow product areas, but one that must be learned for survival.

2. Pricing versus taxation structures

To develop a consistent and profitable combination of products, prices, and markets has been a major challenge. As with other enterprises, SAP initially did not have a complete picture of costs in accordance with Western accounting standards. SAP now prices its airplanes to cover costs, and to be highly competitive against Western companies in its intended markets for the level of technology involved. However, SAP has found that it must pay on the order of 80 percent of its profit to the state in taxes. This fraction is far too high to meet the needs of a market-based stock company. When coupled with the rate of inflation, the tax structure is a critical problem for the enterprises. Even without excessive inflation, the Russian tax structure places Russian enterprises at a competitive disadvantage internationally, makes it very difficult to operate on a true market basis (even domestically), and makes it difficult for the new Russian shareholders to see real benefits. SAP is one of many former defense enterprises that are now lobbying heavily within Russia for tax reform.

3. International certification and quality control

SAP's conversion products are focused heavily on the international market, where its aircraft will have to meet international quality control and certification standards. Standards focus on both aircraft functions not essential for flight and on passenger convenience. Additionally, testing standards in some areas are more rigorous. A special problem has to do with the environmental pollution characteristics of SAP production machinery and processes. International certification requires production plant certification, which in turn requires production technology that meets international environmental standards. Each of these areas places new expensive demands on SAP that add to the product price. This demonstrates one of the hidden costs of defense conversion that will probably be experienced by many enterprises producing products for international markets.

4. Defense production to generate short-term revenues

Although SAP is committed to defense conversion, it has also recognized potential opportunities to produce military equipment on a limited scale to help generate short-term revenue. During 1993, SAP produced unspecified defense products for foreign sales through the Russian arms company Oboronexport, hoping to receive \$26 million in hard currency revenues, which, as of the beginning of 1994, had not yet been paid to SAP. Additionally, SAP is supporting the Yakovlev Design Bureau through the Yak Aircraft Corporation in the development of new products, including the new Yak-141 VSTOL fighter in which a number of countries have displayed interest.⁴⁹ Because of SAP's financial situation, SAP managers feel that any real business opportunities must be pursued, even though they result in the temporary production of military equipment. This situation could arise with other former defense enterprises in Russia because of the current economic situation and the other external barriers they are facing.

B. Privatization issues and obstacles

During SAP's privatization, important issues arose in five main areas.

1. Conceptual understanding

Discussions of transition to a joint-stock company revealed a lack of understanding among managers and employees of many of the basic concepts behind a market-based stock corporation.⁵⁰ These included the very concept of a corporation, stock, stock valuation, the

relationship of stock value to profitability and growth, stock issuance, stock dilution, and stock liquidity. A second set of conceptual issues focused on governance, and included the role and responsibilities of a corporate board of directors (versus the management council responsible for day-to-day operations), the purpose of shareholders' meetings, shareholders' voting rights and responsibilities, and the basic idea of "one share, one vote" (as opposed to "one shareholder, one vote"). A third set of conceptual issues concerned corporate legal documents (charter and bylaws) and the difference between those documents and documents that describe day-to-day corporate operations and production development plans.⁵¹

2. Trust

SAP managers expressed concern that transition to an employee-owned joint-stock company may not actually result in the distribution of the profits to the employees and managers. They also were anxious about insuring that employee-owners would have sufficient say in company operations, and that they would have the power to replace the board of directors. These concerns illustrate a cultural issue that SAP managers had to confront as a part of the transition to employee-ownership: they had learned their jobs under the Soviet system, which eroded trust in authority. Workers and managers did not trust the government, the legal system, or enterprise management.

SAP managers found, however, that trust is an essential requirement of a Western-style joint-stock company. The stockholders must trust that the elected board of directors will act in their best interests. They must be comfortable delegating their authority to others to vote on their behalf as they see fit, but with the overarching good of the stockholders as the guiding principle. The stockholders must also trust that the legal system will provide them with a means of resolving disagreements fairly. Employee ownership makes this basic issue more immediate because the employee-owners are also subject to the day-to-day problems of running a company. The employees must trust that company management will successfully deal with such problems and create a long-term strategy. Finally, the employee-owners must trust that profits and rewards will be distributed to them fairly.

3. Employee expectations

In several instances, employees expected that employee ownership would mean maximum control and immediate personal profit, which led them to advocate short-sighted policies. Many SAP employees wanted to keep ownership solely in the hands of employees because they feared outsiders. SAP managers, however, saw the need for selective foreign investors. There was also conflict over the shares that were withheld from the workforce as a corporate reserve for future incentives. Many SAP managers and employees felt that these shares should be distributed immediately. Some SAP employees and managers also pushed to dispose of shares withheld for revenue in order to meet current economic problems associated with inflation, rather than retaining them for their long-term growth potential.

The managers of the five small enterprises that had previously been granted legal independence demonstrated another clash of interests resulting from inappropriate expectations of the new structure. They wanted to retain financial independence so that they could distribute their profits directly to their workers, but SAP management called for the return of their profits to SAP; their reward for financially sound management would be additional ownership shares in SAP, or simply an increase in the value of stock already owned.

4. Procedures and operations

There were several issues SAP encountered concerning the mechanics of transition to and operation of an employee-owned joint-stock company. These included creating procedures for the initial distribution of ownership; establishing stock programs and ownership plans to provide different classes of incentives; creating and operating an internal market for trading stock; electing an initial board of directors; defining and carrying out operational duties of the board; learning and executing the mechanics of stockholder meetings and votes; creating a bonus, incentive, and profit-sharing system for rewarding employees for increased productivity; and drafting a full disclosure statement for stockholders explaining the risks and potential rewards associated with stock ownership. SAP had many procedural questions, and many issues associated with the adaptation of traditional Western practices to the specifics of its situation.

5. Law

Several issues surfaced with regard to Russian law.⁵² At the beginning of 1992, extant laws raised a number of problems for SAP. The most basic of these was the issue of SAP's legal status as a collective enterprise, which was not a long-standing form of property in the Soviet Union. It was introduced in the USSR Law on Property (March 1990) as a halfway step toward the creation of real private property, which was completed by the Russian Law on Property of December 1990. Neither this law nor the Russian Law on Enterprises and Entrepreneurship, also passed in December 1990, mentioned collective property. The legal status of a "collective enterprise" was therefore ambiguous.

By 1992, there were also legal difficulties in implementing SAP's plan to become an employee-owned joint-stock company. The Russian government's draft privatization plans limited the fraction of employee ownership permitted for an enterprise.⁵³ The draft laws applied only to state and municipal enterprises about to be privatized; however, SAP was already fully privatized by May 1992, and thus did not fit into either category. Also, there were legal ambiguities concerning the procedural requirements for transfer of ownership from a privatized collective enterprise to a joint-stock company. Finally, the legal structure was incomplete and did not regulate security exchanges, enforce the corporate right of first refusal of stock repurchase,⁵⁴ define procedures for establishing an employee-owned closed joint-stock company with foreign investment, or determine legal forms for a corporate charter and bylaws.⁵⁵

As 1992 progressed, some of these legal ambiguities were clarified, but new ones appeared. In July, SAP moved from collective ownership to the form of a "partnership with limited liabilities" as the result of an imminent Russian law that threatened to outlaw the collective form of ownership. At the same time, new regulations affected the process of transition to a joint-stock company and created new requirements for stock company formation and asset valuation. The net impact of these regulations was to delay the process by several months. Perhaps most importantly, the Russian legal requirement for transferring all ownership to employees upon incorporation as a joint-stock company prevented SAP from immediately establishing stock-based worker incentive programs, which are a principal advantage of employee ownership.

Another issue of Russian law concerned the distribution of the initial shares of stock associated with the formation of the joint-stock company. SAP, as an employee-owned company, would have liked to hold back some of the initial shares as treasury stock. This pool of authorized but not allocated stock could be drawn on by SAP managers for such purposes as rewarding employees for superior performance, creating a formal employee

stock ownership program, or enticing key new recruits to join the SAP workforce. Unfortunately, Russian law currently requires the complete distribution of initial shares of stock, and SAP interpreted this to mean that all shares must be allocated to the new individual shareholders. Creating a special stock pool for other purposes now must await a subsequent authorization of new shares of stock by the SAP board of directors. Legal provisions that would allow enterprises to allocate initial stock to a company-held pool, and legal assistance in creating and developing appropriate procedures for operating such a pool, would help provide a mechanism for motivating the workforce.

As 1994 began, SAP established a pension fund, with no real guidance from Russian law. As they worked through the options and issues, SAP managers found that many outside managers were coming to them for advice on how to proceed in their own circumstances.

C. Restructuring Issues and Obstacles

Restructuring involves such activities as changes in internal management structure for efficiency, motivation, and profitability; a change in the overall corporate structure from a single to multiple legal entities; divestiture of assets; acquisition of assets; and mergers with other enterprises. Specific issues encountered by SAP that will also be faced by other defense enterprises involve the financial planning and monitoring infrastructures, the newly formed small enterprises, the social sphere assets, marketing organizations and consortia, and product line subsidiaries.

1. Financial planning and monitoring infrastructures

SAP is undergoing a progressively more complex sequence of internal changes designed to improve financial planning, monitoring, and accountability. SAP intends to move as rapidly as possible toward the formation of decentralized profit centers, each with its own revenue base and profit goals. This structure will be supported by functional directors whose responsibility will span the corporation, and who will also have their own budgets. The pace at which SAP could enact this change has been limited by the availability of appropriate computer hardware and software to allow the rapid generation of appropriate financial management information.

2. The small enterprises

Like many other former defense enterprises in Russia, one of SAP's initial restructuring steps was the formation of five small enterprises from existing production shops. These were formed to provide alternative sources of income during stagnant periods of aircraft production, to give managers experience with market operations, and to motivate the workers by allowing them to directly manage and distribute their profits. In the SAP case, the units that formed the small enterprises were also essential aircraft production units, so there was the possibility that as new aircraft orders were obtained, scheduling and priority issues would arise. An even greater issue arose from the success of the small enterprises as semi-independent operations. The managers and workers liked their independence, and the ability to directly receive the profits from their work. As restructuring has taken place, SAP senior management has spent much time working on the best way to allow the small enterprises the

kind of independence that they have learned to enjoy while retaining them as an essential part of the aircraft production chain.⁵⁶

3. The social sphere assets

A major part of SAP's restructuring efforts has focused on the disposition of the social sphere assets via divestiture. SAP is trying to create a process by which the social sphere assets will eventually become completely separate companies, perhaps owned to varying degrees by SAP. During the transition process, SAP is creating a de facto holding company structure, creating privatized subsidiaries, and gradually allowing these subsidiaries to become completely independent companies as they gain experience and solidify their financial positions. In some cases (e.g., agriculture), foreign partners are involved in the creation of new subsidiaries. This approach, if successful, ultimately will result in complete divestiture.⁵⁷ Even during the transition process, the approach allows investors to concentrate their capital in specific portions of SAP.

4. Marketing organizations and consortia

SAP has gone through several steps to improve its marketing capabilities. During the initial period of change, SAP depended heavily on the state Aviation Ministry for international marketing, because of the time required to hire and train marketing staff. In 1991, SAP began to hire a few people to concentrate on foreign marketing, and by 1993 had hired a new senior marketing manager. During 1993, SAP also created an international marketing subdivision, AviaImpex, and cofounded the Yak Aircraft Company to provide a more integrated approach to marketing new aircraft.

Additionally, the managers of the small enterprises and the consumer units had to market their side products. As SAP creates separate profit centers, each will be confronted with the need, to varying degrees, to market by either drawing on centralized marketing resources, or by creating separate capabilities focused on specific product lines. SAP's multiple-axis approach to the development of improved marketing capabilities has focused simultaneously on (a) understanding new potential markets as the basis for product definition; (b) the sales of these products; and (c) the procedures of domestic, Commonwealth of Independent States, and Western business. SAP has aggressively sought strategic alliances with both foreign and domestic partners to improve its marketing capabilities. SAP understands the need to create a good reputation in the West, and also realizes that it is somewhat at a marketing disadvantage with respect to Western aviation companies since it does not yet have Western certification for its airplanes and it does not assume responsibility for airplane maintenance.

5. Product line subsidiaries

One other important aspect of SAP's approach to restructuring has been a willingness to rapidly create new subsidiaries focused on the development of a specific project or product line as a basis for attracting foreign investment. SAP hopes that this approach will be attractive because it will make it possible for investors to concentrate their capital, to limit their risk, and to exert specific control over those assets of primary interest, without getting involved in other aspects of the corporation.

D. Overall progress: issues and obstacles

In addition to the issues associated specifically with defense conversion, privatization, and restructuring, there are also several cross-cutting issues that bear on the progress of SAP and other Russian defense enterprises in transition.

1. Psychology of the workforce

One major issue is the attitude of the workforce toward change. At the beginning of the SAP privatization initiatives, many workers and managers were uncomfortable with the transition to a market- and profit-based mode of operation. SAP senior managers made a great effort to convince the workers that the change was both necessary and appropriate. As business improved the workers gained confidence in the reform process.

However, when business declined this confidence waned even though the causes of the decline were apparently external.

2. Senior management initiative

SAP's senior managers have worked to find solutions to problems at the enterprise level without waiting for the overall economic, legal, and political situation to stabilize, and they were willing to proceed incrementally into unfamiliar areas in order to gain the necessary experience.

Yermishin has demonstrated leadership, initiative, and enthusiastic optimism throughout the entire period since 1988, and he continues to try to instill confidence in SAP among the workers and managers. He believes that the current situation is a short-term one. Perhaps the single most important reason for the success at SAP to date has been Yermishin's leadership and his ability to solve unexpected problems. Even in 1994, in the midst of problems caused by circumstances beyond his control, Yermishin's view was that "the only pressing issue remaining is how to pay wages,"⁵⁸ a problem he was sure he would be able to solve.

3. Education

Substantial education and training is essential for both enterprise managers and workers on the principles and structure of market-based corporations, on stock concepts and mechanics, and on the relationship of financial standing to stock values. Workers should be encouraged to view stock in terms of its long-range benefits, a view that will be easier to encourage as the Russian economy stabilizes.

Education should also address the social welfare sector, evaluating state/enterprise responsibility versus individual responsibility for these benefits, and illustrating how such policy choices affect wage structure and enterprise profits. Education can also be useful to describe a legal system of checks and balances that protects individuals' rights, promotes trust of institutions, and provides established procedures for resolving disagreements. Finally, employees should be taught how to balance employee-ownership rights and responsibilities in order to ensure that the employee-ownership structure remains viable. Such awareness will depend largely on experience, as well as education.

4. Russian legal structure

Current Russian law does not allow privatization via complete employee ownership. Employee stock ownership programs, pension funds, and other incentive stock programs do not have legal status as part of the initial creation of the joint-stock company. If these alterna-

tives were available from the outset, employee ownership would be an option for management to provide additional incentives to profitable operation. Also, Russian laws with regard to product liability and taxation are currently a hindrance for those enterprises trying to participate in international markets or capitalization.

5. Improved valuation methods

Russian accounting practices differ significantly from Western practices. When this is combined with the instability of the Russian economy, it becomes very difficult to get a fair market assessment of an enterprise's assets. Some buyouts have been negotiated based on depreciation schedules for equipment and formula values of assets, but there is no established means for assessing intangible values such as good will, market position, and technological capital.

6. Adapting Western economic thought

SAP, like other Russian enterprises, has been confronted with the issue of how best to adapt appropriate elements of Western economic thought and business methods to its own circumstances. Yermishin has focused less on being the beneficiary of technical assistance funds than on the formation of legitimate partnerships based on complementary capabilities.⁵⁹ SAP has experienced frustration as it learns Western business investment criteria and processes, but has still eagerly sought interaction with Western companies.

VI. Conclusion

The SAP experience to date suggests that it takes a long time for Russian defense enterprises to convert, restructure, privatize, and become viable in a market economy. Over the last five years, the Saratov Aviation Plant has made the transition from a Soviet state-owned defense enterprise to a Russian privatized employee-owned joint-stock company producing commercial aviation and consumer products almost exclusively. The progress made in 1992 has resulted in an enterprise whose position is looked upon favorably by its employees, its suppliers, and its customers. As of February 1993, more than 8,000 employees purchased shares in the new joint-stock company, the plant's economic activity increased by 15 percent over the previous year, and 1992 was the first year since 1976 that there had been an increase in the size of the workforce. The quality of products also improved. The enterprise has initiated programs aimed at improving the housing conditions of its workers while preparing to divest the social assets. In addition, the enterprise began the production of two new aircraft types, modernized some of its production shops, and purchased a substantial number of new computers to support both technical and management requirements.

The period of 1993-94 marked the first full year of operation of the joint-stock company, and the development of new operating mechanisms and procedures. The period also marked the development of several new product initiatives, and continued economic restructuring efforts. At the same time, although deliveries were high, the period saw a financial crisis in operating funds due to a variety of circumstances, which led to a reduction in the workforce and in work stoppages that will continue until adequate cash balances can be restored.

SAP's current priorities as of mid-1994 are to continue the program of long-term change, while at the same time concentrating maximum efforts on the restoration of operating capital. The Russian economic situation complicates the task. SAP's leaders believe that the cash flow problem will be short-lived. If SAP can continue to work its way through difficult situations as it has in the past, it could consolidate its progress and grow. On the other hand, if SAP becomes entrapped in Russia-wide conditions, then substantial further reductions of the workforce may be required before short-term financial stability is restored.

Notes

¹ A. Yevreinov, "Saratov: Moving Toward the Future," *Soviet Life* (September 1991): p. 20.

² This paper is a continuation of a series of papers by the author on the Saratov Aviation Plant produced under the Defense Conversion Project of the Center for International Security and Arms Control, Stanford University. This sequence documents the progress of the Saratov Aviation Plant. Each paper builds on the material and analysis documented in previous papers. See Michael McFaul and Tova Perlmutter, eds., *Privatization, Conversion, and Enterprise Reform in Russia: Selected Conference Papers* (Stanford, CA: Center for International Security and Arms Control, May 1994) and M. McFaul, ed., *Can the Russian Military-Industrial Complex Be Privatized? Evaluating the Experiment in Employee Ownership at the Saratov Aviation Plant* (Stanford, CA: Center for International Security and Arms Control, May, 1993). See also Kathryn Hendley, *Steps on the Road to Privatization: A Preliminary Report on the Saratov Aviation Plant* (Stanford, CA: Stanford University, August 1992).

³ Details on SAP history and product lines are from *Collective Enterprise "Saratov Aviation Plant"* (Saratov, 1991), pp. 1-2; and the brochure *Collective Enterprise, Saratov Aviation Plant* (Saratov, 1991), pp. 1-4.

⁴ Alexander Yermishin, author's interview, Saratov, January 1992.

⁵ *Aviation Production Development of Collective Enterprise "Saratov Aviation Plant" Under Conditions of Economic Reform* (Saratov, 1991).

⁶ At the time this step was taken, aircraft prices were state-regulated, and separate enterprises had to be formed to sell products at market prices. Since then, this requirement has been relaxed.

⁷ A "collective enterprise" is not state-owned, but neither is it fully employee-owned in the Western sense. The term denotes collective ownership by the labor force. The Western concept of an employee-owned company involves a corporate legal entity, with shares of stock that account for the current value of all corporate assets, and are issued to the employees as stockholders, who are thus the owners. This type of structure is known as a "stock company" under Russian law, and is sharply distinct from a collective enterprise.

⁸ Yevreinov, p. 20.

⁹ "Council of Ministers of the USSR Resolution on Conversion of Saratov Aviation Plant and Saratov Electro-Aggregate Production Association into Collective Enterprises," in *Aviation Production ... Under Conditions of Economic Reform*.

¹⁰ The formulas used did not attempt to reflect current world market value of SAP assets. Nevertheless, the formula valuation did give SAP management some basis for further distribution of ownership to the individual employees.

¹¹ Corporate governance at that time was based on an annual company conference of delegates selected as representatives by work units (some as small as five employees). A total of 576 delegates was chosen for the first conference, and these delegates then voted for a nine-person board of directors, who in turn elected Alexander Yermishin as President and Chairman of the Board.

¹² The visitors were V. Gorbunov, Vice Director and Chief Operation Officer; M. Mordvinkin, Chief Financial Officer; Yu. Kovshov, Director of Personnel; and S. Sotov, Head of Industrial Security.

¹³ Many new industrial security problems confront SAP. These include not only the physical security of SAP commercial products and facilities, but also a range of intellectual security

issues: intellectual property rights, airplane design rights, nondisclosure issues in subcontracts, team projects and joint ventures with other commercial enterprises, SAP-proprietary information, and patent rights.

¹⁴ Procedures had to be developed to nominate and present an initial slate of candidates to the workers. Since Russian law required approval by three-quarters of the stockholders, the enterprise set up a procedure for a large slate of candidates to be narrowed down progressively until the required number were elected with the necessary majority.

¹⁵ SAP's initial approach was to create a true internal market by which shares would be traded on a monthly basis, with supply and demand determining the price of the stock each month. This approach allowed the internal market to proceed, but made stock prices susceptible to the inordinate impact of trading a small number of shares in a given month. (The relative insensitivity to this kind of anomaly is one of the advantages of the formula approach to establishing the stock price. This is the approach used in some closed employee-owned stock companies in the West. SAP plans to refine its internal market rules once it has some experience.)

¹⁶ The communications program with SAP workers was intensive and took several forms. Managers at all levels received special training and discussed the issues with their subordinates. Extensive use was made of the factory newspaper to explain the impending change and its rationale. Finally, Yermishin started a weekly radio program in which workers could call in and ask questions and he would discuss the answers over the radio. As a result of these efforts, worker support for the change grew rapidly. For example, by October, about 90 percent of SAP employees had written in their workbooks that they intended to transfer the ownership of their shares in the collective to the new joint-stock company. Additionally, there was a noticeable change in the employees: they were becoming very interested in the change, and no one was trying to sell shares.

¹⁷ There was concern that inexperience could put SAP and its employees at a disadvantage if the company became partially owned by outside investors. Hence, in spite of the need for investment capital, SAP made the decision to stay closed so as to be able to better control its own destiny.

¹⁸ Representatives from the CISAC team visited SAP in both October and February, participated in both conferences as observers, and provided consultations and training. In October, the principal issues of concern to SAP management focused on the mechanics of employee-ownership: the election of a board of directors, the distribution of property, the operations of an internal market. In February, SAP management asked for help on various aspects of corporate operations, and many of the issues discussed in earlier training sessions were revisited.

¹⁹ Yermishin, author's interview, Saratov, January 1992.

²⁰ V. Gorbunov, author's interview, Saratov, April 1992.

²¹ Yu. Kovshov, author's interviews, Saratov, January 1992, and McLean, Virginia, April 1992.

²² Decentralized financial operations, one of SAP's objectives, have not yet been adopted, because the necessary financial accounting, budgeting, and monitoring computer systems have not yet been developed. SAP's annual budgeting process is also a holdover from the command-economic mode of operations. It must be adapted to meet the requirements of budgeting with market-driven demand.

²³ Three of the SAP collective farms were formed into a joint enterprise with U.S. agricultural companies. SAP will own a controlling interest in this joint enterprise, but the board of

directors includes representatives of the Western partners. SAP is also working on a program to sell the housing complexes to individuals, and transfer ownership to the individual workers. The firm is promoting single family dwellings, and has programs underway to finance their construction. At this time, SAP is one of the few enterprises in Saratov continuing to build houses.

²⁴ L. Hayes, "Russian Plant Weans Itself from the Military," Wall Street Journal, 5 January, 1993, p. A10.

²⁵ The development of a new Yak-40 airplane, supported by Western European investment, is now a priority for SAP. In 1993, SAP is working on the smaller T-401 aircraft, beginning flight tests of the Yak-42A, enlarging the passenger capacity of the Yak-42, and starting production of an entirely new aircraft design for the Yak-42M using a different engine, different fuselage dimensions, and new avionics. SAP is also continuing to develop the flying plate, an economical flying machine capable of lifting very heavy loads.

²⁶ Yermishin attributed this distinction to general uncertainty about the future political and economic stability of Russia, and not to specific conditions at the firm. Author's interview, Saratov, October, 1992.

²⁷ The salary structure within SAP is still based on old standards established by the Soviet Ministry of Aviation. SAP intends to revise the salary structure soon to meet contemporary requirements.

²⁸ The Saratov Aviation Plant is in the Southern Saratov Industrial Zone, which suffers from air, water, and solid waste pollution. The Saratov region itself, including the Volga river, is a region of major environmental concern. The development of economically feasible methods to reduce SAP's environmental pollution is important for several reasons. First, pollution directly affects the health of SAP workers, most of whom live very near the plant. Second, environmentally clean operations will be cheaper than paying to clean up pollution, which SAP would be required to do under a new Russian law soon to take effect. Finally, in order to receive international certification for aircraft production, SAP production technology must meet strict environmental standards. Hence, solution of SAP's environmental problems is directly related to SAP's future economic viability. E.I. Pyrozhenko, author's interview, Saratov, October 1992.

²⁹ The year 1993 ended with the October 1993 assault on the Russian White House and the December 1993 elections in which the popular vote expressed widespread discontent with the Russian government. Many areas of popular discontent focused on general problems that also are specific issues for the Saratov Aviation Plant.

³⁰ Aviastroitel', Newspaper of the Saratov Aviation Plant, Saratov, 25 May 1994, p. 1.

³¹ Where not otherwise specifically noted, factual information in this section is based on author's interviews with several senior SAP managers in Saratov, February 1994.

³² A. Zakharov, author's interview, Saratov, February 1994.

³³ A. Yermishin, author's interview, Saratov, February 1994.

³⁴ A. Yermishin and A. Zakharov, author's interview, Saratov, February 1994.

³⁵ Reuters News Service, London, 24 April 1994.

³⁶ In February 1994, the author visited the same consumer goods facility that he had visited on earlier trips. SAP had made a major effort to eliminate the earlier clutter, dirt, and materiel piles associated with heavy-duty machine shop production. The unit is now a much tidier, cleaner facility.

³⁷ As a result of contacts established at the Israel-94 Exhibition in Moscow, Russia and Israel signed an agreement to co-develop and sell the Yak-48. The first aircraft is planned to be

ready in 1995, with mass production and sale on the world market beginning in 1997. See Sergei Staroselsky article (untitled), ITAR-TASS, Moscow, June 17 1994. Yermishin visited Israel shortly thereafter to coordinate production, but was not satisfied with the results.

³⁸ Yu. Kovshov, author's interview, Saratov, February 1994.

³⁹ Yu. Kovshov, author's interview, Saratov, February 1994.

⁴⁰ After the founding conference, SAP only had four initial board members who received the necessary 75 percent majority vote required by Russian law. Since the bylaws require a board of nine members, five were approved after the conference. SAP picked those who had received at least 60 percent of the vote. The nine members for 1993 were Yermishin, Mordvinkin, Dubrovin, Popov, Sugak, Zakharov (Technical Director), Larioff, Voronoff, and Zakharov (Capital Construction). In subsequent years, a new board member can be elected with a 50 percent vote of the shareholders.

⁴¹ By contrast, in a Western company the board of directors may typically meet quarterly. The board of directors currently has to approve all purchases, down to even the smallest level.

⁴² A. Yermishin, Yu. Kovshov, and I. Klimova, author's interviews, Saratov, February 1994.

⁴³ N. Akhmanova, author's interview, Saratov, February 1994.

⁴⁴ I. Klimova, author's interview, Saratov, February 1994.

⁴⁵ N. Akhmanova, author's interview, Saratov, February 1994.

⁴⁶ Yermishin's current thinking on the types of companies that may be financed to support the initiatives of current SAP employees is very broad. One example he cited is the case in which 10-15 people may want to establish a brewery or a chain of beer places as a daughter company of SAP.

⁴⁷ If successful, this approach would probably eventually transform the Saratov Aviation Plant into a holding company structure, with the aviation component as a major subsidiary.

⁴⁸ At the beginning of 1992, internal problems and issues were identified as the top concerns of SAP managers. That was not true at the beginning of 1994. External problems had come to the forefront.

⁴⁹ See P. Romanov, "Supersonic Fighter Takes Off Vertically," *Military Parade*, January/February 1994, pp. 72-74.

⁵⁰ In January 1992, a survey was taken of the workers to determine if they preferred to remain a collective enterprise or to transition to a joint-stock company. Of those sampled, 46 percent asked for more information about the differences.

⁵¹ There are also underlying psychological issues that may need to be addressed. For example, one SAP manager argued that some workers are not prepared for transition to a joint-stock company because it is a major step toward the capitalism they were taught to despise.

⁵² For a detailed discussion of legal issues relating to SAP, see Kathryn Hendley, "Steps on the Road to Privatization: A Preliminary Report on the Saratov Aviation Plant," June 1992 Project Status Report of the Center for International Security and Arms Control (Stanford, CA: Stanford University, 1992).

⁵³ During 1992, several versions of draft Russian privatization laws appeared, each of which treated employee ownership somewhat differently. For example, one draft Russian privatization law provided for a maximum of 51 percent employee ownership.

⁵⁴ This right means that if an employee-owner receives an offer to sell stock to someone outside the corporation, or if the employee leaves the corporation and decides to sell his or

her stock, the corporation has the first right to repurchase the stock. This right is acknowledged by the employee as one of the conditions of employment or of stock ownership.

⁵⁵ During the first six months of 1992, there was also the question of the legal status of the debt that SAP incurred from the former Soviet government. SAP resolved this question by paying the Russian government in June 1992.

⁵⁶ Almost all defense enterprises have created small enterprises. Some of these were formed from essential main production assets, and others were formed from support assets or ancillary assets. Once formed, there are only a limited number of choices for reintegration: the small enterprises can be dissolved once sufficient main product orders are flowing; they can be reintegrated as branches with varying degrees of independence; they can be made separate subsidiaries, or they can be spun off as independent companies. Depending on the specifics, defense enterprises are choosing all of these options. However in each case there are personnel and morale issues involved in the execution of the choices.

⁵⁷ Not all defense enterprises have been taking this approach. They all realize the need to separate the social sphere assets from the main economic activity, but some are still planning on retaining them within a new corporate structure that will allow the enterprises more positive control (and guarantees to their employees) than would be obtainable by complete divestiture.

⁵⁸ A. Yermishin, author's interview, Saratov, February 1994.

⁵⁹ At the same time, Yermishin has experienced frustration and disappointment with the pace at which Western technical assistance programs have been forthcoming for the Saratov region.

VII. Privatization at Four Enterprises

Michael McFaul

Given the privileged position of the military-industrial complex in the old Soviet order, many have asserted that the military-industrial complex would be most resistant to radical economic reform. As the coddled employees of the Soviet state, we should expect directors and workers of military enterprises as well as their ministerial superiors to fear liberalized prices, commercial markets, and privatization.

This chapter seeks to explore this prevalent hypothesis about the Russian military-industrial complex by assessing the process of privatization and the delineation of property rights more generally at four defense enterprises and institutes: the Saratov Aviation Plant, Impuls, Mashinostroenie, and TsAGI.¹ Section One outlines the objectives of privatization during transitions to market economies, and contrasts these objectives with the concerns and interests of the defense establishment. Section Two then explores the progress toward privatization at these four military entities, focusing in particular on how the objectives of privatization versus the interests of the military are being reconciled. Section Three concludes by comparing these cases, explaining in particular how different strategies of privatization at each of these enterprises have nonetheless all led to the same “owners” emerging—the directors.

I. Goals of Privatization

Throughout the post-communist world, privatization is one of the most critical policies for establishing a market economy. As Earle, Frydman, and Rapaczynski have summarized in their study of several privatization programs throughout Eastern Europe and the Former Soviet Union, “When the [privatization] process first began, policymakers and external observers realized that the economic transition had two major objectives: the re-organization of industry and the establishment of a privately based economy.”² Russia was no different. Led by Yegor Gaidar and his team of radical reformers, Russia began its economic reform process with price liberalization, to be followed by macroeconomic stabilization.³ Privatization constituted the third but most important component of this plan.⁴ The original privatization program had clearly defined objectives, namely to create privately owned, profit-seeking corporations owned by outside shareholders that would not depend on government subsidies for survival.⁵ As the 1994 privatization program reiterated, one of privatization’s principal objectives is “to heighten the efficiency of enterprises and the national economy as a whole by implementing economic restructuring, developing post-privatization support for enterprises, creating a competitive environment, and developing a secondary market...”⁶

¹ The other two cases included in this study, MCST and ELVIS+, are not large enterprises, but spin-offs, and therefore cannot be compared with these other four enterprises regarding questions of privatization and ownership rights.

² John Earle, Roman Frydman, and Andrzej Rapaczynski, “Transition Policies and the Establishment of a Private Property Regime in Eastern Europe,” manuscript, September 19, 1993, p. 2.

³ See Anders Aslund, *Post-Communist Economic Revolutions: How Big a Bang?* (Washington, DC: Center for Strategic and International Studies, 1992).

⁴ President Yeltsin, national television address, August 19, 1992; and Deputy Prime Minister Anatolii Chubais, in “Chubais Schitaet Shto Glavnaya Zadacha 1993 Goda—Perekhod k Kachestvennoy Privatizatsii,” *Izvestiya - FP*, March 12, 1993. See also Andrzej Brzeski, “Post-Communism From a Neo-Institutionalist Perspective,” *Journal of Institutional and Theoretical Economics*, 148 (1992): 195; and Stanley Fisher and Alan Gelb, “The Process of Socialist Economic Transformation,” *Journal of Economic Perspectives*, 5 (Fall 1991): 98.

⁵ “Gosudarstvennaya Programma Privatizatsii Gosudartvennykh i Munitsipal'nykh Predpriyatii v Rossiiskoi Federatsiya na 1992 God,” in *Rossiiskii Rynok Tsennykh Bumag: Privatizatsiya, Normativnye Akty*, chast 4, (Moskva: Nezavisimaya Investitsionnaya Firma, et.al., December 1992): 97-122. On the necessity of outside owners for “real” privatization, see David Lipton and Jeffrey Sachs, “Privatization in Eastern Europe: The Case of Poland,” *Brookings Papers on Economic Activity*, 1 (1990): 35; the interview with Deputy Prime Minister Anatolii Chubais, in “Snova ‘Fabriki-Rabochim’?” *Argumenty i Fakty*, April 16, 1993, p.4.

⁶ *The State Program of Privatization of State and Municipal Enterprises in the Russian Federation*, Presidential Decree No. 2284, December 24, 1993; as reprinted in *Privatization in Russia: Information Bulletin*, No. 1-2, (Moscow: State

As declared by Russia's first post-communist government, these objectives also apply to Russia's defense industry. Achieving the goals of privatization in this sector of the economy, however, is complicated by several factors. First, privatization of most military enterprises would be meaningless without conversion as well. While some enterprises will be able to continue to sell military products to the Russian government and abroad as private companies, most will have to find new markets to survive. Second, as already mentioned, the Soviet military-industrial complex consisted of giant, centralized conglomerations at which hundreds of different products, both civilian and military, were produced at the same enterprise.⁷ These enterprises or associations of enterprises were structured according to function instead of product line, a configuration that is not always appropriate for market participation.⁸ To become self-sufficient, these large enterprises will have to be unbundled. More generally, the Soviet economy was simply overindustrialized, meaning that many production facilities may have to close down entirely. At the same time, some enterprises, particularly those involved in the production of single, complex, and large products (e.g., airplanes and ships) must maintain some form of organizational integrity to continue production. Spin-offs, the loss of specialized labor, and the shortage of capital may derail in the short run those enterprises that have the potential to make substantial profits in the long run. Finally, Russia's ill-defined security needs further complicate the relationship between the state and military enterprises. While Yeltsin has emphasized that a private company can sell weapons to the state just as well as a state-owned enterprise can, others fear that too much privatization in the defense sector will jeopardize Russia's long-term security interests. For instance, if Russia loses the capability to produce certain military technologies and utilize them in weapons production during this transitional period, it may never reacquire that capability if it is needed in the future.⁹

II. The Reemergence of the State

These special factors regarding privatization of defense enterprises have created a unique tension between state actors on the one hand and managers and employees of military institutes, design bureaus, and production factories on the other. In short, when compared to other sectors of the economy, the state has increasingly tried to assume (or reassume) greater control over the reorganization of property rights of defense enterprises. To attempt to do so, the state had to first reorganize itself. The collapse of the Soviet Union also meant the collapse of the nine ministries that constituted the military-industrial complex. Initially after the dissolution of the Soviet Union, 30 concerns and four corporations in Russia replaced the old Soviet ministries.¹⁰ Later, an unwieldy Ministry of Industry subsumed responsibility for the entire military-industrial complex. Eventually, this new institutional arrangement proved unable to replace the old order, and was replaced in 1992 by a set of State Committees, including the State Committee for Defense Industries headed by Viktor Glukhikh. This new committee, working in close cooperation with the Ministry of Defense, has emerged as the highest government authority regarding Russia's military-industrial complex. Under Glukhikh's chairmanship, this State Committee has aggressively tried to reassert its control over policies of privatization and conversion in the defense sector. Years of state atrophy, punctuated by

Property Management Committee of the Russian Federation and RIA Novosti, 1994), p. 3. Hereafter referred to as the 1994 State Program of Privatization.

⁷ See Michael McFaul, David Bernstein, "Industrial Demilitarization, Privatization, Economic Reform, and Investment in Russia: Analysis and Recommendations," Project Status Report of the Center for International Security and Arms Control, March 1993.

⁸ Committee on Enterprise Management in a Market Economy Under Defense Conversion, National Academy of Sciences, "Interim Report: Dedeveloping Assets of the Russian Defense Sector to the Civilian Economy," ms., March 1993, p. 8.

⁹ A similar fear haunts the U.S. Secretary of Defense. See Charles Lane, "Perry's Parry," *The New Republic*, June 27, 1994, pp. 21-25.

¹⁰ Julian Cooper, *The Conversion of the Former Soviet Defence Industry* (London: Royal Institute of International Affairs, 1993), p. 6.

almost total breakdown during the transition from the Soviet Union to Russia, has made this task an uphill battle.¹¹

The crisis within the military-industrial complex after the collapse of the Soviet Union was exacerbated by the Russian government's initial strategy for encouraging conversion and economic restructuring of military enterprises. In the fall of 1991, President Yeltsin appointed Yegor Gaidar as deputy prime minister, and later acting prime minister, to coordinate economic reform. Upon initiating an economic reform strategy in January of 1992, Gaidar and his team of young economists declared a militant adherence to macroeconomic stabilization—a policy that began with price liberalization, followed by privatization in the context of a tight monetary policy.¹² Gaidar's government initially rejected the idea of a government industrial policy.¹³ Rather, by maintaining restrictions on credits and promoting austerity more generally, Gaidar believed that the forces of the market—the invisible hand—would compel state industries to undertake the necessary restructuring to survive. Those that did not restructure would be forced into bankruptcy.

Defense enterprises were especially threatened by such a laissez-faire strategy. Dependent on the state as their sole customer, military factories could not adapt immediately to the production of competitive consumer goods. And even if they could, the Russian market was only just emerging, making decisions based on projections of market demand virtually impossible. Immediately following the collapse of the Soviet Union, the newly formed Russian Ministry of Defense assured military enterprises that it intended to maintain some level of procurement. The lack of a clearly defined military doctrine for the new Russian state, however, delayed and sometimes stalled indefinitely the allocation of these state orders, forcing military enterprises to find new methods of survival. In 1992, expenditures for procurement of military weapons systems contracted by 68 percent.

In recognition of the special conditions facing military enterprises, the Russian government did establish a series of incentives for promoting conversion, including tax concessions; long-term, low interest loans for conversion projects; accelerated amortization of fixed capital assets; subsidies for conversion projects related to the agro-industry; and a conversion fund for new equipment and technical assistance needed for conversion projects.¹⁴ The ascendancy of the Committee for Defense Industries within the Russian government has resulted in a commensurate growth in the fourteen-point Program for Conversion for 1993-1995.¹⁵ Estimated expenditures on this program were 937 billion rubles in 1993, 1,076 billion in 1994, and 1,969 billion in 1995.¹⁶ The government declared a special interest in financing those projects that utilized the high technological expertise already developed at many military enterprises.¹⁷

Whether or not the state should finance conversion projects was an issue that divided the Russian government. Gaidar and his team of liberal reformers resisted this state conversion program, contending that the transfer of state's funds to enterprises, be it for the financing of conversion projects or simply the subsidization of the enterprises, serves to blur the lines of private and public activity and reaffirm the power of central ministries vis-à-vis enterprises.¹⁸ Consequently, Gaidar's government initially sought to minimize state involvement in the

¹¹ On Russian state collapse, see Michael McFaul, "State Power, Institutional Change, and the Politics of Privatization in Russia," *World Politics*, January 1995.

¹² See Aslund, *Post-Communist Economic Revolutions: How Big a Bang?*

¹³ Erik Whitlock, "Industrial Policy in Russia," RFE/RL Research Report, Vol. 2, No. 9, February 26, 1993, pp. 44-45.

¹⁴ *Rossiiskaya Gazeta*, April 27, 1992, p. 6, as cited in FBIS-SOV-92-083, April 29, 1992, p. 30; Sergei Rogov, ed., *Defense Expenditure Trends in the USSR and the Commonwealth of Independent States*, Brookings discussion paper, (Washington, DC: Brookings Institution, October 22, 1992): 41. This fund was increased in 1993 to 150 billion rubles to keep up with inflation. See Mikhail Glukovsky, "Conversion Voronezh Style," *Delovie Lyudi*, May 1993, p. 20.

¹⁵ See Oleg Lobov, "VPK Pokazyvaet Tovar Litsom," *Rossiiskie Vesti*, No. 123 (292), 1993, p. 5.

¹⁶ Christopher Smart, "Russia's Draft Conversion Program," mimeo, July 12, 1993.

¹⁷ Yegor Gaidar, ITAR-TASS, November 18, 1992, in Yekaterinburg, in FBIS-SOV-92-224, November 19, 1992, p. 21.

¹⁸ See Anatoli (sic) Chubais, "Russia: The Needs Extend Beyond Privatization," *International Herald Tribune*, July 9, 1993, p. 6.

planning or coordination of the conversion process.¹⁹ The Law on Conversion of the Defense Industry signed by Boris Yeltsin in May of 1992 specifically delegated actual decisions about conversion projects to the enterprise directors themselves.²⁰ The result was attempts at conversion that were neither planned by the state nor dictated by the market.²¹ The enterprises made diverse independent attempts to develop and sell new products and services.

While state officials and first and foremost the Ministry of Defense and the Committee for Defense Industries did not succeed in maintaining pre-1991 levels of state subsidies and procurement expenditures, they were more successful in reasserting mechanisms for the state's continued participation in the privatization of defense enterprises. The first comprehensive privatization program approved by the Congress of People's Deputies during the summer of 1991 actually prohibited several kinds of defense facilities from privatizing while placing stringent constraints on those that were allowed to proceed with privatization.²² However, subsequent additional legislation coupled with pressure from military directors seeking to escape government control altered the legal regime governing privatization of defense enterprises so that by the end of 1993, 642 military enterprises already had been privatized.²³ Realizing that halting the privatization process at these enterprises might be difficult and politically unwise, the Ministry of Defense in cooperation with the State Committee for Defense Industries instead pushed for a role in overseeing the privatization process. First, the Ministry of Defense and the Committee for Defense Industries succeeded in becoming part of the approval process for the privatization of defense enterprises. Presidential Decree No. 1267, signed by Yeltsin on August 19, 1993, states that the GKI, the Committee for Defense Industries, and the Ministry of Defense must all approve a privatization plan of a defense enterprise.²⁴ For three years after privatization, a controlling packet of shares stays with a state agency, and will most likely be controlled by the Committee for Defense Industries and the Ministry of Defense.²⁵ During this time the naming of the enterprise directors on behalf of the state will be done jointly by the GKI and Committee for Defense Industries.²⁶ The general director must also be approved by these two state bodies. The 1994 privatization program (though not passed as law as of September 1994) further codified the parameters of state ownership after privatization for defense enterprises by allowing the state to retain "share packages" of 51, 31, and 25.5 percent in privatizing military enterprises for a period of three years.²⁷

Second, the Ministry of Defense and the Committee for Defense Industries succeeded in writing into the 1994 privatization program the concept of a "golden share,"²⁸ a minority ownership position reserved to the state that nonetheless gave the state a veto over any major

¹⁹ For a critical retrospective assessment of this strategy, see the interview with Major General Vladimir Tsarkov, president of the State Center of Conversion for the Aerospace Complex, in V. Khrustov, "Tsentri Konversii: Ot Pervykh Proektov k Natsional'noi Programme," *Rossiiskie Vesti*, No. 22 (191), February 3, 1993, p. 3. Oblasts such as Leningrad, Sverdlovsk, Kaluga, and Tula, in which military enterprises comprised the majority of all economic activity, eventually stepped in to develop their own local conversion programs. "Tratit' Valyutu Ne Obyazatel'no," *Moskovskie Novosti*, January 10, 1993, p. B8.

²⁰ *Rossiiskaya Gazeta*, April 27, 1992, p. 6, as cited in FBIS-SOV-92-083, April 29, 1992, p. 29.

²¹ For a critique of this spontaneous approach to conversion, see the comments by A. Shulunov, president of the League of Defense Enterprises, in "Ekonomika, Konversiya, Predprinimatel'stvo," *Ekonomicheskaya Gazeta*, No. 22, May 1992, p. 6; and Georgii Kostin, "Thoughts on Conversion," *Pravda*, July 30, 1993, p. 3, in FBIS-SOV-93-147, August 3, 1993, p. 22.

²² Eva Busza, "Strategies of Privatization: The Options," in *Can the Russian Military-Industrial Complex Be Privatized? Evaluating the Experiment in Employee Ownership at the Saratov Aviation Plant* (Stanford: Center for International Security and Arms Control, May 1993) 22.

²³ Moscow Ostankino Television, March 28, 1994, in FBIS-SOV-94-060, March 29, 1994, p. 24.

²⁴ Ukaz Prezidenta Rossiiskoi Federatsii, "Ob osobennostyakh privatizatsii i dopolnitel'nykh merakh gosudarstvennogo regulirovaniya deyatelnosti predpriyatiy oboronnykh otraslei promyshlennosti," No. 1267, August 19, 1993, p. 2. Hereafter referred to as Presidential Decree No. 1267.

²⁵ Presidential Decree No. 1267, p. 2.

²⁶ Presidential Decree No. 1267, p. 4.

²⁷ The 1994 State Program of Privatization, p. 12.

²⁸ See Glossary.

reconfiguration of an enterprise.²⁹ This continued intervention of the state in the internal affairs of privatizing enterprises was justified for national security reasons. Deputy Defense Minister Andrei Kokoshin has been particularly vocal in supporting the preservation in state hands of a “core” group of research institutes and construction bureaus as a strategy for maintaining Russia’s technological advantage regarding weapons systems.³⁰ The state, however, is prohibited from holding both a golden share and a share package.³¹ Furthermore, if a defense enterprise has less than 30 percent of its contracts with the state, the state may not retain an arbitrarily large ownership stake.³²

Finally, the legislative regime governing the privatization of defense enterprises has encouraged the formation of concerns, associations, and holding companies. In effect whole ministries are “privatizing” while still seeking to maintain their control and partial ownership over enterprises formerly under their jurisdiction. As Pyotr Filippov described,

All over the country the so-called “industrial generals” are waging attack upon its “captains” and “lieutenants.” Directors of associations, concerns, companies, newly created holding companies with the aid of the ministries stop at nothing in order to curtail the enterprises’ independence. They deprive them of their right of legal person, unite them. Those which do not agree to such a line, threaten the integrity and monopolist rights of associations are immediately punished. (sic) Such a policy is aimed at meeting personal mercenary interests of the “generals.”³³

The creation of so-called “industrial-financial groups” further blurred the lines between state and private ownership by placing whole private entities and whole state entities in one organization. As drafted by Mikhail Yuryev, chairman of the government’s council on industrial policy, these newly created industrial-financial groups would receive direct state support.³⁴ Not surprisingly, first Gaidar and now Chubais have fought to limit the centralizing capability of these parastatals.³⁵ While holding companies are preferred to concerns as they all at least provide the structure for some private ownership, liberals formerly in charge of the Russian government nonetheless see the development of these entities as the greatest threat to the creation of an effective regime of private property rights.³⁶

Finally, some enterprises have been declared off limits for any kind of privatization. As outlined by Viktor Glukhikh, Chairman of the Committee for Defense Industries, “a ‘core’ group of defense enterprises, 449 in number, will remain in state hands.”³⁷ While all political players in the privatization process knew that some military enterprises would remain in state hands, the Chubais team had hoped that the number would be smaller.

²⁹ The 1994 State Program of Privatization, p. 11.

³⁰ See comments by Deputy Defense Minister Andrei Kokoshin, in *Krasnaya Zvezda*, October 29, 1992, p. 1, in FBIS-SOV-1992-214, November 4, 1992, pp. 32-33.

³¹ The 1994 State Program of Privatization, p. 12.

³² The 1994 State Program of Privatization, p. 13.

³³ Interview with Pyotr Filippov in “Commonwealth Business News,” Supplement to *Ekonomika i Zhizn'*, 1992, p. 1.

³⁴ Alexander Bekker, “State Privatization Program Basically Approved,” *Segodnya*, December 21, 1993, p. 3, as cited in *The Current Digest*, Vol. XLV, No. 51(1993): 19.

³⁵ Natalia Kalinichenko “State Committee Objects to Ministry Plan,” *Commersant*, September 15, 1992, p. 6; Alexander Bekker, “State Privatization Program Basically Approved,” *Segodnya*, December 21, 1993, p. 3, as cited in *The Current Digest*, Vol. XLV, No. 51(1993): 19. For instance, during the voucher program, the GKI succeeded in obtaining a new presidential decree that declared that 29 percent of all shares in a joint-stock company must be available for purchase with vouchers. These conglomerates, however, soon found many ways to subvert this decree and still acquire majority stakes in enterprises. See Moscow Radio, May 13, 1993, in FBIS-SOV-93-091, May 13, 1993, p. 33.

³⁶ Natalia Kalinichenko and Mikhail Rogoshnikov, “Russian Concerns May Soon Become Holding Companies,” *Commersant*, June 23, 1992, p. 6.

³⁷ Viktor Glukhikh, “Reform and Stabilization of the Defense Industry,” *Konversiya*, Vol. 3 (Moscow: State Committee of the Russian Federation for the Defense Industries, 1994): 17. It is interesting to note that Glukhikh estimated this number of enterprises to remain state (*kazennikh*) to be 300 in June of 1993. See Viktor Glukhikh, “Mozhno li privatizirivat' tankovyi zavod?” *Rossiiskie Vesti*, June 17, 1993, p. 7.

The reemergence of the state in the process of privatization and continued control of defense enterprises has complicated the development of unambiguous property rights in the defense sector. As one authoritative survey of privatization processes throughout the former communist world has forewarned,

“As a general principle, policies that maintain large roles for the state both as a participant in the process and as a rulemaker for the participants may fail to convey full property rights, including the expectation that those rights will be respected and enforced in the future.”³⁸

At the same time, the weakness of the Russian state suggests the exact opposite—that the reassertion of state control over enterprises will not succeed. Under these conditions, who then really does own defense enterprises? Who controls these enterprises? What is the balance of ownership and control between directors, workers, state ministries and committees, privatized ministries/holding companies, and outside investors? In this confused context, how should or can we evaluate the long-term prospects for the emergence of private, profit-seeking enterprises out of the former Soviet military-industrial complex?

While by no means a random or scientific sample, the following analysis of privatization processes at four defense enterprises reveals a striking similarity. While the selection of cases includes both scientific research institutes and factories; enterprises that produce prototypes and those involved in serial production; those that are fully privatized and those that will never privatize; those receiving no financial support from state and those with state contracts; those essentially fully converted to civilian production and those still involved in the design and production of military weapons systems; nonetheless rights associated with ownership have been appropriated by directors at all of these enterprises. Both the path to control and the degree of control over these property rights varies, but in none of these cases does another set of actors have more de facto ownership of these enterprises than the directors themselves.

Other actors could have assumed a controlling position. The Ministry of Defense, the Committee for Defense Industries, or several of the sectoral ministries (e.g., the Ministry of Aviation) could have developed a more powerful position regarding property rights at these enterprises. Similarly, outside private owners could have emerged as the first owners of these enterprises. Both Poland and the Czech Republic have been more effective in stimulating outsider stakes to counterbalance insider claims.³⁹ Armed with the most comprehensive mass voucher privatization program ever attempted and further buoyed by more than 650 investment funds, it is striking how insignificant outsiders have been in the initial definition of private property rights at defense enterprises in Russia.⁴⁰ The influence of investment funds, secondary markets, and individual investors may become manifest in the future, but the first round of defense privatization was won by the managers.

III. Saratov Aviation Plant⁴¹

Of the cases reviewed in this study, the Saratov Aviation Plant was the first enterprise to initiate privatization procedures. SAP, in fact, may have been the first military enterprise to fully privatize in all of Russia. SAP directors took advantage of the ambiguities and omissions in the Soviet and then Russian privatization regime. Because SAP began to privatize under the

³⁸ Earle, Frydman, and Rapaczynski, “Transition Policies and the Establishment of a Private Property Regime in Eastern Europe,” p. 9.

³⁹ Earle, Frydman, and Rapaczynski, “Transition Policies and the Establishment of a Private Property Regime in Eastern Europe,” p. 34.

⁴⁰ ITAR-TASS, April 7, 1994, in FBIS-SOV-94-068, April 8, 1994, p. 29.

⁴¹ The following section on the Saratov Aviation Plant draws heavily from Kathryn Hendley, “Legal Development and Privatization in Russia: A Case Study,” *Soviet Economy* 8, no. 2 (1992): 131-157, and John Battilega, “A Case Study of Russian Defense Conversion and Employee Ownership: The Saratov Aviation Plant,” in Michael McFaul and Tova Perlmutter, eds., *Privatization, Conversion, and Enterprise Reform in Russia: Selected Conference Papers* (Stanford: Center for International Security and Arms Control, May 1994).

Soviet regime, however, certain institutional legacies from that era have lingered in the structure and organization of the now private SAP. Most strikingly, SAP at least on paper is 100 percent employee-owned, the only employee-owned company of its kind in Russia. This kind of ownership organization, no longer legal under the 1992 privatization law, has been beneficial to SAP in the short run in that the structural and organizational integrity of the enterprise has been maintained, an accomplishment of monumental importance for a company seeking to produce a complicated product like an airplane. As a closed joint-stock company, however, SAP has had virtually no outside investment. Nor has significant reorganization or downsizing taken place. The consequences of this lack of investment and restructuring, whether permanent or temporary, are still unclear.

While SAP's method of privatization is virtually unprecedented in Russia and is most certainly unlike any other examined in this study, it is still striking that SAP directors have nonetheless achieved the same objectives as other directors using different methods of privatization under review here. Despite the veneer of employee ownership, SAP is still controlled by its directors, and first and foremost its charismatic general director and now chairman and chief executive officer, Alexander Yermishin.

Yermishin's quest to acquire independence from the Soviet state and control of the aviation plant began well before the concept of privatization was even legal. As with virtually all other enterprises, SAP had become increasingly independent from its governing Soviet state ministries during the waning years of the Soviet era.⁴² Upon becoming director of the plant in 1988, Yermishin was eager to gain even further autonomy. His moment of opportunity was created by political events in Moscow in 1990. At the time, then Prime Minister Nikolai Ryzhkov was under severe criticism for failing to implement more radical reforms. Debate concerning the creation of private property was particularly polarized as reform-oriented Communists including both Gorbachev and Ryzhkov were nonetheless categorically opposed to private property. Ryzhkov, eager to find an alternative form of ownership to either state or private property and still demonstrate his commitment to economic reform, decided to experiment with collective ownership at two plants in Saratov, the Saratov Aviation Plant and the Saratov Electrounit Production Amalgamation.⁴³ In essence, Ryzhkov approved a special decree, signed on July 10, 1991, which transferred full rights to ownership to the workers' collectives of these two enterprises.⁴⁴ Under the terms of this special resolution, the Soviet government transferred 54 percent of SAP outright to the workers' collective. The remaining 46 percent was to be sold to SAP over time. Given that the enterprise (including the collective farms, housing complexes, health care, and educational facilities) was valued at only 250 million rubles in 1991 prices, the SAP workers' collective paid 115 million rubles to the state to assume complete property rights for the entire plant. They paid off this debt in May 1992.

Property rights to SAP were not transferred to shareholders or individual owners. As already mentioned, Ryzhkov and his government opposed outright privatization. Rather, SAP was collectively owned by everyone who worked at the plant. In Yermishin's estimation, this was not a viable long-term form of ownership. By making the transition to a collective enterprise, Yermishin accomplished his first objective— independence from the state and especially the Ministry of Aviation. Under this form of ownership, he had in essence also achieved his second apparent but unstated objective— individual control of the enterprise— as the ambiguities of collective ownership meant that the director ultimately made all decisions about the operation of the plant. At the same time, Yermishin saw collective ownership as a transitional form of ownership somewhere in between the Soviet and market system. Once SAP achieved independence from the state, Yermishin and his colleagues initiated a process by

⁴² See Michael McFaul, "Agency Problems in the Privatization of Large Enterprises in Russia," in *Privatization, Conversion, and Enterprise Reform in Russia: Selected Conference Papers*, ed. Michael McFaul and Tova Perlmutter (Stanford, CA: Center for International Security and Arms Control, 1994).

⁴³ Author's interview with Nikolai Ryzhkov, July 1992.

⁴⁴ "Council of Ministers of the USSR Resolution on Conversion of Saratov Aviation Plant and Saratov Electro-Aggregate Production Association into Collective Enterprises," in *Aviation Production Development of Collective Enterprise "Saratov Aviation Plant" Under Conditions of Economic Reform, Saratov, 1991*.

which collective ownership would be transformed into individual ownership. The first step in this process was the creation of shares, an instrument of ownership that did not exist at the time. This first step, however, was taken very cautiously. Only 18 percent of these shares were distributed initially to individual employees. The largest portion—46 percent—was reserved as a guarantee against the debt to the government, 30 percent was reserved to provide the financial basis for spinning off and privatizing SAP's housing stock, and 6 percent was kept as a reserve to use as special incentives. Though interested in at least introducing the concept of individual ownership, the vast majority of SAP shares were still controlled by the directors on behalf of the collective.

Not only was the first distribution of shares to employees only a small part of the total assets, but the method of distribution also constrained the individual ownership. Distribution was fair. Each employee was given 500 shares, plus an additional number based on a formula that considered length of service, professional qualifications, and five-year salary history. However, individual share certificates were not issued. Instead, the number of shares received was recorded in the individual workbook owned by the employee. Nor was a formal internal market for trading shares quickly established.

Despite these constraints, employees nonetheless welcomed the opportunity to own a stake in their plant. When employees were offered the opportunity to purchase additional shares, they purchased 1.1 million rubles worth of shares in 1991 alone.⁴⁵ By this method SAP raised most of the 1.5 million rubles it needed to pay its first installment on the government debt.

While the actual structure of internal ownership was changing, however incrementally, SAP was still formally registered as a collective enterprise. After the collapse of the Soviet Union and the assumption of power in Russia of Yegor Gaidar and his team of radical reformers, collective ownership was destined to become a relic of the past. Realizing this, SAP managers began to search for an alternative legal status and eventually decided to become an employee-owned joint-stock company. Drawing from American experiences with employee ownership,⁴⁶ Yermishin and his staff of directors considered employee ownership the natural next (though by no means last) stage of transformation for their collective enterprise as this ownership structure would further delineate individual property rights and educate SAP workers about the market and private ownership, while at the same time protect SAP from a hostile outside takeover. Empowered with superior information about both the operations of the plant and the ways of the market, SAP managers would also maintain control and therefore de facto property rights over the enterprise.⁴⁷ Finally, according to John Battilega, a member of the CISAC research team from Science Applications International Corporation, managers at the plant believed that there were several potential economic benefits to employee ownership. They believed that the joint-stock company would:

- (a) Truly motivate the employees with a greater feeling of ownership than with the collective enterprise, and thus increase productivity.
- (b) Provide a means of obtaining investment capital from the employees and possibly from other sources that could then be used for plant modernization, product development, and marketing, with the long-term profits returned to the employees.
- (c) Provide a recruiting incentive for new employees from the Saratov region.

⁴⁵ The formula for purchase was the following. Employees were allowed to buy additional shares for one ruble each, with two additional shares given to them from the SAP reserve for every one purchased, subject to a minimum purchase of 400 rubles and a maximum purchase of 4000 rubles.

⁴⁶ See John Battilega, "A Case Study of Russian Defense Conversion and Employee Ownership: The Saratov Aviation Plant," in McFaul and Perlmutter, *Privatization, Conversion, and Enterprise Reform in Russia*, pp. 173-175.

⁴⁷ See McFaul, "Agency Problems in the Privatization of Large Enterprises in Russia."

(d) And most importantly, provide a better basis for SAP employees to cope with their own problems to help compensate for the lack of an adequate external economic infrastructure.⁴⁸

After an interim step as a partnership with limited liabilities, a conference of SAP worker delegates approved the plan to become an employee-owned joint-stock company in the fall of 1992. On February 6, 1993, the first SAP shareholders meetings approved a new charter for the company and elected a board of directors. Not surprisingly, Yermishin was elected with an overwhelming majority to the board of directors. After a five-minute meeting that same day, the board unanimously elected Yermishin as the company's Chairman of the Board and Chief Executive Officer.⁴⁹ All eight other members of the board, with the exception of the head of the workers' collective, came from managerial staff of the plant. At least initially, the change in the legal structure of ownership at SAP did not change who actually exercised property rights at the enterprise.

In ratifying Yermishin's de facto control over SAP, shareholders were consciously or unconsciously also making several decisions about who was to be the real owner of Saratov Aviation Plant. First, and most obviously, the move to employee ownership meant that SAP was moving further away from state control. Having converted almost fully to civilian production, SAP directors and now shareholders saw no future in fulfilling military contracts or relying on state credits and subsidies; SAP already struggled to receive payments from the state for planes delivered to Aeroflot. State authorities and GKI officials in the first instance did not approve of SAP's decision to remain a closed joint-stock company—a legal status that was outlawed for all companies initiating privatization procedures in 1992.⁵⁰ The Ministry of Aviation also disapproved of Yermishin's brash move to independence. At the same time, these federal authorities knew that they were in no position to "re-nationalize" a property that they could not financially support. While Yermishin and his colleagues were handed a bargain deal by the outgoing Ryzhkov, it was nonetheless a deal that could only be overturned at a very high cost.

By ratifying the employee ownership plan, SAP shareholders also were making a second decision concerning the organizational integrity of the company. As at many other large plants in the Former Soviet Union, small enterprises had been established at the Saratov Aviation Plant. Directors of these five small enterprises were threatened by the codification and delineation of property rights at SAP; two directors wanted SAP to spin off their operations entirely. Yermishin used the occasion of the creation of the joint-stock company to regain control of these five entities. The new charter stipulated that major assets could not be separated from the plant as a whole without the approval of the new board. As part of his strategy to regain control over these small enterprises Yermishin nominated their directors as candidates to SAP's board of directors. None, however, was elected, demonstrating the lack of approval SAP shareholders had for their activities. Soon thereafter, Yermishin used a series of coercive methods to insure their cooperation in fulfilling the goals of the plant as a whole.

Finally, by voting to remain a closed joint-stock company, stockholders were discouraging outside investment in one of the few Russian industries that actually had real potential for attracting capital, including foreign investment.⁵¹ Given the reputation of the plant, Moscow brokers are confident that SAP would be actively traded if ever the company went public.⁵²

⁴⁸ John Battilega, "A Case Study of Russian Defense Conversion and Employee Ownership: The Saratov Aviation Plant," in *Can the Russian Military-Industrial Complex Be Privatized? Evaluating the Experiment in Employee Ownership at the Saratov Aviation Plant*, pp. 41-56.

⁴⁹ The author attended this meeting.

⁵⁰ Author's interview with Alexander Krasnoselsky, at the time advisor to acting prime minister Yegor Gaidar, December 1992.

⁵¹ See Leyla Boulton and Paul Betts, "Co-operation Lifts Russian Aero Industry," *Financial Times*, March 30, 1993, p. 10. Of course, foreign investors could enter into a joint venture arrangement while parts of the Saratov Aviation Plant could be spun off. Given that SAP has really one kind of product—airplanes—these kind of arrangements are more difficult to establish with SAP than is the case with other large Russian enterprises.

⁵² Author's interviews with Moscow-based brokers and bankers (Russian, American, and English), September 1994.

Yermishin has explored partnerships with several Western aerospace companies, but for the time being decided that SAP would try to go it alone; Yermishin and his staff had dreams of becoming a competitor of Boeing, not a subsidiary of it.⁵³ Because SAP already exported aircraft to China, the company's management believed that they could independently generate the capital needed for reinvestment. If SAP cannot become financially viable in the near term, Yermishin is confident that they can sell equity at a later date. Moreover, SAP directors believe that an initial period as a closed joint-stock company will give SAP owners and directors time to learn the ways of the market without having to fear a hostile takeover. This strategy, however, is also risky. As other Russian aircraft producers acquire strategic alliances with Western partners now, there may be few Western investors left for SAP in the future. In shrewdly maintaining their control over the plant during this transitional period, SAP directors have either established the basis for a genuinely employee-owned commercial aircraft company, or forfeited a golden opportunity to become a foreign subsidiary of a major Western aerospace company.

IV. Impuls

As with the Saratov Aviation Plant, acceptance of transition to the market occurred only after a change in leadership at Impuls. During the Gorbachev period, the financial situation at Impuls had become increasingly worse. While the enterprise's financial condition was (and still is) ill-defined in the Russian context, the Impuls factory newspaper, *Conversiya*, declared that the enterprise had become bankrupt by 1992. After several years of financial trouble, the workers collective elected Alexander Grigoriev as general director in 1992. Under Grigoriev, Impuls made real progress toward becoming a privately owned enterprise, and privatized under Option One in June 1994.

Unlike at SAP, Grigoriev and his associates did not race to privatization. As a designer of components for smart bombs and other technically sophisticated weapons systems, Impuls directors continued to believe that their company's future was still best secured by fulfilling contracts for the Ministry of Defense. In their view, the dramatic decline in military procurement expenditures—68 percent in 1992—was just a temporary aberration. Once corrected, Impuls wanted to be in a position to reassume its relationship with the Ministry of Defense. This hope for future defense contracts was driven in part by a perceived lack of alternatives. Unlike most Soviet military enterprises, Impuls was involved in very little civilian production. As a developer of cutting-edge military technologies, Impuls worked almost exclusively on military projects. What market niche Impuls could occupy as a "private" company, therefore, was not as obvious as it was for Yermishin and his aviation plant.

Consequently, Grigoriev and his management team initially adopted a cautious (though by no means negative) approach regarding privatization. Rather than push for special treatment from the state or attempt to subvert the laws on privatization, Impuls directors pursued privatization strictly in accordance with the guidelines outlined by the GKI and in close consultation with the Ministry of Defense and the Committee for Defense Industries.

As with most other enterprises, a special commission was established at Impuls in 1992 to explore the enterprise's options regarding privatization. As a designer and producer of weapons systems, Impuls needed special permission from the government to privatize.⁵⁴ Because Impuls appeared on the list of enterprises forbidden to privatize without government approval, directors at Impuls were not compelled to begin privatization procedures. In fact, many military enterprises on this list spent most of 1992 and 1993 securing government credits and subsidies rather than thinking about future restructuring or ownership issues. Reflecting its cautious yet forthright approach to privatization, Impuls directors nonetheless decided to examine and then draft proposals for privatization. This process of exploration reveals several of most salient issues confronting directors during this transition period.

⁵³ Author's numerous conversations with Yermishin and SAP directors, 1992-1993.

⁵⁴ Presidential Decree No. 720.

The directors at Impuls embraced several different models of privatization before going ahead with their final plan adopted on June 24, 1994. The frequent changes in the plan before final adoption reflected a dynamic tension between two primary objectives—securing control of the enterprise in the hands of the directors and pleasing state authorities such as the GKI, Ministry of Defense, and Committee for Defense Industries.

Impuls's directors initially embraced Option One of the government's privatization program whereby workers would be given 25 percent ownership with non-voting shares and could purchase an additional 10 percent at discounted rates, the management would purchase 5 percent ownership, 10 percent would be entrusted to the FARP (Shareholders' Fund for Enterprise Employees),⁵⁵ and the remainder would be auctioned on the open market.⁵⁶ Impuls directors embraced this option for the simple fact that the government was heavily promoting it. With limited knowledge about the structure and operation of joint-stock companies, they were simply following orders.

Because Impuls was not on the first list for immediate privatization, the directors did not submit this initial privatization concept for GKI approval. As the privatization process began to expand during the fall of 1992 and the beginning of 1993, Impuls had the opportunity to observe how the first large privatized enterprises were faring. During this time, the biggest fear to spread among privatizing enterprises was the prospect that outsiders would acquire major stakes in their companies through the voucher auction system. The most famous case was at Uralmash, a machine tools factory in Ekaterinburg that had proceeded with privatization according to Option One. After auctions for Uralmash's stock, it was revealed that one person, Kokha Benedukidze, had acquired 18 percent of the company. Reports of outcomes like that at Uralmash, although the exception and not the rule, changed directors' attitudes toward Option One. Because it would be easier to control workers at the plant than outside stockholders, directors instead embraced Option Two as the best method for maintaining managerial control. By the end of 1993, more than two-thirds of all privatizing enterprises had chosen Option Two. Figures for 1994 suggest that roughly 75 percent of all Russian enterprises will be privatized according to Option Two.

Directors at Impuls also reconsidered their initial approach to privatization and began working on different variations of Option Two. In considering Option Two, Impuls directors explored ways of keeping majority ownership among its workers while also maintaining control in the hands of management. At the time of additional deliberation, Impuls directors also wanted to maintain good relations with the Ministry of Defense and those industries involved in the acquisition of weapon systems. (The Committee for Defense Industries was just being created at the time.) Reflecting this desire to retain its links with the state, Impuls even considered a privatization plan whereby the state would hold 51 percent ownership and the workers collective and management would own only 49 percent of the company.

While initially an attractive option, Option Two had one clause which eventually was cause for rejection entirely. According to GKI regulations, companies adopting Option Two must offer closed subscription of shares to not only active workers but also pensioners and recent employees of the enterprise. For Impuls, this regulation was especially problematic as an additional 4,000 people no longer working at the enterprise were eligible to buy shares in addition to the 2,000 current employees. While Impuls directors had some confidence that active employees would not hastily sell their shares to outsiders, this other group—two-thirds of those eligible to bid under closed subscription—has no stake in the long-term development of the company. Because of Impuls's very valuable location right in the center of Moscow, the management at Impuls therefore feared that a hostile outsider would aggressively acquire shares from pensioners and the unemployed, close down the research work currently underway at Impuls, and then use the space for commercial development.⁵⁷

⁵⁵ See Glossary.

⁵⁶ On the functions of the FARP, see McFaul and Perlmutter, *Privatization, Conversion, and Enterprise Reform in Russia*, p. 221.

⁵⁷ Author's interview with Alexander Grigoriev, director of Impuls (Moscow, October 1993).

Even if a hostile outsider did not assume control over the property, Grigoriev also became increasingly concerned that the second option could lead to the general director being stranded among a group of worker-owners who have no common strategy and don't consider the long-term interests of the enterprise as a profit-seeking entity. Despite repeated attempts at educating his workforce, several key leaders of the workers collective remained skeptical of Western concepts of "employee ownership" and instead agitated for the preservation of "collective ownership." Instead of acting as shareholders, Grigoriev feared that his workers would use their ownership stakes to increase salaries and benefits while blocking investment and labor shedding.⁵⁸

Ironically, new legislation establishing a more active role for the state in the privatization of defense enterprises offered Grigoriev an alternative model by which to gain even further control of his enterprise. As mentioned above, Yeltsin signed Presidential Decree No. 1267 regarding the privatization of defense enterprises in August 1993.⁵⁹ While designed to encourage privatization of defense properties, this decree also secured a continued role for the state in the operation of these enterprises for a transitional period, either through the creation of a golden share(s) or the holding of a controlling packet of shares. As Grigoriev assessed, this decree represented a compromise between state security interests and the commercial goals of individual enterprises.⁶⁰ In mandating this continued albeit transitional role for the state, this decree alleviated Grigoriev's fears concerning hostile takeover bids by outsiders. In fact, the decree actually increased the director's control of the enterprise as the decree stipulated that shares held by the state, golden or otherwise, could be voted by the director. In accordance with this new set of regulations, a government decree was signed for the privatization of Impuls in December 1993.⁶¹

After two years of considering several different plans, Grigoriev had come to fully appreciate the advantages of the SAP privatization model. In February 1994, Grigoriev stated that the ideal model would be a modified version of the SAP plan—a closed joint-stock company with only 5-7 percent of shares sold on market. This would allow the enterprise directors as well as their workers to get through the difficult transition period without being exposed to a hostile takeover. Through this experience, they would learn what stock is and what ownership is. After such an experience, he and his colleagues would then be prepared to work with outside owners.

While radically different in form and appearance, the final privatization plan for Impuls actually did approximate the extent of control achieved by SAP managers. Guided and protected by the new legislative regime governing defense enterprise privatization, Grigoriev and his associates reembraced an amended version of Option One. As in all privatizations following this model, the 4,000 pensioners along with the 2,000 active employees still can acquire and then sell to outsiders up to 35 percent ownership in the company. 25 percent is given to workers and former employees while an additional 10 percent can be purchased at a reduced price. The 25 percent given to workers under Option One, however, is non-voting stock, a condition which allays the threat of an outsider buyout. Eventually these shares will become voting shares, but Grigoriev plans this transformation to happen only after he and his associates have acquired a controlling packet of all shares. The management at Impuls—seven people—has the option to buy up to 5 percent ownership. Twenty-nine percent of all shares is supposed to be sold to outsiders through an open auction. Instead of a golden share, the remaining 31 percent will be left in the hands of the state. It is Grigoriev's expectation, however, that the state will grant the directors the right to vote two-thirds of these state-owned shares or 20 percent of total

⁵⁸ Tova Perlmutter, trip report from meeting with Impuls directors in February 1994, mimeo.

⁵⁹ Ukaz Prezidenta Rossiiskoi Federatsii, "Ob osobennostyakh privatizatsii i dopolnitel'nikh merakh gosudarstvennogo regulirovaniya deyatel'nosti predpriyatii oboronnikh otraslei promyshlennosti," No. 1267, August 19, 1993, p. 2.

⁶⁰ Author's interview with Alexander Grigoriev, director of Impuls (Moscow, October 1993).

⁶¹ Impuls was originally on the list of those defense enterprises not to be privatized. Therefore, it had to get special approval from the GKI, Ministry of Defense, and Committee for Defense Enterprises. See Presidential Decree No. 1267, p. 11.

ownership of the enterprise. When combined with the 5 percent to be purchased by Grigoriev and his associates, this new stipulation helps to insure that the directors will continue to control the enterprise. Their control position is enhanced by several other factors. First, regarding the auction, Impuls directors can themselves arrange to buy additional shares. They can also encourage friendly outside owners to buy shares. Second, regarding the 11 percent (31-20) still voted by the state, Grigoriev is confident that it will be easier to come to agreement with the government's representatives concerning dividends and reinvestment than it would be for those directors to negotiate with shareholders interested in only short-term profits (outside owners) or employment security (workers). Moreover, Grigoriev has plans to eventually transfer this block of shares into a holding company controlled by himself or to a firm or group of firms with contractual relations with Impuls, including foreign investors with whom Grigoriev has entered into extended negotiations.⁶² Finally, Grigoriev—like most directors—is confident that he will have extensive influence over how workers will vote their shares.

Besides letting management keep greater control of the enterprise, this version of Option One also represented a compromise between Impuls, the Ministry of Defense, and the Committee for Defense Industries. Through this plan of privatization, Russian defense officials can feel secure that they still have a voice in the operations of Impuls in the interim.⁶³ Impuls also benefits. In selecting this model, Impuls has been assured that it will receive new state orders as well as a 50 percent tax reduction. Additionally, as alluded to above, state officials have assured Grigoriev that all profits from dividends owned by the state will be reinvested into Impuls.⁶⁴

During the spring of 1994, this privatization plan for Impuls was approved by all relevant government bodies, including most importantly the GKI, the Ministry of Defense, and the Committee for Defense Industries. On June 6, 1994, as Grigoriev declared, State Scientific and Production Enterprise "Impuls" became Public Joint-Stock Company "Impuls."⁶⁵

V. TsAGI

Unlike the Saratov Aviation Plant or even Impuls, TsAGI has never had a real prospect of total privatization. As the "NASA of Russia,"⁶⁶ TsAGI simply has too many unique physical and technical features to become a private company.⁶⁷ Even if the state did allow TsAGI to privatize, the huge overhead associated with operating its wind tunnels suggests that the enterprise as currently configured could not survive in the market.

While TsAGI has not pursued full privatization and probably will not be fully privatized in the near future, the reorganization of property rights at the research facility is nonetheless unfolding. While the state continues formally to own the facility, managers and even individual scientists already have acquired de facto property rights over much of the productive activity of TsAGI. While not following the same path, TsAGI managers nonetheless have ended up with the same level of control over their enterprise as their counterparts at SAP and Impuls.

Like many other enterprises, the transfer of real property rights to TsAGI managers began under the system of *khozrashchet*⁶⁸ began under Gorbachev. The new regime governing enterprise management required that enterprises become financially self-sufficient. TsAGI became a *Khozrashchetnoe Predpriatie* in 1990. In assuming this responsibility for balancing the books, TsAGI directors gained a great deal of autonomy from the state. This governing authority over the internal affairs of TsAGI grew even more during the last years of the Gorbachev regime and the first year of the Yeltsin government when state transfers to TsAGI for work done became

⁶² Author's interview with Grigoriev, September 9, 1994.

⁶³ The interim board of directors will consist of one person from the Committee of Defense Industries, one person from the GKI, Grigoriev, and the head of the Impuls workers' collective.

⁶⁴ Ron St. Martin, SAIC, memo on visit to Impuls, June 1993.

⁶⁵ Letter from Alexander Grigoriev to David Bernstein, June 14, 1994.

⁶⁶ This is how TsAGI directors like to describe their enterprise.

⁶⁷ See Chapter II.

⁶⁸ See Glossary.

increasingly erratic. By 1994, TsAGI Deputy Director Victor Tyurin expected that less than 35 percent of TsAGI's income will come from state projects, military or otherwise.⁶⁹ This collapse of state support has meant that TsAGI directors had to assume responsibility for the continued operation of the facility no matter what the formal ownership structure. As Sergei Chernyshev, TsAGI Advisor on International Affairs, stated, "We have a gentlemen's agreement with the state. They do not pay us and they do not ask us for money."⁷⁰

As part of their strategy for maintaining TsAGI's capabilities, however, TsAGI directors had to relinquish their own control over their employees. Beginning in 1990 but especially after price liberalization in January 1992, state salaries for scientists and skilled employees were no longer competitive with salaries offered by commercial firms. To retain their best employees, therefore, the leadership at TsAGI allowed their employees to first moonlight, then fulfill ad hoc contracts, and finally to form small private firms on TsAGI premises. The teams of skilled personnel needed to run complicated equipment and to perform difficult experiments were thereby kept in place, even though many of TsAGI's wind tunnels went idle while others were used under capacity. When not needed to work on TsAGI projects, these skilled technicians and scientists could sell their services and, to a lesser extent, their products, to outside contractors and businesses. Ironically, this highly decentralized policy was the only method for maintaining TsAGI's overall structural integrity. Over the last four years, TsAGI did lose 2,000 employees. Of these 20 percent retired while 80 percent, according to Chernyshev, were the youngest and the brightest lost to the commercial labor market.⁷¹ Despite these losses, TsAGI managers still believe that their institute has maintained its core capabilities.

Over the last three years, this liberal policy regarding the proliferation of private enterprise has resulted in the creation at TsAGI of more than thirty small businesses of varying legal stature. While perhaps a necessary strategy for maintaining a core team of vital employees, TsAGI managers now face a series of legal problems as they try to reorganize their enterprise.⁷² The distribution and appropriation of intellectual property rights are among the most critical issues. With each contract signed by an individual or small company working out of TsAGI, the company's intellectual property is being spontaneously privatized. TsAGI managers have few mechanisms to regulate, stop, or profit from this form of privatization. First, TsAGI directors encouraged this behavior from the very beginning. To intervene now would fuel worker hostility and thereby jeopardize the original goal of maintaining TsAGI's skilled labor staff. Second, TsAGI directors have no greater formal rights to these technologies than their employees, as legally both are employees of the state. Finally, and more generally, there is no legal framework in Russia governing intellectual property rights or licensing procedures for the use of technologies. TsAGI directors have initiated work with an American law firm, Heller, Ehrman, White & McAuliffe, to develop its own set of procedures for regulating and controlling the enterprise's intellectual property rights. If the plan works, TsAGI directors believe that it will become the model for other research facilities in Russia.

Beginning in 1993, the principal strategy adopted by TsAGI's managers in their quest to regain some control over these small enterprises has been to codify the division of property rights and relations between the state, TsAGI, and its employees. On paper, a new institution has been created to facilitate this delineation—a state scientific center.

According to the 1992 privatization law, TsAGI and other research facilities like it were not allowed to privatize. It soon became clear to both the Russian government and its research institutes that the state could no longer finance scientific research, be it military or civilian, at the same levels that were supported during the Soviet era. The task before the state, therefore, was to determine which institutes needed future state support and which institutes would be

⁶⁹ Tova Perlmutter, trip report, mimeo, March 1994.

⁷⁰ Sergei Chernyshev, TsAGI Advisor on International Affairs, "Problems of Conversion in the Russian Aerospace Industry," lecture at CISAC, May 4, 1994.

⁷¹ Sergei Chernyshev, TsAGI Advisor on International Affairs, "Problems of Conversion in the Russian Aerospace Industry," lecture at CISAC, May 4, 1994.

⁷² Kathryn Hendley, memo on visit to TsAGI, May 4, 1994, p. 2.

allowed, or forced, to be removed from the state budget. By the end of 1993, the Russian government announced plans for the creation of “state scientific centers.” Such centers were to receive federal funding to support basic research through the Ministry of Science (and not, for instance, through the Ministry of Defense or the Committee for Defense Industries.)⁷³ Those institutes not designated as state scientific centers were to be privatized or closed.

In a special decree issued by President Yeltsin himself on March 29, 1994, TsAGI was made Russia’s first State Science Center. Using TsAGI as a model, the Ministry of Science intends to create an additional thirty-nine centers of this kind. This new status guarantees TsAGI a certain level of state support, but also insures that TsAGI will never become completely privatized. Though still under negotiation, TsAGI directors expect that 70 percent of the institute’s existing assets will be devoted to this scientific center.

Ambiguities still remain regarding the eventual division of property rights between TsAGI the State Scientific Center and the other small enterprises located at TsAGI. Nonetheless, TsAGI directors believe that their creative reorganization has maintained the scientific capability and financial health of the institute as a whole, while also allowing its employees the opportunity to earn commercial-level salaries. Moreover, TsAGI directors believe that the sources of financial support for the science center and the subsidiaries are sufficiently diverse so as to protect TsAGI from the loss of any one customer. In 1994, as an example, it was estimated that 30 percent of all revenues would come from the Ministry of Science, 20 percent from the Committee for Defense Industries (for developmental work on a new version of the Tu-204 and Il-114), 40 percent from foreign contracts, and 10 percent from miscellaneous sources such as Gasprom or the automobile industry.⁷⁴ Not surprisingly, this new organizational arrangement also keeps the directors of TsAGI in firm control of their enterprise.

VI. Mashinostroenie

Like Impuls and TsAGI, Mashinostroenie was placed on the list of enterprises forbidden to privatize as outlined in the 1992 law on privatization. As one of Russia’s leading developers and producers of space vehicles and sophisticated military systems including both cruise missiles and nuclear-weapon systems, Mashinostroenie was forbidden to privatize by several criteria.⁷⁵ Nonetheless, formal prohibition to privatize has not slowed the de facto transfer and reorganization of property rights at the enterprise. As state support collapsed, Mashinostroenie directors were forced to assume responsibility for the financial well-being of the company. Different from Yermishin at the Saratov Aviation Plant, Mashinostroenie director Herbert Yefremov did not welcome this breakdown of the Soviet regime as an opportunity, but adapted rather reluctantly to this new situation. While critical of the new Russian government’s revolutionary methods for creating a market economy, Yefremov and his associates also realized that this new state—still the legal owner of Mashinostroenie—could nonetheless not be relied upon to support the enterprise. Managers expressed to the author in the fall of 1993 that the government “owns” the same percentage for which they provide orders. In 1994, they put in orders for 20 percent of the total business so this is their ownership share.⁷⁶

The devolution of property rights did not stop, however, at the level of the senior directors at Mashinostroenie. Similar to other large enterprises, individuals, sector groups, and divisions at Mashinostroenie have sought to “privatize” as much of their work and production as

⁷³ John Battilega, memo of meeting with TsAGI managers, March 7, 1994, p. 1.

⁷⁴ Sergei Chernyshev, TsAGI Advisor on International Affairs, “Problems of Conversion in the Russian Aerospace Industry,” lecture at CISAC, May 4, 1994.

⁷⁵ First, Mashinostroenie is part of the strategic armament industry. Second, the law prohibits the privatization of enterprises involved in the production and/or deployment of nuclear weapons, and Mashinostroenie services equipment for the nuclear arms industry. Third, another set of regulations requires enterprises with more than 10,000 employees or a book value of greater than 150 million rubles to get special permission. Fourth, all companies that produce space vehicles, service the launch and surveillance of space vehicles, or conduct research and development on space products were forbidden to privatize in 1992. The draft 1993 privatization regulations also prohibit space-related enterprises from privatizing.

⁷⁶ Author’s interviews with Mashinostroenie managers, November 1993.

possible. Above all, and to a much greater degree than the Saratov Aviation Plant, Impuls, or TsAGI, directors at Mashinostroenie have therefore been most concerned with maintaining the organizational integrity of the company as a whole. Entire divisions have aggressively pushed to split from the parent company while the managers of small private companies, organized and operated from the Mashinostroenie facility, also have sought autonomy. Ironically, Mashinostroenie managers recently have explored different strategies of privatization as a method for maintaining the enterprise as a whole.

In a pattern similar to other large enterprises, Yefremov allowed the formation of small businesses and joint ventures as well as greater autonomy to individual divisions as a means for maintaining the research and technical capability of the enterprise as a whole for larger projects. Three basic organizational forms of varying legal status were created. The most independent entities are the small joint ventures or "daughter companies," which numbered fifteen by the fall of 1994.⁷⁷ Mashinostroenie owns a controlling share in each of these joint-stock companies, ranging from 45 to 100 percent ownership. To date, these daughter companies employ only 200-300 people full-time (although Mashinostroenie employees frequently are contracted to do work for these smaller companies on a project-by-project basis) and constitute less than 10 percent of all income received by Mashinostroenie as a whole. Nonetheless, Mashinostroenie managers believe that these companies have the greatest growth potential of all ownership schemes at the enterprise.

Rental arrangements constitute a second kind of small business activity taking place at Mashinostroenie. Numbering ten by the end of 1994, these businesses are concentrated principally in activities such as transportation, catering, and housing construction that are not associated with Mashinostroenie's main production projects.⁷⁸ Eventually, the directors at Mashinostroenie would like to create independent legal entities out of these operations which could then subcontract their services to other large enterprises.

Finally, the least independent entities at Mashinostroenie are the divisions and departments. Numbering 150 by the fall of 1994, these subunits have been reorganized to give them greater autonomy. For instance, each division and department now has its own account, meaning that transfers to other units of the enterprise are recorded as profits and losses. Likewise, these 150 entities do independent contracting with suppliers and customers regarding small item transfers. Given that the facilities and operations at these entities are vital to the production of Mashinostroenie's large projects for the Ministry of Defense and the Russian Space Agency, they have not been allowed to reorganize as a sub-contracting entity or daughter company. These divisions still firmly controlled by Mashinostroenie produce roughly 90 percent of the enterprise's revenues.⁷⁹

As individual daughter companies as well as divisions became increasingly successful in selling their commercial products and services, they became decreasingly interested in remaining subordinate to Yefremov and Mashinostroenie as a whole. For instance, one division eager to acquire independence produces satellite antennas (dishes). According to management, this division has the expertise and equipment to produce the best antennas in the country. In 1993, this division made \$1 million by producing 30,000 antennas.⁸⁰ Not surprisingly, therefore, this particular division has become increasingly less involved in enterprise-wide projects. As commercial demand for these dishes grew, the management of this division lost any incentive to produce the unprofitable experimental antennas requested as part of a government (most likely military) contract. These managers claim that they can make more money in an hour of commercial production than in a whole day of work on government contracts.

Another complicated case concerns the Almaz FTC (foreign trade company), a daughter company organized by top Mashinostroenie managers to sell to foreign customers information

⁷⁷ Author's interviews with Mashinostroenie directors, Reutova, September 1994.

⁷⁸ Author's interviews with Mashinostroenie directors, Reutova, September 1994.

⁷⁹ Author's interviews with Mashinostroenie directors, Reutova, September 1994.

⁸⁰ Author's meeting with Mashinostroenie managers, November 1993.

received from their famous Almaz space stations.⁸¹ Almaz FTC was founded in the end of 1991, with 85 percent Mashinostroenie ownership and 15 percent by private individuals (i.e., the directors at Mashinostroenie). The firm's starting capital was 50,000 rubles. By the end of 1992, the company had a net before-tax income of \$80,000 from trade, mostly with foreign companies. Almaz FTC has only 12 permanent employees, but uses hundreds of others from the parent enterprise for temporary work on projects. As of the summer of 1993, the scope of the subsidiary's activities had expanded to include a permanent wholesale outlet to sell items produced by the enterprise including smaller satellite dishes, medical equipment, and sailboats. In establishing this company, senior managers have personally profited from the sale of the state-owned knowledge and hardware. This is a common method used by Russian managers to profit by their control over state property without privatization. The vast majority of the enterprise's scientists and workers, who developed and produced the Almaz satellite and space station, do not hold any stock in the private company selling its data.

Proposals to spin off raise several difficult questions regarding intellectual property rights at a high-tech company like Mashinostroenie. For instance, those producing the commercial antenna dishes obviously acquired blueprints and the knowledge to produce these systems from Mashinostroenie. If this group was spun off from the enterprise, how would Mashinostroenie be compensated? Moreover, should Mashinostroenie be compensated or should the state—the owner of the enterprise—be compensated? Finally, to what extent are Russia's national security interests compromised by the privatization of these technologies and those individuals with knowledge about these technologies?

Like many other large research-oriented military enterprises in Russia, Mashinostroenie managers initially turned to the concept of a holding company as an organizational model for insuring ownership stakes for their employees while at the same time guaranteeing control of their enterprise as a whole.⁸² While still not officially incorporated as a holding company, the emerging distribution of property rights at the enterprise already has some of the essential characteristics of a holding company. Regarding each small business and joint venture, Mashinostroenie has maintained a controlling share in each of the twenty or so legal entities established. For example, the "Sokol-Almaz-Radar Corporation" (SAR Corporation), a Russian-American joint venture organized "to complete development of the space system Almaz-1B," is owned in the following manner: 47 percent by Mashinostroenie, 4 percent by the All-Russian Oboronexport, and 49 percent by the American company Sokol Group.⁸³ While owning less than their American partner, Mashinostroenie's close relationship with Oboronexport allows the Russian enterprises to maintain a controlling position in this new company. Yefremov was elected Chairman of the Board of this joint venture, while Robert Ellsworth, the chairman and CEO of the Sokol Group, was simply made a member of the board.

The joint venture Galit has a similar ownership arrangement with its parent company, Mashinostroenie.⁸⁴ 50 percent of this company is owned by Mashinostroenie, 25 percent by Izolit, and 25 percent by the MXKT Electrocomplex, the holding company created out of the Electromechanical Ministry.

Finally, a new joint venture underway at Mashinostroenie concerns cola bottling. After winning a competition to be one of the first four recipients of funding from the U.S. Department of Defense (the so-called Nunn-Lugar funds), Mashinostroenie has entered into a joint venture

⁸¹ Richard Stevenson, "Russian Arms Makers Try Change," *New York Times*, May 2, 1994, p. C1.

⁸² Mimeo, given to author by Mashinostroenie directors, November 1993. Hereafter referred to as "SAR mimeo." In this company, Mashinostroenie is the designer, Sokol is the financier, and Oboronexport provides consultative services. In all likelihood, 4 percent was given to Oboronexport as a bribe to allow Mashinostroenie to consummate this deal. Otherwise, as an arms exporter, Mashinostroenie could have been prevented by Oboronexport from creating this joint venture.

⁸³ Galit and the SAR Corporation are the only two joint ventures in existence at Mashinostroenie at the time of this writing, although seven more were planned for registration by the end of the year. In addition, approximately 20 small enterprises owned entirely by Russians operate on Mashinostroenie's premises.

⁸⁴ See Adi Ignatius, "U.S. Defense Agency Weds Russian Science to Low-Tech Partners," *The Wall Street Journal Europe*, September 19, 1994, p. 1.

with Double Cola, a soft drink company based in Tennessee.⁸⁵ While the division of ownership within this new joint venture had not been delineated at the time of this writing, what was clear was that Double Cola would not take a stake in Mashinostroenie, but would create a new company similar to the other joint ventures just described. In other words, the core military and space projects at Mashinostroenie would not be affected by this new business initiative. Rather than stimulating conversion, this particular U.S. investment has simply encouraged the Soviet industrial organization model whereby the same enterprise that produces cruise missiles also bottles cola.

While these various joint ventures are market-oriented with clearly defined property rights, the ownership structure of the parent company itself is more complicated and confused. Despite his disdain for the government's privatization program, Yefremov nonetheless sees the creation of a joint-stock company as necessary to avoid control by the government or other outside forces. He and his colleagues also hope that the creation of a private company will help to attract investors and provide incentives, psychological if not monetary, for the workforce.⁸⁶

In exploring different models of privatization, Mashinostroenie managers decided that none of the options in the 1992 privatization program was appropriate for their enterprise. Given the high cost of the company's fixed assets, workers at the enterprise would not be able to buy out 51 percent of the total shares in accordance with Option Two. Mashinostroenie would be exposed to the prospect of outside ownership under either Option One or Two. In expressing their fear of outside ownership, Mashinostroenie managers complained that outside owners would want only dividends and not be prepared to reinvest in the company. Worse yet, Mashinostroenie managers also feared a hostile takeover by mafia elements that would want to use their vast territory simply as a storage space for the imported goods that these groups sell in Russia.⁸⁷ Even if they were interested in production, these outside owners, according to directors at the plant, also would not have the necessary technical knowledge to make wise decisions about enterprise research and production.

Instead of the options available in the privatization law, Mashinostroenie directors lobbied the government for permission to delineate property rights according to a special model they had deemed appropriate for entities like their own. Initially, Mashinostroenie managers worked through the League of Defense Enterprises to lobby for this exemption, modeled after a similar effort by Energiya. As with all other privatization paths examined in this study, the fundamental objective of this unique privatization plan was to retain senior managerial control over the enterprise. In essence, the plan was to follow Option One to distribute the first half of the stock: 25 percent of the stock would be transferred free to the labor collective, 10 percent sold at a discount to the labor collective, 5 percent sold at a discount to managers, and 10 percent would be transferred to the FARP. Unlike Option One, however, Mashinostroenie's plan was not going to distribute all the remaining shares through an open auction. Instead, 38 percent was to remain in the hands of the state. The Committee for Defense Industries would retain approximately half of these shares, while the other half of these government shares would remain in a trust, owned by the state but voted by Yefremov. The final 12 percent was to be transferred to GKI officials for sale at an outside auction.⁸⁸

At the time of this writing, this special scheme had not been approved by GKI. By the fall of 1994, however, Mashinostroenie managers were preparing a new form of ownership which would create even fewer opportunities for the definition of real property rights. Encouraged by the Ministry of Defense and the Committee of Defense Industries, Mashinostroenie's latest plan was to incorporate as a joint-stock company but with 100 percent in the hands of the state.

⁸⁵ Potential Western customers are deterred, for example, because no insurance company is willing to insure Mashinostroenie launches; Mashinostroenie could not be the final legal party to either liability claims or beneficiary payments, since the state is the actual owner of the property.

⁸⁶ According to managers at Mashinostroenie, such a scenario took place with a military enterprise with which Mashinostroenie works closely. Author's interviews with Mashinostroenie directors, Reutova, September 1994.

⁸⁷ The actual percentages of this ownership scheme have changed several times, but the basic concept has remained the same.

⁸⁸ Author's interviews with Mashinostroenie directors, Reutova, September 1994.

While the actual stock distribution has yet to be determined, the idea is that the board of directors would include one representative from the Ministry of Defense, one from the Committee for Defense Industries, one from the State Property Committee (GKI), and three from the directors' corps at Mashinostroenie. This more cautionary approach has resulted from several factors. First, according to Mashinostroenie managers, the period of extreme uncertainty regarding government orders has ended. For Mashinostroenie, this means once again a stable customer for the bulk of its production as 45 percent of all revenues for 1994 were expected from the Ministry of Defense, 15 percent from the Russian Space Agency, and 18 percent for conversion projects from the Ministry of Finance, Ministry of Economics, and the Russian Central Bank. Only 22 percent of Mashinostroenie's revenues were expected to come from commercial contracts. In stark contrast to their attitude toward the state only one year ago, managers at Mashinostroenie now are confident that these state revenues are vital to the long-term viability of their enterprise. They therefore want the state to retain full ownership in the parent company as a way to insure continued contracts and support. Mashinostroenie managers alleged to have witnessed the decline of state contracts to privatized companies; they believe state-owned enterprises receive priority.

A second related factor explaining this turn back toward the state has been Mashinostroenie's own limited success in securing commercial contracts.⁸⁹ While dealing with the state may mean delays in payment, dealing with the outside market may mean no payment at all. Moreover, Mashinostroenie managers are confident that their military products are both unique and invaluable to the Ministry of Defense, insuring their scientists and engineers interesting and challenging work for the long term. On the other hand, Mashinostroenie's commercial products face tough competition while the production of these goods, such as the cola bottling plan or the construction of housing proposed for Nunn-Lugar support, is much less riveting for world-class scientists.

Finally, this new scheme gives Mashinostroenie managers all the privileges of ownership without any of the liabilities. While the enterprise's core production areas of space vehicles and military weapons systems would insure a stable revenue source for the long term, Mashinostroenie managers would not be constrained from pursuing joint ventures on the side.⁹⁰ While de jure ownership of the enterprise would remain in state hands, the opportunity to use and exploit this property would still remain in the hands of the managers.

VII. Conclusion

In comparing these four cases, it is striking how very different strategies and paths regarding the reorganization of property rights have all led to the same outcome: managerial control of the enterprise. This same outcome was achieved despite tremendous variance on a number of seemingly important independent variables. Whether the enterprises had a charismatic leader or not, whether it produced large durable goods such as planes or intellectual products, whether it had fully converted to civilian production or only partially, and even whether it had been fully privatized, partially privatized or not privatized at all, each enterprise nonetheless ended up under the unchallenged control of enterprise directors. For this admittedly small number of cases, these variables do not appear to be determinate in ascertaining how property rights have been (re)distributed during Russia's transition to the market.

Director control at all four of these enterprises is best explained not by looking at different endowment factors in the contemporary period but rather by looking at the nature of de facto distribution of property rights before privatization. Because the Soviet state increasingly lost the means to observe and control its agents (the directors) at the enterprise level, directors began to

⁸⁹ This is another reason for registering Mashinostroenie as a joint-stock company even if all the stock is owned by the state, as the enterprise's present legal status puts severe limitations on the kinds of property schemes allowed. For instance, until Mashinostroenie registers as a joint-stock company, no amount of property can be sold without permission from the State Property Committee.

⁹⁰ This is explored in detail in McFaul, "Agency Problems in the Privatization of Large Enterprises in Russia."

acquire de facto property rights over their entities well before privatization. By the end of the Gorbachev era, directors already had made considerable gains regarding the right to use and right to control their properties.⁹¹ Only the right to transfer remained with the Soviet state.⁹²

Once the Soviet state collapsed, there was no other claimant to these properties strong enough or legitimate enough to challenge these de facto property rights already acquired by managers. The state, in a free fall collapse for several years, has been unable to alter these property relations.⁹³ Workers, though granted substantial formal rights to property in the privatization program, have neither the information nor position within the enterprise organization to exercise real control over “their” property. In the cases examined in this study, the level and kind of managerial control of property in a 100 percent employee-owned company very much resembled the kind of managerial control in a 100 percent state-owned company. The structure of property rights to emerge initially in the post-communist period at many large state enterprises and most certainly the four examined in the study has been determined by the historical distribution of property rights during the Soviet era. The formal form of ownership, be it an employee-owned closed joint-stock company (SAP), an open joint-stock company with partial outside ownership, partial state ownership, and partial internal ownership (Impuls), or a non-privatized enterprise housing several smaller private enterprises (TsAGI, Mashinostroenie), has not yet altered or challenged the de facto property rights acquired by directors during the Soviet period.

This similarity in outcomes suggests that the speed or extent of privatization tells us little about the prospects for economic success of a given enterprise. Because the process of privatization at these enterprises has not yet resulted in any dramatic change in the structure of ownership or the organization of production, the process of privatization in these cases has not yet served as an indicator of greater efficiency regarding property use. For instance, the Saratov Aviation Plant aggressively pursued privatization, becoming the first Soviet military plant to fully privatize. SAP’s short-term business prospects, however, have not been advanced by its speedy privatization. Most importantly, the privatization process has not helped to resolve pressing problems regarding outside investment and market niche. At the time of this writing, SAP’s future was highly uncertain. On the other hand, Mashinostroenie, an enterprise that will remain 100 percent state-owned for the near future, has already showed signs of profitability. Many of the small joint ventures that have sprouted in and around Mashinostroenie have turned profits while future projects, including the Nunn-Lugar sponsored cola project, will bring in additional income without jeopardizing the core military and space projects of the enterprise.

All these preliminary indicators, however, must be taken with a grain of salt. The process of reorganizing property rights has only just begun in Russia. It is a process that will take years if not decades to complete. The long-term winners in this process may not even have appeared, while the real losers could very well be those who benefited in the first stages of transition.

⁹¹ On the three different rights associated with property ownership, see Yorum Barzel, *Economic Analysis of Property Rights* (Cambridge: Cambridge University Press, 1989).

⁹² This right was never really defined internally in the socialist system. Because the system had only one owner, transfers of ownership were meaningless.

⁹³ In a comparative perspective, the most successful privatization program is the place where the state has been most effective—the Czech Republic. See John Earle, Roman Frydman, and Andrzej Rapaczynski, “Transition Policies and the Establishment of a Private Property Regime in Eastern Europe,” p. 34.

VIII. Organizational Restructuring

David Bernstein

I. Introduction

This chapter examines the internal and external factors shaping the internal restructuring of enterprises and the approaches being considered. In most of the enterprises studied, restructuring is an evolving procedure, so the data and models reported herein may not be final, either generally or even at the specific enterprises. Many enterprises are continuing to revise their plans in response to changing government policies, economic conditions, investment opportunities, and/or simply further development of their thinking about how a company functions in a market economy. This analysis describes an ongoing process. Its purpose is to describe and analyze various approaches to organizational restructuring in the Russian defense industry, and to point out some of the problems and potential solutions. As noted in Chapter I, most of the data from the enterprises (except in the areas of social services and accounting) comes from the general directors or their deputies. This bias can be especially important on some of the issues of internal organization, such as decentralization and divestiture strategies.

Most Russian enterprises are discovering that their previous organizational structures are not suitable in the transitional economy, especially given the elimination of the state's historic role in the planned economy. Functions that were handled externally (by the state) must be internalized; functions that were centrally controlled within the enterprise frequently should be decentralized; and the fundamental ownership relations are changed even when the enterprise is still state owned.

Privatization and conversion are the most frequently highlighted changes. While they are certainly critical steps, the necessary restructuring is far broader. It includes reorganizing ownership, governance, strategic planning, product selection, marketing, finance, partnering, personnel policy (including the social services, which are discussed in a later chapter) and external relations. Many enterprises are planning to privatize with, or following, transitions to joint-stock companies. They must coordinate this carefully with their restructuring plans because in a capitalist market economy ownership distribution and organizational structure are not independent of one another.

We have placed considerable emphasis on the enterprises' selections of which products and services to provide since we have seen this to be one of the major drivers of organizational decisions. Chapter IX deals with differences between Western and Soviet accounting practices since this is typical of the type of procedural changes that must be introduced along with organizational changes.

II. Organization Under State Ownership

Prior to the breakup of the Soviet Union both ownership and internal structure were straightforward and well defined by the state, and there was little room for deviation. Ownership and control were in the hands of the state through the "defense complex" comprising nine industrial ministries.¹ The state, through the Ministry of Defense (MOD), was also the user of the industry's output. While the MOD and the industrial ministries competed for power and decision-making about military production, the state was nonetheless both owner and customer. This situation was a conflict of interest (at least by Western standards); an enterprise would not change its product mix or customer base, for example, if such actions were contrary to its customer's dictates, while the state, as owner, did not push the enterprise to maximize its profits or minimize its costs.

Operations within the enterprise were also controlled by the state to a large extent. Wages were set by the state; social services to be provided by the enterprises were mandated and financed by the state; the choice and quantities of products were determined by the state; and the designs, equipment, and materials for production were provided by the state. Even where enterprise directors participated to some extent in product choices, they did not have to consider issues of potential profitability, competition, financing, marketing, market research, or distribution. The state provided a guaranteed market for the output; all output was produced in response to prior orders rather than in response to an uncertain market. This centralization of decision-making above the enterprise obviated many of the organizational functions found in privately owned Western corporations, and it also left the enterprises without the skills and experience to make many business decisions of the type required in a market economy. It placed decision-making at a level and location removed from operational reality.

Until recently, enterprises were dependent upon state support to finance new product development. With the reduced defense budget, R&D funds have diminished about as sharply as orders for production. In addition, legislation for state financing of conversion has been inadequate. Even when supportive legislation or decrees have been issued, the allocations promised have rarely been implemented.² Many enterprises are now beginning to seek alternative sources of financing, but such sources have not materialized to any significant

degree for most. The uncertainty of development financing makes it difficult to decide between simple products that can be brought to market quickly or products with greater profitability and/or long-term potential but requiring longer development cycles and more extensive marketing.

The final say on virtually all interactions between the enterprise and external organizations was also separate from the internal decision-making structure and handled by the state as owner. This included provision of facilities, supplies, and investment capital, as well as assignment of orders and distribution of output. This was true not only for military hardware but for the output of civilian goods as well, so the enterprises had no responsibility for market research or market development.

Thus a defense enterprise was only a portion of an operational business entity as conceived in a market economy, in the sense that many functions were performed by the state, and an enterprise's organizational structure was correspondingly incomplete. Risks, in terms of unemployment for the staff or bankruptcy for the enterprise, were absent. On the other hand opportunities for personal advancement and wealth were severely limited. Rewards for increased efficiency and quality control were also absent, as was much incentive for innovation.

III. Transition from the Command Economy

The centralized method of control may or may not have been the best way to bring about the rapid industrialization of the Soviet Union. However, as the economy became more complex, the state did not have sufficient and reliable data to continue to make informed decisions, regardless of whether the bureaucracy was qualified to make good decisions. The same lack of information that hobbled the command economy has prevented a well-planned centrally assisted reform of industry. In addition the central planners did not have the skills to plan and manage the reform.³

The central command system was allowed to atrophy, but it has not yet been replaced with a commercial infrastructure in which market-oriented commerce can function straightforwardly. The Soviet and later the Russian state decreased its orders to the defense sector by about 80 percent from the late 1980s to the end of 1992, with the major cut of about two-thirds in 1992.⁴ At the same time, the state never implemented and funded a comprehensive conversion program although it formulated one in 1992.⁵ On the other hand funding for conversion (or funding for defense) comes from many sources, including regional and local government budgets, so it is difficult to determine the full funding of conversion and dangerous to generalize from one region to another.

The state also failed to relieve the enterprises of the social-services burden even though it no longer provided the funds to cover the costs of those services. The state similarly required the defense enterprises to maintain their mobilization capability, but did not pay for it.⁶ At a minimum, the state could have implemented a coherent program to fund conversion and systematically help build the commercial infrastructure to replace state functions before abandoning those functions. As industry became more difficult to manage centrally, and as the command system actually started to disintegrate, more decisions were made at the enterprise level. However various external factors made it extremely difficult for the enterprises to take this role:

A. Weak to Nonexistent Commercial Infrastructure

With ministries no longer coordinating transactions between enterprises, another problem they face is the breakdown of domestic supply chains. Since so many of the suppliers are monopolistic, production of complete systems can easily be interrupted by the failure of a supplier to deliver key components. The price and availability of input materials and components are uncertain, and the infrastructure's collapse is exacerbated by interenterprise debt problems. This means that even if an enterprise has identified a product it is capable of producing, for which there is high demand, production capacity may not be elastic. Obtaining additional input supplies or arranging for increased sales and distribution is usually a difficult and lengthy process with no established ways to proceed.

B. The Embryonic Domestic Market

The conventional Western wisdom offered to the Russians is that they should make product decisions based on an analysis of market demands rather than based on their technology—that is, market pull versus technology push. This is partly conventional, partly wisdom, and largely Western. There is no denying that producing in response to a clear market demand is preferable.

Nonetheless this advice is predicated on the market situation in the West. A Western company contemplating diversification looks at a highly developed, nearly saturated market with extensive data on sales levels, producers, trends, and prospects. The market and the macroeconomy in the West are quite stable. Any new product will be a small perturbation on that stable equilibrium, and it is possible for companies to analyze how a given product's introduction will change the status quo, and thus estimate its prospects for success.

In Russia virtually all enterprises are making diversification decisions simultaneously, so there is no stable market picture to analyze. Therefore one enterprise cannot view its own activities as a minor perturbation on a known market picture. At the same time, consumer demand and industrial demand are not yet well defined, and market data are sparse and often inaccurate. Domestically, there is no market equilibrium to perturb.

Thus, it is more reasonable to make decisions based more heavily on core technological capabilities than standard Western advice would suggest. This is not to say that an enterprise can afford to ignore what market information does exist. Nor should it ignore the feedback from the market as it moves to penetrate it. The technology push approach is not adequate by itself, but in many cases, it may be the most practical approach available initially as long as the technology is intended to meet a perceived market demand. In many cases, even though enterprises do not have good domestic market research data, they know that certain products have large markets in the West so it is logical that demand for them will build up domestically. Here enterprises must try to analyze the competitive position of new domestic products relative to imports.

At the same time, part of the reasoning behind the Western prescription may not apply in Russia. Sophisticated market research is particularly critical in markets where competition is high because demand is close to saturated. In Russia, however, the market for many low technology products is not nearly as saturated as in the West. This is a significant advantage, which has already allowed for a boom in cheap imported consumer goods, and which should help some Russian producers as well.

Of course, for enterprises planning to enter foreign markets the lack of market data is not the problem. These companies have access to the same market information as Western

companies, although they are less experienced in gathering and analyzing the data. Having market data is only one element of deciding on the relation between cost and price, cost/price versus performance, or the potential future competitive environment. In many cases the allure of foreign markets, with the expectation of hard currency returns, is difficult to resist, but the difficulty of entering these highly competitive markets, with experienced, well known, sophisticated competitors is frequently underestimated. Many enterprises wisely seek Western partners to help with these issues.

C. Larger Political and Economic Environment

Finally, enterprises must decide on their primary activities and products in the context of volatile and uncertain government economic policies. Russian enterprises have been caught in the political crossfire between those advocating continued industrial subsidies and those urging the imposition of hard budget constraints. There are other elements of uncertainty such as the government policies on foreign investment, import restrictions, taxes, export duties, etc. Furthermore, bankruptcy is not yet implemented consistently or on a large scale by the government, which distorts the distribution of available government funds from a market-driven allocation.

In order to avoid operating financial losses, it would have been necessary to downsize operations, social services, and staff ahead of the decline in orders. Without a sound basis for predicting future state orders, this could not have been done in a rational way.

The problem of adapting to these changes was left almost entirely to the enterprises. Enterprises now need to seek other sources of revenue and investment, bring their operations into profitable and competitive performance, move to private ownership in many cases, and manage all of the external interactions that had been managed by the state. To have any hope of accomplishing this, they must initiate major restructuring programs, and in many cases they are doing so.

IV. Restructuring—Alternative Ownership Configurations

Ownership is dealt with in detail in the previous chapter. Here we consider it only insofar as it affects the internal organization of an enterprise. The relationships among owners, customers, and management will be drastically changed, as enterprises privatize and sell to customers other than the state. A different legal framework applies after privatization. There are differences of opinion as to whether a defense enterprise should privatize and corporatize simultaneously and then restructure or whether it should first become a state-owned joint-stock company, restructure, and then privatize.⁷ Because of the differences of circumstances for restructuring under state or private ownership, the choice of sequence will have a major impact on the details and effectiveness of the restructuring.

The primary argument for privatizing first is that private property concepts are the *sine qua non* for all economic reform, and that being a state-owned joint-stock company is an artificial existence that will perpetuate many of the basic flaws of a command economy, including the absence of hard budget constraints, and the lack of investment and modernization needed to compete in a market economy.

A counterargument is that it is easier to make the transition to a joint-stock company while the state is still protecting the enterprise, the macroeconomic reforms proceed, and a commercial infrastructure is being established. It is important to remember, however, that if the restructuring is done prior to privatization, the differences in the Russian and Western perceptions of the structure of a joint-stock company may be less susceptible to resolution since the new owner- management relationship will not yet have been established. Therefore the author believes that privatization should be accomplished early in the restructuring process so that the owners will have to deal with the full spectrum of issues present in a market environment.

To a considerable extent, the choice has not been a free one for the enterprises. President Yeltsin issued a decree on the privatization of defense enterprises in August 1993⁸ and a decree on "Privatization in Russia,"⁹ which stipulated that enterprises were to become open joint-stock companies prior to privatization. In addition many defense enterprises had been on the list that was prohibited from privatizing prior to this decree; others were still prohibited even afterward. Many of those started taking steps to restructure (including corporatization) with the eventual goal of privatizing part or all of the enterprise. Given the restrictions on privatization, this was a logical step.

Three approaches to privatization and restructuring of defense enterprises are emerging from the cases that we have studied. These are privatization of the entire enterprise as a single joint-stock company; privatization of a component of an enterprise that is not permitted, or does not choose, to privatize as a whole; and more complete decentralization, which is both a strategy for internal restructuring and allows for a variety of privatization methods for different parts of the enterprise. These approaches may use any of the three GKI privatization options (for enterprises or divisions that are permitted to privatize) or may involve the creation of one or more new private companies. Subsequent business formation steps, such as the formation of joint ventures, can also enter into the privatization strategy. The three approaches to privatization and restructuring of defense enterprises are:

1. Privatization of the entire enterprise as a single joint-stock company. Impuls and SAP have taken this approach. A condition for this is that the enterprise is not on the GKI list of enterprises not permitted to privatize. In most cases, domestic military orders are not sufficient to sustain these enterprises anywhere near their previous levels of output. In these circumstances it is difficult to find investors that want to invest in the entire enterprise. In the absence of such investors, the enterprise will have to undergo substantial conversion, and/or expand foreign military sales, and/or downsize dramatically (in the absence of continued massive subsidies).
2. Privatization of a component only. This approach applies to enterprises that must, or choose to, remain state-owned because of their defense mission or their role as a national resource. In order to pursue nonmilitary business, an enterprise frequently creates a small subsidiary company to pursue a commercial line of business or to function as a marketing agent for the parent enterprise, which does not privatize. TsAGI is an example of an enterprise much of which was not allowed to privatize, and Mashinostroenie is an example of one that chose not to. Each established a small subsidiary company, whose function was to market the parent's services abroad. A considerable amount of business was obtained through these subsidiaries.

One reason for taking this approach is that commercial orders, especially from foreign customers, are easier to obtain if the customer can deal with a private joint-stock

company instead of dealing with a state-owned enterprise. The nonmilitary orders are from the customer to the privatized component, but the execution of these orders is actually done by the parent enterprise under subcontract to the component. In reality, the component may be nothing more than a paper company with the staff drawn from the parent and participating in the activities of both. In some cases the parent and the component are both managed by the same people. This can be effective in an operational and marketing sense, but it has the potential for abuse in terms of distribution of profits if the marketing company can keep a disproportionate fraction of the revenue for itself and its managers.

3. Decentralization. Here a military enterprise with many diverse products and technologies decentralizes into many divisions, each of which may have a different privatization and business strategy. This approach, although closely tied to privatization choices, is also essentially a restructuring decision about how to organize internal operations. It will therefore be discussed in more detail in the next section on internal strategies. TsAGI and Mashinostroenie have also adopted this model for their subsidiaries.

Within these approaches are different strategies for conversion. In some cases this is the driving force in the selection of a privatization approach. Some enterprises establish organizational elements along product or technology lines to optimize their organizations to attract foreign investment, to better understand and control elements of cost, to assign product and profit responsibility to managers, to focus the development and commercialization of a new product, or simply to break a huge enterprise down into manageable components.

V. Restructuring—Internal Operations

As noted above there are several reasons that the previous organizational structures of Russian defense enterprises are not appropriate for participation in a market economy. There are, of course, no examples of Russian defense companies that have gone through the transitions and functioned for many years in a market economy. There are, however, cases of enterprises that have gone part way through this reform, and they should be analyzed carefully and continually for indications of successful (and unsuccessful) approaches.

An enterprise will have to make other adjustments aside from privatizing that will require time and investment. Issues of internal organization that a Russian enterprise must address include:

- strategic planning
- functional versus programmatic structures
- development of new functions/elimination or reduction of some old functions
- decentralization of management

In many cases, success will depend on a new structure's ability to attract investment, especially foreign investment. This argues for decentralization, rapid adoption of Western accounting practices, and downsizing to increase efficiency.

A. Strategic planning

Perhaps the most important challenge for enterprise managers is to plan strategically for the course they wish to take over the next several years, recognizing that it may be necessary to revise the plans in response to internal and external circumstances. The serious nature of their economic circumstances, and the lack of a coherent, funded government program on conversion have caused many enterprise directors to react quickly to some dramatic shocks somewhat to the exclusion of longer range planning. We do not say this critically since the directors have been faced with issues of survival.

When a Western company reorganizes, implementation of the new plan may require a transitional period, but the plan itself can generally be formulated and approved within a limited time. Furthermore, once the plan has been determined, it can usually be executed in a reasonable period of time, without major revisions along the way. This is possible because there is stability in the political and economic environment, and most of the elements and skills of the new structure exist in the old one or are available in the market. These situations do not obtain for a Russian company going from state ownership and military production in a controlled economy to private ownership and civilian production in a nascent market economy. In fact, the end of the transition process, both for any individual enterprise and for the state and the economy at large, is probably several years in the future.

The long-term goal of reorganization is to enable a business to grow, with increased profits, in a competitive market environment. Reorganization to achieve this goal must be balanced with shorter term performance requirements. In Russia this balance is especially difficult since survival in the short term is not easily guaranteed regardless of longer term goals. In these uncertain circumstances, the first concern for enterprise managers is structuring operations to allow their companies to survive in the near term. Near term survival has led many enterprises to shed some excess labor, whereas the seemingly instinctive approach of most enterprises has been to retain labor. Another survival example is that many enterprises enter into trade arrangements having nothing to do with their business in order to generate near term revenues.

This gets to the dilemma of whether to plan aggressively or defensively. If reform succeeds, the civilian economy should grow much faster than the state sector, which could continue to contract, and an enterprise will benefit from having chosen to pursue civilian opportunities. If, however, the economy continues to decline and/or the military-industrial complex becomes stronger politically, an enterprise could regret having abandoned the military market. This latter possibility seemed much more likely right after the elections in December 1993 than it had a year earlier. At this writing (summer 1994) it again seems very unlikely. Given the scarcity of investment capital, it is extremely hard for an enterprise to plan for both outcomes.

One of the most critical factors is the uncertain future of sources of financing. The principal source in the past had been government subsidies. Prior to October 1993, there was an extensive clash between Yeltsin and the Parliament (and the Central Bank, which reported to Parliament) about whether hard budget constraints should be imposed quickly, gradually, or not at all, and policy has oscillated in the wake of the political power struggles.¹⁰ From the standpoint of strategic planning in the enterprises, the final policy may not be as important as consistency. Such consistency may not be politically attainable, but if the government could set a policy and stick to it, the enterprise managers would at least have a solid basis for planning. They could try to balance long-term investment against short-term

survival tactics. Other potential sources of investment capital, particularly foreign sources, are also sensitive to consistency of government policy. This study has not included a review and analysis of the various potential sources of financing; however, it is clearly a key aspect of the reconstruction of any economy that has undergone rapid, major decline.

A major source of misunderstanding, and bitterness, is the reluctance of many foreign companies to invest in the military-industrial complex (MIC) enterprises. The Russians see many Western companies visit but few invest. The Russians tend to see their technological capability, production capacity, skilled workforce, potential Russian market, and the exchange rate as irresistible reasons to invest. Many Western companies see the lack of a commercial infrastructure, the lack of good financial data, the logistical problems with communications and transportation, crime, and government instability as major disincentives. Any investor has more investment opportunities than funds, and he chooses those investments with the best perceived reward-to-risk ratio. In the past year the evaluation of that ratio is improving in the minds of many private and institutional investors, but the levels of investment are still far from what is desired.

Despite these complications, enterprises must confront the issues of strategic planning by establishing the goals for reorganization, identifying core competencies, and selecting business lines. This planning involves decisions about product selection; staff size and composition; training; equipment purchases; R&D; partnering; finance; etc. In the present environment it is almost impossible to make well-informed decisions on these matters.

B. Functional versus programmatic structures

The relative values of organizing along functional (marketing, engineering, manufacturing, etc.) lines versus programmatic (product lines, research projects, etc.) activities will shift. On the one hand a programmatic organization is more suitable to decentralized management, especially in very large enterprises. On the other hand the shortage of certain new skills (e.g., marketing and finance) favors maintaining centralization. Matrix organizations (a combination of programmatic and functional organizations), in which the unfamiliar functions are centrally provided to product line divisions, may be desirable in the short term to balance these facts. The absence until now of good cost accounting practices makes it difficult to evaluate the relative economic efficiency of the different organizational forms, with consideration of all transaction and administrative costs, including those of functions previously handled by the state. Performance criteria should be changed at the enterprise, subunit, and employee levels to emphasize profitability and efficiency. The previous emphasis on levels of output did not result in efficiency. The financial and cooperative relationships between components of the enterprise may change with greater decentralization and with new incentives and performance criteria.

Some enterprises, especially ones heavily involved in research and development, are attempting to convert by adopting their military technologies to nonmilitary applications. In these cases the engineering groups may be involved in both military and nonmilitary projects, so that the management may choose not to segregate them along product (as opposed to technological) lines. This commingling is a barrier to obtaining foreign investment and the technology transfer that may be associated with it.

In spite of the apparent synergy of commingling, this could prevent or inhibit the development of successful nonmilitary products. The selection and design of new products involves market analysis as well as an assessment of available technology. This analysis must

include the price for which a product can be sold, the specifications that will meet the market demand, current and anticipated competition, financing required, marketing/sales/distribution plans, and manufacturing plans. The habits formed in designing and producing military equipment are not conducive to this process that is essential in the commercial marketplace. This is one of the few lessons from American efforts at conversion that is applicable to the Russian situation.

C. Development of new functions and elimination or reduction of old functions

Companies must add elements that are essential to success in commercial markets. While they will require considerable time to undergo complete restructuring, they must at least add the functions that will enable them to select commercially viable products and to market them. If enterprises simply privatize and base new product designs on their existing technology, as many tend to do, the chances of success will be poor.

One important priority that dictates which functions must be added is the search for sources of investment capital. There is often a disparity between what projects a Russian company thinks will interest a Western investor, and what a Western investor finds attractive. Russian industrialists do not always appreciate that a Western company has many more investment opportunities than capital, and that there must be a compelling reason to invest in a foreign country with a weak economy and no functioning commercial infrastructure, banking system, contract law and litigation process, or capital markets. There are in general many strong reasons to look for investment in the newly independent states (NIS), such as the huge potential market, lower labor rates, abundant natural resources, and a skilled and educated labor force; however, in many cases, these advantages do not outweigh the hazards in the eyes of potential investors. There is also a disparity between Russian and American businesspeople in their approaches to making a deal, and a gap in expectations as to the ease and speed of making deals. This is partly because interenterprise deals in the command economy were all "within the family," so such deals did not have to be responsive to the need for return on investment to shareholders.

Thus, several of the necessary new departments are those that are needed to persuade a potential investor that the company is viable. One of these is marketing. Military enterprises have always engaged in marketing in the sense of lobbying their one customer, but they did not engage in analyzing a broad market and making product decisions on this basis.¹¹ The addition of marketing to an enterprise should include the ability to perform adequate research to be certain a product can sell, the ability to reach customers to inform them about the product, and the ability to persuade investors that research, sales, marketing, and every other aspect of the company are well managed. Similarly, legal and finance departments must be added in order both to improve internal efficiency and to facilitate contracts and partnering arrangements. Both of these functions can serve to protect the enterprise's interests vis-à-vis a Western partner as well as to attract the partner in the first place. Another requirement that follows clearly from these is extensive training of personnel. The enterprise must make a real commitment to business training of both senior and lower level managers.

Given the Russian privatization program, which led to extensive employee ownership in many companies, it is also critical to initiate education of workers as to what it means to be a joint-stock company competing in the market. Employee shareholders are generally not familiar with the concept of the owners' interests being represented by a board of directors to

which the management is accountable, and they are not confident about such an arrangement.¹² While they were accustomed to the state setting wages and guaranteeing funds for these wages, as well as for many social services, employees are now faced with a situation in which not only are wages not guaranteed, but the management may actually reduce staff in order to be competitive. So there is reason for anxiety about a new form of ownership. At the same time, the employees may not recognize the need for investment in new functions. Since the state always provided orders for the company in the past, for example, the need for marketing is not clear to them.

Aside from the various new activities that must be added, there is also the need to close down unpromising operations. Social services, for example, which many enterprises previously provided to their employees, are now insufficiently funded by the state and may not all fit logically into a privatized industrial structure (see Chapter X).

An enterprise that has invested in modernization and the establishment of such things as a marketing department may find that these investments detract from their near-term financial performance, but they may have better long-term economic prospects than an enterprise that quickly shifts to the production of low-technology consumer goods in an obsolete factory with excess labor. The longer-term strategy is vulnerable, however, to the rapid adoption of hard budget constraints or other near-term shocks.

D. Decentralization of management

There are external and internal forces favoring decentralization and/or disaggregation of the enterprises. Decentralization generally involves establishing separate cost and profit centers, that may or may not be separate legal entities. Managers recognize that the best chance for attracting foreign investment is to attract it into these subunits rather than into the overall enterprise. Another motivation for creating the subunits is that many of the enterprises are seeking a larger, more diversified spectrum of products as they convert, and they attempt to set up businesses by product lines.

Decentralization can take a wide range of forms, with many possibilities in terms of ownership distribution and operational autonomy of subunits. The following are a few models:

- a. The decentralization can proceed to the point of total independence of the divisions, through the formation of distinct joint-stock companies, with the disappearance of the parent company.¹³
- b. The original enterprise may exist as a holding company, possibly privatized, retaining equity in the new joint-stock companies formed out of the divisions.¹⁴
- c. The original enterprise may maintain its base business while setting up separate divisions or joint-stock companies to pursue diversification opportunities.¹⁵
- d. A group from within an existing enterprise or institute can leave (on its own initiative) and form a new private company.¹⁶ In some cases the startup company may continue to coexist within the facilities of the parent organization. The startup and the parent may or may not plan for the eventual separation of the startup, but, in time, such separation is likely to occur.

In some cases the enterprise may have had one dominant product, such as a major space system or aircraft, and some of the specialty shops or activities can be reorganized into

separate divisions or subsidiaries. In other cases, where there is no dominant product, the entire parent enterprise may decentralize into many divisions, subsidiaries, or independent entities. This broad diversification has its hazards, and may not necessarily be a sound strategy, but it is understandable as enterprises search for viable product lines in the face of declining state orders.¹⁷

Decentralization places strains on the management structures of the enterprises since very few managers have much, if any, familiarity with managing within a market environment. In some cases there is a tendency for the enterprises to put the responsibility for new products and financial performance on the various subgroups before they are ready to handle it. This is the same type of premature devolution of responsibility that the state imposed on the enterprises.

Whether or not to create subsidiaries is one of the most difficult and contentious decisions for enterprises. It is frequently true in the United States, and probably in Russia, that spinning off promising new ventures will be a more efficient way to run those new business lines than keeping them in the parent company, and that the parent, through its equity in the spin-off, stands to profit more in the long run. This hypothesis must be tested in the Russian environment. The sudden abandonment of various administrative and operational functions by the state means that there is no stable baseline of the integrated fully self-sufficient enterprise to compare against the decentralized forms. The transaction costs and other elements of efficiency must be analyzed (or at least estimated) for both the integrated and decentralized versions without extensive operational experience in either form and in the absence of good cost accounting data.

In Russia, the parent is usually not in a position to provide adequate capital or other resources needed by the spin-off. The parent perceives, possibly correctly, that it will have little claim to equity in the spin-off if it is recapitalized with external investors. Furthermore the parent frequently does not want to give up the revenue generated by the new venture in the short term even though reinvesting the revenue in the subsidiary may serve the parent's long-term interests. Therefore the parent is very often unwilling to spin off new ventures but tries to keep them as operating divisions of the parent.

E. Product and market selection

Enterprise directors seek to identify products suitable for the promised market economy of the future and the corresponding hard budget constraints, but at least some of the products must also be viable in the current transitional economy, which may endure for several years. Products that will succeed in a market economy may, for example, require advertising, marketing, distribution, maintenance, and customer support networks that are not yet available. Other products may require the ability to have variable levels of production staffing or the ability to subcontract competitively for greater efficiency.

At the same time, managers must think somewhat defensively about how they will function if there is a reversion to some form of command economy, or longer-term persistence of highly subsidized industry. This clearly poses a very different challenge than that faced by a Western company diversifying into nonmilitary activities.

Managers must consider the proper level of technology for their products. To accomplish this effectively, enterprises will have to conduct an inventory of their skills, technology, know-how, and other endowments which give them a competitive advantage over potential competitors. In part this will depend on the past profile of the firm. Managers of many

defense enterprises try to maintain their previous level of technology in their new products, rather than diversify to much lower technology products. This is more than a matter of pride—it is an important factor in retaining their best scientific personnel. In the absence of challenging technical work, there is little to dissuade skilled personnel from taking higher paying jobs in banks and other commercial institutions.

American experience suggests, moreover, that diversification is more often successful when the new and old products are at comparable levels of technology.¹⁸ This reflects the effectiveness of not only design teams but of marketing, manufacturing, sales, customer service, and other departments which are able to work at familiar levels of technology. The American experience may not be fully transferable since the lower technology product markets are more saturated in the United States than in Russia.

Two approaches, dual use and military production for export, appeal to many managers (and to the Russian government) seeking to keep their enterprises at a high technological level, particularly managers who are reluctant to change the enterprise's profile to a significant extent. Nevertheless many enterprises are branching out into civilian production, sometimes on the basis of existing capabilities.

There are some cases in which the technology incorporated into products developed for the military can also have civilian applications and vice versa. These cases of dual use are apt to be more prevalent in services, components, and software than in complete weapon systems sold to the military.

Enterprises may also find they have a competitive advantage in certain areas when they have experience with products that are not capital intensive, such as software. The most easily utilizable asset of the militarized economy appears to be intellectual capital. Projects that rely more on human resources and skills than on manufacturing can also avoid many problems such as finding reliable input suppliers, outdated production technology, and shipping of end products. Such ventures may also be likelier to attract foreign customers. Sun Microsystems, for example, has found that contracting with MCST to develop technical software has been a means of utilizing Russian skills without a large capital investment or high risk.

Some enterprises have core capabilities applicable to civilian products, based on a history of production of civilian goods. Many defense enterprises in the Soviet Union produced civilian products in addition to their military output. In fact almost all products with some technological content (radios, television sets, aircraft, appliances, etc.) were produced primarily by the MIC enterprises. The civilian products were not always in the same technology area as the military ones produced at the enterprise, which is not surprising since the MIC was responsible for such product lines as food processing machinery and household appliances. Beyond that, some firms have competitive advantages in products or services that require relatively little capital.

As of 1990, the MIC had about 400 enterprises (20 percent of the MIC enterprises) engaged solely in civilian production. Some of these were brought under the MIC as part of the early Gorbachev conversion program. About 30 percent of the MIC's R&D and about 40 percent of its production output was for civilian purposes.¹⁹

As a first approximation, the higher the percentage of civilian goods that an enterprise produced, the easier it should be able to adapt to the economic changes simply by continuing, and possibly expanding, its production. However, there are other complications. First, as discussed above, the state used to place the orders, coordinate supplies, assure prompt payment, and take responsibility for distribution. Without the state, enterprises must

develop or acquire capabilities in these functional areas. Second, civilian products did not have to stand up to competition. Since the state has not protected domestic products from imports during the economic transition, Russian-made products have lost out to foreign competition in terms of both quality and price. Imported goods such as personal computers have taken a large share of the market. Thus this logical conversion product is not very appealing even for the domestic market. Nevertheless, possessing established production lines for civilian products should help an enterprise undergoing conversion.

The Russian government is attempting to adopt a similar strategy to that of the United States on dual use technology. By encouraging the development of technology for commercial applications the Russian government also hopes to provide a technology base for military requirements. The situation differs from that in the United States in that Russian military technology still leads civilian technology in almost all fields. In the United States civilian technology leads military technology in some of the most important categories for future weapon systems, namely electronics, computers, and sensors.

One approach to financing conversion is called “economic conversion.” This is a euphemism for exporting arms and using the revenues to finance conversion. It is yet to be demonstrated that this is an economically viable approach. The world market for arms dropped from about \$40 billion in 1989 to about \$20 billion in 1993.²⁰ Soviet/Russian sales dropped from \$28.8 billion in 1986 to \$5.9 billion in 1991 to \$1.3 billion in 1992.²¹ In addition many former customers are not in a position to pay hard currency—a condition that the Soviet Union had not imposed for previous exports. Notwithstanding the high technology of Soviet weapons systems, many of them are now in need of modernization to be competitive since military R&D has also been cut heavily over the past several years. The Russians have also lacked the maintenance support that customers demand. The Russian systems are not technically compatible with the existing Western systems that many potential customers already have in place, so it is difficult for the Russians to capture new customers from the Western suppliers. Finally, it may be prohibitively expensive to maintain diverse production lines for small and unpredictable foreign sales in the absence of substantial domestic orders.

However, there are some weapon systems, most notably combat aircraft, that appear to be economically viable export products. This has been the largest category of arms exports by the Russians in the past few years, and the profits may be adequate to maintain production and capability of a small number of selected plants, but it is still questionable whether the profits can be adequate to help finance conversion. At the same time, if combat planes make up a significant proportion of all arms export revenues, this means that the revenues for all other military exports are even smaller than the \$1.3 billion figure would indicate.

Another factor affecting the degree of difficulty of conversion has been the extent of vertical integration in a given enterprise. Extreme vertical integration has both advantages and disadvantages during the economic transition. On the one hand, it reduces reliance on outside suppliers, which may not be dependable in the wake of the recent economic disruption. In a legal environment where contracts are not enforced, enterprises cannot rely on monopolistic suppliers for timely delivery of necessary inputs. This is important not only for maintaining ongoing activities but also for planning new products.

On the other hand, excessive vertical integration may be very inefficient, at least in the longer term. Many enterprises maintain capabilities such as their own machine tool shops,

casting and forging shops, and even power plants that do not achieve economies of scale on the enterprise level.

For those firms that are not already highly vertically integrated, their prospects depend strongly on where they are on the production chain. Some enterprises were only engaged in research and development work and had no production capabilities. Others had prototype production capacity. Still others made components used by assemblers of final systems, but did not produce any end products and were dependent upon orders from the system integrators. If the end producers no longer require these inputs, these enterprises must diversify to produce some end products.

A major decision for enterprise directors is whether to address foreign or domestic markets (including the Commonwealth of Independent States). The domestic markets are less saturated, less demanding in terms of product quality, and more familiar. However, they may also be more volatile and less rewarding in terms of hard currency. Foreign markets may be more easily penetrated with a strategic partner.

Those who choose to enter domestic markets must also decide whether to develop and produce products for the private market or for the state. Several enterprises have found that many sectors of the state are currently not reliable customers, either in terms of placing anticipated orders or paying their bills.²² The state has been slow in setting budgets, placing orders, and making payments, and the profits, if any, are generally lower for state orders. One reason for this is the ongoing political debate about military doctrine, industrial policy, and budgets.

The domestic market must also be broken down into major sectors. Some of the major sectors are agriculture, telecommunications, transportation, natural resources, and consumer goods. Enterprises face a serious dilemma here. There is a logic to developing and manufacturing capital equipment since almost all industry is in serious need of modernization, or equipment for rebuilding infrastructure. However without investment capital in their potential customers' enterprises, there will not be adequate demand, not to mention adequate investment capital, to design and build the capital equipment itself. The state subsidy policy has focused more on employment and continuity of operation than on investment. Agriculture is another example of an industry with a large need for new equipment yet little capital available for its purchase.

Many enterprises have entered the consumer goods market. The products of choice seem to be those with modest technology content and fairly high (for individual consumers) unit cost, such as bicycles, microwave ovens, and VCRs. Enterprise can get such products to market quickly, with minimal development, and using customary sources of supplies. Furthermore these have been highly successful growth products in Western markets. But this is also a perfect example of the risks resulting from the enterprises' inability to do a reliable market analysis. The market for these products is nowhere near a stable picture to be analyzed; it is rapidly developing, with the likelihood of far too many entrants and subsequent shakeouts.²³

The natural resources sector is very attractive because of its higher likelihood of access to investment capital—both state and foreign. However, the investment is going primarily to the organizations in the energy sector. The supplier chains to new entrants in this field have not been established so there is a considerable lag in getting products designed and delivered. There is also strong foreign competition for equipment, especially when the investment is also foreign. Nonetheless resource development is one of the more viable prospective sectors

in Russia and is increasingly being viewed as one of the better long-term markets for suppliers of equipment and R&D.

VI. Data on Enterprises

In the CISAC project, we have discussed the issues analyzed above with several defense enterprises of differing sizes and business lines, and there are some common factors emerging. Most of the enterprises seem to want:

- To privatize, or at least to privatize commercial ventures.
- To reduce expenditures on social services.
- To restructure their organizations to be better able to function in a market economy.
- To attract foreign investment.
- To reform their accounting systems.
- To reorganize the enterprise into subunits along business or technical lines, with these subunits taking partial responsibility for generating revenue.
- To maintain control by the existing management and avoid an outsider takeover.
- To retain skilled personnel, while reducing excess staff.
- To provide economic benefits for employees and managers.

A. Saratov Aviation Plant (SAP)

SAP has undertaken all the elements of restructuring in parallel. It had the advantage of being completely privatized very early and in a single stroke. Because of this, however, the enterprise had to do many things without precedents and in the absence of a commercial infrastructure. Almost all of the other enterprises and organizations with which SAP dealt were still state owned and had no experience in dealing with a private company.

SAP's overall approach to restructuring is probably not a model for any other enterprise because the initial conditions and the political and economic circumstances along the way will not be repeated, especially those that occurred under Soviet control. Nonetheless the various elements of this enterprise's transition provide valuable insight for other enterprises.

SAP engaged in strategic planning for independent operation earlier than the other enterprises studied. The state has actually been a negative factor as it held up the transfer of payment to SAP for aircraft that had already been delivered. Management made the assumption that they had to be financially independent of the state and organized accordingly.

In terms of planning for product selection, SAP had an advantage over the other enterprises in this study in that it already manufactured a major civilian product. The Yak-42 commercial airliner constituted about fifty percent of the plant's output in 1988. Furthermore, SAP's tooling, facilities, and production workforce for manufacturing military aircraft and cruise missiles were largely adaptable to increased civilian production. SAP's conversion was also easier because the plant started earlier (1989) while the distribution and supply channels of the command economy were still functional. Thus, it could make a gradual transition to functioning independent of the state.

At the same time, SAP's management has moved aggressively to start several new aircraft projects. The planned financing for these new projects is a combination of state development projects, domestic joint ventures, foreign sources, and internal profits. The Russian government, however, has not only failed to pay for all of the planes that it had previously ordered, but has also failed to turn over some of the receipts from foreign sales that had to go through the government. This means that some projects have been interrupted in midstream due to a lack of financing. It may well be that SAP is overextended having put so much of its working capital into new product development. On the other hand, it may be necessary to start several projects to demonstrate the reality of opportunities to prospective investors, with the realization that all of them may not come to fruition.

However, SAP did not rely totally on aircraft production. Starting in 1991, SAP began to emphasize the manufacture of consumer products to make more complete use of plant capacity and old equipment in some of the specialized production shops that also supported the aircraft production. These consumer products have generated profits with virtually no investment. In this way the enterprise partially compensated for some of the lost revenue from military orders while it was building up the volume of civilian airplane orders. Notwithstanding these efforts, SAP has not been able to meet payrolls or keep production lines operating in the spring and summer of 1994.

SAP also has been dealing with issues of decentralization longer than the other enterprises in our study. The aviation plant took steps to grant autonomy to divisions, combining this movement with reorganization of legal ownership. In early 1991 five of the specialized production units were made into separate legal entities and allowed to operate as separate small enterprises, serving SAP aircraft production needs, but also producing consumer goods for independent sales at market prices.

On the one hand, this step gave managers of these shops experience producing and selling consumer goods at market prices. At the same time, however, it made them much more protective of their independence. This threatened the management of SAP, which was concerned that these shops continue to produce necessary parts of the main aircraft products. It is not clear if this concern was well founded, or if control and power were the real issues. Whether or not this was a real issue in SAP's case, it is potentially an important issue for many enterprises. Profit maximization of a subsidiary can be in conflict with profit maximization of the parent.

The directors of the five small enterprises understood the new structure differently from SAP management. They wanted to retain financial independence so that they could distribute their profits immediately as they saw fit. SAP management called for the return of their revenues to SAP, with these managers and employees to be rewarded centrally. Following long and sometimes contentious negotiations, SAP brought these enterprises back into the main enterprise, and they have lost much of their financial independence, at least for the present.

SAP's attempts to build its social services into self-supporting businesses is also an example to be studied by others. The intent was to make them self-sufficient, but this has not materialized as planned. It is not clear whether this is a failure on SAP's part, or whether it is caused by the lack of markets and infrastructure in these new, and unfamiliar, areas of business.

B. Central Aerohydrodynamic Research Institute (TsAGI)

TsAGI's case may be unique among those studied in that a large portion of this enterprise will probably always remain a state-owned facility. TsAGI continues to receive a research budget from the state for the operation of its primary research and testing facilities, and these facilities were recently designated as the first State Science Center. TsAGI's central operation is supported by a large number of high technology specialty groups. TsAGI's business strategy is to find additional (principally international) customers for its central testing services; retain the availability of the specialty groups to support this base business; allow the specialty groups to take advantage of their special technical capabilities to develop new products, services, and markets; and utilize excess space for other (not necessarily high technology) revenue-producing ventures. Business activities not within the State Science Center have been or will be privatized, but the distribution of ownership varies.

The central portion of TsAGI and the high technology groups had a similar advantage to SAP in that they had already been using their test facilities for commercial (domestic) as well as military projects. However, the level of testing of Russian commercial aircraft (in the absence of military projects) is not sufficient to utilize the facilities anywhere near capacity. Unlike SAP, TsAGI's level of business does not vary linearly with production levels of a single airplane. TsAGI also has large fixed costs connected with the maintenance of its test facilities. It has increased facility utilization by selling testing services to Western aircraft manufacturers, but these facilities are still not operating close to capacity. Whereas SAP had a small share of the commercial airliner market and was able to increase it, TsAGI had been the sole Soviet supplier of certain testing services and could not easily replace the decrease in state orders. On the other hand, TsAGI did have quick access to Western aircraft manufacturers, which have the lion's share of the world market. SAP could not even try to sell its planes on Western markets because of lack of certification.

TsAGI has a broad range of basic technology that is suitable for diverse applications. In line with TsAGI's commercial strategy, a number of subsidiaries have been formed to take advantage of these technologies in new markets. In addition, some subsidiaries, with minority ownership held by TsAGI, produce low-technology consumer goods. Their value to TsAGI is to generate revenue and provide employment for production workers.

This business strategy is driving TsAGI's restructuring strategy, which is comprehensive. It involves a combination of state and private ownership with the establishment of many independent legal entities and a wide diversity of products, services, and customers. Nonetheless the strategy must be to maintain a degree of integration that facilitates and rewards cooperation among the entities to accomplish much of TsAGI's business. While the task is challenging, the scenario is far from unique in Russia. This could be an important model for other organizations, particularly major research institutes.

TsAGI is one enterprise that is moving strongly toward establishment of subsidiaries as opposed to divisions. TsAGI has a greater claim on future equity in these subsidiaries because the base business of TsAGI embodies facilities and technologies that are important to many of the subsidiaries. The enterprise has established more than thirty separate joint-stock companies. Because some of these are essential to the base testing business at TsAGI, the enterprise wants to avoid the problem of competing priorities that SAP encountered with its small enterprises. It should be possible to do this with a combination of contractual and license agreements that are part of establishing the eventual independence of the subsidiaries. Nonetheless TsAGI is aware of the potential pitfalls and is proceeding cautiously. TsAGI and SAP may both establish spin-offs which have a degree of independence necessary to pursue

their new businesses and yet contribute to the base business of the parent. However, the two enterprises will have arrived at this structure by way of extremely different paths.

C. Mashinostroenie

Mashinostroenie had worked hard to get permission to privatize, and had planned to do so using Option One while leaving 38 percent of its shares in government ownership. In mid-1994, the management decided not to privatize, at least for the time being. Mashinostroenie has continued to take some soft money from the state. Conversion products are leading to an increasing percentage of Mashinostroenie's revenue, and managers expect these efforts to become a significant portion of the enterprise's business. Much of this business involves commercial applications of Mashinostroenie's space program.

Mashinostroenie did not have serial production capability, but it has developed it more recently. For some of its products, such as the Almaz satellites, which are produced singly, the lack of serial production capability is not a problem. The enterprise has been so intimately involved in every step of the utilization of these satellites, including post-launch control, that its involvement is essentially insured, as long as there are any orders. Mashinostroenie has endeavored to sell commercial utilization of Almaz and its data. This is a limited market, but with significant volumes and margins relative to Mashinostroenie's size.

The Proton booster, on the other hand, is produced by Khrunichev, and Mashinostroenie, which designed it, may have limited influence on future research priorities or even on which enterprise will do the research. When research funding was provided by the state, the state dictated which enterprise would perform the research. Funding for research is now supplied to Khrunichev by Lockheed under a recent agreement.²⁴ In difficult economic times, many businesses (East and West) reexamine their (or the state's) previous decisions as to which tasks should be subcontracted and which should be performed in-house. Khrunichev could decide to do more of the future R&D in house rather than contracting it to Mashinostroenie.

Mashinostroenie is also pursuing other contacts, both domestically and abroad. Recently, for example, the enterprise teamed up with the Double Cola Company, which received a conversion grant from the U.S. Department of Defense to form a joint venture for purely commercial activities.

In contrast to its rapid movement toward reorienting production to commercial markets, management is proceeding conservatively in its restructuring. In particular it is not moving toward the creation of subsidiaries for its major business lines. The main organizing principle of Mashinostroenie has not been changed in that it remains a highly hierarchical enterprise. There are at least two strong reasons for the general director resisting change. First, the enterprise's state defense business, either directly from the state or through orders received via other enterprises, has not decreased as precipitously as that of many other defense enterprises. Second, one of Mashinostroenie's main strengths is as a systems integrator. The enterprise coordinates the activities of many external enterprises as well as its own internal divisions. Continuation of this business, which is still reasonably in demand, leads management to keep the existing organization, with the improvement of some central administrative functions to facilitate attempts at foreign marketing.

While the organization is not changing dramatically in its basic structure, the apportionment of decision-making and responsibility within the organization is changing somewhat. Programmatic and business initiative is being decentralized, and the major program managers meet frequently to discuss corporate issues. Marketing and aggressive outreach to

Western partners and customers seem comparatively well developed at Mashinostroenie. Commercial activities are now a significant source of revenue.

Mashinostroenie has not resisted setting up subsidiaries. It has set up twenty joint-stock company subsidiaries in which the parent enterprise retains a majority interest, or at least negative control. These companies are designed to develop new business lines, but their current funding is almost completely internal. However, these are a small portion of Mashinostroenie's overall business, and they are not vital to its central activities. This is not to say that Mashinostroenie has not considered spinning off subsidiaries closely related to its core business, but the point of decision has not been reached as it has in some of the other enterprises.

By developing a management council that is bringing the enterprise's internal structure more in line with companies in market economies, while keeping the ownership/governance configuration of the enterprise much as it was, Mashinostroenie is taking a very different strategy from many other enterprises. This represents one extreme of the spectrum of restructuring strategies in that it does not involve major external changes. Instead, Mashinostroenie management is revising the enterprise's internal operations (not necessarily their internal organization) to take advantage of new market opportunities. This can be a very logical strategy for an enterprise that is involved in large integrated projects (for both the state and commercial customers) and that still has a reasonable amount of state support.

Another argument for keeping a strong central organization is that there are both military and civilian applications of Mashinostroenie's space technology. American companies and Soviet defense enterprises usually segregated military and civilian activities. Interestingly, one of the few (if not the only) major cases of successfully commingling military and commercial production in the United States is Hughes Aircraft's satellite business, and this may be influencing Mashinostroenie. Whether Mashinostroenie can successfully follow this model remains to be seen, but there is at least a strong basis for attempting to do so.

D. Impuls

Even prior to privatization, Impuls attempted to minimize its dependence on state subsidies by raising some independent (domestic) financing from individual parties. In June 1994, Impuls became a privatized joint-stock company under Option One with the state retaining 31 percent minority interest.

Impuls has faced a different type of conversion problem than the other enterprises. The enterprise did not make any end products and relied on other enterprises up the line to utilize its components and research and development services. Thus, Impuls was an exception to the frequent case of extreme vertical integration in the military industrial complex and was more vulnerable to the decisions of other enterprises once the command economy broke down. The enterprise was not very large, and had very little nonmilitary business. Impuls's conversion challenge was thus probably one of the most difficult of the enterprises studied.

Impuls's management had to try to develop new products, manufacturing capability, and a new customer base simultaneously. Impuls has demonstrated this approach by designing, producing, marketing, and selling a machine to count currency notes. This has been a successful product, which the enterprise is selling to totally new (for Impuls) markets, primarily the banking industry (domestic and foreign). The product utilizes some of Impuls's electro-optical sensor technology, but in the early versions it is not a particularly high technology product. Other NIS enterprises, as well as foreign companies, are also producing

bill counters, and the competitive balance between supply and demand is not yet clear. This, like that for microwave ovens and VCRs, may be a market that will be overly saturated and subject to shakeout, but if the market (or some part of it) moves toward higher technology products with enhanced optical discrimination capability, Impuls should be well positioned to take advantage of this shift.

Impuls is attempting to market other products that utilize its high technology. Rather than large, low volume systems, however, in general these are large-volume, multi-customer products very demanding to produce and market. This is a difficult strategy to pursue because Impuls is entering a competitive arena that depends more heavily on marketing, cost-competitive design, and high volume production than it does on high technology. TsAGI, by contrast, is entering markets and developing products for which its unique capabilities and facilities will sharply limit competition. In some cases, Impuls may license its technology to other enterprises for production.

Another enterprise that faces a similar challenge is the Lybertsi Science and Production Association Soyuz.²⁵ Its principal military activity had been research and development of solid rocket propellants. It also had prototype production capability, but serial production was always performed by other enterprises. A major part of its conversion activity is to utilize solid propellants for gas generators for a wide variety of applications such as fire extinguishing equipment, oil well stimulation, and seismic exploration. Soyuz also applied its R&D capability in solid propellant motor casings to fiber wound containers for other corrosive chemicals and for other structural applications. The enterprise does some manufacturing in house, but goes outside for additional capacity. It has chosen to concentrate its investment funds on developing new civilian products rather than on building up serial manufacturing capability. However, even if it goes outside for production, it usually is the owner and marketer of the end product. Many of these external fabricators are, naturally, the enterprises that had incorporated Soyuz's previous developments into military equipment. It appears that Soyuz's products are closer to its previous components and technology than are those of Impuls. Soyuz also seems to have kept a higher technology content in its products.

As with other enterprises in this study, the business diversification strategy at Impuls has driven the restructuring strategy. Restructuring did not have great significance until Impuls could find a viable business to engage in. Nonetheless, the enterprise's leadership moved to change its internal operations and bring middle management much more into the decision-making and market/product development process. New systems of incentive compensation were also set up to retain valuable employees while encouraging some of those less suited to the necessary business transition to leave.

Impuls's top managers also utilize the engineering staff to help plan, as well as design, new products. Lacking good market data or the complete staff capability to gather and analyze it, the enterprise has embarked on developing these skills. Impuls had to develop various prototype products in order to find out what the market might buy. This is a backward process by Western standards, but it is not clear that Impuls (or many other Russian enterprises) had a better option. Impuls has also formed some joint ventures with other Russian companies to exploit various new products and technologies.

Management also focused on developing manufacturing capability, and made a major effort to determine and allocate costs accurately in order to have a basis for making product decisions, pricing the products, rewarding employees, and reducing both direct and overhead costs.

As some of its products started to sell, Impuls has sought to establish the organization best suited to developing, producing, and marketing those products. This includes decentralization of marketing and other functions, with the eventual possibility of a more decentralized overall structure. At this time, specific product marketing resides primarily with the division developing the product. The central marketing department is engaged more in organizing trade shows and exhibitions and other forms of institutional marketing. Impuls is actively decentralizing with a matrix type of organization. The core competency divisions have the primary responsibility for major market areas such as satellite communications, TV measurement systems, and radioelectronic systems. Product managers in these areas will call upon various specific technologies (R&D divisions) such as microelectronics, electro-optics, etc. Unlike many American matrix organizations, the R&D divisions are also encouraged to bring in external business for their divisions. The product managers will also call upon the various production shops to produce the products. The managers of the production shops have essentially no decision-making role in the selection of products and markets to pursue. At the present time the decentralization is through the formation of divisions with varying degrees of autonomy, but not by the creation of subsidiaries. This is probably partly for reasons of control and equity, but management says that it is also to provide management assistance and stability to the new business lines. This argument is more plausible than in some other enterprises because Impuls has taken steps to drop unproductive personnel. There is also a need for flexibility as the fortunes of various new product ventures rise and fall.

While the divisions do not have separate bank accounts, records are kept for each division's performance. Grigoriev started quite early to introduce a reasonable cost accounting system so that he could understand and control the various sources of overhead and direct expenses.

E. ELVIS+ and The Moscow Center for SPARC Technology

Prior to the breakup of the Soviet Union, ELVIS+, which was a spin-off of a larger enterprise, was not subject to all of the state's regulations and external interactions, and it had a far greater degree of control over its organization than state-owned enterprises did. MCST was a spin-off, partially owned by the state, but it was essentially free to organize and manage its internal affairs. This enterprise is an example of potentially successful conversion and privatization by the spin-off of a small portion of a much larger defense establishment. In this case the spin-off was at the initiative of the small business rather than the parent (Institute of Precision Mechanics and Computers). Although its primary customer (Sun Microsystems) is very different from the Soviet state, MCST has continued to serve predominantly one customer and initially did not have much business on the open market.

At MCST and ELVIS+ the top managers are also the lead technical personnel. This is typical of small, high-technology U.S. companies at this stage of their development. The managers' motivations in forming their companies were at least as much to keep their technical teams together and to take care of their people as they were to make large sums of money. As a result of this, and due to the close communications characteristic of a small company, the employees trusted the management, regardless of whether or not the employees were shareholders.

MCST also assumed financial independence, but it was formed to perform contract work that it had already negotiated so the short-term risk was small. ELVIS+ was formed to

be financially independent, except for the utilization of state-owned property and equipment.

MCST is now the only viable portion of its parent institute; it is growing, and the institute is shrinking. The institute has extracted some of MCST's revenue through rental and service assessments, which appear to be excessive. As MCST has grown, it has hired additional technical personnel from the institute. It is not clear that the institute would not have been better off encouraging MCST's growth, rather than taxing its revenue as much as it could. Either way the institute would probably have shrunk to a hollow company holding 45 percent of MCST, but this asset may have become far more valuable if MCST could have used all of its retained earnings revenue to grow.

ELVIS+ and MCST are essentially new enterprises, and their product selection is based primarily on the technical skills of the individual engineers and scientists. The production chains into which their personnel previously fit (although in different organizations) have been largely decimated by the cutback in state orders. Therefore they are faced with developing new products and finding new customers. As difficult as this is, because they have greater flexibility, it can be easier for a small new companies than for large old enterprises or institutes.²⁶ This is especially true for MCST where its dominant customer, Sun Microsystems, has defined the products to be developed and provided an order. This bears many resemblances to working for the state on an R&D order in that the customer continues to perform many of the essential functions.

MCST and ELVIS+ are not so much studies in restructuring as they are in the development of spin-offs. The approaches of the parent institutes are in strong contrast to that being taken by TsAGI, for example, and provide many negative lessons. Neither MCST nor ELVIS+ has really thought a great deal about internal organization as both enterprises are still quite small (fewer than 100 employees). Most decisions still seem to be made at the top, and largely by technical people, and neither company has an organized approach to finance or strategic planning. (ELVIS+ now has a small staff to handle domestic and international marketing, however.) These new companies are still relatively small, but organizational issues need to be addressed soon as the businesses start to grow.

VII. Conclusions

Each of the enterprises studied is adopting a restructuring strategy to fit its particular business lines and objectives. The specifics of the products and their design, marketing, and production requirements are the primary basis for the organizational approach selected. These lead to very different models. In turn, product selection is driven by the enterprises' core competencies and their adaptation to the demands of a competitive market environment.

The choice of products following the collapse of military orders is complex. It depends on assessments of external factors such as the political economic conditions imposed from above; the anticipated and actual availability of elements of a commercial infrastructure; the strength and development of the market; the availability of supplies, components, and subcontractors; and the past and present strengths of the individual enterprise including the degree of vertical integration. Making these product selections is a far more speculative process than the analogous selection by a Western company. Failure can just as easily result

from a misassessment of changing external circumstances unrelated to the specific product line and their evolution as from inability to compete in a growing market. Failure can also occur as a result of not building all of the necessary new capabilities (marketing, finance, etc.) into the enterprise as it moves from state- to market-dominated business.

Another major factor determining the choice of restructuring plans is the desire to maintain control over all valuable segments of the enterprise. The main issue here is the form of decentralization—divisions versus subsidiaries. In the cases studied the choice is strongly influenced by the degree of integration of the enterprise's activities into its primary business lines, attraction of outside investment, importance and control of intellectual property, the significance of centralized facilities and capital equipment to the noncentral business lines, and the management's attitude toward control. The last factor can distort rational business judgment. Constraints on restructuring plans, such as the legal limitations on privatization, are also very important.

Many important elements of a Western-style business are missing in all of the enterprises studied, but they simply move ahead in spite of this. For example, none of these enterprises has converted to a Western accounting system, but they are still working on cost control even without proper cost accounting. The enterprises studied herein appear to have made quite reasonable restructuring plans for their own particular situations. In hindsight, they have made some mistakes, but considering the circumstances, and the lack of precedence and experience, they seem to be on reasonable tracks. In considering whether these models are applicable to other enterprises, it is important to compare their business conditions. In some cases a combination of different models may be the best approach.

Notes

¹ Julian Cooper, *The Soviet Defence Industry: Conversion and Reform* (London: Pinter/Royal Institute of International Affairs, 1991).

² David Bernstein, "Conversion," in Michael McFaul, editor, *Can the Russian Military-Industrial Complex Be Privatized? Evaluating the Experiment in Employee Ownership at the Saratov Aviation Plant* (Stanford, CA: Center for International Security and Arms Control, May 1993).

³ The optimum sequence of decontrol, however, is not obvious. The economic system in China suggests that maintaining a greater degree of political as well as economic control than the Soviet Union did may have been a better course of action. That option is no longer available.

⁴ Julian Cooper, "The Conversion of the Former Soviet Defense Industry" (London: Royal Institute of International Affairs, 1993). Since the Russian Republic accounted for about 75 percent of all Soviet military production and about 90 percent of all military R&D, the trend can be followed by analyzing Russia in spite of the breakup of the Soviet Union.

⁵ Michael McFaul, editor, *Can the Russian Military-Industrial Complex Be Privatized? Evaluating the Experiment in Employee Ownership at the Saratov Aviation Plant* (Stanford, CA: Center for International Security and Arms Control, May 1993), 11-12.

⁶ Cooper, "Transforming Russia's Defence Industrial Base," *Survival*, Winter 1993-94.

⁷ For a detailed exposition of the controversy, see Anders Åslund, *Post Communist Economic Revolutions: How Big A Bang?* (Washington, DC: Center for Strategic and International Studies, 1992).

⁸ On the Special Features of Privatization and Supplementary Measures of State Regulation of the Activity of Enterprises of the Defense Sectors of Industry, decree by Boris Yeltsin, August 19, 1993.

⁹ The State Program of Privatization, decree by Boris Yeltsin, January 1, 1994, Section 5.18.5.

¹⁰ At this writing (September, 1994) it appears that Prime Minister Chernomyrdin may have the dominant role in formulating such policies. It also appears that he will be less generous in providing subsidies than he might have been earlier, but it is much too early to say that the government will have a coherent and consistent policy on these matters.

¹¹ This same distinction can be made, perhaps to a lesser degree, between American defense contractors and commercial companies.

¹² The Russian system differs from that in the United States in that the general director (equivalent to an American CEO) is elected directly by the shareholders, rather than by the board of directors, and does not report to the board. Therefore the shareholders do not have a board specifically to look out for shareholders' interests. Decree No. 601, December, 1990.

¹³ This can be described as a split-up.

¹⁴ This is to be distinguished from the so-called holding companies which have been created out of some of the ministries to maintain their positions vis-à-vis the enterprises that had reported to them in the command economy.

¹⁵ If separate legal entities are created, they are defined as spin-offs, meaning that the shares are distributed on a pro rata basis with the shares of the parent enterprise, and may subsequently be sold separately.

¹⁶ This is defined as a start-up.

¹⁷ It is interesting to note that 70 percent of all American plants manufacture a single product, and another 15 percent manufacture only two products (Arthur Alexander, presentation at Stanford conference, Industrial Demilitarization, Privatization, Economic Reform, and Investment in Russia, December 1992). This leads one to believe that there may well be further disaggregation of many of these enterprises at a later stage.

¹⁸ Jacques Gansler, "American Downsizing and Conversion Experience," in Defense Conversion, Twentieth Century Fund, forthcoming.

¹⁹ Julian Cooper, "The Conversion of the Former Soviet Defense Industry" (London: Royal Institute of International Affairs, 1993). As an interesting comparison, civilian production makes up 90 percent of the business of the 100 largest prime defense contractors in the United States. John A. Alic, Louis M. Branscomb, Harvey Brooks, Ashton B. Carter, and Gerald L. Epstein, *Beyond Spinoff: Military and Commercial Technologies in a Changing World*, Harvard Business School Press, 1992.

²⁰ 1993 SIPRI Yearbook

²¹ Eric Schmitt, "Arms Sales to Third World, Especially by Russians, Drop," *New York Times*, Page A2, July 20, 1993.

²² See case studies in this report.

²³ According to Vladimir Bessarabov, director of the Nizhny Novgorod Department of Conversion, 113 Russian defense enterprises have begun producing microwave ovens. See Jeffrey Lehrer, "Nizhny Novgorod: A Success Story in Defense Industry Restructuring?" *Conversion*, no. 4 (October 1994): 11.

²⁴ Jeffrey R. Lenorovitz, "Space Systems/Loral Books Proton Launchers," *Aviation Week and Space Technology* (September 20, 1993): 90-91.

²⁵ We have not studied Soyuz as closely; the author spent one day with their top managers, as opposed to many days spent at Impuls over a two-year period. Therefore the comparison is tentative, but it does seem true that there are different strategies available even within this narrow class of enterprises.

²⁶ See David Bernstein, "Spin-offs and Start-ups in Russia: A Key Element of Industrial Restructuring," *Workshop on Russian Economic Reform*, Stanford University, November, 1993.

IX. Principal Differences in Accounting Systems in Russia and the United States

Tatiana Krylova

I. Introduction

This chapter deals with the major changes in accounting systems that are needed to accompany Russian enterprises' transitions to a market economy. It also contains some information on several enterprises' perceptions of these requirements and the steps they are taking to meet them.

In a centralized system accounting is used as a tool of central planning and control at regional and national levels. In a market-based system accounting identifies, measures, and communicates economic activities of an economic entity for the purpose of efficient allocation of economic resources within the economy and within the organization. The audience for accounting reports in the United States, for example, includes stockholders and capital markets as well as company managers and government agencies. Therefore if the Russian economy is to change to a market economy, and enterprises are to function in it, major changes in the basic accounting systems are required.

II. The Transformation of Accounting in Russia

At present Russia is moving from an administrative planned economy toward a market economy. Accounting reform is one of the major elements of this dramatic change. Accounting, often referred to as the "language of business," at any given moment in time reflects a business's economic and legal environment. That is why the Russian accounting system is so

different from the U.S. accounting system, as well as from accounting systems in other developed market economies.

Aside from the fact that any two countries have distinct accounting and reporting systems that would have to be reconciled to work together, the systems of the United States and Russia specifically are influenced by the administrative command economy in Russia and the U.S. market economy. Thus accounting reform is one of the main conditions for the success of economic reforms in all countries in transition. Some of the activities requiring accounting reform are privatization; development of capital markets; promotion of domestic and foreign investment; achievement of private sector efficiency; and the development of an informational infrastructure adequate to the dimensions of the market economy, including national statistics, social issues, taxation, financial markets, and an informational network.

But accounting is not only a tool and prerequisite of the development of economic reform, it is also a consequence of this development. This interdependence is a major obstacle for the implementation of accounting reform in Russia, and one which can be overcome only gradually with the evolution of the market economy sector. What Russia needs now is a new accounting system that would both meet the requirements of the transition period and be based on international accounting standards. Introducing changes in accounting practices is not enough. In order to understand the new role of accounting, accountants must not only comprehend and accept new accounting standards, they need to understand the new rules of the market economy mechanism in general.

A. Main features of the accounting system used in an administrative planned economy

To understand the current state of accounting in Russia, it is useful to consider the main features of accounting in an administrative economy. In addition to showing what dramatic changes Russian accounting must undergo, this will explain some of the transitional features of current Russian accounting, in which quite a few concepts from the old system still exist. The main features of accounting in an administrative system are:

- In an administrative economy the predominant measure of performance was production. To the extent that finance was understood it was almost exclusively as a tool to measure what was produced. In the management structure of the enterprise, production managers held the highest positions and financial managers did not exist at all. For this reason there was no basis for using financial accounting as a tool of communication within the enterprise or with the outside world. The emphasis was on production figures rather than sales figures. The major users of accounting information were government bodies, and they were the ones who made most of the important management decisions. As production played the dominant role, accounting reports were highly production-oriented and were essentially detailed management reports for the internal use of the enterprise and its owner/customer (the state).
- The main purpose of these reports was to enable the central administration to check deviations from the central plan, to prepare plans for future periods, and to collect taxes.
- Since the main function of accounting reports was to report on the utilization of assets given to the enterprise by the state, profitability had much less importance because enterprise managers could not influence its level. The only leverage they had was cost reduction through more effective use of labor, materials, and other factors. They were somewhat encouraged to reduce costs by incentives (e.g., bonuses) but this approach generally did not work. Prices were set centrally, with the goal of keeping a constant margin within an

enterprise (a planned profitability level) to enable it to maintain certain funds for enterprise development, bonuses, and social assets.

- The main function of the accountant was to control the flow of funds allocated to a particular state enterprise. The accounting system was used to register this information. The accountant was thus a state controller of the enterprise and performed a function closer to that of a bookkeeper in the West, who does not make managerial decisions.
- Accounting was also a tool to monitor the fulfillment of the central plan. Budgeting, planning, production decisions, and pricing all emanated from the central control. Customers and suppliers of the enterprise were also chosen by state bodies.
- Central control placed a high priority on comparability of accounting information, which led to strict unification of accounting systems throughout the Soviet Union, using unified Chart of Accounts, codes, and forms of documents. All procedures were regulated in detail.

In sum, administrative accounting takes a production-oriented approach as opposed to the sales/profit-oriented accounting of a market economy; it is the basis for state control versus decision-making by enterprise management, and for the calculation of gross costs versus product profitability and profits. For these reasons several major accounting problems exist in Russia:

- The nonexistence of the financial reporting concept as a means of communication between enterprises and capital markets.
- Accounting is understood as a tool of control, but not as a tool of management. There is a lack of understanding that accounting information has value in itself.
- Accounting is still oriented toward reflection of the past information in order to determine the taxable income of the enterprise, instead of evaluating the business performance of the economic entity for purposes of future decision-making.

And, possibly the most acute issue, there is still no conceptual framework of accounting in the transition period.

B. Recent developments in accounting in Russia

When economic reforms started in Russia it became clear that accounting practices also had to be changed. The first incentive to do so was provided by joint ventures, which started to evolve in 1987–1988 and sometimes could not operate due to the incompatibility of Russian and Western accounting standards. In 1989 the United Nations initiated its activities to develop a new conceptual framework of accounting in the USSR. The Intergovernmental Working Group on Accounting and Reporting Standards of the UN Centre on Transnational Corporations formed a task force that consisted of leading Russian and Western experts. The result of this work was the release of the new Chart of Accounts adopted by the Russian government as of January 1, 1992. In 1993 the Russian government issued a decree outlining the need to introduce international accounting standards into the Russian accounting system, which was followed by accounting regulations in March and June 1993. In July 1994 the Ministry of Finance issued additional explanations which, among other things, gave the enterprises a better idea of the degree of flexibility in the regulations in terms of such items as depreciation. Though Russia at present still does not have an accounting law, much effort has been made to develop market-oriented accounting standards. This effort is headed at present by the advisory board of Russian and Western experts affiliated with the State Duma.

As a result of these activities Russia has achieved more comparability with Western accounting standards, which means that Russian accounting is at present more market-oriented than it was before.

The most important changes made to date are the following:

- An accrual principle for revenues has been introduced. (In the Former Soviet Union a cash basis was used for recognition of revenues and an accrual basis for the recording of expenses.)
- Prudence (conservatism) and a lower cost-or-market rule has been introduced for investments in securities of other enterprises.
- A matching principle is stated in the regulations.
- New methods of evaluation of fixed assets and inventories were allowed. (Accelerated depreciation of fixed assets has been introduced; for inventory average cost, FIFO (first in, first out) and LIFO (last in, first out) methods were introduced in addition to the specific identification method that was the only method of inventory evaluation used before. In a recent regulation released in March 1994, however, FIFO and LIFO methods have been terminated.)
- Clarification of intangible assets and their amortization has been achieved. (In the FSU intangible assets were not recognized in accounting.)
- Reporting forms such as balance sheets and income statements have been simplified and are easier to use for analytical purposes. Liquidity criteria are being used to list assets, and a clearer definition of liabilities and equity of the enterprise has been worked out.
- Some important items for business evaluation such as retained earnings have appeared in the reporting forms.
- Enterprises gained flexibility to design their own accounting systems.

There are still many unsolved problems arising from the fact that a country in transition cannot use the accounting principles of a country with a developed market economy. This has led to a situation where some principles are stated in the regulations that do not work in practice. Another transitional problem is to have a self-consistent approach to adjusting for inflation.

Because accounting reform in Russia lacks a conceptual approach, accounting regulations are fragmentary and interpretations of accounting rules are insufficient. No clear decision has been made as to which standards to choose and which accounting model (European, International, American, French, British, etc.) to use for Russian accounting reform. These factors, along with the lack of educated accounting personnel ready to accept new accounting concepts, make it very difficult for Russian enterprises to convert their accounting systems to the Western format.

III. Conceptual Differences in Russian and American Accounting

A. Common features

Doubtless there are at present more differences than common features in these two accounting systems. Nevertheless because accounting measures and communicates information on enterprise performance, some shared features exist. Russian accounting, just as American accounting, was always based on such principles as dual entry, periodicity, relevance, timeliness, truthfulness, monetary measurement, and comparability.

In some cases, however, even the same definition does not mean the same content. First, as financial accounting and reporting did not and does not exist in Russia, all of these features actually relate to the cost accounting system. Second, some principles were stated but were not followed—for example, timeliness of accounting information was always a problem in the administrative system. And third, in the new Chart of Accounts some market accounting principles are stated but not supported by the interpretations—and thus at present they do not work at all. These include the going-concern principle, substance over form, retained earnings, and the matching principle.

B. Differences

The main conceptual differences in accounting systems are the following:

- From the most general perspective accounting in Russia is still oriented toward the recording of information for internal use by enterprise managers and for reporting to the tax authorities.
- There is no concept of financial reporting as a way to communicate with different outside users or financial markets.
- The presentation of accounting information does not meet the needs of either financial managers or investors. Actually in the new environment it cannot be efficiently used for internal management purposes in general because the existing accounting system is still highly standardized. Russian enterprises use a single Chart of Accounts enforced by the Ministry of Finance which consists of nine parts and contains about 100 titled accounts with the appropriate numerical codes. Besides that the Chart of Accounts includes a group of Off-Balance Sheet Accounts designed for resources that do not belong to the enterprise and therefore are not to be shown on its balance sheet. The Chart of Accounts is supplemented by an Instruction on Implementation of the Chart of Accounts which explains what records are to be made in each of the accounts and how these records correspond with other accounts. Also in accordance with the Chart of Accounts, Russian enterprises submit their annual reports in a standardized format.

Russian regulations still lack many of the principles central to a market economy. Among them are the following:

- a) Going concern, which is the assumption that a business will continue operating indefinitely. This is the basis for using historical cost to value accounts of the enterprise rather than liquidation value since the company will remain in existence.
- b) Neutrality, which means that financial information should be neutral and not intended to favor any group of users of financial statements. At present financial statements of Russian

enterprises serve the interests of only one user—tax authorities. Items such as net income do not even exist in financial reports of the enterprise; there is only net income before taxes.

c) Prudence (conservatism) holds that in financial statements assets and net income should be under- rather than overstated and liabilities should be over- rather than understated. Such an approach helps to deal with uncertainties in business and leads to less misleading information for users. In Russian reports, assets are often overestimated. For example, according to Russian regulations receivables should be shown as actual amounts outstanding, though in some cases up to 80 percent of receivables should be treated as bad debts. The lower-of-cost-or-market rule is stated only in respect to financial investments but interpretation of this principle is not clear and enterprises do not yet use this method. On the contrary, liabilities are usually underestimated due to the fact that only existing liabilities are to be included in the balance sheet and such items as contingent liabilities (a potential liability that may exist in the future depending on the outcome of a past event) are still not recognized in Russian accounting.

d) The matching principle as stated in the regulations says that there should be correct allocation of revenues and expenses between related accounting periods, but there is no clear explanation of how this should be done. The current regulations actually preserve the existing mismatching of revenues and expenses by allowing enterprises to choose either an accrual or a cash principle for recognition of revenues, but for expenses only the accrual principle is being used.

These conceptual differences are manifested in differences in financial accounting and reporting. According to Russian regulations enterprises must submit financial reports quarterly to the owners and the parties authorized to supervise enterprise performance, such as tax authorities and other state bodies (for example, enterprises that are owned by the state fully or in part have to submit reports to Goskomimuschestvo, to their cognizant ministry, etc.; enterprises that are financed from the state budget have to submit reports to appropriate financial bodies).

IV. Cost Accounting

The definition of production costs described above causes problems for the calculation of some important ratios for analysis of profitability of the enterprise by the users of financial statements. But this is not the only problem arising from the different approaches to cost accounting in Russia and the United States. Another problem is that in Russia there is no management accounting system that enables management to analyze product profitability and make relevant, timely decisions. In the administrative system there was no need to measure the actual costs of each item produced by the enterprise, because profitability was not the major criterion in the decision to produce the product or to cancel its production. Because the costs or profit centers concept did not exist in administrative accounting, it is very difficult now to extract information about the results of this or that production division. Of course under Soviet accounting, enterprises did calculate costs of production units, but this was done using the so-called pooling approach. Direct costs were directly allocated to the product, but all overheads were allocated in accordance with some basis that usually was planned cost item (direct labor, direct materials, or output of the division).

Western enterprises generally have a management accounting system, tailored to their managerial needs, that gives them detailed information on product costing. Russian enterprises currently have this same flexibility to design their own cost accounting system in accordance with their unique production process and management structure. But previous concepts of administrative accounting and Russian enterprises' lack of experience in a market economy environment make this difficult. Besides that, Russian enterprises have to face the fact that in Russia there is no distinction between accounting and taxation, and the Ministry of Finance strictly regulates what can and cannot be included in production costs. For management purposes this information is insufficient, because management needs more detailed information on cost structure and product profitability, rather than such strict regulations.

V. Financial Reports

Financial reports consist of the balance sheet, income statement, and notes to the balance sheet. (See the appendix for the elements of these reports.)

The balance sheet consists of assets and liabilities. The assets side has three groups of assets: non-current assets; inventories; and cash, receivables, and other. Thus current assets are split into two sections, unlike the U.S. practice where they normally would have just one current assets section. In addition, there is no special section for financial investments in the Russian balance sheet.

The income statement includes sales, costs of sales, and non-operating results. The income statement in Russia is still conceptually very different from that in the United States.

In the West the income statement (as well as the entire accounting system) has been designed to enable an investor to get an answer to his/her most important question: whether or not an investment will be profitable. Normally several indicators are used to measure an investment's performance, such as gross profit as a percentage of turnover (or of total assets), or net profit as a percentage of turnover (or of total assets). The current Russian income statement, however, does not actually show how much it costs to produce a product and hence how profitable the product is in the Western sense. To arrive at this information some adjustments have to be made, since the main purpose of the existing income statement is to calculate taxable income. Although in Russia investors and other interested parties now need information on enterprise profitability, financial reports do not yet meet the new needs of investors and reporting formats do not allow the calculation of financial ratios useful to measure enterprise performance in the market environment. Though profit in Russia is also understood as the difference between sales and costs of sales, in almost every sub-item there are different approaches.

VI. Business Valuation and Accounting

Business valuation normally requires consideration of the value to be put into the business from the standpoint of both the buyer and the seller. Thus historical costs, accounting records, and financial statements have only indirect relevance. But this is true only in part,

because in most cases accounting information is a starting point for making decisions on business valuation and hence it is important that this information be reliable.

Major methods of evaluation can be split into two major categories: methods based on future benefits (expected returns) and methods based on assets valuation.

Methods based on expected returns are mainly the price earnings method and the discounted cash flow method.

The price earnings method is based on an estimate of business earning power and its capitalization with a price/earnings ratio. Information on price/earnings ratios is available for some major Russian companies, but the reliability of this information is questionable. The first problem is that the calculation of earnings does not correspond to international standards. Then there are problems of forecasting future earnings, lack of development of the financial infrastructure for price/earnings calculations, and lack of development of stock exchanges.

The discounted cash flow method concentrates on cash flows, which are to be discounted using a discount factor corresponding to the expected rate of return for the investor. The use of this approach in Russia is complicated by the difficulties of forecasting future cash flows in an unstable political and business environment, and uncertainty regarding the evolution of interest rates and tax policies. Also, companies to be valued have very short records of independent commercial activities.

Methods based on assets valuation are widely used in Russia. The problems with using these methods are directly related to the accounting issues mentioned above. Besides the fact that accounting principles in Russia still differ from international accounting standards, the major issue here is lack of valid historical information. This has the following shortcomings:

- Past financial figures were influenced by past economic factors such as state price control (for fixed assets that are still in use, prices were determined by the state rather than the market), subsidies, low interest loans, the monopolistic position of some of state enterprises (which may or may not be eliminated by market forces), and overemployment in some large state enterprises.
- There is no financial and legal infrastructure that can insure a truthful and fair presentation of the financial position of the enterprise to be valued.
- High inflation rates.

VI. Training Needs in Accounting

One of the major obstacles to accounting reform is the lack of trained personnel. In the command economy the main function of accountants was recording of information; they were simply bookkeepers and were not involved in the decision-making process. The job did not require a high level of education; in the Former Soviet Union less than 20 percent of the three million accountants had university diplomas. In the new environment accountants not only have to understand the new rules of accounting, they have to understand the role of accounting in the new market economy, and to understand the market economy in general. Hence the whole approach to accounting education and training has to be changed.

At present there is no common body of knowledge adequate to the market economy that is required of those in or entering the accounting profession. A great effort is needed to

develop this minimum level of knowledge, because it must be accomplished through the joint approach of academicians, practitioners, and government officials. To achieve efficient results the following measures are necessary:

- The development of new accounting curricula for universities on the national level and for training institutions.
- The coordination of accounting education with the requirements of professional standards of accounting.
- The adoption of a comprehensive approach in education and training that would:
 - a) Require the development of new types of teaching materials not before used in Russia, such as case studies and computer-based courses using a Russian setting; and the creation of an information technology infrastructure.
 - b) Involve students, faculty, practitioners at all levels, and government officials.
 - c) Maintain a balance between immediate needs and long-term strategy.
- Providing an interchange whereby government officials would understand and accept the recommendations of academia, dictated by practical needs for the role of accounting in the new market economy.

VIII. Steps Being Taken by Some Russian Enterprises To Convert to Market Accounting Standards

A. Mashinostroenie

The Mashinostroenie accounting department has 40 employees. It consists of a division for production costs, a division for materials accounting, a division for payroll, and a division for settlement (taxes, payables and receivables, and other settlements). The head of the accounting department reports to the general director or to the first deputy director. The main function of the accounting department is bookkeeping for the enterprise's transactions, assets, and liabilities. The accounting department also performs some analysis of the enterprise's economic performance. It submits quarterly or sometimes monthly reports to a special enterprise commission. The reports include a balance sheet, income statement, distribution of profits, and statement on the flow of funds. These results are compared with the planned figures in order to analyze deviations from the plan. The accounting department also analyzes production costs of the projects but normally within one month after the period reported on.

In addition to the accounting department, the finance department was created recently. It has 80 employees and consists of a pricing division, business plans division, general planning division, finance division, contracts division (for internal and external contracts), and feasibility study division. The major purpose of creating this department was to centralize all economic issues. The finance division has eight employees and its main function is to settle relations with banks, debtors, and creditors.

Management has identified the following problems in accounting and finance:

- The cost management system must be restructured to enable heads of divisions (projects) to obtain timely information on their production costs in order to make relevant decisions. At present this issue is becoming more and more acute. Mashinostroenie now has about 50 project managers, all of whom need to have meaningful figures on their expenses.
- The existing system of allocation of enterprise overheads must be changed so that it does not distort the real picture of division performance; a distinction must be made between fixed costs and variable costs for analysis of the enterprise's activities.
- The accounting system needs to be computerized utilizing the most recent and reliable accounting software in order to achieve timeliness and accuracy of managerial information. At present considerable effort is spent just to obtain basic figures for decision-making, while managers need to receive information at least weekly on their activities.
- A system for monitoring cash flow must be developed (the cash flow concept did not exist in the Soviet Union).
- An administrative office concept must be developed to analyze general overheads and to produce an overall analysis of enterprise performance.
- A concept of strategic management must be developed.
- Account and finance personnel must be trained:
 - a) Mashinostroenie managers said training was particularly important in payroll accounting, cost accounting, materials accounting, and overhead accounting. A minority of the Mashinostroenie accounting staff have university diplomas. The chief accountant should be one of the first to be trained, and this should be done as soon as possible.
 - b) For finance training, managers identified such general fields as pricing, contracts, planning, and management structure. For finance specifically they pointed to relations with banks, securities transactions, pension and insurance issues, and risk management. Managers would like to retrain at least ten employees as soon as possible.

B. TsAGI

The TsAGI accounting department has 60 employees, but the chief accountant has admitted that she can only rely upon ten qualified individuals. The accounting department consists of general settlements (with banks, debtors, and creditors), cost accounting, materials accounting, payroll, taxes, and hard currency transactions divisions. It used to have a finance division, but this was recently reorganized as a separate department.

Besides bookkeeping, the accounting department carries out analyses of the economic activities of the enterprise in general. Analysis of the performance of individual divisions is conducted by the planning department. The accounting department submits quarterly reports to the general director that include information on bank loans, itemized costs, output, and income and its distribution.

During the last year TsAGI was implementing the following changes:

- a) Beginning with last year TsAGI has adopted a new accounting policy in accordance with the new accounting regulations, and has implemented a new Chart of Accounts.
- b) The enterprise began to put its social assets on separate balance sheets, which means that preschools, polyclinics, etc. become separate accounting entities.
- c) TsAGI started and continues to work on the computerization of its accounting. At present the enterprise has computerized funds transactions, cost accounting, taxes, fixed assets

accounting, and payroll. Programs are being developed by enterprise specialists. The enterprise has four computers in the accounting department, but these computers are obsolete. There are also ten computers in the accounting department of the enterprise's computer center, and special equipment has been purchased to network the computers of the accounting department with those of the computer center. Installation of this equipment was scheduled to take place in the summer of 1994.

The accounting department has identified the following main problems:

- Problems with maintaining social assets. At present TsAGI has to finance its social assets from its net income. The enterprise would like to have some budget financing for these assets, since municipal authorities are not in favor of taking care of them.
- Problems with receivables and payables. TsAGI tries to sell its production on a prepayment basis, but since a significant fraction of its orders are state orders it cannot enforce this principle for all contracts.
- Difficulties with allocation of the overheads. With inflation this task has become even more complicated than it was before, but the small number of qualified accounting personnel is not adequate to deal with this situation.
- The accounting department has difficulty producing reports for division managers to enable them to monitor their costs and profits. The department is under increasing pressure from division managers, who insist on receiving some reliable information for decision-making. Recently the accounting department had to spend two full days trying to extract accounting information related to one particular division at the request of its head.
- The need to retrain personnel is acute, but financing is very limited. Not many employees have university diplomas. At present TsAGI is using the following options to train accounting personnel:
 - a) The establishment of a training department within TsAGI. Recently the entire accounting department participated in a training course taught by university professors on dealing with changes in accounting regulations.
 - b) A local company, Aviaaudit, offers a monthly training course for the top managers.
 - c) All department heads go through special training courses in a training center in Tomilino. And, the chief accountant recently participated in auditing courses at Moscow State University.

The finance department was recently created in recognition of the increasing importance of finance transactions. It has 17 employees and consists of sectors for transactions with banks, settlements with debtors and creditors, securities transactions and transactions with hard currency, and cash transactions. All finance department employees are university graduates or about to graduate from universities. These 17 employees were chosen out of about 50 applicants during a tryout period. Most of them, including the head of the finance department, worked previously in the enterprise's planning department.

At present the finance department is working to computerize its activities. So far the department has computerized transactions with banks, transactions with debtors and creditors, advances and other settlements with employees, and taxes. But this work is not yet finished. Programs are developed by enterprise specialists. But financing is very limited while the scale of the work is large and rather sophisticated. For example, TsAGI now has relations with 10 banks, and has several hard currency accounts, shares in small businesses and subsidiaries, and other financial investments. All of this is very different from its previous

experience. Another problem with computerization is that in previous years TsAGI created a computerized skeleton of activities that is now no longer suitable.

The finance department also has pressing training needs. In addition to the training options mentioned above, the finance department uses the Link Open University to train its staff. TsAGI leased some space to Link, and instead of rent payments Link conducts employee training free of charge. At present one person, the head of the finance department, has graduated from the financial management course, and three more are nearing graduation.

The head of the finance department also realizes the need to train accounting department staff: the finance and accounting departments are interrelated, but sometimes simple transactions cannot be forwarded because they are not understood by the accounting department. On the other hand it is very difficult for managers to find opportunities to study financial management, especially financial management as it pertains to Russian problems. This is the main drawback of the Link course: it deals only with Western practices.

C. Saratov Aviation Plant (SAP)

SAP's accounting department falls under the department for economics and finance. It has a separate financial manager responsible for the internal stock accounting system, the internal trading market, and the operation of the SAP pension fund. The SAP trading department conducts internal stock trades and maintains the shareholders' database. Because of changes in the law, these functions might be taken over by a new SAP-founded bank or financial investment company.

SAP is beginning the process of decentralizing its financial operations. Functional directors have increasing authority to manage their own budgetary funds. SAP is also in the process of creating and registering an internal bank that will be able to give out credits and budgets. This will allow the creation and management of separate profit centers for each production line. If SAP gives money to less productive divisions, these divisions will be expected to increase their production and pay back the money.

SAP is also introducing a computer system of financial management to complement its existing system of production control. Already, more than 160 modern computers are partially linked in a local area network supporting the mechanical preparation of the production plant, and SAP plans to create a family of fully integrated local area networks to handle all aspects of design, production, financial planning and monitoring, payroll, stock management and internal market operations, and personnel administration. Each separate branch now has its own computer system for accounting and expenses, but SAP plans to combine them. New standard procedures are also being developed to provide consistent rules for accounting for orders received, some of which may be independent from main factory sales. Once this system is implemented, production shops will be allowed to make their own sales if they do not interfere with aircraft production. These shops will not be required to enter all of the financial details of these sales into the centralized accounting system, but they will have to enter the profits received from those orders.

Problems at SAP include:

- Continuing to decentralize profit centers.
- Developing the computerized accounting and financial system.
- Assessing intangible values such as good will, market position, and technological capital.
- Training personnel.

D. Impuls

Impuls has restructured its accounting function and now has a deputy director in charge of economics, under whom is the accounting department headed by the chief accountant. Besides an accounting division, the accounting department also has a division of finance.

The main problems that Impuls is trying to address are:

- Allocating and controlling overhead costs.
- Providing timely accounting information.
- The lack of computerized accounting (in terms of both qualified personnel and equipment).
- The difficulties of allocating expenses for facilities to cost and profit centers.
- Transfer pricing for interdivisional work.
- Personnel training.

E. Moscow Center for SPARC Technology

There is only one person in charge of accounting and finance at the Moscow Center for SPARC Technology (MCST). MCST's main problems are related to the allocation of overhead costs between the parent institute and MCST and huge payroll taxes for employees (now amounting to about 40 percent of the employer's salary fund). The Center also has trouble monitoring its offshore account from Moscow.

The chief accountant acknowledges his need for more education in accounting and finance and is exploring enrollment in training courses at Moscow State University.

IX. Conclusions

The changes in accounting standards and implementation systems required for enterprises to function in a market economy are extensive. If the enterprises are to do business internationally, the changes are both conceptual in the manner of treating many items and generational. In addition there is a serious need to train and accredit personnel and to computerize operations. Accounting data must be provided in a timely way and be suitable for use as a management planning and control tool as well as a mere record of facts.

The enterprises interviewed clearly recognize the need for making the transformation, for computerizing, and for training, but it is not clear that they fully appreciate the value of the results attainable. Such an appreciation can only be complete when managers have dealt with good accounting data over a period of time. Such experience will also be an integral part of their management training.

In addition, the investment in time, money, and training to make the changeover is extensive. It is not enough to change the system and retrain the accountants—it is necessary as well to train the consumers of the accounting reports, at least those within the enterprise.

These enterprises have managed to do international business without a Western accounting system. In most cases the Western partner has made the accommodation. This may be a satisfactory interim step for the scale of international business that the enterprises are currently conducting; however, many Western companies will very likely be reluctant to make very large investments without intelligible accounting records.

Appendix

Financial reports

Balance Sheet format of Russian enterprises

Assets

1. Fixed assets and other non-current assets

- Intangible assets (initial value less accumulated amortization)
- Fixed assets (initial value less accumulated depreciation)
- Equipment for installation
- Construction in progress
- Long-term financial investments
- Settlements with co-founders
- Other non-current assets

2. Inventories

- Raw materials and other inventories
- Livestock
- Low value fixed assets (initial value less accumulated depreciation)
- Semi-finished goods
- Prepaid expenses
- Finished products
- Goods for resale
- Value Added Tax (VAT) for purchased inventories
- Other inventories

3. Receivables, cash and other current assets

- Accounts receivable
- Notes receivable
- Settlements with subsidiaries
- Settlements of budgetary payments
- Other settlements with workers and employees
- Other receivables
- Advances to suppliers and customers
- Short-term financial investments
- Cash:
 - on hand
 - in the bank
 - hard currency in the bank
 - other monetary items
- Other current assets

Liabilities

1. Capital and Reserves (Equity)

- Statutory capital
- Additional capital
- Reserve capital
- Accumulation Fund
- Direct budget financing
- Lease liabilities
- Retained earnings from previous years
- Profit for the financial year

2. Liabilities

- Long-term bank loans
- Other long-term loans
- Short-term bank loans
- Other short-term loans
- Bank loans to employees through the enterprise
- Accounts payable
- Notes payable
- Wages and salaries payable
- Social insurance payable
- Settlements with subsidiaries
- Property and personal insurance payable
- Settlements of non-budgetary payments
- Settlements of budgetary payments
- Advances from customers
- Deferred income
- Settlements with co-founders
- Consumption Fund
- Provisions for future expenses and payments
- Provision for bad debts
- Other liabilities

a) Non-current assets

Non-current assets include intangible assets, fixed assets, long-term financial investments, long-term construction in progress, and some other items. Intangible assets include different rights of the enterprise such as copyrights, rights to use land and other natural resources, know-how, etc. Goodwill has not yet been recognized in Russian accounting. Intangible assets are to be shown at their initial costs and allowed to be amortized on the straight-line basis in 10 years.

Fixed assets include buildings, equipment and machinery, transportation equipment, and other tangible assets to be used longer than one year. Unlike U.S. companies, Russian enterprises do not include land as a fixed asset (it is not considered to be an asset of the enterprise); however, an enterprise's social assets (housing, schools, hospitals, etc. that belong to the enterprise) are considered fixed assets. Fixed assets normally are to be

depreciated on the straight-line basis, but in some cases accelerated depreciation can be used. For the straight-line basis depreciation rates set by the government are to be used. Accelerated depreciation can be used in very limited cases for limited items of the active part of fixed assets (machinery and equipment), such as fixed assets for computer production, for production of technologically new types of materials and equipment, and for export expansion in cases when enterprises engage in mass replacement of old fixed assets for new ones. For the purpose of accelerated depreciation, the straight-line depreciation rate shall be increased but not more than two times. In addition to this small businesses can write off 50 percent of fixed assets in the first year of their useful life if this useful life does not exceed three years.

Due to the high inflation rate at present, the balance sheets of Russian enterprises must show the replacement value of fixed assets and the revaluated value of the accumulated depreciation. Differences are reported accordingly as Additional Capital and Special Fund on the liabilities side of the balance sheet. If the revaluated value of the fixed assets is higher than their market value, enterprises are allowed to report fixed assets at their market value and to show the difference between the market value and the value before revaluation in the Additional Capital Account or Special Fund Account.

Long-term financial investments are investments in the securities of other enterprises. They are reported at the actual costs, but can be shown at the market value if it is lower than actual costs and if these securities are regularly quoted at stock exchanges and if their market value is regularly published.

Item Settlements with the co-founders shows the debit balance of the settlements with the co-founders account. This account is used for such transactions as contributions of co-founders to the statutory capital and dividends to be paid to co-founders (except employees). Credit and debit balances of the Account show respectively in the liability and asset sides of the balance sheet.

b) Inventories

The inventories section includes raw materials, semi-finished products, finished goods, prepaid expenses, and low value fixed assets. It also includes VAT for purchased inventories that is to be subtracted for calculation of the VAT for the goods produced by the enterprise. Raw materials, semi-finished products, and finished goods are to be reported at the average costs. Low value fixed assets (fixed assets accounting for less than 100,000 rubles) are shown at their initial costs less accumulated depreciation.

c) Cash, receivables, and other assets

This section includes different receivables, advances, short-term securities, and cash.

Accounts receivable are to be reported at their amount outstanding less bad debts actually revealed during inventory-taking at the end of the reporting year. Short-term securities, just as long-term securities, are to be reported at the lower cost or market value.

Cash includes cash in banks and on hand, hard currency accounts, and other cash. At present Russian enterprises are allowed to have cash accounts in one bank only. Hard currency amounts are to be reported in local currency according to the exchange rate of the Russian Central Bank at the balance sheet date. Other Cash includes such items as cash in transit. This is very important for an analysis of the financial position of any enterprise, since at present in Russia it might take a long period of time to transfer money from one party to another.

The liabilities side of the balance sheet includes equity and liabilities.

d) Equity

The equity section consists of Statutory Capital, Additional Capital, Reserve Capital, Accumulation Fund, Special Purpose Financing Fund, Lease Liabilities, Retained Earnings, and some other items.

Statutory capital is a monetary measurement of partners' (owners') contributions to the enterprise. The additional capital account shows results of the revaluation of fixed assets (except social assets, for which such results are shown in the Special Funds Account). Reserve capital is a contingent reserve for unpredicted losses, and it also includes capital in excess of par value. The Accumulation Fund is part of an item called Special Funds and is used for production investments of the enterprise.

The Special Purpose Financing Fund shows financing received by the enterprise from the government or other enterprises for special purposes. It also includes balances of the Privatization Fund Account and settlements for the Shares Account. The balance of the Privatization Fund Account shows amounts that are included in the Privatization Account in accordance with the legislation on privatization, such as amounts excluded from the Statutory Capital for the purpose of privatization (such as the net value of social assets); 50 percent of the retained earnings of the reporting year that has not been allocated to Special Funds; and 10 percent of revenues from sales of the shares of the enterprise to the Property Fund (Fond Imushestva). This money is to be allocated to the personal accounts of employees of the enterprise. It is not taxable and can be used only for purchasing shares of other enterprises to be privatized. Settlements for the Shares Account show liability of the enterprise to the Property Fund for the shares for which employees have subscribed.

Lease liability shows liability of the lessee to a lessor for a rental charge in case of a capital lease, which in Russia is a long-term lease agreement for the fixed assets when lessor transfers ownership of the property to the lessee at the end of the lease term.

Retained earnings is income left after taxes, dividends, and transfers to Special Funds. Thus it does not coincide with what is called retained earnings in the West, which is accumulated earnings of a company since inception less dividends. In Russian balance sheets, retained earnings has been split into two items: retained earnings of the previous years and income of the current year (which is income before taxes).

e) Liabilities

The liabilities section includes long-term loans, short-term loans, payables, advances received, prepaid revenues, the Consumption Fund, the Reserve for Future Expenses, the Bad Debt Reserve, and other short-term liabilities.

Long-term loans are loans received for any period longer than one year. Long-term bank loans are to be shown separately from loans received from other parties. If loans from other parties have been received through a bond issue, the premium is to be reported in the Prepaid Revenues Account and eventually should be amortized on the straight-line basis.

Short-term loans are loans for any period of less than one year; short-term bank loans also shall be shown separately from other loans. Item Bank loans shows loans issued by banks through the enterprise bank account to employees for housing construction, dacha construction, etc.

Payables include trade payables and such accrued liabilities as salaries, social insurance, personal and property insurance, taxes payable, liabilities to subsidiaries, and other payables. The major difference here is that there is no distinction in Russia between accounting income and taxable income, and thus there is no deferred tax item in Russian reports.

Liability to co-founders shows the credit balance of the account Settlements with the co-founders and reflects liability of the enterprise to the co-founders in terms of dividends payable, etc.

Prepaid Item Revenues shows revenues registered in the current year but related to future periods. Also this shows future payments for shortages of past periods that were discovered in the current period.

The Consumption Fund is money allocated (reserved) for social development (except capital non-production investments) of the enterprise and for employee bonuses.

The Reserve for Future Expenses is a reserve for even allocation of some expenses between different accounting periods. The following amounts can be registered in this account: salaries for employee vacations, annual bonuses, future expenses for repair of fixed assets, etc. Rules of reservation of such amounts are regulated by special government instructions.

The Bad Debt Reserve Account shows the amount of bad debt. Bad debts are receivables that are not paid in a timely way and for which there are no evidence or guarantees that they are going to be paid. The results of an annual inventory of receivables create the basis of this reserve. The amount of reserve should be determined separately for each debtor based on the financial position of the debtor and the probability of the debt's repayment. If by the end of the following year the bad debt reserve is not spent for appropriate purposes, this amount shall be added to the profits of the following year.

Income Statement

1. Sales
2. VAT
3. Excises
4. Costs of sales
5. Results from sales
6. Results of other sales
7. Results of transactions other than sales
8. Total profits and losses
9. Total balance sheet income

a) Sales

At present enterprises in Russia can choose the method of revenue recognition. Sales can be evaluated on either an accrual basis (at the time when the transaction occurs regardless of the period when cash is actually paid) or a cash basis (at the time when cash is paid). After deduction of VAT and excise taxes, the enterprise arrives at a net sales figure.

b) Costs of sales

In the West cost of sales is an important figure to control costs in order to be able to cover these costs by revenues from sales at prices acceptable to the competitive market. Costs of sales include direct materials, direct labor, and factory overhead. Other costs are considered to be period costs, expensed in the period in which they occur and covered by gross profit from sales, which is the difference between sales and costs of sales. Period costs include operating expenses (general and administration, selling expenses) and non-operating expenses (all other expenses of the enterprise).

In a command economy, the main concern was the quantity of product output and the fulfillment of a plan. Almost all costs of an enterprise were (and are) included in production costs, rather than just direct materials, direct labor, and factory overhead as in the West. In Russia non-production operating expenses, which in the United States would be expensed as general overhead, were also accumulated and apportioned to the cost of production. A product's price was set by state authorities based on these costs plus some planned level of profit, also determined by the state.

In Russia such definitions as non-operating expenses or period costs do not exist at all. Therefore, part of costs which in the West will be written off immediately as they are related to goods sold will in Russia be proportionately carried forward in the value of unsold products, which also will result in overvaluation of inventories.

In Russia costs of sales include:

- Direct labor costs (within a certain limit tied to the minimum level of salary set by the state).
- Direct material costs.
- Factory overhead.
- General and administrative expenses.
- Selling expenses.
- Interest expenses (within the interest rate of the Central Bank, interest rates over this level are to be paid out of the net income of the current year).
- Audit fees.
- Some other expenses of the period.

On the other hand, some of the items that in the West would normally be included either in production costs or in period costs are covered in Russia by the net income of the enterprise. These include some payments from the Consumption Fund, which is created out of after-tax profit, such as employee bonuses, social and cultural amenities, and other employee benefits. This leads to at least two important consequences:

- a) Employee benefits to production staff causes an understatement of production costs.
- b) Social benefits are not tax-deductible and therefore in a market economy there will be little material incentive for the enterprise to provide them.

Other examples of costs that in the United States are included in production or period costs but in Russia are covered by net income after taxes are the interest rate above the rate of the Central Bank, and labor costs and business trip expenses above certain limits set by the state.

Thus there is no information to calculate gross profit from sales. The first intermediate profit indicator shown in the Income Statement is operating income (sales less VAT, excises, and costs of sales).

The next items in the Income Statement of Russian enterprises are results from other sales and results of transactions other than sales. Results from other sales are mainly gains and losses from the disposal of assets. Results of transactions other than sales are losses on canceled production orders and contracts, losses and gains from revaluation of inventories, dividends and interest received, rent received, penalties paid and received, profits and losses of the previous years revealed in the current period, gains and losses on currency transactions, expenses for legal proceedings, losses from theft, bad debt reserves, and losses from bad debts.

The total of the operating profit, results of other sales, and results of transactions other than sales gives the so-called balance sheet income, which is income before taxes that is shown in the balance sheet.

For tax purposes income before taxes shall be adjusted for:

- Dividends and interest received from other companies.
- The enterprise's share, if any, of income of other companies.
- Income from gambling business if any.
- Income from intermediary activities.

The reason for such adjustments is that there are special tax rates to tax these activities.

Also, taxable income should be decreased by payments to the Reserve Fund of the enterprise and increased by salaries above the stated limit. Then it should be reduced by special items in accordance with the tax regulations, such as investments for reconstruction and renovation of fixed assets, investments for environmental protection, expenditures for social assets, and donations. All of this information is shown in section 2 of the Income Statement and in the Notes to the Income Statement.

Section 2 supplies information on payments to the budget, to the Reserve Fund, to the Accumulation Fund and to the Consumption Fund for the reporting period.

Notes to the Income Statement show payments to the budget (different types of taxes paid by the enterprise) and provide a breakdown of the enterprise's tax benefits of the year.

The annual report also contains several footnotes that give more detailed information on items included in the balance sheet. These footnotes are:

- Flow of Funds (Reserve Fund, retained earnings of previous years, Accumulation Fund, Consumption Fund, Special Purpose Budget Financing).
- Loans.
- Payables and Receivables.
- Intangible assets.
- Fixed assets.
- Financial investments.
- Social indicators (Payments to the Social Insurance Fund, Pension Fund, Employment Fund, Consumption Fund, and Salaries Fund; Bonuses; Dividends Paid).
- Foreign currency bank accounts.

X. Reorganization of Social Services

Tova Perlmutter

I. Introduction

One critical element in the transition of a society from a socialist economy to a market economy is the reorganization of social welfare programs and facilities. In the Soviet Union, such services were entirely under public ownership. Some were administered, wholly or partially, by state agencies, such as the Ministry of Social Protection, while some were organized as benefits for workers and their dependents through the workplace. As a World Bank report put it, "Russia has inherited a system of social benefits in which the enterprises, Government, legislature, and local governments all have overlapping and ambiguous responsibilities."¹ The process of transforming a socialist economy into a market economy involves choices at the level of government policy, the enterprise level, and the micro-level of families and individuals. These choices will determine how much of the social sphere will remain in public control, how much will remain linked to the workplace, and how much will move into the private sector, which includes both for-profit and nonprofit organizations.

This chapter will touch on the broader policy issues of social welfare, as well as the choices that face individuals playing by the new rules, but it addresses the social sphere primarily from the point of view of enterprises. Social welfare facilities for their employees were once the pride and joy of many industrial managers, demonstrating both their concern for "their" people and their ability to obtain resources from the central government. As state funds shrink drastically, these same directors are reexamining how much, if any, of their funds they will devote to such programs.

Most of the information presented here was collected in interviews with senior management of several Russian enterprises, which are or were involved with defense production. In addition to the enterprises described in this report's case studies, substantial data was

obtained from three others: the Start design bureau, a medium-sized research and production enterprise in the city of Ekaterinburg; the Russian Federal Nuclear Center at Arzamas-16, an enterprise that formerly employed and managed this entire closed city in the Nizhny Novgorod region; and the Russian Federal Nuclear Center at Chelyabinsk-70, which also ran a closed city in the Chelyabinsk region in the Urals. For several of the enterprises, our sources were deputy directors specifically charged with managing the social sphere; for each other enterprise, we spoke with either the general director, a deputy general director, or both.²

There are a variety of different facilities owned by enterprises that can be considered social assets. Most broadly, the term includes any programs or activities that are not specifically necessary for the production of an enterprise. The facilities discussed in this paper include all those referred to in Russian as “sots-kul’-byt”; this term is an acronym from the words sotsial’noe (social), kul’turnoe (cultural) and bytovoe (a word difficult to translate that connotes everyday, neighborhood consumer services such as laundries or hairdressers). Usually, such departments provide services for workers, such as child care, health care, or access to leisure or recreation facilities, but they may also be responsible for obtaining food, clothing, or other consumer goods and selling them to employees at reduced prices. Other activities often organized under the same administrative structure include housing; capital construction, repairs, and daily maintenance of all buildings, whether or not they are production-related; maintenance of the local utility networks and even of roads; and delivery and management of supplies and shipments for the enterprise. Many industrial enterprises even own farms that produce and sell food.

All these types of facilities were established to serve enterprises or their employees and pensioners, but local residents not employed by a given enterprise may use some or all of its social facilities. Depending on the size, type, and location of an enterprise, it may have owned or administered none, some, or all of these types of facilities under the Soviet system.

There is evidence that suggests that enterprise-owned social facilities may have been concentrated disproportionately in areas dominated by defense enterprises, or in one-company towns. (Cities like Chelyabinsk-70 and Arzamas-16 would fit both these categories.) In other words, defense enterprises may have invested more heavily than other enterprises in social facilities, and may therefore now be suffering under the financial burden of social assets more than other enterprises.

A World Bank report found differences among regions, with enterprise-run housing highest in areas with high concentrations of heavy industry and defense.³ The report also explains that for “smaller enterprises with less local labor market dominance, ...enterprise-provided social benefits may be much less important than those provided by the state,” but “where an enterprise acted as a locally dominant employer, it would often fulfill the service functions that would otherwise be performed by a subnational authority.”⁴

Furthermore, Clifford Gaddy of the Brookings Institution has identified some evidence that is interesting in this context. In a statistical analysis of defense industrial regions as compared to other regions, Gaddy demonstrates a positive correlation between enterprise profits and wages for Russia as a whole, but finds that this correlation

does not hold for defense regions....[T]he defense areas were no worse off than others in terms of profits in the first half of 1992. Yet they clearly fell behind the others in wage growth. This suggests that the defense enterprises may have been using their profits differently from other enterprises. Specifically, these enterprises may not have

placed as high a priority on using revenues to pay wages....In other words, employee benefits took the form of more non-cash benefits.⁵

Gaddy suggests that the differing priorities of defense enterprises may persist: "It may well be that they are continuing even now to reward workers more with in-kind (non-monetary) benefits than with cash salaries....The conclusion from the data seems then to be that in the trade-off between using profits for higher wages or for social expenditures, the defense areas chose the latter."⁶ Defense enterprises, and those that dominate local employment, seem to spend more on social services.

In the current transition period, for both defense and civilian enterprises, there are many factors that determine managers' decisions on what to do with social assets. Managers must now assess every activity paid for out of enterprise revenues in terms of several questions: whether it is necessary for daily operations of the enterprise, or for worker welfare or morale, whether it could conceivably make a profit or at least support itself, whether the local authorities are able or willing to take on the burden, and other questions. Given all the relevant issues, it is essentially impossible for the director of even one enterprise to devise a blanket policy for all the social assets of that enterprise; thus, it would be entirely unrealistic to attempt to propose a universal solution for all enterprises. This chapter will therefore not recommend one particular course of action in regard to enterprises' social assets. Instead, what is offered here is an outline of some of the issues in the Russian context that determine directors' choices and influence their reasoning, with examples from specific cases and discussion of the advantages and disadvantages of certain choices.

The next section of this chapter describes government policies and regulations on the social sphere, which determine some limits on enterprises' choices. Section III then breaks social assets down into five major categories, and the policies of managers we interviewed are summarized with reference to each of these categories. Section IV asks why many enterprises want to retain social facilities; after some cultural and psychological reasons are suggested, the economic bottom line rationale is assessed. The question of whether the policies of the enterprises studied for this chapter are likely to reflect other enterprises' choices, or are appropriate only to these enterprises in particular, is discussed in Section V, which is followed by a conclusion.

II. The Government Environment

Any enterprise manager struggling to cope with the social assets on the enterprise's balance sheet is subject to various laws and regulations regarding these facilities. At the federal level, the Russian government has established legal guidelines and some mandates, and local governments have taken action both to implement national policy and to create their own.

The first relevant presidential decree, signed by Yeltsin on January 10, 1993, is "On the utilization of the social-cultural and communal facilities designated to privatized enterprises."⁷ This decree addresses the disposition of social assets owned by state enterprises during the enterprises' privatization, although it also recommends to local authorities that the same guidelines govern the privatization of enterprises that belong to the region or the municipality. The January 10 decree entitles a privatizing enterprise to keep social assets on its balance sheet, if the workers' collective of the enterprise chooses to do so.⁸ A list of exceptions that may not be retained is also included in the decree, one of the most important

of which is housing stock.⁹ The social facilities retained as enterprise assets are required to continue the same principal activities. Social facilities that are permitted to privatize at all may privatize separately if the workers' collective does not choose to keep them. Social assets the enterprise does not keep (the most important usually being housing stock) are transferred to municipal ownership if they do not privatize separately. Enterprises and local authorities are expected to negotiate and come to agreements about how facilities are to be funded and what rights of access and use enterprise employees will retain. In case of extreme disagreements, there is also a provision for arbitration by a committee appointed by the GKI (Goskomimushchestvo, or committee to manage state property).

Yeltsin's decree was followed by a regulation (rasporyazhenie) issued January 17, 1993 by the GKI, "On the process of regularizing the delimitation of property rights to social-cultural and communal facilities of privatizing enterprises."¹⁰ This regulation required municipal property committees to put together lists of social assets for transfer into municipal ownership and to develop a transfer procedure. Again, the regulation specified that health care facilities, infrastructure (including electricity, heat, water, and gas networks), and housing stock, as well as maintenance personnel for these facilities, were to be transferred to municipal ownership/management. It provided that these lists and procedures be approved by the local soviet, and that agreements for joint use and financing of these facilities be negotiated by the municipal property committees and the enterprises that formerly owned the social assets.¹¹ Furthermore, the regulation suggested that municipal property committees consider the introduction of local taxes on enterprises and organizations, in order to finance the "sots-kul'-byt" facilities in proportion to the number of employees in each local enterprise.

The central government has issued other regulations on specific sectors of the social sphere, such as housing or medical care, but the only other federal policy regarding social assets in general that we will discuss at this point is the enterprise tax policy. Enterprises pay several taxes earmarked for social needs of the population, including payments to the social insurance fund, the state pension fund, the unemployment fund, and for medical insurance. Beyond these special payments, they also pay large corporate profit taxes, and must also support their social programs out of their own revenues, while they are given minimal or no special state subsidies to pay for these services. There are, however, various provisions for tax deductibility of social expenditures.¹² These may add up to significant savings; one manager reported that his enterprise was able to deduct the legal maximum of half the corporate profit tax.

Managers interviewed for this report complained that although their enterprises make the required payments, the state still does not provide the services these national systems are supposed to. Although they are required to buy medical insurance, in order actually to ensure health care for workers, enterprises must either maintain their own medical services or pay for care privately. Although they make required contributions to the federal pension and social insurance funds, many enterprises feel obligated to give extra money to their retirees and to new mothers. And although they pay into the fund intended to support the unemployed, fears of social unrest, among other reasons, constrain firms from reducing costs by laying off workers. The social safety net that is supposed to be administered by the central government is perceived as a failure by enterprises, which still feel obligated to pick up the slack.

It is true that the central government will reimburse enterprises for legally mandated birth, death, and maternity benefits, but the reimbursement is for precisely the amount

established by law, even if an enterprise voluntarily increases the payment. As mentioned above, enterprises can also deduct some expenditures on the social sphere, but that helps only enterprises with significant profits. If an enterprise is running in the red, managers often continue to feel a responsibility to maintain social services, but a reduction in profit taxes will not help such enterprises.

Some enterprises may be receiving funds from the government to cover social sphere expenditures, but judging by those we interviewed, such assistance is minimal. At Start in Ekaterinburg, for example, the enterprise submitted an itemized budget to the district executive committee (raispolkom) in 1993 requesting 300 million rubles to fund specific social welfare programs at a minimum level. Under the old system, Start was given whatever amount the enterprise requested to cover management, maintenance, and services of *sotkul-byt*, including housing. In 1993, the enterprise received two million rubles designated for repairs on its pioneer camp, seven million to repair a particular building, and eight million to pay for architectural plans for new single-family homes whose construction is planned (see below). Thus, the authorities granted Start a total of 17 million out of 300 million requested, while the enterprise's deputy director in charge of the social sphere estimated that it would have taken 600 million rubles to cover the social programs at the level he considers appropriate (i.e., at a level comparable to expenditures before reforms began).

Aside from central government policy, the enterprises' environment is also shaped by the policy of the oblast or local government. Subnational governments are authorized to institute local taxes, and are encouraged to do so to fund social services in particular by the GKI regulation of January 1993 cited above. We have sketchy data on such local taxes, but know that a few cities at least have tried to use them to fund social services. Starting in 1993, all enterprises in Ekaterinburg that did not own housing were required to pay a tax of 1.5 percent of their production expenditures. The tax is designated to support infrastructure that the city has taken over, but according to Vladimir Ilyich Vaulin, chair of the Sverdlovsk oblast GKI in Ekaterinburg, the revenue is far from sufficient. The city of Kachkanar has levied a tax of nine percent of profits, and the city of Kushva has tried to collect 24 percent of profits, the sums officials calculated were necessary to cover infrastructure costs.¹³ Given that some managers have claimed their total tax bills are as high as 82 percent of profits without these local infrastructure charges, many enterprises may not be able to survive when the charges are added to the tax obligation.

III. Social Sphere Policy Choices of the Enterprises in This Study

For the purposes of this analysis, we will discuss five categories of social facilities: a) kindergartens and other child care, b) housing, c) medical services, d) agricultural programs, and e) sports, leisure, and cultural facilities.¹⁴ More details follow below, but a general summary of social services at the enterprises we studied indicates that most have transferred existing housing to the local authorities but are moving ahead with construction of new housing; they vary in the degree to which they are still funding kindergartens and health care; they are maintaining agricultural programs; and they are attempting to keep sports and cultural facilities and in many cases to turn them into sources of profit for the enterprise.

Although several reports have said that municipalities are resisting taking on social assets, the enterprises discussed here have generally been creative and fairly successful in

coming to terms with the local authorities. In Chelyabinsk, the municipality wanted to receive either all or none of the institute's social assets, but institute managers managed to transfer only some of the programs. Impuls has negotiated to sign over property, buildings, and maintenance responsibilities, while also retaining special access to the facilities for the enterprise's employees. Start also has stipulated that workers not lose the right to use certain facilities the enterprise no longer runs.

With the exception, in general, of housing (which has been prohibitively expensive to maintain), the leaders of these enterprises want to continue running most of their social facilities. They would like to maintain these programs because they feel responsible for the welfare of their employees, and they believe such social services will be essential to recruit highly qualified personnel in the future. Furthermore, many expect to be able to recoup some if not all of their expenditures, or possibly even make a profit, by contracting to provide these services for other enterprises or private customers.

This ambition to turn a financial burden into a self-supporting if not profitable division is present in particular at the larger enterprises we studied: Mashinostroenie, TsAGI, and SAP. Managers at all three of these firms intend to put social services into separate subsidiary companies, which they hope to make independent of financial support from the rest of the enterprise. Aside from the need simply to reduce overall costs, managers are also aware that Western investors will be more likely to look favorably on partners whose social expenditures do not fall into the general budget, to be covered by general revenues at the expense of more profitable divisions.

Whether or not self-supporting social services are realistic will be addressed further after a more specific discussion of enterprise strategies for each of the five categories.

a) kindergartens. A World Bank report observed that the earliest, "most widespread changes appear to be taking place with respect to the financing and provision of pre-schools."¹⁵ The enterprises we studied seem to bear this out, as all those that owned child care facilities have taken action to reduce such costs. Of the enterprises we studied, only MCST and ELVIS+, as new, private companies, had never owned child care facilities. Most of the rest—Impuls, Mashinostroenie, Start, Arzamas-16, and Chelyabinsk-70—had transferred the kindergartens they used to own to local authorities by the end of 1993. Both TsAGI and SAP could have turned their kindergartens over, but they have chosen to keep them, seeing them as important benefits to keep and attract qualified workers. Both these enterprises have consolidated and reduced the total number of kindergartens, however. Managers cite the lower birthrate as a reason for running fewer kindergartens, but as one interviewer surmised, it seems likely that "an increase in fees...is the proximate cause" for shrinking attendance and thus for the closure of these facilities.¹⁶

b) housing. As discussed above, the decree of January 10, 1993 by Yeltsin requires in principle that enterprises turn their housing stock over to the local authorities. In practice, however, local authorities whose budgets are already under great strain are often reluctant to take on this burden. Negotiations are necessary to determine how quickly municipalities will accept housing stock, and which enterprises' stock they will accept first.¹⁷ In general, the enterprises we studied that owned significant housing have been aggressive in moving to divest themselves of this expense, whether by pressing the local governments to allow them to transfer it soon, or in SAP's case, by initiating individual privatization of flats to tenants (the particular situation of SAP will be discussed further below).

Managers we interviewed said that maintenance on existing housing stock was by far the most expensive part of their social expenditures, while rents remain far too low to cover

these costs, and even those who expressed a desire to keep social services as complete as possible said that the enterprises had to be relieved of the apartment buildings soon in order to survive. This is particularly true because any given building is much more expensive for an enterprise to manage than for the local authority, since the state no longer subsidizes the enterprise for associated expenses such as energy, while the municipality does get subsidies.¹⁸

Several of the enterprises were able to establish agreements to give the local authorities the housing stock within a relatively short time. Impuls, for example, was able to transfer all its housing to the prefecture at once in the fall of 1993.¹⁹ Mashinostroenie, TsAGI, and Start had to negotiate with the authorities at greater length, but all devised plans that meet their needs. Mashinostroenie's leaders made a deal with the town authorities that they would turn over the housing stock and other social facilities in four stages in 1993. The enterprise would continue paying for the maintenance of the apartment buildings for three months after their transfer. This payment thus covered the lag time for the municipality to get an administrative structure set up and going, and to get the necessary funds from the oblast.

TsAGI, too, transferred 146 of its 163 apartment houses to the local authorities in 1993, after extensive negotiations. TsAGI managers claim that the city government wanted to take over the housing, and they managed to get an agreement that even after TsAGI is relieved of financial responsibility for the buildings, it will have the right to house its employees in any units that become vacant.

The deputy director for the social sphere at Start, Yuriy Titarenko, projected that the enterprise would have to spend 372 million rubles to maintain its housing in 1994. Expenditures at this level would not allow the enterprise to survive long. He negotiated with the city to accept one building in the center of Ekaterinburg by March 1994, and even managed to get the city to pay 17 million rubles to cover the enterprise's associated costs. Moreover, Titarenko worked out an agreement with the local authorities to transfer all of Start's housing in 1995. This would make Start the second enterprise in the entire area to divest of its housing; Start was the only one to set up an agreement in 1993.²⁰

Even while most of the enterprises studied are moving aggressively to transfer existing housing as quickly as possible, more than one enterprise has made what at first seems a counterintuitive decision to proceed with construction of new apartment buildings. Without knowing the regulatory environment, one might expect that an enterprise would want either to keep control of as much housing as possible or to free itself from all responsibility for housing. In fact, however, there is sound reasoning behind such a plan.

The bureaucratic procedure for obtaining land access and permission to build is already established for enterprises that had the right to build housing under the old system, whereas it involves long, complex, and expensive negotiations for private investors, when it is possible at all. At the same time, both residential and business space are at a premium throughout Russia, and are renting at extremely high prices when they are available privately. This means that an enterprise can demand large financial contributions from private investors in exchange for relatively little space in a jointly owned building, while the enterprise retains most of the space simply by contributing land permits, officially approved architectural plans, etc. The enterprise will still be responsible for maintenance on this new building, but by the time it is a significant expense, rent control laws may have eased. Furthermore, the enterprise can control who occupies the new space, while it cannot evict non-paying tenants in existing buildings.²¹

At TsAGI, for example, management has opted to turn dozens of apartment buildings over to the Zhukovsky town authorities, but at the same time the institute has been moving

ahead with its plans to build three new multistory apartment buildings. One was finished in early 1994, and the enterprise was able to cover the costs of building it by selling only five of the 97 apartments privately. The construction schedule for the remaining buildings calls for expenditure of approximately three billion rubles during 1994. Since prices for construction and materials are continually rising, TsAGI's deputy director in charge of the social sphere expects that many more flats will have to be sold to private investors in order to finance these buildings. So far approximately one-quarter of the apartments have been sold at market prices for the 16-story building currently under construction.

Similarly, Start's Titarenko negotiated a deal with the local authorities and an outside investor to continue with that enterprise's plans to build a subdivision of kottedzhi, or single-family houses. The raispolkom (district executive committee) gave eight million rubles in 1993 to pay for architectural plans for this development, and in exchange will own 10 percent of the houses to be built. Start itself will own 45 percent, and the remaining 45 percent will be owned by a neighboring enterprise, Bukhara-Ural, in exchange for paying 40 million rubles to fund the architectural plans.

Start has also laid the foundation for a nine-story building with 142 apartments, which is expected to cost about 1.5 billion rubles. (When Titarenko contracted to build this building, it was budgeted at 2.5 million rubles. This 600-fold increase in cost outpaces even the rapid general inflation over the past few years.) The enterprise found partners who will pay 100 percent of the costs of building in exchange for 30 percent of the space. Investors are willing to make such agreements because only Start has the necessary permits, land rights, and engineering/other networks for water, electricity, etc. Start also has architectural plans that have already been approved.

Mashinostroenie, too, has continued with its plans to build four new apartment houses for rental to employees, and General Director Efremov said that he hopes to build more. He intends to use them to recruit and keep top personnel, by offering them the chance to privatize a sizable apartment at the end of a long-term contract. Even MCST, a small company that has not owned housing in the past, is considering investing in housing for several employees. Particularly in Moscow, where MCST is located, investment in real estate may pay off if an enterprise can find the capital.

SAP is the one enterprise in this report that has not moved to transfer its existing housing stock to local authorities. SAP privatized very early, before the GKI program was devised, by a special decree in 1991 of then (Soviet) Prime Minister N. I. Ryzhkov. Under this decree, the enterprise's work collective purchased all the enterprise's assets from the state. Since SAP's privatization did not occur through the GKI program, the enterprise's managers do not consider it to be subject to GKI regulations; they consider the housing along with other social assets as already having been purchased with the rest of the enterprise. Neither federal nor local authorities have questioned the enterprise's claim to keep its housing stock.

SAP's privatization history explains how the enterprise has been able to retain control over the extensive housing it holds. It does not answer the question of why SAP managers have wanted to, however. They believe that local authorities would not provide adequate maintenance services for housing because they lack experience, and workers would continue to come to SAP management with complaints even if the municipality were formally responsible. Since managers feel obligated to keep workers content, the enterprise would have to continue being responsible for maintenance of housing assets, while no longer enjoying any control or potential income from these assets. SAP managers therefore see no advantage to the enterprise in wholesale transfer of housing to the municipality.

This does not mean that SAP is doing nothing to reduce the financial burden represented by ownership of extensive housing stock. The enterprise is working actively to privatize each apartment to the individual tenant who inhabits it, using a method parallel to cities' programs allowing residents of municipally owned apartments to become owners of their flats.²²

SAP has formed a separate joint-stock company, AO Zhil'e (Housing Joint-Stock Company), as a subsidiary of SAP to manage its housing stock. Vladimir Khropunov, the deputy director for the social sphere at SAP, is also head of AO Zhil'e. Individuals privatizing their apartments are required to enter into a maintenance contract with AO Zhil'e, which covers the costs of maintaining the common areas. Any repairs will be done by the maintenance department of SAP on a contractual basis. Khropunov hopes AO Zhil'e will eventually break even or generate profits. He does not expect maintenance to generate profits in the short run, but hopes that repairs and maintenance on privatized apartments will become a source of profit in time, with the fees gradually working their way up to market rates as economic conditions improve.

The more immediate source of profit for AO Zhil'e is from market-level rents paid by tenants in the commercial space on the ground floor of many of the buildings. Other enterprises, such as Start, mentioned renting out space to shops, but did not indicate that these were a significant source of revenue. Regional variation in the degree to which rent controls have been relaxed or removed may explain why SAP is counting on income from a source some other enterprises are not yet able to tap.²³

SAP is currently experiencing serious financial difficulties, but hopes to resume construction when its financial condition improves. The fact that commercial firms are building in Saratov suggests that construction may potentially be profitable there. In fact, SAP's policy of retaining existing buildings while setting up a system to privatize flats and then charge tenants for maintenance is essentially equivalent to the other enterprises' choice to transfer housing for which they cannot raise rents or maintenance fees, while building new housing they expect to manage on a cost-effective basis. In both cases, managers are seeking to turn the housing shortage and their experience in construction and maintenance to the enterprises' advantage (either financially or in attracting key personnel).

c) medical care. Enterprises pay premiums to a government-mandated program for health insurance, but this program does not provide adequate care for employees. Nevertheless, existing state clinics and hospitals are still operating, and workers can get care there (although good care, as in the past, may depend on the ability to pay bribes). The enterprises we studied seem to be steering a middle course with medical care; they are trying to lower their expenditures on health care, or mitigate them by providing medical care on contract to other enterprises, but still want to contribute in some degree to the health of employees and their dependents.

Impuls is maintaining the clinic on its territory, for example, and continuing to bring in medical specialists regularly, including an ENT specialist, a dentist, a lung specialist, and a gynecologist. All these services are completely free to employees. This is a significant expense for the enterprise (total expenditures on health care amount to 10 million rubles per month in 1994, including the costs for energy, salaries, and physical maintenance of the facilities). Since there is some extra capacity, a neighboring enterprise has made a deal to send its employees to use Impuls's services.

Impuls also pays for private insurance to cover all major surgery and other extreme cases. Similarly, managers at Energia in Voronezh reported paying an insurance company to

cover complicated treatments that cannot be done at Energia's clinic. This may seem to be an added expense (in 1994, the total yearly premium at Impuls is equivalent to about 5 percent of payroll), but given that managers feel obligated to cover such expenses for employees, the insurance is necessary to protect the enterprise from risk and unexpected losses.

A standard arrangement in Soviet Russia placed physical facilities for medical care—the buildings and equipment—under enterprise ownership, while the local government paid staff salaries. This system is still in effect in many places, but TsAGI recently chose to change this arrangement in Zhukovsky by taking full financial responsibility for the medical facilities. TsAGI managers did this because they believed that the authorities in Zhukovsky were particularly active and eager to assert control, and they feared authorities would try to control enterprise decisions.

With the enterprise bearing responsibility for salaries as well as facilities, the need to reduce costs has been all the more pressing. TsAGI is very actively pursuing contracts for other enterprises to use its facilities, in order to lessen the expense of maintaining the enterprise's seven-story hospital. The hospital provides very good medical care, gets medicines as needed, has good equipment, etc. The head doctor in TsAGI's hospital is authorized by TsAGI management to make agreements with other companies to serve their employees. Medical care costs TsAGI 64,000 rubles per person per year, on average, so the hospital charges other enterprises 83,000 rubles per employee per year. The institute also funds a polyclinic, which provides services to other enterprises by contract, and to TsAGI employees for free.

While TsAGI and Impuls are trying to maintain full existing services but lower their net costs, other enterprises are providing less care themselves but will help their employees use local alternatives. Start will keep two "healthpoints" (on-site nurses at minimal facilities) as well as one polyclinic, but is transferring ownership of a gynecological clinic, a children's clinic, a third healthpoint, a regular clinic, and a pharmacy to the city along with the buildings that house them. The Chelyabinsk-70 institute will keep a healthpoint on its territory, but is transferring all other medical facilities to the local authorities.

Mashinostroenie has a clinic that provides employees with free care; primary doctors are paid by the oblast, but Mashinostroenie pays specialists' salaries. If workers need more than this clinic can provide, they can go to local hospitals with whom Mashinostroenie has contracted for care. Mashinostroenie also pays half the cost of any necessary drugs for employees. In August 1994, the enterprise began the process of giving control over medical care to an insurance company, Konstanti-plus. It is planned that by 1995 this company will cover all costs, including doctors' pay. Konstanti-plus has also contracted with various hospitals in Moscow to treat Mashinostroenie employees. Mashinostroenie managers are considering offering insurance through Konstanti-plus to outsiders, at a rate that will be profitable to the enterprise.

Although MCST does not own any medical facilities, managers at this company too have chosen to provide health care for their employees. With financial support from MCST's main client, the American company Sun Microsystems, the Russian firm has recently taken out a corporate membership in Moscow's American Medical Center, a private Western-run clinic with prices as high or higher than equivalent facilities in the United States. Boris Babaian, director of MCST, expressed some concern over how to monitor employee usage of this privilege; he feared that Sun and MCST could not afford to allow all employees to treat every illness, and thought the company might have to set up some guidelines on who can receive what care.

As funds become scarcer, some enterprise managers are being forced to cut services even further. In Saratov, for example, the city authorities continue to be responsible for salaries in the clinics serving SAP employees, but the medical facilities are not being funded by the enterprise for equipment or other necessities. Like the other enterprises, SAP is making every effort to maintain medical care for workers, but as the enterprise is in financial crisis, it can provide no funds for new equipment.

d) agriculture. The agricultural programs of our enterprises range from none to extensive. As usual, the two private, new companies provide the least in-kind assistance for their employees. At the next, minimal level, TsAGI and Impuls have arrangements to provide technical assistance to kolkhozy (collective farms), in exchange for food at low cost for their employees. Mashinostroenie also contracts with local kolkhozy for low-cost food for workers.

Start owns about 200 hectares of agricultural land, most of which it has rented to private farmers in exchange for part of the meat produced. So far, the enterprise has not received any meat as the farmers have not been successful, but Titarenko did not express great concern over this loss. One of the lease agreements provides that for 60 tons of meat, the enterprise will transfer ownership of the land to the farmer completely. This suggests that management does not consider the farms significant, either as a burden or as a potential source of revenue.

Start does, however, invest resources in three greenhouses, which cover 3,000 square meters. The greenhouses produce 20 tons of cucumbers and five tons of tomatoes per year, which are sold to the employees at low prices in the dining hall or in the children's canteen. (Some space is also allotted to rosebushes, which produce 42,000 roses for sale annually.) Titarenko expected that the enterprise would continue this program to assist its employees.

Before privatization began, SAP and the institutes at Chelyabinsk-70 and Arzamas-16 all had full-fledged, large sovkhozy (state farms) on their balance sheets. At Arzamas-16, these have now become independent legal entities, which are surviving so far on a commercial basis with no connection to the institute. Chelyabinsk-70 is keeping its farms in order to continue supplying its workers with food.

SAP has not only retained its existing agricultural resources, it has acquired more property to expand its program. Providing for employees may be part of the motivation, but the enterprise has more ambitious goals of setting up food processing facilities in hopes of selling food products for profit. Furthermore, agriculture is no longer part of the social sphere at SAP; farming activities have been split off into a separate branch, with a deputy director whose background is in agriculture appointed specifically to manage them.

Although agricultural programs may represent significant expenditures for enterprises, they seem not to be at the top of managers' lists for economizing on social services. Given the rates of inflation and markup on food items, enterprises may at least be able to provide their employees with significant savings, effectively adding to their wages simply by selling them produce at cost. Of the enterprises we studied, only SAP is attempting to reorganize agricultural activities so that they will generate profits.

e) sports, leisure, and culture. Russian culture considers sports and leisure essential to good health; facilities Americans might consider to be luxuries are viewed as medical necessities. This applies to children's camps, spas, or resorts which are often referred to as recuperative or preventive, and other vacation places either near the enterprise or in a popular area such as the Black Sea. "Palaces of culture" (dvortsy kul'tury) are also popular, as they provide large auditoriums for performances and smaller spaces for clubs or children's programs to meet.

Many of these cultural facilities are continuing to operate, although their parent enterprises are running on austerity budgets. Sports complexes, vacation facilities, and dvortsy kul'tury seem to be the types of programs that can move most easily into the private sector. Impuls, for example, owns a children's camp that needs renovation. The enterprise doesn't have enough money to do all that is necessary, so managers are looking for a partner that will invest in exchange for the right to time-share the facility. Impuls also has a sports complex, which employees use for free. This facility is self-supporting, as it is rented out to other organizations/enterprises, and the charges cover maintenance costs.

Enterprises are interested in using their facilities to provide social services on contract for other enterprises or groups of people. Mashinostroenie, SAP, and TsAGI are working to rent out space in their cultural facilities to commercial businesses, cafes, and other tenants. TsAGI has also been considering renting out its baza otdykha (local vacation mini-resort) as well as its sports facilities, and Start has rented out space in its gymnasium.

Such profit-making agreements need not involve only leisure facilities, however. As described above, TsAGI is attempting to take advantage of its well-respected medical services, and the institute's department for shipping and procurement of supplies also earns 20 percent above its costs by providing its services to other local enterprises. At TsAGI, the initiative for such side agreements seems to come from the managers of the facilities themselves. The institute encourages these arrangements by establishing a system by which some money from side agreements is kept within the division that earned it. These are not personal incentives for the managers, however, as the funds must be spent on maintaining the buildings and on salaries for each structure's staff. Nevertheless, since managers feel some personal identification with their responsibility to their staff and programs, the system seems so far to have helped encourage a movement toward efficiency and potential profits among TsAGI's social structures.

Many managers in charge of social facilities believe that by providing services on contract they can make these facilities self-supporting. They spoke confidently of a potential base of affluent customers, who are ready to spend money on sports, culture, and vacations. At TsAGI, for example, Olgo Bessolova, deputy director for social services, claimed that all of the institute's social structures could actually support themselves through private contracts with rich people. Other observers, however, such as Vladimir Vaulin, chair of the Sverdlovsk oblast GKI, have asserted that strict rent control, which remains in effect in many regions, and other government regulations preclude any hope of profitability for these facilities. It is hard to say as yet whether the dream of self-supporting social facilities is more than wishful thinking.

This idea raises three issues, however. First, although a new class of rich Russians is evident and growing, it cannot be large enough to support the leisure facilities of all the enterprises that hope to cater to it. It remains to be seen which enterprises have the most attractive facilities in the best locations, are most energetic in marketing them, and are best able to provide good service and maintenance—in short, which will survive competition in the market. Second, in order to make their facilities available for paying customers, enterprises may have to reduce or eliminate access for their own employees unless their workforces shrink considerably. Although some managers were ready to reduce workers' benefits, all were nervous about the response of workers to such a decision. Third, where a ready market of the new rich does exist, there is a strong incentive for the head of any one social facility to try to separate his or her division from the parent enterprise, so the division will not have to turn over profits to the central management. Although such moves toward independence

would probably be unsuccessful most of the time, they could delay or prevent the enterprise at large, and its employees, from benefiting from social facilities that do generate revenue.

IV. The Rationale: Why Retain Social Facilities?

From the point of view of managers, there are several reasons for enterprises to continue providing social services. There are at least three kinds of motivation for management, which are not mutually exclusive and may in fact reinforce each other. First, managers often feel responsible for the welfare of their employees. The socialist system under which they have spent most of their lives gave them direct administrative responsibility for services for workers; even with the change in economic system, the culture that developed with socialism persists, continuing to encourage the belief that those in positions of power should help the collective. The deputy directors for social services that we spoke to all expressed a sense of responsibility for their employees.²⁴ This remained the case even at Impuls, for example, where the enterprise had already turned over kindergartens and housing to the municipality, and no longer had formal responsibility for them; Ludmila Povolotskaya, the deputy director for social services, still considers herself and the enterprise responsible for helping employees solve problems and get service in these areas.

At the same time, parallel to a perceived obligation to help employees may be a conscious or unconscious desire to retain control over them. Michael McFaul argues that the provision of social services to workers through the workplace created a paternalistic relationship, in which “workers had few opportunities to organize so as to represent their interests in opposition to the directors,” and that “the uncertainty of living in a collapsing economy [has] made workers even more dependent on and loyal to their directors at the plant level.”²⁵ McFaul claims that this dependence and passivity of workers vis-à-vis managers has been an important factor in directors’ ability en masse to influence privatization legislation toward their own interests. Within an enterprise, this relationship has also in some cases helped managers to persuade the workers’ collective to approve the privatization option favored by management.²⁶

It is hard to say how important a factor continued control over workers is in the decision of managers to maintain social services. No manager is likely to announce to an outsider that social services are essential to keep employees passive and easily controlled, so interviews with managers are not a reliable way to answer this question. At the same time, managers may not recognize this motivation in themselves; they may experience the desire to maintain a paternalistic relation to workers as an altruistic, valid feeling of parental responsibility toward subordinates whom they believe need their help.

A third reason managers are interested in keeping social facilities, which is not at all incompatible with the other two, is their belief that such services need not represent a financial drain, and in some cases may even make money.

Managers have not yet determined in each case which solution best responds to their various priorities. At times their commitment to providing services for employees (whether out of altruism or paternalism) leads them to choices that might seem to a Western manager to violate a strict cost-benefit approach. For example, Povolotskaya does not plan to free Impuls of its medical expenses by transferring the clinic to the prefecture authorities. Since the enterprise is in Moscow, where there is access to other medical facilities, the possibility of

making the clinic a self-supporting operation would probably depend on the ability to market its specialists as something out of the ordinary. When asked whether the specialists at Impuls's clinic are particularly good, however, Povolotskaya said that was not the point. The basis on which she evaluates the clinic and its specialized services is that these particular physicians have been working for Impuls for many years, so they know their patients well, and that it is convenient for the staff to have them on site. If these factors are the most important in her choice of how to handle medical services, a Western manager's decision to cut services significantly or to replace staff in order to attract outside, for-profit customers will not be the choice that seems most rational to this manager.

Workers, too, have showed a preference for retaining social services, even when they are aware that doing so may jeopardize wages or enterprise survival. By law, the workers' collective at each enterprise votes once a year on how the enterprise will spend its profits. This vote is not on minutiae, but does allocate the percentage of profits to be spent on subsidizing vacations at the resorts, for example, or on kindergartens, or to build new housing.²⁷

In practice, this vote may be simply a pro forma approval of a budget prepared in advance by the management, but in at least one case the workers' collective has used this forum as an opportunity to debate options and to voice employees' choices. At Arzamas-16, the enterprise's sports facilities have not been transferred to the local authorities because the workers' collective has consistently voted to keep them. The workers are aware that maintaining the facilities is a significant financial burden on the enterprise. They have chosen until now to keep funding them, however, because they are afraid that if the sports complex is given to the city, it will be rented out to the highest bidder and may not remain a sports center—or even if it does, it will be available privately only for a fee, which they won't be able to afford. People felt strongly, particularly that it was critical that their children have access, so they voted to cover the gym out of the institute's profits. The deputy director reported that there was vocal debate on this issue and on whether to keep the *dvoretz kul'tury*, the "palace of culture" that provides an auditorium and space for clubs and cultural events. Bessolova and Povolotskaya did not give details on the workers' choices at TsAGI and Impuls, but both described this vote without cynicism, and implied that it was a real part of the policy-making process.

In a Western corporate context, the most highly qualified and highly paid personnel might be expected to prefer their compensation in cash, so that they can use it to purchase services of higher quality, or to avoid subsidizing services they do not need (e.g., a childless worker or one whose children are grown might prefer that the enterprise not subsidize children's camps). In Russia, however, private services are not yet available in all areas, so even elite workers may continue to depend on existing services for at least the short run. As growth of the private sector accelerates, such highly paid employees may find market-provided services they prefer to those run by the enterprises. Even when they are not using enterprise services, however, they may still be influenced by the communal culture to support their provision for those less well off.

Cultural and psychological factors may contribute to managers' intention to maintain social facilities, but neither of these will suffice if the third reason mentioned above, the profit motive, is unrealistic—that is, if the bottom line does not support these calculations. Can Russian enterprises possibly survive if they continue providing social services to employees? Is such a decision an economically rational choice?

Compare overall enterprise expenditures on social services with the cost of corporate benefits in a market economy. The World Bank has found that the average expenditure of a Russian enterprise on all social services together is between 35 and 40 percent of what it spends on wages, which is “broadly comparable to the patterns observed in many industrial countries...In the U.S. private sector in 1990, the cost of voluntary non-wage benefits amounted to 25 to 30 percent of business payrolls.”²⁸

The enterprises we have worked with have spent comparable amounts on social services. In 1993, according to Titarenko of Start, the enterprise’s expenditures of about 150 million rubles on the social sphere were slightly more than 20 percent of the 700 million rubles paid out in salary. (These figures do not include the salary of workers in the social sphere as part of social expenses; if it is included, the percentage might rise to 25 or 30 percent.) Arzamas-16 also provided data from the last year or so; the deputy director estimated that 30 to 35 percent of revenues is spent on salaries and five to seven percent of revenues is spent on the social sphere, which means that recently social costs have been equivalent to somewhere between 15 and 25 percent of salary expenditures. (He added that social expenditures have been a lower proportion than usual because of late the enterprise has not done what would ordinarily be considered necessary repairs.) Bessolova, TsAGI’s manager of social issues, estimated that in the past, social expenditures were usually equivalent to 30 percent or less of the wage bill. Her estimate included as social costs the maintenance and construction materials, salaries of employees in these facilities, and subsidies for the food service, as well as cash grants to employees who apply for special assistance. Both Titarenko and Bessolova expect that the recent increase in the proportion of funds spent on social services will be offset when the enterprises are relieved of having to maintain the housing stock.

If the expenditures of enterprises under the socialist system have been roughly comparable to expenditures of companies in market economies, this suggests that in the long run, if the Russian economy becomes stable, enterprises that survive the transition to capitalism may not be unrealistic in expecting to provide such benefits for their employees. Housing, which has been by far the largest single portion of social expenditures,²⁹ cannot be maintained at previous levels, but if that burden is lessened it may end up being in the interests of enterprises to provide other benefits.

There is another reason that continuing to run social services may not be an irrational decision. A World Bank report on services of all sorts in Russia suggests that the share of consumer services in the Soviet economy was “substantially below...international norms,” and that services “could be a major source of growth in Russia.” The report claims that bringing services in Russia up to the level expected for an economy of its size “could increase GNP by more than 10 percent.”³⁰ If services do make up a major part of economic growth over the next several years, enterprises that already know how to run services may benefit.

In the long run, market economics should predict that the enterprises that run their social services most efficiently, or who can offer location or other amenities that attract wealthy customers, will maintain these services, while other enterprises move increasingly toward contracting out for such programs. During the transition to this system, however, enterprises that do not perceive their own comparative disadvantage, or who are not willing to reduce employee benefits, may sink under the financial burden their social commitments impose.

V. The Significance of This Data

The enterprises that provided the information summarized in this chapter vary somewhat from one another, but share important similarities. If some aspects of their social policy choices seem to be consistent, can they even tentatively be generalized to the larger population of Russian companies, or might the similarities result from our choice of a sample of all high-technology enterprises previously involved in defense production?

Russian industrialists, government officials, and scholars stress the heterogeneity of enterprises and their local environments. As economist Irina Starodubrovskaya emphasized in an interview on social services, “There is no common economy” from one region to another.³¹ Not only does the proportion of local social facilities that has been in the hands of enterprises differ by region, the policy choices of municipal and regional authorities also vary. These may depend on the local political or social climate, the type of industry, or on the financial resources of the region.

One factor that makes the social asset issue very different from one enterprise to another is location. An enterprise in Moscow, for example, or another big city such as Ekaterinburg or Saratov, may struggle with local authorities about when, how, and how quickly it will transfer its facilities to municipal ownership, but at least in these cities the authorities have existed and have exercised some power for more than a few months. In Moscow, the city has managed a substantial infrastructure, including energy, water, and road networks, social and medical services, district kindergartens, schools, and clubs. This means not only that a system exists and is capable of taking over social facilities, whether or not its bureaucrats want to; it also means that employees and area residents can be served by other facilities, even if an enterprise must simply close a service down.

In smaller, newer towns, by contrast, the municipal authorities may only have existed as such for a very brief time, or may never have managed infrastructure of any size. The town of Zhukovsky outside Moscow, for example, was initially founded when TsAGI moved in 1939 to what had been a rural area. For the first ten or twenty years of its existence, therefore, the entire town of Zhukovsky—all housing, health facilities, schools, etc.—was on the TsAGI balance. In the 1950s part of TsAGI was separated out to form the Flight Research Institute, and so parts of the town were also split off and put on that institute’s balance. It was only by the 1970s, as more retail and service facilities were built, that a small municipal authority was created to organize and own some of these new structures.

The institutes in Zhukovsky have now been transferring many of their facilities into municipal ownership, which means that the fledgling municipal authority is growing and taking on new responsibilities rapidly. TsAGI managers report that Zhukovsky officials have been eager to adopt the responsibility and expense of these social structures because, in the view of TsAGI managers, the Zhukovsky mayor sees control over the town’s housing stock as a way of gaining power. City officials might also have been influenced by the town’s relative proximity to Moscow; if housing and social services have the potential to be profitable anywhere, perhaps the most likely locale would be within commuting distance of one of the world’s most expensive cities.

For TsAGI, therefore, the task of divesting the institute of many of its social responsibilities has not been insurmountable. Other towns throughout Russia, however, are no more advanced than Zhukovsky, and often far less, in developing an effective, competent local administration. They may not have the advantageous location Zhukovsky enjoys, and in many towns the revenue base is even more limited. For example, Zelenograd, where ELVIS+ is located, has had difficulties collecting rents since costs are high for residents. Moreover, there are company towns that depend entirely on the activity of a single giant enterprise. In

these instances the shrinking revenues of the enterprise cannot support its social facilities whether they remain within its bureaucracy or are transferred to an inexperienced, instantly created municipality.

Chelyabinsk-70, for example, was a closed city all of whose scientific, productive, retail, and social activities were run by the Institute of Technical Physics, which specialized in nuclear research. In May 1994, Oleg Buryakov, a deputy director for the institute, explained that the institute has transferred many of its social assets to the new municipality. The municipality is not ready to handle the responsibility of managing the social services, however, nor does it have sufficient funds, so services have deteriorated since the transfer. Some people feel the institute moved too quickly in ridding itself of these responsibilities, and in fact, in order to help workers get what they need, the institute has recreated internal departments to buy food and clothing for distribution to employees. These operations are smaller than the major networks the institute used to run, but their very existence can be seen as evidence that the institute cannot yet divest itself of social services entirely.

Given these and other differences among enterprises and the conditions they face, is there any reason the enterprises we studied may share goals and resources for social policy? Perhaps the most surprising findings of our interviews were the enterprises' policies of trying to keep services even when they could transfer them to local authorities, and their initiative in trying to turn some of these facilities into self-sufficient programs. There are two reasons high-technology former defense enterprises in Russia might be particularly open to the argument that providing social services is a reasonable investment even if it costs money initially, and that it may be possible to do so with no net loss.

The first reason has to do with the personnel needs of high-technology enterprises. In the United States, companies that use unskilled, minimum-wage labor are the least likely to provide good benefits, while those that must compete for the limited pool of highly educated, qualified professionals often offer the best benefit plans, sometimes even providing additional advantages for length of service in order to reduce turnover. The Russian enterprises we are studying want to maintain their profile as advanced scientific enterprises, and managers feel they will need to provide social services in order to attract the best personnel, scientists and engineers who are capable of doing cutting-edge work. At Arzamas-16, for example, the enterprise has chosen to keep a dormitory and a hotel on its balance, because without an effective local government and given a shortage of living space, managers feel they have no other way to ensure housing for workers they need on a temporary or longer-term basis.

It could be argued that high wages would be at least as effective in attracting top qualified employees, and that providing the benefits in the form of salary or at least contracting out for their provision would allow these enterprises to focus on their core business. For the short to medium term, however, it can be entirely rational for management to keep running these services. Managers at TsAGI and at Mashinostroenie said they needed to maintain social services, because they could not compete with the salaries provided by private businesses. In principle, saving on social expenditures would free funds for use on salaries, but in fact the enterprises have already invested capital in these services, have developed the human capital to run them at least satisfactorily if not optimally, and could not recover this investment from the municipality if they transfer the facilities. If the municipality does not have the funds to keep services running, moreover, workers could lose all access to important services, which would be a strong incentive for them to move elsewhere.

The need in the future to be competitive in a free labor market is one strong motivator these high-technology enterprises have in common. There is another potential reason these enterprises may not be representative of all enterprises with social assets. It is possible they may be more disposed than other enterprises to look favorably on turning social facilities into profit-making ventures if they are more open and knowledgeable about Western concepts of profit-making and the private sector. The enterprises studied for this report have been cooperating with the CISAC project in exchange for technical assistance on defense conversion for some time, the earliest starting as far back as 1991. Even those who joined the project more recently have self-selected for the project by initiating and maintaining contact, and expressing great interest in hosting consultants from the United States in order to learn about business operations in the capitalist context. It is possible that enterprises most disposed to participating in such a project are also most likely to be willing to try moving their social services into the private sector.

For purposes of comparison it would be useful to interview managers at institutes that are further out in the provinces, at those that have had less contact with Western ideas, or at less prestigious enterprises that cannot afford to support social services with the long-term goal of attracting high-level scientists.

VI. Conclusion

Some studying the Russian economic transition suggest that in order for failing enterprises actually to enter bankruptcy, thus allowing more productive use of their capital assets, the government must remove social programs from enterprise budgets and create a social safety net independent of employment. A Radio Free Europe report, for example, claimed that "The principal reasons for the slow implementation of bankruptcy legislation appear to be the political unacceptability of massive, open unemployment, the lack of an effective social safety net, and the fact that many unprofitable enterprises provide kindergartens, clinics, etc., that would disappear with the plants' closure."³² This argument rests on the assumption that the existing social welfare programs are supported by the state through the enterprises, and that the enterprises therefore cannot be closed because without them there is no mechanism to fund and manage the facilities.

The enterprises we have studied closely do not provide good evidence for or against this idea, because most of them are probably not at risk of government-imposed bankruptcy soon. The managers of every enterprise we visited felt themselves to be struggling financially, but were not at the end of their resources. All the enterprises that do own and manage social assets were trying to reduce the costs of these programs, to devise ways of using them to earn profits, or to rid themselves of the responsibility by transferring them to municipal authorities. This would suggest that for these enterprises, at least, running money-losing social services is not a method of maintaining significant state support.

It is possible that for enterprises that have no project or product revenues, state social subsidies are higher, or even if they are at the same minimal level, may represent a more important proportion of the enterprise's income. However, implementation of the two decrees of January 1993 mandating transfer of social services to municipalities has begun. The real question is whether enough of the essential facilities have been transferred in a given area for the workers to meet their needs without the enterprise. It is true that the social safety

net is currently inadequate, but the slow rate of bankruptcies and fear of layoffs are due more to the insufficiencies of the system and level of cash payments than to the fact that many social service facilities have been housed and managed by enterprises. At the enterprises we have studied, the process of transferring money-draining social facilities is well under way, to the extent that enterprise management wants it to occur.

Even if the enterprises we studied lose money at a much higher rate, and none of their hoped-for projects pans out, the state has reasons other than their social services to keep some of them afloat. High-prestige, high-technology enterprises doing advanced research, which includes defense projects even now, have greater claims for state contracts, credits, or other support than enterprises that manufacture low-level consumer goods. Thus, for example, TsAGI was recently made a State Science Center by a special decree, a status that ensures a minimum level of state support for R&D. Chelyabinsk-70 and Arzamas-16 have also been the beneficiaries of special decrees freeing them from their social burdens.

Defense plants and one-company towns are entities the state would not be likely to let go bankrupt in any event. Unemployment at these enterprises, with the attendant threat of brain drain in the case of high-tech institutes, would be a much more significant threat than the loss of their social services. At the same time, as discussed in the introduction to this chapter, certain enterprises may be less likely to own significant social assets. These may be the enterprises that the government would allow to close down anyway because they are less strategically important or in locations with other employment opportunities may be less likely to own significant social assets. This hypothesis should be researched further, but if indeed enterprise-run social services are concentrated at enterprises that are valued by the state for other reasons, this does suggest that social services per se are not what has slowed bankruptcy.

This chapter has tried to describe the conditions, opportunities, and threats facing enterprises that own substantial social facilities. The central government has provided some procedures for transferring such services to local authorities (although these authorities' willingness to accept them varies greatly). The government also seems from our interviews to have reduced social subsidies sharply. Both these actions will help move social programs from the enterprise sector to the public sector, which should relieve enterprises of this responsibility to the extent they are willing to relinquish it. The Russian government's policy of tax deductions for social expenditures, however, still offers some support to enterprises that choose to keep these facilities.

None of the enterprises discussed in this chapter has a single, uniform approach to social assets. Managers at all the enterprises want to pick and choose among their programs. They hope to maintain the facilities most important to their employees, or most likely to break even or make a profit, while transferring the ones that are in worst condition or are most expensive to maintain. They are confident that they understand the costs and benefits of their social programs, and none have implemented a strict austerity regime to eliminate these burdens. This may indicate that social services are a potential source of revenue or a necessary cost in Russia of doing business. In particular, the hope that social services will be a reasonable investment may be better founded in Russia for high-technology former defense enterprises. In some cases, however, it may simply mean that these managers have not been forced to face fiscal realities.

It should be noted that whether managers are realistic in their plans or not, ordinary workers will probably end up with fewer services at greater costs to them individually. In some cases, such as SAP's housing policy, enterprises will pass costs on to them directly as

soon as they can. In other instances, as mentioned above, enterprises that move facilities into the for-profit market are likely to reduce access for non-paying employees. And workers may lose services altogether in cases where private-sector reorganization of social assets proves unsuccessful, or where local authorities have insufficient budgets to maintain what is transferred. Workers without high-level, lucrative skills will have to hope that the new elites remember the needs of the collective.

Notes

¹ Russian Economic Reform: Crossing the Threshold of Structural Change (World Bank Country Study: Washington, DC, 1992): 143. Hereafter abbreviated Russian Economic Reform.

² Of the enterprises described in this report's detailed case studies, Impuls, Mashinostroenie, TsAGI and SAP all owned significant social assets. MCST and ELVIS+, both small, relatively new private companies, did not, although their parent enterprises did. Data gathered from these two firms therefore are less extensive than information on the other enterprises discussed. Interviews with managers about the social sphere were conducted in 1993 and 1994, by Tova Perlmutter (TsAGI, Start, Impuls, Mashinostroenie, MCST, Arzamas-16, Chelyabinsk-70), Susan Gates (ELVIS+, MCST, Impuls, TsAGI, Energiya), David Bernstein (ELVIS+, MCST), Kathryn Hendley (TsAGI, SAP), Jeffrey Lehrer (TsAGI) and Kim Zisk (Mashinostroenie).

³ Russia: Social Protection During Transition and Beyond (Washington, DC: World Bank Report No. 11748-RU, February 1994): 22. Hereafter abbreviated Social Protection. Clifford Gaddy offers figures that suggest this trend may hold for other social services as well. He writes that "In Chelyabinsk ... enterprises account for fully 66 percent of all social spending. The central government accounts for 14 percent, and the local government 20 percent." Clifford Gaddy, "Economic Performance and Policies in the Defense Industrial Regions of Russia," in *Privatization, Conversion and Enterprise Reform in Russia: Selected Conference Papers*, eds. Michael McFaul and Tova Perlmutter (Stanford, CA: Center for International Security and Arms Control, 1994): 123, n. 11.

⁴ Social Protection, 22.

⁵ Gaddy, 112.

⁶ Gaddy, 112. Gaddy finds evidence for this idea with regard to housing in particular, where his figures show that "defense industry variables had a significant positive impact on new housing construction." This idea is also consistent with a suggestion Gaddy makes earlier in his paper, that "the defense regions may have been more of a command-administrative economy than the rest of society, one in which a greater part of resources was allocated by central administrative decisions, not by individual choice...more of a non-monetary economy than the country as a whole" (110).

⁷ Presidential Decree no. 8, On the utilization of social-cultural and communal facilities designated to privatized enterprises, January 10, 1993. This decree can be found in English through NEXIS.

⁸ The decree refers to "facilities designated as social-cultural (public health, education, culture and sports) and communal-daily services (public baths, laundries, hairdressers and other facilities)."

⁹ These exceptions include facilities not subject to privatization according to the federal privatization legislation: buildings or space within them that is used in retail trade, public dining, daily services, or for organizations that serve social needs, such as orphanages, maternity hospitals, old age homes, boarding schools, hospitals and sanatoria for invalids, children and the elderly, and children's health resorts and camps. Also excepted are regional transportation and energy-related facilities, regional public health facilities, housing stock, and maintenance facilities.

¹⁰ GKI Regulation No. 135-r, January 17, 1993.

¹¹ The regulation recommended that similar arrangements be made for social assets belonging to enterprises formerly owned by republics within the Russian Federation, kraia, oblasts, autonomous regions and okrugs, and the cities of Moscow and St. Petersburg.

¹² The basic principle for these deductions is established by Chapter 7, Article 1 of Russian Federation Law No. 2116-1, On profit taxes for enterprises and organizations, December 27, 1991, as amended December 22, 1992 and December 27, 1993.

¹³ Author's interview with Vladimir Vaulin, chair of the Sverdlovsk Oblast GKI, Ekaterinburg, January 1994.

¹⁴ One category Western readers might expect to see is pension payments. In Russia, pensions are paid by the state, not through the enterprise (although their size does depend on length of service at a single workplace). Of the enterprises we studied, only SAP has set up an enterprise pension fund. Like many arrangements particular to SAP, this is a result of the enterprise's privatization by special decree. Unlike the GKI program, SAP's privatization decree did not specify that retired workers were entitled to ownership shares. Feeling that they had built the enterprise, SAP's retirees resented their exclusion, so management created a pension fund to appease them.

In September 1994, Mashinostroenie management began working to set up a nongovernmental pension fund for employees. Details are not yet available. Although they do not sponsor formal pension programs, the other enterprises still try to aid their retired employees on a case-by-case basis. This obviously adds to their social expenditures, but managers did not describe aid to pensioners as a separate category of social assistance.

¹⁵ Social Protection, 48.

¹⁶ Kathryn Hendley, private communication, August 1994.

¹⁷ In interviews, only one manager (Yuriy Titarenko of Start) referred to the decree as a reason his enterprise was transferring its housing stock. Others spoke of housing transfer as a matter of their choice. This suggests that it might not be difficult for an enterprise to get a partial or full exemption from this provision of the decree (in meetings with GKI officials, it seemed that enforcement of other privatization regulations can also be flexible). Note that TsAGI transferred much of its housing, but arranged with local authorities to keep 17 buildings.

¹⁸ Author's interview with Ludmila Povolotskaya, Impuls, February 1994; see also Russian Economic Reform: "Enterprise stock is much more costly to operate than local government housing. In 1990, operating subsidies per square meters of the total enterprise stock were reported to be 5.4 Rb as opposed to 0.14 Rb for municipal housing" (222).

¹⁹ Prefektura, or prefecture, is the new name for what used to be called a raion, a district within Moscow. These administrative units were recently reorganized and renamed.

²⁰ Another example of a solution negotiated to relieve an enterprise of the financial burden of maintaining housing is the agreement between the city authorities of Ekaterinburg and the giant enterprise Uralmash. The city set up a for-profit company for maintenance and management of housing (a TOO, tovarishchestvo ogranichennoi otvetstvennosti or limited liability company). Over the next five years, this company will accept 20 percent of the expenses of the housing stock each year, so that at the end of five years, Uralmash will have transferred 100 percent of the financial responsibility to the city/company. The relation between this private company and the city is not entirely clear, but the individuals who founded the company believe that they'll be able to make profits from it. Author's interview with Yuriy Titarenko, Start, January 1994.

²¹ This rationale for enterprises' investment in new construction was first explained to me by Marianna Afanasyeva, consultant to the European Bank for Reconstruction and Development.

²² The Saratov Electro-Mechanical Production Organization (SEPO) was privatized under the same decree as SAP, and thus has the same right to keep control over its housing. Like SAP, SEPO is actively promoting individual privatization of enterprise-owned flats, as is another Saratov enterprise, Tantal. Managers at these enterprises also are motivated to retain housing by their concern that the municipal authorities will not be able to maintain housing adequately. Kathryn Hendley, private communication, August 1994. For further discussion of the relations between Saratov enterprises and the regional government, cf. Kathryn Stoner-Weiss, "The Political Economy of Good Government: Lessons from Russia's Regions," unpublished ms., 1994, or Stoner-Weiss's forthcoming dissertation.

The company Energiya in Voronezh provides another example of an enterprise that retained its housing when it privatized before the GKI program. Energiya collects rent from workers, at the rate charged by the local municipal authorities, and is continuing to build new apartment buildings.

²³ Some research on local and regional policies regarding commercial real estate and rent control has been done by April Harding of the World Bank.

²⁴ Cash assistance from an enterprise on a case-by-case basis is common, both to workers and pensioners. Mashinostroenie, for example, not only provides its pensioners with free medical care, but also helps with utility bills or cash when needed. At Start, Titarenko said that the trade union committee was in charge of allocating such special grants, but he added that in recent years workers feel that everyone is struggling, and they are embarrassed to claim special treatment.

²⁵ Michael McFaul, "Agency Problems in the Privatization of Large Enterprises in Russia," in *Privatization, Conversion, and Enterprise Reform in Russia: Selected Conference Papers*, eds. Michael McFaul and Tova Perlmutter (Stanford, CA: Center for International Security and Arms Control, 1994), 43.

²⁶ Olgo Bessolova, interview with CISAC research assistant Jeffrey Lehrer, McLean VA, July 1994.

²⁷ The workers' collective may be influenced in these choices by the council of the workers' collective (sovet trudovogo kollektiva, or STK), a smaller body comparable to a steering committee. STKs, established by a 1987 Soviet law, were intended to represent the interests of workers. They currently do not exist at every enterprise; where they do, they vary in how active they are, and to what extent they are controlled by the general director or may balk at or challenge his policies.

Another institution that exerts some power in allocating services for employees is the trade union. At many Russian enterprises, the only union workers have access to is the Federatsiya Nezavisimyykh Profsoyuzov, or FNPR (Federation of Independent Trade Unions), the official union sponsored by the Party in the Soviet period. Historically, the official trade union committee at an enterprise did not challenge the authority of the general director in any significant way, but concerned itself with distribution of discretionary social benefits, such as cash assistance for families in financial difficulties. Some new unions have begun to emerge in the post-Communist era, but none are active at any of the enterprises studied in this report.

Depending on the enterprise, FNPR union representatives now vary as to the degree to which they will advocate for employees versus management. At TsAGI, the collective labor

agreement for 1993 and 1994 has included a clause prohibiting layoff of more than five percent of the workforce. (This may in practice have little effect on management; very few layoffs are categorized as such, since workers given the option of resigning will do so in order not to have a layoff on their record. Even if the clause is violated, the weak system of legal enforcement means workers have little recourse for any meaningful restitution. Kathryn Hendley, private communication, August 1994.) The TsAGI union representatives also ask for salary raises for all employees every few months. According to deputy director Bessolova, TsAGI management listens to these requests because they believe union representatives are more sensitive to social tension or dissatisfaction among employees.

For more information about the history and role of STKs and enterprise trade union committees, see Michael Burawoy and Kathryn Hendley, "Between Perestroika and Privatisation: Divided Strategies and Political Crisis in a Soviet Enterprise," *Soviet Studies* 44, no. 3 (1992): 371-402; Walter D. Connor, *The Accidental Proletariat: Workers, Politics, and Crisis in Gorbachev's Russia* (Princeton: Princeton University Press, 1991); Arcadius Kahan and Blair A. Ruble, eds., *Industrial Labor in the USSR* (New York: Pergamon Press/Kennan Institute for Advanced Russian Studies, 1979), especially Part II. On worker-management relations more generally during the current transition, see several articles in the special Supplement to *Economic and Industrial Democracy* 14 (November 1993).

²⁸ *Social Protection*, 47-48.

²⁹ According to the World Bank, housing has accounted for about 14 percent of total labor compensation. *Social Protection*, 22.

³⁰ William Easterly, Martha de Melo, and Gur Ofer, *Services as a Major Source of Growth in Russia and Other Former Soviet States* (World Bank Policy Research Working Paper 1292, April 1994): 13; 18; 20.

³¹ Author's interview with Irina Starodubrovskaya, World Bank economist, Moscow, January 1994.

³² Keith Bush, "Slow Introduction of Bankruptcy Proceedings," *RFE/RL Daily Report* No. 25, February 7, 1994 (on-line).

XI. Conclusion

David Bernstein

I. Introduction

The reform of the Russian economy in general and of the military-industrial complex in particular has required very large and very rapid changes from the situation under the Soviet command economy to that of an emerging marketized economy. In going through this major transition, Russian defense enterprises, and the state, need to pursue several partially conflicting goals. Many of the policies required to achieve these goals are interdependent, and moreover it is essential to accomplish many of them simultaneously. The major goals include:

- To redistribute ownership from the state to managers, employees, and outside investors.
- To utilize the assets of the enterprises to increase efficiency, revenue, and profits from both state and nonstate customers.
- To maintain operational control of the enterprises in hands sympathetic to the continued operation of the enterprises.
- To provide employment and social services for the employees.
- To remove the burden of support from the state and impose hard budget constraints.
- To maintain the technological and industrial base required for national security.
- To reduce the degree of industrialization and militarization of industry and thereby increase both civilian production and service sectors of the economy.
- To liberalize prices.
- To demonopolize the supply chain.
- To achieve macroeconomic stabilization.

Almost all defense enterprises have undergone a severe demand shock in the past few years. This is true for the four larger enterprises (Impuls, Mashinostroenie, SAP, and TsAGI)

of this study and for the progenitors of the two small, new enterprises (ELVIS+ and MCST). The responsibility for adjusting to this shock has fallen on the enterprises, with little help from the state. The enterprises have found themselves having to cope in an overindustrialized, militarized economy. Market forces have inexorably led to a substantial reduction in industrial production, especially military production, and hence to the need for large-scale conversion to nonmilitary output. The state did not provide reliable data for the enterprises to forecast the extent and nature of the demand shock. Such a forecast would have been necessary in order to cut the cost structure ahead of the reduction in demand, thereby avoiding accumulated losses.

The enterprises have addressed these problems by means of a spectrum of major restructuring moves. These moves include:

- Converting from military to civilian production in an attempt to respond to real market demand;
- Changing of ownership, primarily through privatization, to reduce state control and to provide a better environment for outside investment, particularly in individual projects;
- Restructuring their internal organizations to be more adaptable to functioning in a market economy; restructuring their social assets to be more efficient and self-sustaining; and
- Changing operational procedures, such as accounting, for participating in either domestic or international commerce.

At the same time that enterprises are working toward structures suitable for participation in a market environment, they are also making the necessary adjustments to survive in the transitional economy. There is frequently a tension between these two objectives.

II. Conversion

Conversion has been both active and passive. The enterprises have actively undertaken the development, production, and marketing of nonmilitary products and services. The active conversion includes the tacitly sanctioned utilization of state enterprises' facilities and labor to establish private business ventures—so-called spontaneous privatization. In addition, passive conversion has occurred as many skilled employees have left the military enterprises for better paying jobs in the growing commercial sector. The passive conversion is primarily building up the service sector.

The decline in industrial production has been easier to monitor than the increased unreported economic activity that has occurred in parallel. The active conversion portion of increased economic activity is measurable, but the results of spontaneous privatization and small trading operations are part of the gray economy, the extent of which, by definition, is not accurately known. There are also no reliable data on the portion of buildup of the service sector that can be attributed to passive conversion. Nonetheless unemployment has not nearly matched the decline in production as was feared and predicted, so the economy is absorbing far more of the displaced personnel than the official statistics reveal.¹ Field interviews at the enterprises in our study qualitatively confirm the extensive spontaneous privatization and the defection of skilled personnel from the enterprises to the commercial sector. The enterprise managers view the latter form of passive conversion as a brain drain detrimental to the enterprises.

The enterprises have borne the major burden of conversion and restructuring without much organized assistance from the state. While the state has provided subsidies, many enterprises have used these largely for maintaining employment instead of advancing conversion. This has been a failing on the part of both the state and the enterprises that have made this choice. While this does not seem to have occurred extensively in the four major enterprises studied herein, we have chosen to work with enterprises committed to reform. It should be noted that reliable quantitative information on this subject is extremely hard to get from the enterprise managers.

From 1989 through 1991 the (Soviet) state debated about how to effect conversion, but it never came up with a coherent program. In March 1992 the Russian government formulated a conversion program, but it was never funded and implemented as planned.² As pointed out in Chapter VII, the government has formulated another, more specific Program for Conversion for 1993-1995, calling for annual investments of about one trillion rubles in 1993 and 1994, and about two trillion rubles in 1995. The state has also designated select research institutes, such as TsAGI, as state science centers. The corollary, the closure of inefficient enterprises, has been very slow to materialize.

The general directors of the enterprises in this study have shown considerable adaptability and creativity in their short-term survival skills and in laying the foundations for long-term success. Here again our study is biased toward those enterprises committed to reform, but the managers of these enterprises, and many others that we have not followed as closely, clearly refute the assertion that managers from the Soviet era are incapable of reform and should be replaced wholesale.³ On the contrary, their challenges are in my opinion far greater than those faced by their American counterparts. The managers of enterprises in our study have far less relevant training and far fewer resources, yet they have sustained their operations against great odds.

III. Privatization

Privatization has been the flagship of the Russian reform program to date. As of September 1, 1994, approximately 75 percent of small enterprises and approximately 50 percent of all medium and large enterprises had been privatized. More than 40 percent of Russia's industrial labor force is now working in the private sector.⁴ As pointed out by Michael McFaul in Chapter VII, privatization has in many cases resulted in a solidification of the operational control of the enterprises the managers achieved late in the Gorbachev era. Whether this operational power is greater than that exercised by managers' counterparts in the United States, the responsibility with which they exercise it will undoubtedly be a subject of much analysis in the years to come. The current utilization of state or company assets for private business activities (spontaneous privatization) would certainly not be condoned in Western companies. The economic activity so generated in a desperate time is constructive, but allocation of the profits must be brought in line with ownership. The current practice can only be tolerated as a transient expedient.

In addition to operational control, ownership is another major feature of privatization. Operational control has flowed from the political power of the directors within the enterprises as opposed to being the result of ownership control. Ownership is concentrated internally as a result of the privatization options; however, in many cases privatization has

not been accompanied by capitalization. When foreign investment (and domestic) investment funds flow into Russian industry, as is starting to happen, the distribution of ownership should change in favor of external sources of capital and internal and external sources of innovation. In addition the equity owned by workers and shareholders created by the voucher program will most likely grow in value. Capitalization will also bring about more outsider control, which is currently lacking following voucher privatization. Insiders have been extremely concerned about hostile takeovers of their enterprises. In my opinion this anxiety is justified because the rewards for asset stripping and utilization of the enterprises' real estate frequently exceed the apparent rewards of operating the business. The reutilization of resources by asset stripping may be economically sound, but it is not in the interest of those who want to build the enterprise as an operational company.

The four major enterprises in this study have taken four different approaches to privatization. SAP was privatized much earlier, under the Soviet regime, and it has chosen to become an employee-owned, closed joint-stock company. Impuls has chosen to privatize by Option One to maintain control through internal ownership, friendly investors, and retention by the state of a 31 percent minority interest, with a voting proxy to the general director. Mashinostroenie has chosen not to privatize at this time, relying on state ownership to maintain control and preserve the basic nature of the business, while diversifying by spinning off subsidiaries, which may be privatized. In the case of TsAGI, the state has established the basic aerodynamic and thermal testing facilities as a state-owned science center. Although the state has made this decision against complete privatization, the TsAGI management was in agreement with the decision. Commercial applications will be conducted through privatized subsidiaries.

IV. Organization

Internal organizational changes are being undertaken by all four of the larger enterprises. These changes cannot be viewed as totally independent of the privatization decisions. Managers may address various organizational issues quite differently if their enterprise is privatized than if it remains state-owned. The required organizational changes include:

- Privatization requires internal departments for handling stock transactions and records.
- Financial reporting to shareholders will require additional accounting procedures and legislation, both of which are still in a state of development.
- In a privatized company employee stock ownership is an integral part of the overall personnel and incentive program.
- The incentives and handling of intellectual property rights (IPR) will probably be different for privatized companies.
- The policy toward spin-offs may be affected by privatization.
- The general administrative requirements will expand as state ownership is dropped and the boundaries of the firm expand.

In spite of these potential differences, the four large enterprises studied have addressed most organizational issues, except those relating to stock, as if they were privatized. This is true for the TsAGI State Science Center and Mashinostroenie even though they remain state-owned. MCST and ELVIS+ are still too small to have addressed many of the organizational issues, but they have addressed structural issues such as product selection and marketing.

The enterprise managers are taking the steps necessary to make complete business units of the enterprises by internalizing functions previously performed by the state and by modifying existing and new functions to operate in a market economy. The primary factor in choosing the specific organizational form seems to be the selection of products to produce (and the means to market them) after restructuring.⁵ Having a viable product and a continuing or expandable market (civilian or military) is clearly an advantage.

Of the four major enterprises SAP had the easiest course as it already produced and delivered civilian airliners. Some fraction of these were for foreign customers although sales and deliveries had been handled by the state. As the enterprise privatized and established its own marketing function, this product proved to have an expandable market, but the state has maintained a role in export transactions that has caused critical problems in terms of getting payment for aircraft delivered. SAP's other major problem is that it may have invested too much of its revenues in too many new product developments.

TsAGI had unique services to offer, and its main product thrust was to expand the market for these services to international customers. This has proven to be a viable course although the enterprise's testing business is still not up to previous levels. TsAGI has also pursued new commercial applications of its extensive technology, applications it is attempting to exploit through subsidiaries.

Mashinostroenie has maintained its state-sponsored defense business better than the other enterprises as it has been in a priority field; however, this is still inadequate to support the enterprise at its previous size. Mashinostroenie has developed and marketed new products utilizing its technological capabilities but addressing totally new markets. It has also established an innovation fund for the development of new products.

Impuls has had the most difficult product line transition of the four major enterprises in that it had not previously produced any end products, and the defense market for its research and high-technology components has declined dramatically. Impuls is pursuing a variety of high-technology products, but its greatest success to date has been a low-technology bill counter sold primarily to the banking industry. This has required developing complete capability for manufacturing, cost control, and marketing. Operationally it has achieved some of the largest structural changes of any of the enterprises.

MCST is a new company formed to respond to a high-technology market opportunity. While the products it produces are very different from those its personnel produced previously, the technical skills of its key personnel were very adaptable to these new products. Software in particular does not require many of the functional capabilities needed for manufactured products.

ELVIS+ is also a relatively new company formed around the technological capabilities of a few engineers. This enterprise has found it difficult to grow substantially because its most advanced capabilities require a large strategic partner to be fully exploited. In the interim it has engaged in other product developments that while not as technically sophisticated have generated vital revenue.

Another major organizational issue is that of decentralization. The four larger enterprises have sought different balances between maintaining small business entities within the enterprises as divisions versus spinning them off with the greater potential for attracting external investment. The decisions have been complicated by the lack of a complete legal infrastructure, including employment contracts, IPR legislation, and legislation favorable to foreign investors. The approaches have varied from TsAGI's creation of a large number of subsidiaries with varying degrees of TsAGI ownership to the decisions of SAP and Impuls to keep all of the organizational components tightly held as divisions.

I believe that spinning off viable divisions with a large (including majority) equity to outside investors will be essential to the growth, if not survival, of most enterprises. The enterprises themselves simply do not have the capital that will be required to turn advanced technology into competitive, well-marketed products. This spinning off process can be most successful when the enterprise has a core business to provide technology and near-term stability to the subsidiaries. Here again, Impuls has the most difficult challenge of the four larger enterprises because it does not have a core business. In time it may be desirable for an enterprise like Impuls to evolve into a holding company with partial ownership of several diverse businesses.

V. Social Assets

The enterprises have all tried to reduce the financial burden of the social services provided to employees. On the one hand, enterprise leaders recognize that these services are a key element in their ability to attract and retain skilled employees. On the other hand maintenance of these assets can render the enterprises so noncompetitive that they cannot utilize the employees. This problem is closely related to the reluctance to shed labor for efficiency.

The enterprises have taken two general approaches. Some have chosen to divest themselves of these assets by transferring them to the local governments. The others have attempted to turn some of them into self-sustaining businesses that would also sell their services to other enterprises. The choice of approaches should depend on the likelihood of attracting the necessary funds to provide the services. The problem is more one of money than of form of delivery. If other customers can indeed be found, then creating self-sustaining businesses is a logical approach, but it is not clear who such customers would be since virtually all enterprises are in the same bind. There may be a market in the trade and service sector. If the local governments can attract money from organizations such as the World Bank that have indicated an interest in supporting social safety nets, then this policy of transfer may be better.

VI. Accounting

The accounting practices of the Soviet era were not designed to provide adequate financial data to shareholders, creditors, or management; nor do they provide adequate cost accounting data for managers to improve efficiency. In addition the accounting practices do not utilize the international standards that are necessary for international business transactions. The old accounting systems were designed to provide the state with data on production and employment, and even these figures were subject to falsification.

Many of the enterprises have taken steps to incorporate rudimentary cost accounting systems. These systems may not have all of the format of modern accounting systems, but they are becoming adequate to allocate and track cost elements by product lines, individual shops, or other units of the company. This is a major step toward understanding and controlling costs. It is, of course, much easier to have systems of this type that are basically for internal use; however, the cost data will have to be in more standard formats in order to be informative to outside investors and creditors.

The problems of transition are substantial. In addition to initiating systems based on market-oriented standards, it is necessary to train or retrain the practitioners. This is difficult because of the cultural legacy of Communism, which places value judgments on business concepts that must be treated objectively. In addition to the need for new systems within the enterprises, there is a need for new systems on a national level. Legislation must be couched in the same accounting terms that are used at the enterprise and international levels. The banking and stock market systems must also be compatible. There is similarly a need for a structure of independent auditors and for regulatory bodies such as the Securities and Exchange Commission or the Comptroller of the Currency in the United States. The accounting systems of all of these entities must be compatible.

VII. Conclusions

In this study we have looked at some of the most important elements of restructuring that are involved in the attempt to generate a viable civilian industrial sector from the assets of the military-industrial complex. There are many other reform activities that must be implemented at the national level to create the environment and infrastructure necessary for the functioning of the restructured industrial sector. We have not addressed these here, but they are equally important and equally difficult to implement. Another issue that we have not addressed is the pandemic presence of organized crime, which is a huge financial “tax” on economic activity as well as a disincentive to entrepreneurship and investment. I believe that this is the largest single problem threatening the economic stability of Russia today.

Perhaps the most difficult challenge is that all of the reforms must evolve simultaneously. The industrial changes are being attempted in the presence of one of the greatest (if not the greatest) systemic economic shifts in history. And all of these reforms are interdependent. On the face of it, the task sounds virtually impossible, but the results are far more encouraging than such a scenario suggests. The enterprises in our study, and many others that we have observed, are not only surviving, but they are beginning to take a longer-term perspective and plan for the future.

The study is biased in so far as it excludes those enterprises that were not reform oriented. There are of course many enterprises that are not surviving, but this is inevitable and healthy in the light of the previous overindustrialization. The achievements of the enterprises studied, the means of reaching those achievements, and the lessons learned are applicable to other enterprises in similar circumstances (product lines, markets, degree of vertical integration, level of technology, etc.), but many of them cannot be applied to enterprises with vastly different circumstances. Enterprises determined to rely on state subsidies will not find these lessons of much value. They would only succeed in a different future from the market-oriented one that we, and more importantly the enterprises studied, are anticipating.

The burden of enterprise conversion and restructuring will continue to have to be carried primarily by the enterprises themselves. In the long run this is probably good. While the state could assist more in providing the legal environment and infrastructure, it would probably be a disaster for the state to get involved in the enterprise restructuring per se, even of the state-owned enterprises. In addition, many enterprise managers are proving to be adaptable, and they will become far more capable once they solve their problems themselves. A key

element of the new industrial structure should be a sector of small high-technology companies that will more easily shed the legacies of the Communist system as well as provide the innovation and jobs as does the equivalent sector in the United States.⁶ Creation of this sector will be more conducive to attracting foreign investment. This sector is starting to emerge through the decentralization approaches of many enterprises.

Notes

¹ Ksenia Gonchar, "Employment Aspects of Defense Conversion in Russia," paper presented at the Bonn International Center for Conversion/CISAC workshop on "Conversion of the Defense Industry in Russia and Eastern Europe," August 1994.

² David Bernstein, "Conversion," in *Can the Russian Military-Industrial Complex Be Privatized? Evaluating the Experiment in Employee Ownership at the Saratov Aviation Plant*, ed. Michael McFaul (Stanford: Center for International Security and Arms Control, 1993).

³ Kenneth L. Adelman and Norman R. Augustine, "Defense Conversion: Bulldoze the Management," *Foreign Affairs*, Spring, 1992.

⁴ British Broadcasting Corporation, *Weekly Economic Report on Former USSR*, October 14, 1994.

⁵ As in Chapter VIII, products is used here to include services as well as manufactured products.

⁶ David Bernstein, "Spin-offs and Start-ups in Russia: A Key Element of Industrial Restructuring," in *Privatization, Conversion, and Enterprise Reform in Russia: Selected Conference Papers*, ed. Michael McFaul and Tova Perlmutter (Stanford: Center for International Security and Arms Control, 1994).