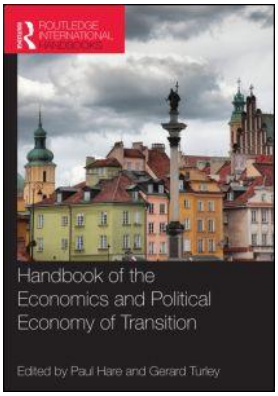

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FROM USSR TO RUSSIA
The fate of the military economy

Julian Cooper

Introduction

One of the factors complicating post-communist economic transformation in the Russian Federation from the beginning of 1992 was the existence of an extremely large military sector employing many millions of people in the armed forces, the defence industry and agencies concerned with the planning and management of this hypertrophied system for the defence of the country. It was not only the scale of this military capability that presented a problem, but also its structure and mode of functioning. For decades this had been the highest priority sector of the Soviet economic system, used to working with the best-quality resources available, relatively generous funding and strong political support at the highest levels of the Communist Party and state. The collapse of the USSR and communist rule at the end of 1991 had a profound impact on the military economy, with powerful echoes even two decades later.

The USSR military economy

The core of the defence industry of the USSR was administered, for most of the final 25 years of the country's existence, by nine industrial ministries, often referred to simply as the 'nine', overseen by a high-level co-ordinating agency, the Military-Industrial Commission. In addition, some industrial enterprises of nominally civilian ministries also produced armaments alongside civil goods such as tractors, motor vehicles and energy sector equipment. However, most of the enterprises of the defence industry proper also produced civilian products, including consumer goods (mainly electrical and electronic) and certain material inputs and equipment required in the manufacture of armaments, such as special steel and machine tools, which the civilian industrial ministries concerned were unable to supply to adequate quality and precision. This in-house supply of inputs also reduced the vulnerability of the defence industry to the supply breakdowns endemic in the Soviet economy: in 1990 approximately 60 per cent of total output was military, i.e. armaments and other military hardware made to the order of the armed forces or produced for export, the rest civilian. The activities of the defence industry were shrouded in an extraordinary level of secrecy, only relaxed to a modest degree in the final years when Mikhail Gorbachev was leader.[1]

The defence industry was indeed of a massive scale. By 1990 it employed over 8 million people, including almost 1.5 million in research and development (R&D). This was over 19 per

cent of total industrial employment. Its output represented 12 per cent of the total output of industry as a whole. However, as noted, the defence industry also manufactured many civilian goods, in particular those of a relatively high technological level. Indeed, almost all high technology industry in the USSR was undertaken within the defence sector, so much so that in 1990 half the industry's total production was of civilian goods. In the same year almost 80 per cent of all industrial R&D undertaken in the country was performed by the defence industry and almost 70 per cent of this was for military purposes.[2]

The work of the defence industry was coordinated by a small (in terms of personnel) but powerful agency, the Military-Industrial Commission. Just as the Soviet economy as a whole was producer-driven, with very weak customer power, this was also true of the defence industry, which to a large extent was able to determine the types of weapons supplied to the armed forces and their volume. Only in the late Gorbachev years were the military able openly to voice their discontent with this one-sided arms procurement system.

The USSR was a very large-scale exporter of armaments. During the 1980s the volume of arms exports approached US $20 billion a year. In principle, the earnings from these exports should have strengthened the trade balance and permitted more imports, including consumer goods. In practice, many of the arms were supplied on very generous credit terms with little expectation of full repayment, or given away as gifts. Thus in 1986–90, according to official sources, only a third of arms were sold for cash, 40 per cent were supplied on credit and 27 per cent were given away or transferred at heavily discounted prices.[3] Arms were transferred to Warsaw Treaty Organization partners, nations regarded as close political friends, and to less developed countries in the hope that they would support Soviet policies and, perhaps, take the path of socialism. Only towards the final years of the Soviet Union did a more commercial approach begin to develop, with arms being sold for hard currency to some Middle Eastern oil-rich nations.

For most of the post-war years, Soviet military spending was totally non-transparent and the official figure for budget spending on defence in the annual State Budget covered only personnel and maintenance, the financing of all arms procurement, R&D, nuclear weapons, construction being hidden in other budget chapters. With *perestroika* and *glasnost*, the Soviet leadership began to publish a more comprehensive version of the defence budget. For 1989 the USSR declared a figure of just over 8.0 per cent of gross national product (GNP) but this referred to the Ministry of Defence (MOD) forces only.[4] For the same year the Central Intelligence Agency (CIA) estimated a total spending on the entire military effort of almost 18 per cent GNP.[5] In the present author's view, 14–16 per cent represents a more credible share of GNP in 1988–89.[6] In 1988 the Soviet leadership decided to reduce military spending and, at the same time, embarked upon a policy of 'conversion', meaning, in principle, replacement of military production by civilian, with a direct re-orientation of production capacities to alternative uses.

However, it was not the scale of the military effort alone that had a deleterious impact on the performance of the Soviet economy. This was a point that many liberally minded critics during the Gorbachev years failed to grasp, sometimes leading them to propose wildly exaggerated estimates of the size of the 'monster', as the military-industrial complex was often termed. The first important issue is the one that the economist Yurii Yaremenko (1981) understood: the fact that the defence industry, the highest priority branch of the economy, was allocated the best available quality material inputs and provided with funding allowing it to offer favourable conditions of employment, permitting it to employ the most highly skilled personnel. Lower priority sectors were deprived of quality inputs, material and human, and were unable to work as effectively or to produce high quality products. Over time, this structural distortion of the Soviet economy became ever more pronounced and became a factor inhibiting the overall development of the economy. This argument relates to that of Kornai (1980): the defence

industry of the USSR became habituated to very soft budget constraints. Finance as such was a secondary factor, what mattered was access to real human and material resources of adequate quality, and these were assured.

Yaremenko's argument was taken further by a leading Soviet authority on military matters, Vitalii Shlykov, a former military intelligence officer. It was Shlykov who coined the term 'structural militarisation' to characterise the state of the Soviet economy (Shlykov, 1995). He was the first in the USSR to focus public attention on the extraordinarily elaborate system of mobilisation preparation that had developed in the country from the 1930s. In Shlykov's view, this system had become the 'sacred cow' of Soviet national security policy (Khrapovitskii, 1991). In the USSR countless enterprises, military and civilian, were obliged to maintain substantial spare production capacities to be engaged rapidly in the manufacture of armaments or other military-related goods in the event of war or national emergency, the so-called 'special period'. In order to undertake such production, enterprises were also required to stockpile materials, components and other inputs, and to ensure that workers were properly trained to switch to military work if required. In the European part of the country, these reserves had to be sufficient for three months of wartime production; in the Asian part, six months. This extraordinarily elaborate and costly system was shrouded in almost total secrecy.[7]

As Shlykov has persuasively argued, this system had an impact on the whole economy, not just the defence industry. Mobilization plans could involve preparation for potential increases in military output of 10 times or more. In order to supply this production, the metals industry, chemical industry, civilian machine building and energy sector, and other industries providing inputs also had to maintain spare capacities and in some cases keep them in operation in the event of need. This was an extraordinarily wasteful system, giving rise to massive spare capacity and low levels of productivity, over time deepening the structural distortions of the economy. In Shlykov's opinion this 'structural militarisation' played a significant role in the weakening and eventual failure of the Soviet economic system.[8] Interestingly, this view has been echoed more recently by none other than the head of the leading economic research centre of the MOD, the 46th Central Scientific Research Institute, the responsibilities of which include drawing up the long-term armaments programme. After an overview of the Soviet mobilization preparation system, Vasilii Burenok concluded that the demands of attempting to guarantee the security of the country in this way had consequences: 'The breakup of the USSR and the destruction of its economy are explained, not in the last instance, by the efforts to fulfil demands of this type, that overstrained the capacities of the state and brought it to a catastrophe.'[9]

In March 1989 there was a decision to reduce Soviet military expenditure by 14 per cent over the period 1988–91, including a reduction of spending on arms procurement by 19.5 per cent and on military R&D by 15 per cent. According to data published later, this intention was over-fulfilled: in the event, the reductions were 29 per cent for procurement and 22 per cent for R&D.[10] As spending was being reduced, many defence enterprises were under pressure to increase their civilian output, in particular their manufacture of televisions, washing machines, refrigerators and other household goods, the government seeking to expand the output of goods in demand that would absorb some of the rapidly growing monetary overhang. Meanwhile, *Gosplan* and the defence industry ministries worked on a highly ambitious state conversion programme for the years 1991–95, which was eventually approved in December 1990.[11] By this time the ministries of the defence industry had already been allocated enterprises from the disbanded Ministry of Machine building for the Light and Food Industries and some plants making medical equipment. The programme was elaborated in typical Soviet fashion with detailed targets and investment allocations on the assumption that the traditional planning system would continue to function, but by the time it had been approved this was no longer

the case. The economic system was in crisis and the conditions for the realization of the conversion programme had to a large extent disappeared. In the event, many defence enterprises did start new civilian production but this usually did not involve any conversion of capacities previously devoted to military work; instead, these capacities, if no longer receiving orders, were mothballed in order to retain production capabilities in the event of mobilization for war.

After the attempted coup of August 1991, the leaders of which included three prominent figures of the defence industry, the administrative structures of the military economy rapidly unravelled. *Gosplan* had already been transformed into the Ministry of the Economy, and in November the Military-Industrial Commission was abolished and all but one of the industrial ministries dissolved, the only one to be retained, on security grounds, being that for the nuclear industry. By this time an increasing number of defence industry organizations in the republics, which had declared their sovereignty, adopted a republican status and no longer recognized the authority of Moscow. The highly disciplined and coherent Soviet military-industrial complex, to a large extent, had already ceased to exist before the final end of the USSR in December 1991.

The 1990s: transformation and contraction

In independent Russia from the beginning of 1992, the military economy underwent far-reaching transformation, just as the economy as a whole underwent market transition. Firstly, the scale of budget funding of the armed forces contracted rapidly and to a very considerable extent; secondly, spending on arms procurement and R&D was cut even more radically than total spending on defence, with extremely severe consequences for the defence industry; thirdly, the defence industry was not immune to privatization and the general 'disorganization' that characterized the economy as a whole. The impact of these factors was unambiguous: the output of the defence industry, especially of armaments and other military hardware, collapsed, with a rapid shrinkage of employment. To some extent the blow was cushioned by arms exports, but overall the principal motivation of defence industry managers became survival. The dramatic downsizing of the vast Soviet defence sector was not undertaken to any coherent plan, but was overwhelmingly a spontaneous process of adaptation to rapidly changing economic conditions.

In the early months of 1992 the new Gaidar government wrestled with the problem of drawing up a feasible budget for the year, initially for the first quarter only, in an attempt to reduce the massive deficit which developed during the final years of the Soviet Union. This followed price liberalization at the beginning of the year, a process that had an immediate, negative, impact on the defence industry. It was decided to reduce military expenditure but to focus the cuts on procurement and R&D, in recognition that manpower reductions could not be implemented immediately. As a result, expenditure on arms procurement was cut by two-thirds at a stroke.[12] In taking this action the government received support from the military leadership, which acknowledged that there were vast stocks of weapons available, supplemented by equipment withdrawn from countries previously in the now dissolved Warsaw Treaty Organization. The scale of the cuts caused panic in the defence industry, which pressured the government, not without success, to pursue an active arms export policy. In reality, results were modest but to some extent production levels were maintained during 1992, most of the finished arms finding no buyers.[13] In the expectation that the policy of reduced procurement would be reversed, heightened by the dismissal of Gaidar as acting Prime Minister in December 1992, enterprises endeavoured to retain their employees. As argued by the above-mentioned Shlykov, this was done in part by disposing of stockpiles of non-ferrous metals and other materials held under the Soviet system of mobilisation preparation.[14] The export of mobilization reserves,

strictly forbidden but possible in the circumstances of fragmented authority in the early 1990s, was a profitable business that helped to keep many enterprises afloat, at least in the short term.

Military expenditure remained severely constrained until the 1998 financial–economic crisis and beyond, only easing to some extent after the year 2000. To make matters worse for the defence industry, allocations to defence in budget laws were increasingly subject to sequestration. By 1997 the military output of the defence industry had fallen to less than one-tenth of its 1991 level. Civilian output held up more strongly, but the overall output of the industry was still less than one-fifth of its level in the final Soviet year.[15] By 1997 total employment in the defence industry in Russia, excluding the nuclear weapons sector, was almost 2.8 million, including 600,000 in R&D, compared with over 6 million in 1990, 1.3 million of whom had been in R&D.[16]

As the privatization campaign gathered pace in 1992, Anatolii Chubais, chair of the State Committee for the Management of State Property (GKI), made it clear that the defence industry would not be immune. As part of preparation for possible privatization, many of the production associations and research–production associations, groupings of enterprises into corporate structures that had been created in the USSR from the early 1970s, were disbanded, on the principle that enterprises and R&D organizations would be privatized as separate units. Many defence industry directors vigorously opposed possible privatization and succeeded in diluting the GKI's original intentions.[17] As a result, by the end of the 1990s three-quarters of all defence industry enterprises and organizations remained in full state ownership or had state shareholdings, of varying size, from a single 'golden share' to 75 per cent or more, and just one-quarter were fully privatized joint stock companies.[18] By branch, the electronics and aviation industries had the largest share of fully privatized companies, the munitions, ground forces equipment, and shipbuilding industries had the smallest.

In privatizing defence companies, two considerations complicated the process. Firstly, a feature of such enterprises in Soviet times was the attachment to them of extensive provision of housing and diverse social assets considered vital in maintaining stable, suitably skilled, labour collectives. Secondly, notwithstanding market transformation and the new post-Cold War security situation, the elaborate system of mobilization preparation inherited from Soviet times remained intact, albeit with somewhat reduced expectations as to the scale of reserve capacities that had to be maintained. Officially, these obligations extended equally to both state and privately owned enterprises fulfilling state defence orders, although in practice they proved more difficult to enforce at the latter.

With Vladimir Putin as President from early 2000, following the initial post-crisis recovery fuelled above all by the sharp devaluation of the rouble from August 1998, the economy began to revive and prospects for the military sector began to improve for the first time in almost a decade. Military expenditure on the MOD forces as a share of GDP stabilized at around 2.5–2.7 per cent.[19] Gradually, budget allocations on the annual state defence order, covering the procurement of new armaments, the repair and modernization of existing arms, and military R&D, began to increase, permitting the purchase of modest volumes of new strategic missiles, tanks and armoured vehicles, and by the end of the decade a few combat aircraft, helicopters and naval vessels.

This increased domestic acquisition improved the economic situation of some enterprises, but for most of the decade from 2000 it was growing arms exports that kept key enterprises alive and permitted some new investment. The volume of arms exports increased from US $3.7 billion in 2000, to US $6.2 billion in 2005 and US $10.4 billion in 2010.[20] However, these exports were heavily focused on a limited range of systems and companies, in particular combat aircraft (Sukhoi and to a lesser extent MiG), helicopters, air defence systems, supplied by the 'Almaz-Antei' corporation, some diesel-electric submarines and surface naval ships, and tanks and other

armoured vehicles. Some strategically important companies were unable to benefit from export orders because of the nature of their work, in particular those involved in building strategic nuclear missiles.

During the 1990s the defence industry underwent numerous administrative changes, ranging from initial leadership by a Committee for the Defence Industry, to a Ministry in 1996, then the Ministry of the Economy, followed by a number of specialized agencies. During the late 1990s some stability was finally achieved, with oversight of the industry being vested in the Ministry of Industry.[21] The Federal Space Agency (*Roskosmos*) was responsible for the missile-space industry, the Federal Nuclear Agency (*Rossatom*) for nuclear weapons, and from the end of 2007 some 330 enterprises and organizations of the defence industry were transferred to a state corporation, *Rostekhnologii* ('Russian Technologies'), although remaining subject to the general oversight of the industry ministry. In 2006 a new Military-Industrial Commission was organized, headed by a deputy prime minister, but while taking responsibility for the state defence order and the system of mobilization preparation, it was not granted the strong powers to command lower level organizations enjoyed by its Soviet predecessor.

From 2000 there was a concerted effort by the government to group defence industry organizations into a limited number of corporations, so-called 'integrated structures'. This proved to be a difficult, protracted process as many enterprises resisted incorporation, often backed by regional authorities, concerned that tax revenues obtained from local enterprises would be centralized in Moscow. As of 2011 this state-led process of restructuring was still underway but many free-standing enterprises still remained. However, by then several significant corporate structures had been formed, including the above-mentioned 'Russian Technologies', the 'United Aircraft Corporation' (all fixed-wing aircraft building), the 'United Shipbuilding Corporation' (the majority of shipyards) and 'Almaz-Antei' for air defence systems. As a result, the Russian defence industry is now dominated by a relatively small number of monopoly, or near-monopoly, producers, a process justified by the government in terms of the need to respond to international competition. However, the absence of competition in the domestic market has generated problems, as discussed below.

From 2000 the output of the defence industry steadily increased on an annual basis, but even by 2010 the level of 1991 had still not been recovered. Thus, for military goods, barely half the 1991 output had been reached, for civilian goods, 70 per cent.[22] In 2010 almost 70 per cent of total output was of a military character, a share somewhat larger than that in late Soviet years, in part because of the inadequate competitiveness of many of the sector's products, but also because by this time some predominantly civil enterprises had left the defence industry.[23] The employment of the industry had almost stabilized, with some 1.6 million in industrial activity and 500,000 in R&D.[24] The large number employed in R&D can be explained in part by the low productivity characteristic of this sector in Russia, but also by the fact that budgetary funding of research is less rigorously monitored than budgetary funding of production activities, leading to the suspicion that military-related R&D is characterized by considerable waste of resources. But in individual branches the loss of personnel had been dramatic, for example, the electronics industry, responsible for components, by 2007 had 100,000 employees, compared with 724,000 in 1990.[25]

However, with only modest recruitment of new workers, largely because of relatively low pay compared to the average for industry as a whole, not to speak of more dynamic sectors such as financial services, the defence industry's personnel have aged: in 1990 the average age was 39 years, by 2008 approaching 50.[26] Of all the sectors of the defence industry, it is electronics that exhibits the most serious loss of capability. Notwithstanding an official policy, at least until the late 2000s, of almost total reliance on domestic sources of supply for all armaments delivered to the Russian armed forces, there has been a mounting dependence on imported electronic components.

One significant aspect of the Soviet military economy, inherited by Russia, remained virtually unchanged for many years and began to be reformed only in recent years: this was the system by which the military procured new armaments. In the USSR the military was a relatively passive customer for armaments, with the defence industry able to a large extent to dictate what weapons were supplied and also the quantities delivered. This was a producer driven system and the memoir literature suggests that this bias became even more pronounced after the appointment of Dmitrii Ustinov, with a background in defence industry management and oversight, as defence minister in 1976. However, the military were able to exert some influence on the quality of weapons through its network of 'military representatives' who were located at enterprises and development organizations to monitor their work on behalf of the customer. In addition, the technical specifications of new armaments were partly determined by the staff of the ordering agencies of the military. In independent Russian in the early 1990s when a civilian, Andrei Kokoshin, a specialist on the USA, was first deputy defence minister, there was interest in moving towards a US-style customer-driven procurement system, but practical results were minimal.[27]

Central to the system of arms procurement are the ten-year state armaments programme and the annual state defence order. The programme, updated every five years, sets out the military's requirements, with funding estimates based on the economic forecast of the economics ministry and the budget forecast of the finance ministry. The programme does not have legal force but to a considerable degree is supposed to determine the state defence order, which in recent years has been drawn up by the Military-Industrial Commission and signed into law by the President. Russia's experience with the armaments programme has been negative. The programmes adopted to 2005, 2010 and 2015 were all abandoned as unrealizable, largely because they were elaborated on the basis of over-optimistic economic forecasts, including inadequate allowance for inflation.

At the end of 2010 the latest programme, to 2020, was adopted. This proved to be extraordinarily ambitious, with total spending of almost 21 trillion roubles (*c.* US $700 billion), including 19 trillion roubles for the MOD, in order to secure a fundamental modernization of the equipment of the country's armed forces.[28] The preparation of this programme was in part a response to the experience of the Russian armed forces in the brief war with Georgia of August 2008. This exposed some serious deficiencies in the armaments deployed and focused the attention of the political leadership on the need for decisive action.

The war with Georgia also prompted a far-reaching reform of the MOD forces to give them 'a new face', to use the term adopted by the civilian minister, former chief of the Federal Tax Service, Anatolii Serdyukov. As part of this reform there have been vigorous efforts to transform the arms procurement system, with two main directions. First, the ordering of armaments and the conclusion of contracts with the defence industry contractors is being civilianized, with the creation of a new agency, *Rosoboronpostavka*, the head of which, Nadezhda Sinikova, is a former deputy leader of the tax service. The ordering process is being monitored by another civilian agency, *Rosoboronzakaz*.[29] Second, the military's role in implementing the annual state defence order has undergone a significant change. Whereas in the past the military simply accepted the terms offered by industry, in particular the prices charged for armaments, with the order for the year 2011, the MOD, backed by President Dmitrii Medvedev and Prime Minister Vladimir Putin, played the part of a tough and demanding customer, refusing to accept prices it considered to be excessively high. To some extent the high prices being demanded by some defence enterprises reflects a Soviet-era legacy: they have extraordinarily high overheads because they seek to maintain the inherited social infrastructure, retained in the defence industry to a greater extent than in other sectors, and also to finance the retention of substantial unused capacities, kept to

meet possible mobilization demands. However, they also reflect the monopoly position of many suppliers. The tough negotiations resulted in long delays in placing orders but the move signalled a fundamental change in the balance of power: producer dominance is over, now the MOD is to be a demanding customer, very much on the lines of the acquisition system of the USA, although, as is well known, such a system is also not without problems.

In making this belated reform the MOD, backed again by the government, made it clear to industry that in the event that it failed to meet the military's requirements, armaments would be imported. To underline the point, in June 2011 a deal was signed with the French company DCNS for the purchase of two 'Mistral' class helicopters carrying amphibious assault ships, at a cost of €1.2 billion.[30] However, this was not the only acquisition of foreign military technology: Russia has also purchased armoured vehicles from Italy, unmanned aviation vehicles from Israel, night vision systems from France and light armour from Germany. Until recently the defence industry always knew that the military would procure its products, even if they did not meet requirements, because there was no alternative, a strict policy of domestic supply only being observed.[31]

Conclusion

In retrospect it is difficult to see how the downsizing of the military economy could have been achieved by other means. The institutional conditions for an orderly, programmed, process were lacking. The administrative capacities of the Russian state were extremely weak during the 1990s and the organizational structures that had managed the military economy in Soviet times had been liquidated or, if they still existed, failed to function with any effectiveness. The sharp contraction was painful and costly, but what is striking is the extent to which many of the relatively highly-skilled labour force of the defence industry proved able to find alternative employment on their own initiative. However, the fact remains that for almost twenty years the Russian armed forces received very few new weapons and the stock of equipment inherited from Soviet times degraded inexorably. By 2010 re-equipment had become a necessity and it is not surprising that the political and military leadership embarked upon an ambitious state armaments programme. However, over a 20-year period much of the defence industry had also been starved of investment and hired only a limited number of new personnel. Its ability to meet the new challenge must be in serious doubt. In a few years time, Russia may have little choice but to open up the military economy and promote large-scale international cooperation. By 2011 this process had started but on a very cautious basis. Its further development will mark the true end of the USSR military economy.

In assessing the extent of transformation since the end of the USSR it is relevant to consider the present-day Russian military economy from the perspective of the analyses of Kornai, Yaremenko and Shlykov. Firstly, it is clear that soft budget constraints, though less prevalent and not as soft as in Soviet times, still exist. One of the factors promoting the creation of large corporate structures such as *Rostekhnologii* and the 'United Aircraft Corporation' was the fact that many enterprises working for the state defence order are loss making. By grouping them with profitable enterprises, cross subsidisation became possible, just as it was within Soviet industrial ministries. In the case of *Rostekhnologii*, according to its general director, Sergei Chemezov, one-third of the enterprises entering into the corporation when it was created in late 2007 were bankrupt or in a near-bankrupt state.[32] During the 2008–09 financial-economic crisis, a quite large number of defence enterprises received budget support to keep them functioning.

Secondly, the structural regime, with its associated price distortions, as conceptualized by Yaremenko, has largely disappeared. Indeed, some of the cost and pain of transformation experienced by the military economy can be explained in part by its adaptation to the loss of the administratively secured special conditions that it enjoyed in Soviet times. Now, if a defence

industry enterprise wishes to secure highly skilled personnel or acquire high grade production equipment, it has no choice but to provide competitive remuneration or pay the ruling market price.

Thirdly, the structural militarization, as analysed by Shlykov, has to a large extent disappeared, but not completely. The elaborate system of mobilization preparation still exists but on a reduced scale and appears to be restricted more narrowly to the immediate defence sector rather than ranging widely over the civilian economy. However, since responsibility for management of the mobilization system was switched in 2008 from the Ministry of Economic Development to the Military-Industrial Commission it has once again become a matter of high-level state secrecy, making an assessment of its status almost impossible.

Overall, it can be concluded that the two decades since the Soviet system began to collapse have seen a substantial systemic transformation of the military economy. It is no longer the 'monster' or 'state within the state' as it came to be regarded in the final years of the USSR, but with its nuclear capability and role as the world's second largest arms exporter, it is by no means a minor actor in present-day Russia. However, the capability of the defence industry is extremely uneven and future development is likely to involve increased international engagement.

Notes

1 For an overview of the Soviet defence industry, see Cooper (1991).
2 Data from Cooper (2006), pp. 132–33.
3 Data from *Nezavisimaya gazeta*, 29 September 1992 (P.Fel'gengauer). The latter category may have included arms supplied according to barter arrangements, but details are lacking.
4 Calculated from Alexashenko (1993), p.7 and Goskomstat SSSR (1991), p.5.
5 Firth and Noren (1998), p. 130.
6 Cooper (1998), p. 246. Note, the military share of GDP in the USA in 1989 was 5.8 per cent; in the UK, 4.0 per cent (SIPRI (1991), p. 174).
7 Significantly, when a fuller version of the defence budget was eventually published in 1989, it did not include spending on the mobilization preparation.
8 Shlykov (2002), p. 149 ('… the economic collapse of the USSR was a consequence in the first instance of the system of mobilization preparation of the economy.')
9 Burenok (2011), p. 6.
10 See Vinslav (2006), part 1, p. 45.
11 Vinslav (2006), part 1, p. 51.
12 See Cooper (2001), p. 246.
13 See Cooper (1997), pp. 174–95 on Russian arms export policy in the early 1990s.
14 See Shlykov (1995), pp. 27–29.
15 Cooper (2001), pp. 317–19.
16 Cooper (2010), p. 156 and Cooper (2006), p. 133,
17 On defence industry privatization, see Sánchez-Andrés (1995) and (1998).
18 Http://ia.vpk.ru/vpkrus, accessed 11 February 1999 (Information Agency TS VPK).
19 Cooper (2010), p. 147.
20 *Ibid*., p. 153, and www.vpk.name/news/5180, 18 April 2011.
21 See Cooper (2010), p.155.
22 Calculated by the author from data of Information Agency TS VPK (www.vpk.ru) and, for 2010, www.rosprep.ru/news, 19 April 2011.
23 www.minpromtorg.gov.ru/special/gov/20/36, accessed 23 April 2011.
24 *Ibid*., p.156.
25 *Strategiya razvitiya elektronnoi promyshlennosti Rosii na period do 2025 goda*, Moscow, 2007, p.13 and *Sovestskaya Rossiya*, 17 April 1999.
26 Cooper (2006), p. 133, and http://nvo.ng.ru/concepts/2008=06=20/1_opk.html, 20 June 2008.
27 See Cooper (1993), pp. 152–54.
28 http://nvo.ng.ru/armament/2011-03-11/8_opk.html, 11 March 2011, Vladimir Shcherbakov, 'Bol'she zhelaniya i skromnye vozmozhnosti'.
29 See http://rosoboronpostavka.ru and http://www.fsoz.gv.ru.

30 www.rg.ru/2011/06/14/mistral-anons.html, 14 June 2011.
31 The only exception was supply from other former Soviet producers in countries of the Commonwealth of Independent States considered reliable, in particular Belarus.
32 www.rostechn.ru/archive/3/detail.php?ID=7403 (from *Novaya gazeta*, 21 April 2010, interview with Sergei Chemezov).

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