7. Arms production

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I. Introduction

The arms production sector has undergone profound change in many countries, both quantitatively and qualitatively. The catalyst for this change was the end of the cold war, which brought a sharp reduction in Russian arms procurement and arms exports and a smaller although still significant decline in arms procurement and arms exports in the industrial countries in the West. The change in security policies and force structures since the end of the cold war, long-term developments in military technology and the continuous increases in the cost of advanced weapon systems have also brought about a change in the type of weapon systems and services demanded. The 11 September 2001 terrorist attacks in the USA are likely to result in yet another shift in military–industrial developments because of their impact on security requirements and international relations, including the military–industrial sphere.

Most of the decline in the volume of arms production took place in the first half of the 1990s, when the main trends in the arms industry were downsizing, rationalization and diversification into civilian production.[1] Since the mid-1990s the decline in the volume of output has levelled out. The main trends in the development of the arms industry in this period were associated with the strategies developed by the major surviving companies to enable them to remain competitive on a global scale. Section II of this chapter analyses the results of these developments for the concentration, internationalization and privatization of arms production. It assesses how far these processes had developed by the early 2000s, both in the main centres of arms production in the United States and Western Europe and in some of the minor arms-producing countries in Europe and other regions as a result of the sales and marketing strategies of large supplier companies. While the dearth of data in the field of arms production makes it difficult to obtain a comprehensive empirical picture of these trends, the chapter draws on the SIPRI database on arms-producing companies and data on national arms production to identify the broad characteristics of the arms industry currently. Section III discusses the specific features of developments in the Russian arms industry, although the data are still too weak to allow a comparative analysis. Appendix 7A presents financial and employment data on the 100 largest arms-producing companies in the Organisation for Economic Co-operation and Development (OECD) and developing countries. For the first time it has been possible to

[1] See previous editions of the SIPRI Yearbook.

Table 7.1. National arms sales[a] and arms exports,[b] Western Europe, 1990–2000

Figures are in US $m. at 2000 prices and exchange rates. Figures in italics are percentages.

Country		1990	1995	1996	1997	1998	1999	2000	Change (%) 1990–2000
UK	Arms sales	24 470	19 940	21 910	22 730	22 530	19 410	. .	*– 21*
	Arms exports	9 140	8 170	10 430	10 940	9 550	6 630	6 680	*– 27*
France	Arms sales	20 740	13 940	14 280	15 170	14 810	12 370	11 060	*– 47*
	Arms exports	6 430	2 840	4 300	6 260	5 920	3 560	2 490	*– 61*
Germany	Arms sales	12 930	5 790	. .	. .	. .	. .	. .	. .
	Arms exports	890	1000	500	680	650	1 370	630	*– 29*
Italy	Arms sales	. .	3 220	. .	. .	. .	. .	. .	. .
	Arms exports	980	660	620	750	960	840	560	*– 63*
Nether-	Arms sales	1 920	1 440	1 190	1 520	1 490	. .	. .	. .
lands	Arms exports	850	420	730	850	. .	. .	. .	. .
Sweden	Arms sales	1 020[c]	1 040	1 110	1 300	1 490	1 230	1 210	*+ 19*
	Arms exports[d]	460	370	340	340	390	400	480	*+ 4*
Spain	Arms sales	2 770	2 100	2 170	2 310	2 350	2 600	. .	*– 6*
	Arms exports[e]	360	. .	. .	500	450	. .	. .	. .

[a] Data on arms sales are for total arms sales of the country (i.e., for domestic arms procurement and for export). For some countries, such data are provided by the government or a defence industry association, for other countries they are estimated by SIPRI, by adding arms exports and subtracting arms imports from figures for national arms procurement.

[b] Data on arms exports are provided separately from arms sales and are seldom comparable to arms sales because of differences in the definition of military equipment. Therefore, the table does not show arms exports as a percentage of arms sales. The use of such shares in a cross-country comparison would be somewhat misleading.

[c] Data are for 1991.

[d] The Swedish definition of arms export changed in 1993.

[e] Data on arms exports are derived from Ministry of Defence, *La industria de defensa en España, 1999* [The defence industry in Spain, 1999]. These data differ significantly from arms exports statistics provided by the Spanish Ministry of Economy (see appendix 8E).

Sources: Appendix 7B.

compile similar data, although still tentative, on Russian companies. These data are also provided in appendix 7A together with the sources and methods used in the data compilation. Appendix 7B describes the availability of data on national arms production by governments and defence industry associations and their limitations.

The reduction in the demand for military equipment during the 1990s was significant, both in the aggregate and for some individual countries. NATO statistics show that the combined military equipment expenditures of all NATO countries dropped by 40 per cent in real terms from the peak level in 1987 to 2001—by 43 per cent in the United States and by 35 per cent in NATO Europe, although with great variation between countries. In Europe the reductions took place during the first half of the 1990s. Since 1997 equipment

expenditure in NATO Europe has increased by 6 per cent in real terms. According to the NATO statistics, the decline in total NATO equipment expenditure since 1997 is due to the continuing reduction in US expenditure on equipment.[2]

Estimates of national arms sales—used as an approximation of arms production—for the seven largest arms-producing countries in Western Europe show a sharp decline between 1990 and 1995 in most countries, and a slower decline thereafter (table 7.1).[3] The decline has presumably also been sharp in Germany and Italy, although no statistics are available for these countries. Among the seven countries listed in table 7.1, arms production has increased only in Sweden, a reflection of the JAS-39 Gripen combat aircraft programme. In recent years the decline in arms exports has been sharper than in arms production. Attempts to compensate for decreased domestic arms procurement by increased arms exports thus may not have been successful.

II. Concentration, internationalization and privatization

In the early post-cold war period the decline in the demand for military equipment and the continuously rising research and development (R&D) requirement for major weapon systems reinforced economic pressure to concentrate and internationalize arms production activities and led to increased acceptance of foreign ownership of arms-producing facilities. In countries where much of the arms industry was still under state ownership there was also pressure for privatization in order to enable or facilitate mergers with other companies, particularly in cases of cross-border acquisitions.

The international system for the production and trade in weapons has evolved in line with developments in the mode of production, military technology and the security environment and with military requirements.[4] Changes in the organization and control of the production and sale of weapons have created major changes in the rate of concentration, internationalization and privatization.

The mass production of weapons began in the 19th century as a result of the industrial and technological revolution. A separate military–industrial sector emerged, which was privately owned and produced weapons largely for profit. It was dominated by a few large companies with a markedly international orientation. Exports and production were relatively unregulated, because they were perceived to facilitate the maintenance of innovative capabilities and the productive base. In the late 19th century, one of the largest companies, Krupp (Germany) exported 86 per cent of its arms production. In the period between

[2] See appendix 6B in this volume; and NATO, *Financial and Economic Data Relating to NATO Defence–Defence Expenditures of NATO Countries (1980–2001)*, Press Release M-DPC-2(2001)156, 18 Dec. 2001, URL <http://www.nato.int/docu/pr/2001/p01-156e.htm>.

[3] Similar data for the US arms industry are not available.

[4] Krause, K., *Arms and the State: Patterns of Military Production and Trade* (Cambridge University Press: Cambridge, 1992), summarized in Held, D. *et al.*, *Global Transformations (*Polity Press: Cambridge and Oxford, 1999). See also Dunne, P., 'The defense industrial base', eds K. Hartley and T. Sandler, *Handbook of Defense Economics*, vol. 1 (Elsevier Science: Amsterdam, 1995).

the two world wars, when the demand for weapons declined, the companies formed cartels to divide the reduced international market among them.

Beginning in the 1930s and continuing through World War II the major powers built up indigenous arms industries under national control. The development and production of weapons were focused solely on war. World War II involved a dramatic increase in arms production, a profound reconfiguration of the pattern of arms production and a sharp reduction in the international arms trade. Massive state intervention in the arms trade and production system was required to ensure the supply of arms and continuous military innovation.

During the cold war, arms production and the arms trade were dominated by the two superpowers. Arms production and trade reacquired a global dimension as arms transfers were used by the superpowers in their East–West rivalry. The cold war arms trade system appears to have been an historical exception in that the system of arms production and arms trade was so strongly dominated by governments and conditioned by the bipolar structure of world politics.

Since the end of the cold war, the global system of arms production and arms trade has again undergone a transformation. During this period of shrinking demand and rapid developments in military technology, the arms-producing companies which have emerged as large suppliers have used strategies of growth (primarily through mergers and acquisitions) to remain competitive. They have had to cope with rising R&D costs, access foreign markets and gain leverage with their main customers: national governments. In this restructuring the USA has taken the lead, aided by the size of the arms procurement and R&D budgets of the US Government. This has resulted in changes in the global structure of arms production, its industrial structure, state–industry relations and company characteristics.[5]

Concentration

In modern times, the arms industry has been much less concentrated than comparable civilian high-technology industries. A probable factor behind this difference is the preference for procurement from national production in countries which had the industrial capability and economic resources to do so. However, since the end of the cold war, economic pressure for concentration has resulted in a major shift in government perceptions and policies towards the domestic defence industrial base. There has been an increased acceptance of concentration and monopolistic tendencies in the arms industry.

In the post-cold war period, the rate of concentration has increased significantly among the 100 largest arms-producing companies on the SIPRI Top 100 list. Table 7.2 presents the change in concentration ratios for different groups of the largest of these companies, both in their total markets (total sales) and in their military markets (arms sales). In 1990 the concentration

[5] For an analysis of the consolidation process and its implications for the 1990s see Markusen, A. R. and Costigan, S. S. (eds), *Arming the Future: A Defense Industry for the 21st Century* (Council on Foreign Relations Press: New York, 1999).

Table 7.2. Change in concentration ratios, SIPRI Top 100 companies, 1990–98
Figures are percentages.

	Concentration ratios (% of combined total of Top 100)					
	Arms sales			Total sales		
Company section	1990	1995	2000	1990	1995	2000
5 largest companies	22	28	42	33	34	40
10 largest companies	37	42	58	51	53	57
15 largest companies	48	53	66	61	65	68
20 largest companies	57	61	72	69	73	76

Source: The SIPRI arms industry database.

ratios for arms sales were very low—much lower than for their total sales. This reflects the fact that commercial markets were more concentrated than military markets. By 2000 concentration ratios were considerably higher in the military markets. The increase in concentration in the 1990s was most marked for the group of the 5 and 10 largest companies, but there were also significant increases in other groups. The process of concentration was relatively slow during the first half of the decade. In the second half, the rate of concentration increased considerably.

By 1995 the rate of concentration in arms production was still not as high as in comparable non-military production, but by 2000 the difference had tended to disappear. For the 10 largest companies the concentration was higher in arms sales than in total sales in 2000. This indicates that during the 1990s the dilemma of the choice between the benefits of economies of scale and the benefits of competition, the central defence industrial policy dilemma for the past 40 years, had gradually been resolved in favour of scale.[6] Economic forces have been given freer play in military sales, which has resulted in a concentration rate almost similar to that of the non-military markets—at least for the largest arms-producing companies. This will probably raise difficult political issues. In their arms procurement processes countries will confront large international arms-producing companies with strong market power.[7]

Increased concentration has resulted in an increase in the size of the largest arms-producing companies, both in relation to other companies and in relation to the total procurement budgets of domestic governments. The few very large companies at the very top of the SIPRI Top 100 list in 2000 (appendix 7A) are significantly larger in terms of arms sales than their counterparts in 1990.

[6] For more on the economic dynamics of this policy dilemma see Smith, R., 'Defence procurement and industrial structure in the UK', *International Journal of Industrial Organisation*, vol. 8 (1990), pp. 185–205.

[7] Dunne, J. P. and Smith, R. P., 'The evolution of the international arms industry', Paper presented to the Fifth Annual Middlesex Conference on Economics and Security, Middlesex University, London, 15–16 June 2001, URL <http://bobbins.mdx.ac.uk/~john6/conf2001/paper522001.pdf>. This paper presents a quantitative analysis of the changes in the structure of the market and the degree of concentration in the arms industry based on the SIPRI data on arms-producing companies for the period 1990–98.

These are the companies that emerged as the largest defence contractors from the series of mergers and acquisitions (M&A) in the late 1990s. Growth is the result primarily of acquisitions, not internal growth. The problems associated with large-scale acquisitions—increased debts and difficulties with integrating acquired activities—have led several of the largest companies (e.g., Lockheed Martin, Boeing and Raytheon) to begin divesting some of their non-core activities with the aim of focusing their business activities and reducing their debts.[8] Other companies, such as Northrop Grumman and General Dynamics, continue their expansion in military activities, in particular in information technology (IT) services to the US Department of Defense (DOD).[9]

The high rate of concentration can also be seen in the dominance of a few contractors in government arms procurement. In the USA, the share of the five largest recipients of prime contract awards has increased from 22 per cent of total US DOD prime contract awards in 1990 to 31 per cent in 2000. Two companies, Lockheed Martin and Boeing, received 11 and 9 per cent, respectively, of the total value of US DOD prime contract awards in fiscal year (FY) 2000.[10] Similarly, the domestic arms sales of the British BAE Systems and French Thales—two of the largest European arms-producing companies—accounted for 15–20 per cent of total arms procurement from domestic production in 2000.[11]

Concentration takes place primarily through mergers and acquisitions and through joint ventures. Table 7.3 lists the major acquisitions during 2001 in the Euro-Atlantic area. It shows that although the US M&A peaked in the period 1994–97, the process continued to 2001, albeit on a less intensive scale.

The main development in US concentration in 2001 was the $2.1 billion acquisition of Newport News Shipbuilding, owner of one of six major shipyards in the USA. General Dynamics, owner of three of the other shipyards, was blocked from the acquisition, based on the conclusions of the DOD that it 'would eliminate competition for nuclear submarines' and 'harm competition for surface combatants and for the development of emerging technologies for both nuclear submarines and surface ships'.[12] Instead, the DOD decided to allow the bid by Northrop Grumman, owner of the other two shipyards.

[8] Lockheed Martin had a debt of $10 billion at end-2000. Lockheed Martin, *Annual Report 2000*, p. 56.

[9] 'Flat DOD budgets force contractors to diversify into booming sector', *Defense News*, 26 Feb. 2001, p. 34.

[10] US Department of Defense, *100 Companies Receiving the Largest Dollar Volume of Prime Contract Awards*, fiscal years 1990 and 2000.

[11] Estimates are based on the share of the company's domestic arms sales in total domestic armaments spending. For BAE Systems: £1.5–2 billion in £10 billion; for Thales: €1.5 billion in €10 billion. Company annual reports; British and French official data on national arms sales; and appendix 7B in this volume.

[12] 'Northrop Grumman expects Newport News buyout soon', *Jane's Defence Weekly,* 31 Oct. 2001, p. 34.

Table 7.3. Major acquisitions of arms-producing companies in North America and Western Europe, 2001

Figures are in US $m.

Buyer company (country)	Acquired company	Seller country	Sector[a]	Price	Deal status
Intra-US					
AlliantTech Systems	Thiokol Propulsion	USA	. .	685	Completed
AlliantTech Systems	Unit of Blount Int.	USA	SA/A	250	Agreed
BF Goodrich	Unit of Raytheon	USA	El	. .	Completed
DRS Technologies	Unit of Boeing	USA	El	84	Agreed
EDO	Dynamic Systems	USA	IT	. .	Agreed
General Dynamics	Primex Technologies	USA	SA/A	. .	Completed
L-3 Communications	Unit of AlliantTech	USA	El	. .	Agreed
L-3 Communications	Gov't Service Group	USA	El/IT	38	Agreed
Lockheed Martin	OAO Corp.	USA	IT	. .	Agreed
Northrop Grumman	Newport News	USA	Sh	2 600	Cleared
Northrop Grumman	Unit of Aerojet (Gencorp)	USA	El	. .	Completed
Northrop Grumman	Litton	USA	Sh	2 600	Completed
Titan	BTG	USA	IT	. .	Agreed
Veritas Capital	Raytheon Aerospace	USA	Ac service	270	Agreed
Intra-European					
EADS (FRG/FRA/SPA)	Patria Industries	FIN	El MV SA/A	42	Completed
EADS (FRG/FRA/SPA)	CAC Systèmes	FRA	Ac	5	Cleared
HDW/Ferrostaal (FRG)	Hellenic Shipyard	GRE	Sh	6	Agreed
Transatlantic by USA/Canada					
CAE (CAN)	Unit of BAE Systems	UK	El	80	Agreed
Carlyle Group (USA)	Unit of BAE Systems	UK	El	200	Agreed
FLIR Systems (USA)	Unit of Saab Tech Elecs	SWE	El	. .	Agreed
General Dynamics (USA)	Santa Barbara	SPA	MV SA/A	5	Completed
ONCAP (CAN)	BAE Systems Canada	UK	El	200	Agreed
Transatlantic by Europe					
EADS (FRG/FRA/SPA)	Cogent	CAN	El	. .	Agreed
Thales (FRA)	Magellan Corp and Navigation S.	USA	El	70	Completed
ASML (NET)	Silicon Valley Group	USA	Oth	. .	Agreed
GKN (UK)	Unit of Boeing	USA	Ac	. .	Agreed

USA = United States; FRG = Germany; FRA = France, SPA = Spain, FIN = Finland; GRE = Greece; CAN = Canada, UK = United Kingdom; SWE = Sweden; NET = Netherlands

[a] For sector codes, see appendix 7A.

Sources: The SIPRI arms industry files on mergers and acquisitions.

The decision in favour of Northrop Grumman could be interpreted as a sign that the US Government prefers a degree of competition in its weapon acquisitions. Whether this will be successful is uncertain. In an examination of the implications of this acquisition, the Congressional Research Service (CRS) concluded that it could reduce competition in the construction of aircraft car-

riers and amphibious assault ships as well as in naval radar and combat systems.[13] The deal is an illustration of the dilemma for governments of balancing the promotion of rationalization and economies of scale to achieve cost reduction against preserving competition in an already highly oligopolistic market.

In Europe, the consolidation of national arms industries took place earlier, because of the smaller domestic markets. Further concentration efforts have involved international joint ventures and mergers, resulting in integration on the European level. European integration and transatlantic industrial linkages are described in the section on internationalization.

Impact on company specialization

Reduced budgets for arms procurement after the end of the cold war left arms-producing companies with three options: (*a*) leaving the military market, (*b*) reducing their dependence on military sales through diversification into civilian products, or (*c*) strengthening their position within the military market, primarily through acquisitions. The outcome of industrial adjustment strategies is likely to have a significant influence on government–industry relations. Companies specializing in specific weapon programmes often hold a dominant position in the market and thereby gain strong leverage over governments to favour their systems in the weapon acquisitions selection process.

A comparison between the 10 largest arms-producing companies in 1990 and 2000 illustrates that there has been no reduction in their specialization on military sales between 1990 and 2000. Growth and consolidation through acquisitions does not seem to have led to reduced dependence on arms sales for these companies. The same finding was arrived at by a study of defence specialization in a number of US firms.[14]

The restructuring process has not led to a further specialization of single companies on one specific sector of military production. Companies have maintained, if not increased, their diversification within the military sector largely as a result of acquisitions. None of the world's largest producers of military aircraft—Lockheed Martin, Boeing, and BAE Systems—derived more than 20 per cent of their total sales from sales of military aircraft in 2000. However, several of these companies have focused on a few major weapon programmes. For example, the F-16 and the F-35 (Joint Strike Fighter, JSF) combat aircraft programmes accounted for more than 15 and 25 per cent, respectively, of Lockheed Martin's order backlog in 2001.[15] The contract for the JSF, which is expected to be the only new major combat aircraft development programme for several decades, was awarded to Lockheed Martin as single prime contractor in October 2001, under a 'winner-takes-all'

[13] *Navy Shipbuilding: Proposed Mergers Involving Newport News Shipbuilding: Issues for Congress*, Report by the Congressional Research Service, May 2001, summarized in 'DOD signals relaxed attitude towards mergers', *Defense News*, 8–14 Oct. 2002, p. 6.

[14] Markusen, A., 'The post-cold war persistence of defense specialized firms', ed. G. Susman, *Defense Diversification in the Post-Cold War Era: Corporate Strategies and Public Policy Perspectives* (Elsevier: London, 1998).

[15] See chapter 8 in this volume.

procurement strategy. The contract award was accompanied by an intensive debate on the possibilities of maintaining competing technological capabilities in fighter aircraft production in the USA within the framework of this strategy.[16] Lockheed Martin's third major aircraft programme, the F-22, entered a low-rate initial production phase in 2001. Similarly, for Boeing, its C-17 transport aircraft and F/A-18E/F combat aircraft programmes account for a high share of the company's Military Aircraft and Missiles division sales. Both aircraft are, however, unlikely to be produced in large numbers and Boeing's failure to win the JSF prime contract award may significantly reduce its role as a military aircraft producer.[17] Therefore, government intervention has been discussed to support the company's military activities through other programmes, such as the C-17 and 767 tanker, based on industry considerations rather than on military requirements.[18] Contracts for the US missile defence system are another major source of revenue for Boeing—$1200 million in 2000. These activities accounted for roughly 15 per cent of its Space and Communications sales in 2000.[19]

Internationalization

The arms-producing activities of companies are generally much less internationalized than their commercial activities, because of national security considerations. While there has been a higher degree of internationalization since the end of the cold war, it is still relatively limited. The main forms of internationalization in the arms industry are: international trade, foreign investment, sub-contracting, licensing, mergers and acquisitions, joint ventures and looser forms of inter-firm agreements, including co-production, management consortia and teaming arrangements.[20]

The types and drivers of internationalization vary with the geographical context and between the tiers of producers. The largest Western arms-producing companies derive a significant portion of their sales from exports (10–40 per cent in 2000).[21] For individual weapon programmes, exports can account for an even larger share of total production. Thus, Lockheed Martin sales of F-16 combat aircraft since 1975 included slightly over 2000 aircraft to the US armed forces and almost the same amount (slightly over 1800) for export.[22] New orders in 2000 for the F-16 included 220 for export and only 14 for the

[16] RAND, 'Assessing competitive strategies for the Joint Strike Fighter: opportunities and options', 2001, URL <http://rand.org/publications/MR/MR1362/>, p. 80.

[17] De Briganti, G., 'After JSF, Boeing glides in military market', defense-aerospace.com, 5 Dec. 2001, URL <http://www.defense-aerospace.com/data/features/data/fe215/index.htm>.

[18] Project on Government Oversight, 'The Pentagon attempts to quietly push two sweetheart deals for Boeing through Congress', 26 Nov. 2001, URL <http://www.pogo.org/mici/c17/c17alert.htm>.

[19] Boeing, *Annual Report 2000,* p. 58.

[20] Sköns, E., 'Western Europe: internationalization of the arms industry', ed. H. Wulf, SIPRI, *Arms Industry Limited* (Oxford University Press: Oxford, 1993), p. 190.

[21] Estimates based on available data for the 10 largest arms-producing companies in the OECD and developing countries in 2000.

[22] Lockheed Martin, URL <http://www.lockheedmartin.com/factsheet/product2.html>.

USA.[23] Similarly, Boeing has very high export shares for some of its programmes, including its Apache and Chinook military helicopters, all of which were exported in recent years.

As a result of international mergers and acquisitions many of the major Western arms-producing companies are increasingly expanding their access to foreign markets through the establishment of foreign subsidiaries rather than direct exports alone. Thales has called this strategy a 'multi-domestic' industrial presence.[24] The term epitomizes the acknowledgement by an international company of the preference of national governments to procure domestically produced arms.

The largest West European companies are more internationalized than US companies in terms of foreign subsidiaries. This is true, in particular, for the three companies among the Top 10 in 2000—BAE Systems, EADS and Thales. These companies have pursued very active strategies for investment in foreign companies, not only within Europe but also in the USA, Australia and South Africa. BAE Systems has a strong presence in North America, where its foreign subsidiaries had combined sales of $3.7 billion in 2001 and employed 22 000.[25] Its sales from foreign subsidiaries worldwide accounted for 45 per cent of total sales in 2000.[26] The number of foreign subsidiaries owned by Thales increased from 55 in 1998 to 213 in 2000, largely as a result of its acquisition of Racal (UK). Thales has an extremely high dependence on foreign markets. Foreign sales (exports and sales from foreign subsidiaries) accounted for about 75 per cent of its total sales in 2000.[27]

Internationalization occurs in three different geographical contexts and layers of producers: (*a*) among the major arms-producing companies in Europe, a process which is currently focused on the signatories of the 2000 six-nation Framework Agreement;[28] (*b*) on the transatlantic level; and (*c*) on acquisitions by major Western arms-producing companies in minor producer countries in the context of major arms export deals.

These developments are also linked to different political and institutional processes. Since governments are the arms industry's main customers, their procurement plans and defence policies play a major role in shaping the industry. The future of European defence industrial integration is intertwined with the process of European integration in general and with the development of a European Security and Defence Policy (ESDP) in particular.[29] The tension between the goal of an autonomous military capability for Europe and that of maintaining and developing the transatlantic partnership within NATO is also reflected in the defence industry policies and the developments in industry.

[23] Lockheed Martin, URL <http://www.lockheedmartin.com/spotlight/newslines/newsline18 7.html>.
[24] Thales, *Annual Report 2000*, p. 38
[25] BAE Systems North America, URL <http://www.na.baesystems.com/aboutus.htm>.
[26] BAE Systems *Annual Report 2000,* p. 43.
[27] Thales, *Annual Report 2000*, pp. 8, 71.
[28] Framework Agreement between the French Republic, the Republic of Germany, the Italian Republic, the Kingdom of Spain, the Kingdom of Sweden, and the United Kingdom of Great Britain and Northern Ireland Concerning Measures to Facilitate the Restructuring and Operation of the European Defence Industry, 27 July 2000, URL <http://projects.sipri.se/expcon/loi/indrest02.htm>.
[29] See chapter 3 in this volume.

Integration among the major arms-producing companies in Europe

European integration of arms production capabilities has been limited to cross-border joint ventures because of the difficulties that confront international mergers and acquisitions, most notably the lack of a legal and political framework for transnational companies in otherwise fragmented military markets. However, many of the joint ventures that were formed during the 1990s represent rather broad cooperative structures that may be forerunners to more integrated structures in the future. A turning point was reached in 2000 with the creation of EADS through a cross-border merger of three major aerospace companies—following the creation of BAE Systems through a national merger in 1999. While it is still not clear to what extent EADS represents genuine integration at the management level,[30] and despite the fact that roughly 80 per cent of the company's sales are for the non-military market, its creation marked a milestone in European military–industrial integration. Intra-European integration continued in 2001, with the continued concentration of arms production within large transnational joint ventures (table 7.4). The major events in 2001 included the creation of the British–Italian helicopter joint venture AgustaWestland and the expansion of the British–Italian avionics joint venture Alenia Marconi Systems.

The major European joint venture created in 2001 was the British–French–German–Italian MBDA for the design and production of missiles.[31] Owned by BAE Systems, EADS (37.5 per cent each) and Finmeccanica (25 per cent), it will include the missile activities of Anglo/French Matra BAe Dynamics, of former Daimler-Chrysler Aerospace, of Italian Finmeccanica, and some additional French and British activities with a combined turnover of €2.3 billion ($2.1 billion) and total orders worth €13 billion ($12 billion). The merger was subject to review by national monopoly commissions but national governments invoked an EU clause exempting the merger from a review by EU Commission competition authorities for national security reasons, since arms sales account for 99 per cent of MBDA sales. The EU Commission competition authorities were reported to be considering a challenge of the legality to use this clause and an investigation.[32]

While a number of other joint ventures were created and old ones expanded in the European arms industry in 2001, a development in early 2002 illustrated the difficulties that remain for the consolidation of the European arms industry. This was the collapse of the plans by EADS and Finmeccanica to create a joint venture company—the European Military Aircraft Company (EMAC). In effect, EMAC would have resulted in a merger between the military aircraft capabilities of Germany, France, Italy and Spain with a combined employment

[30] Betts, P., 'Take-off delayed by squabbles in the cockpit', *Financial Times,* 16 Nov. 2001, p. 12.

[31] MBDA is an abbreviation for Matra, BAe Dynamics, Alenia Marconi Systems and Aérospatiale Matra.

[32] 'Merger wins go-ahead for missile venture', *Air Letter*, 30 Dec. 2001, p. 5.

Table 7.4. International, West European and transatlantic joint ventures and mergers among arms-producing companies, established in 2000–2001

Company name	Owner companies, parent company (country)	Sector[a]
West European		
Aero Propulsion Alliance (APA)	24.8% MTU (Germany); 24.8% Rolls-Royce (UK); 24.8% Snecma (France); 13.6% ITP (Spain); 8% Fiat Avio (Italy),[b] 4% Techspace Aero (Belgium)	Aircraft engines (A400M)
AgustaWestland	50% GKN (UK); 50% Finmeccanica (Italy)	Helicopters
Astrium	50% DaimlerChrysler Aerospace (Germany); 50% Matra Marconi Space (France/UK)	Space
Diehl Avionik Systeme	51% Diehl (Germany); 49% Thomson-CSF Sextant, Thomson-CSF (France)	Avionics
European Aeronautic Defence and Space Company (EADS)	30% DaimlerChrysler (Germany); 15% French State; 15% Lagardère (France); 5.5% SEPI (Spain)	Aircraft, electronics, missiles
ET Marinesysteme	50% EADS (Germany/France); 50% Thales Nederland, Thales (France)	Naval electronics
Eurofighter Simulation Systems	26% Thales (France); 26% Indra (Spain); 24% CAE Elektronik, CAE (Canada) and STN Atlas Elektronik (Germany); 24% Finmeccanica (Italy)	Simulation
MBDA[c]	37.5% EADS (Germany/France); 37.5% BAE Systems (UK); 25% Finmeccanica (Italy)	Missiles
Nordic Support and Service Centre (NSCC)	AerotechTelub (Sweden); Danish Aerotech (Denmark); Astec Helicopter Serv. (Norway)	Helicopter logistics
Rolls-Royce Snecma	50% Rolls-Royce (UK); 50% Snecma (France)	Aircraft engine development
Stand-Off Surveillance and Target Acquisition Radar (SOSTAR)	28% EADS (Germany/France); 28% Thales (France); 28% FIAR (Italy); 11% Indra (Spain); 5% Fokker Space (Netherlands)	Radars
Turboprop International	33% Snecma (France); 33% MTU (Germany); 22% Fiat Avio (Italy); 12% IPT (Spain)	Aircraft engines (A400M)
Transatlantic		
Aviation Communication & Surveillance Systems (ACSS)	70% L–3 Communications (USA); 30% Thales (France)	Electronics
Performance Diesels Company	MTU, DaimlerChrysler (Germany); General Dynamics (USA)	Engines for military vehicles
Rotorism	50% AgustaWestland (Italy/UK); 50% CAE (Canada)	Helicopter simulation
Thales Raytheon Systems	50% Raytheon (USA); 50% Thales (France)	Radars

[a] For sector codes, see appendix 7A.

[b] FiatAvio was excluded from the joint venture in early 2002 following the Italian withdrawal from the A400M programme.

[c] MBDA is an abbreviation for Matra, BAe Dynamics, Alenia Marconi Systems and Aérospatiale Matra.

Sources: The SIPRI arms industry files on joint ventures.

of 17 000 and annual revenues of €2.5 billion.[33] The official reason for the failure was that the planned mix of commercial and military aircraft, which the Alenia contribution had planned to include in order to bring its participation up to rough parity with the others, would not 'fit with the situation post September 11'.[34] Another, perhaps more crucial, complication was the Italian Government's decision to participate in the US F-35 JSF project, in which BAE Systems is a partner. The failed integration of Alenia Aerospazio (of Finmeccanica) into EADS prolongs the competition between EADS and BAE Systems for a dominant position in the European military aerospace sector. However, EADS and Finmeccanica continued negotiations to link their military aircraft activities in a looser structure of cooperation.

Continued industrial integration is supported by government policy initiatives aimed at harmonizing armament requirements. The defence ministers of six European countries—France, Germany, Italy, Spain, Sweden and the United Kingdom—signed a declaration in late 2001 that commits them to: (*a*) cooperate on advanced technologies that will develop Europe's future capabilities for combat air systems towards the end of the next decade (2020); (*b*) to launch, in cooperation with industry, a programme known as the European Technology Acquisition Programme (ETAP) for this purpose; and (*c*) to encourage European industry to make a suitable financial contribution to the effort.[35] The declaration is an indication of the determination of the major European governments to create a framework for the continued integration of arms-producing activities in Europe.[36] It also aims to achieve a balance between European and transatlantic integration. ETAP allows individual partner countries to cooperate only on selected parts of the programme. This made it possible for the UK, which shares the same kind of sensitive military technology with the USA within the JSF project,[37] to participate in ETAP. While this represented yet another step in efforts to promote and support the integration of the European arms industry at the government level, future European cooperation in the development and production of advanced weapon systems is still only developing slowly.

Transatlantic military–industrial links

The establishment of military–industrial links between the USA and Western Europe has been subject to even stronger political and regulatory challenges than the efforts to integrate the arms industry in Western Europe. As a result,

[33] 'EMAC to allow Europe to take on US fighter industry', *Jane's Defence Weekly,* 18 Apr. 2001, pp. 26–27.

[34] Nicoll, A., 'EADS withdraws from Italian deal', *Financial Times,* 24 Jan. 2002, p. 1.

[35] French Ministry of Defence, 'European governments and industry to cooperate on future capabilities and technologies for combat air systems', Press notice on behalf of the defence ministries of France, Germany, Italy, Spain, Sweden and the United Kingdom, Paris, 19 Nov. 2001, URL <http://www.defense.gouv.fr/english/news/shortnews/b201101/201101.htm>.

[36] It is a continuation of previous policy measures by the same countries: the 1997 statement of their joint interest in an efficient and globally competitive European aerospace and defence electronics industry, and the 2000 Framework Agreement on Measures to Facilitate the Restructuring and Operation of the European Defence Industry.

[37] Barrie, D., 'ETAP partners look to seal stealth deal', *Defense News*, 8–14 Oct. 2001, p. 4.

transatlantic mergers and acquisitions among the largest arms-producing companies on both sides of the Atlantic have been rare.

The most important transatlantic acquisitions since 1995 were the acquisition of the US military electronics company Tracor by the British company GEC in 1998 and the acquisition of two Lockheed Martin military electronics units by BAE Systems in 2000. The acquisitions were made possible because of the particular military–political relation between the UK and the USA. Companies from other West European countries have not been able to establish a similar strong foothold in the USA.

The large West European arms-producing companies have sought acquisitions in the USA in order to gain access to its vast budget for military equipment. US arms-producing companies, on the other hand, seem to be less interested in large-scale acquisitions in Europe, mainly because of the significantly smaller market for military equipment and its continuing fragmentation into national markets.[38] Despite this, minor US acquisitions in Europe have taken place in recent years. Among the most significant were the acquisitions of the Swedish Bofors Defence by United Defense in 2000 and of the Spanish Santa Barbara by General Dynamics in 2001.

While direct mergers and acquisitions have been rare, transatlantic military–industrial links have developed in more flexible forms, particularly in joint ventures. This trend is likely to continue. A number of industrial links have been established among major arms-producing companies on both sides of the Atlantic as an outgrowth of government-to-government programmes. These include the partnerships between Boeing and BAE Systems, between Lockheed Martin and EADS, between Northrop Grumman and EADS, and between Raytheon and Thales.[39]

The establishment of the large transatlantic joint venture Thales Raytheon Systems was approved in June 2001 by the French and US governments. Thales Raytheon Systems includes the air defence activities of Thales and Raytheon and represents the first US–European partnership across an entire product sector. Having solved a range of regulatory issues, in particular in the fields of security and export licensing, it may serve as a model for future transatlantic strategic partnerships.[40]

The most significant decision in 2001 with regard to its impact on future transatlantic cooperation was the decision by the British Government to participate in the JSF project. The project will clearly strengthen existing British–US armaments cooperation and result in a number of new military–industrial links between the two countries.

[38] US General Accounting Office (GAO), 'Defence trade, contractors engage in varied international alliances', GAO/NSIAD-00-231, Sep. 2000, URL <http://www.gao.gov>.

[39] The reasons for European efforts to establish themselves in the USA are the subject of a study by Andrew James. James, A. D., 'The prospects for a transatlantic defence industry', in ed. B. Schmitt, *Between Cooperation and Competition: The Transatlantic Defence Market*, Chaillot Paper 44 (Western European Union Institute for Security Studies: Paris, Jan 2001).

[40] 'Thales–Raytheon teaming raises regulatory issues', *Defense News,* 10–16 Sep. 2001.

Internationalization in minor arms-producing countries

In their search for access to markets, major Western arms-producing companies are establishing close industrial links with companies in some of the smaller arms-producing countries. These are often countries that are embarking on large military procurement programmes. The arms industries and governments in these minor arms-producing countries perceive a close relationship with a large Western arms-producing company as a means of gaining access to advanced military technology and financial resources essential to restructuring, and thereby maintaining parts of their domestic defence industrial bases.

These industrial links take different forms ranging from collaboration agreements to acquisitions. The acquisition of shares in companies that are in need of not only technological and marketing support but also financial investment is increasingly becoming a central part of the offers to supply armaments to countries which have failed to carry through long-standing arms industry restructuring and privatization plans. Such offers are often made voluntarily—on the initiative of the supplier company—but they can also be part of formal offset requirements on the side of the recipient country. In both forms they have become a central marketing strategy of foreign supplier companies. Investment in the arms industry of recipient countries may also be a means for a company that is transferring military technology through licence agreements to maintain control over the technology.

There are various implications of this kind of linkage between arms exports and direct participation in arms-producing companies in the recipient country. Such offset requirements may lead supplier companies to compete in areas outside of their core activities and result in job losses in the supplier country and in technology transfers that decrease the competitive advantage of the supplier.[41] On the recipient side, military offsets may divert the focus of decisions on weapon procurement from military requirements to industry considerations. The close link between industry offsets and armament imports may also increase the pressure on governments to implement military procurement plans. Moreover, buyer companies often agree to broad investment and restructuring schemes. Therefore, direct military offsets in the form of the acquisition of arms-producing companies in the recipient country by the supplier company may lead to the maintenance or strengthening of arms production in companies that would otherwise have left the military market, either through diversification into civilian production or by closing down their facilities for arms production. The majority of the companies that were subject to foreign acquisitions in connection with arms deals in 2000 and 2001 faced severe financial problems and might have gone bankrupt in the absence of foreign investment.

[41] The role of offsets in international trade and their possible adverse effects on the US industry, economy and national security are the subject of a report by the US Presidential Commission on Offsets in International Trade. *Status Report of the Presidential Commission on Offsets in International Trade,* 18 Jan. 2001, URL <http://www.offsets.brtrc.net/statusreport/statusreport.htm>. See also chapter 8 in this volume.

Table 7.5. Company acquisitions linked to arms deals with minor producer countries, 2000–2001

Figures are in US $m. Figures in italics are percentages.

Arms procurement deal			Related company acquisition			
Buyer country	No. and weapon system	Value	Acquired company	Buyer company	Share (%)	Price
Agreed						
Brazil	(48) Combat Ac upgrade	230	Aeroeletronica	Elbit (Israel)	*60*	2.3
Greece	3 Submarines	1 300	Hellenic Shipyard	HDW (Germany)	*100*	30
Finland	20 Helicopters	480	Patria Industries	EADS (France/ Germany/Spain)	*27*	39
Poland	8 Transport Ac	212	PZL Warszawa–Okecie	EADS (France/ Germany/Spain)	*51*[a]	7
Poland	. . Combat Ac engines	. .	PZL Rzeszow	UTC (USA)	*85*	70
Planned						
Czech Rep.	24 Combat Ac	1 300	Aero Vodochody	BAE Systems/ Saab (UK/Sweden)	64	. .
Greece	60+ Combat Ac	≈ 4 600	Hellenic Aerosp.	. .	*49*	. .
Poland	10–12 Helicopters	. .	Swidnik	. .	*37*	. .

Ac = aircraft

[a] EADS agreed to increase its share in the company to 85% within 2 years.

Source: SIPRI arms industry files.

During the 1990s new arms markets for Western suppliers have emerged in South Africa and Central and Eastern Europe (CEE). The increase in the procurement requirements of these countries has coincided with a need for foreign investment and technology input for the restructuring of their domestic industries. Major West European armaments suppliers are negotiating a series of agreements on direct investments in the South African arms industry in connection with its large procurement programme, which was initiated in 1999.[42] During 2000 and 2001, similar investment agreements were made with or offered to arms-producing companies in Poland and the Czech Republic (table 7.5), stimulated by the competition between major aerospace producers to gain control over the markets in these countries.

The arms industry restructuring plan adopted by the Polish Government in 1999 linked the purchase of foreign military equipment to the sale of the state-owned domestic arms-producing companies. Under the scheme foreign suppliers were not only required to place offset contracts with the Polish arms industry but also to participate in the privatization of the Polish company

[42] Acquisitions of South African companies by Western arms producers in 1999 are discussed in Sköns, E. and Weidacher, R., 'Arms production', *SIPRI Yearbook 2000: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2000), pp. 311–14.

involved in these offsets.[43] The aim is to achieve a successful restructuring and privatization of the Polish arms industry by linking it closely to the implementation of arms import programmes.

In 2001 the first privatization of a Polish arms-producing company in direct connection with the purchase of foreign military equipment was agreed. As part of a deal involving the procurement of eight CASA (EADS) military transport aircraft, the supplier companies EADS and Spanish AVIA Systems Group acquired a 51 per cent stake in the Polish aerospace company PZL Warszawa-Okecie and agreed on an investment plan for the company.[44] The dependence on military sales of the Polish aircraft company PZL Warszawa-Okecie is likely to increase if the offset agreement related to its acquisition is implemented. The company currently produces the PZL-130 Orlik military trainer aircraft, but its main production is civilian aircraft—mostly for agricultural use. The 2001 offset agreement stipulated the participation of the Polish company in the production of the military transport aircraft and the transformation of the company into the primary in-service support centre for the aircraft in Poland.[45] Similar offers have been made by foreign suppliers in connection with the Polish procurement plans for combat helicopters.[46] These included offers to acquire shares in a helicopter company (PZL Swidnik). The postponement of the procurement programmes has resulted in withdrawals of these offers. In another example, a US engine company (Pratt & Whitney) acquired a majority share in a Polish company producing aircraft components (PZL Rzeszow) with the purpose of increasing its chances of gaining involvement in a procurement contract for combat aircraft.[47] In late 2001 the Czech Government set a requirement for direct military offsets similar to the Polish one. The Czech Government required the acquisition of the state-owned majority share in the domestic aerospace company Aero Vodochody in connection with its combat aircraft procurement tender.[48] Aero Vodochody is facing severe financial difficulties, largely as a result of the low demand for one of its main military products, the L-159 combat aircraft. The team winning the fighter contract, BAE Systems (UK) and Saab (Sweden), offered to acquire a 64 per cent stake in the company.[49]

[43] Krason, M. A., 'An offer to investors: arms industry closer to NATO', *Rynki Zagraniczne* (Warsaw), 6–7 May 1999, p. 5, in 'Polish military industry discussed', Foreign Broadcast Information Service, Daily Report–East Europe (FBIS-EEU), FBIS-EEU-1999-0524, 25 May 1999; and Piskorski, M., 'Arms industry more attractive', *Rzeczpospolita* (Warsaw), 24 June 1999, in 'Polish Cabinet drafts arms industry privatization law', FBIS-EEU-1999-0624, 25 June 1999.

[44] Ratajczyk, A., 'Privatization takes off', *Warsaw Voice*, vol. 672, no. 36 (9 Sep. 2001), URL <http://www.warsawvoice.pl/>.

[45] Holdanowicz, G., 'Warsaw buys C–295s with offsets to revamp PZL', *Jane's Defence Weekly,* 5 Sep. 2001, p. 19.

[46] 'Helicopter producer for sale', *Warsaw Voice*, 28 Nov. 1999, p. 10.

[47] Lockheed Martin F–16 fighter aircraft are powered by Pratt & Whitney engines. See Holdanowicz, G., 'Country briefing: Poland, an uphill task', *Jane's Defence Weekly,* 26 Sep. 2001, p. 24; and 'Pratt & Whitney buys Polish aero firm for $70m', *Air Letter,* 25 Sep. 2001, p. 4.

[48] Elch, J., 'Nya krav kan sinka affär' [New demands can sink deal], *Svenska Dagbladet* (Stockholm), 21 Nov. 2001.

[49] 'Report: Czech Army grounds L–159s', *Air Letter,* 19 Nov. 2001, p. 1.

Similar, although less clear, cases of foreign ownership participation linked to procurement programmes occurred in two other minor arms-producing countries during 2000 and 2001—Finland and Greece. The partial privatization of the largest Finnish arms-producing company Patria Industry in 2001 took place in close connection with a major procurement decision by the Nordic countries. In June 2001 Finland, Sweden and Norway decided to procure NH-90 helicopters, produced by a joint venture in which the EADS helicopter subsidiary Eurocopter maintains a majority stake. In February 2001 EADS had agreed to acquire a minority stake in state-owned Patria Industries.

The Greek Government's decision in 2000 to sell off a 49 per cent share of the loss-making domestic aerospace company Hellenic Aerospace Industries (HAI) was strongly linked to a procurement plan for combat aircraft.[50] The Eurofighter companies—EADS, BAE Systems and Alenia Aerospazio—competed with a French–Greek bid led by Dassault Aviation, producer of the Rafale combat aircraft, for the share in Hellenic Aerospace (HAI).[51] In late 2000, however, the fighter procurement plan was suspended and with it the related privatization plan for HAI.[52]

These are examples of cases where direct investment in the arms industry of minor arms-producing countries has been part of the market access strategies of supplier companies. Supplier companies may also see the acquisition of shares of arms-producing companies in the recipient country as a means to secure control over their weapon technology. This can be important in cases where the importing country has an offset policy for arms imports which includes requirements for technology transfers from the supplier. It is exemplified by the acquisition of Hellenic Shipyards (Greece) in 2001 by the German consortium Howaldtswerke Deutsche Werft (HDW) and Ferrostaal. In 2000 the German consortium signed a contract for the construction of three Type 214 submarines, one to be built in Germany and two in Greece by Hellenic Shipyards.[53] The acquisition of the Greek company responsible for the construction of the German-designed submarines allows HDW/Ferrostaal to maintain control over the technology transferred through the deal.[54]

[50] In 1999 the Greek Government decided to acquire 50 F–16 and 15 Mirage 2000. In early 2000 negotiations were still continuing about the possible acquisition of 60–90 Eurofighters. 'KYSEA briefed on course of armaments program', Athens News Agency, 21 Jan. 2000, in 'KISEA discusses Greek five-year arms programme', Foreign Broadcast Information Service, *Daily Report–West Europe* (*FBIS-WEU*), FBIS-WEU-2000-0121, 24 Jan. 2000.

[51] Bombeau, B., 'Mirage 2000–5 pour la Grèce', *Air & Cosmos*, no. 1776 (22 Dec. 2000), p. 31.

[52] Hellenic Aerospace was awarded a significant share of the subcontract work as part of the offset agreement for the Greek purchase of French Mirage 2000 (5 aircraft, or 65 billion drachmas). Valmas, T. L., 'Greece signs US$1.4 billion contract for 32 Mirage 2000s', *Jane's International Defense Review*, Nov. 2000, p. 24.

[53] HDW/Ferrostaal acquired Hellenic Shipyards for €6 million and agreed to invest in the company: €33 million immediately and another €15 million within 5 years. HDW Press Release, 12 Oct. 2001, on Defense–aerospace.com, URL http://www.defense-aerospace.com/data/communiqués.

[54] Agüera Büchenbeuren, M., 'German buy continues European shipyard mergers', *Defense News*, 29 Oct.–4 Nov. 2001, p. 12.

Privatization

The national arms-producing facilities which were built up in the 1930s to provide states with effective control over military production have gradually been replaced by, or transformed into, private commercial companies that produce weapon systems for the state on contract. The privatization of arms production continued throughout the 1990s. By the early 2000s a large part of the arms industry was privately owned in most major arms-producing countries.

Three major drivers of privatization in the post-cold war period can be distinguished. Table 7.6, shows the major events of privatization since 1990: (*a*) the privatization of the major remaining state-owned arms-producing companies in Western Europe (France, Italy and Spain) and Australia in the first stage of their participation in measures of concentration, often also involving their internationalization; (*b*) the transition of the formerly centrally planned CEE economies to a capitalist system with private ownership, which also involved the arms industry; and (*c*) the privatization in other minor arms-producing countries as a result of industrial offsets in major arms import programmes.

In France, where the state controlled most of the development and production of military equipment as late as 1998, the aim of European integration brought about a series of privatizations of its main military aerospace and electronics companies in 1998–99. However, significant assets remain under state management or ownership, including the shipbuilding company DCN, the aircraft maintenance company SMA, the military vehicle company GIAT Industries and the aeronautics engine company Snecma. There are plans to transform DCN from a state-managed into a state-owned company by 2003,[55] while the partial privatization of Snecma, planned for late 2001, was postponed when the aeronautics market declined after 11 September.[56] In Italy—where throughout the 1990s almost all arms-producing enterprises (except FIAT) belonged to large state holding companies—the major aerospace company (Finmeccanica) was privatized and privatization of the shipyard Fincantieri was initiated in 2000.

Spain, another country with state ownership as the dominant mode in the arms industry, has initiated a series of privatizations since 1999 in order to be able to join in the internationalization of the European arms industry. Thus, by the early 2000s large private companies were the dominant mode of ownership in the arms industry in all major arms-producing countries in the West, similar to the situation before World War II.

[55] Mackenzie, C., 'France's DCN approaches privatization with task list', *Defense News*, 12–18 Nov. 2001, p. 32.

[56] Lewis, J. A., 'Snecma privatization plan is put on hold until markets recover', *Jane's Defence Weekly*, 26 Sep. 2001, p. 14.

Table 7.6. Major cases of company privatization, 1990–2001

Year	Country	Company	Share privatized (%)	Form of privatization (sales of shares)	Buyer type	Nation-ality
1990	Norway	Raufoss	47	Public offering	IS	–
1993	Netherlands	Fokker	51	Private sales	C	F (FRG)
1993	Norway	NFT	49	Public offering	IS	–
1993	Sweden	Celsius	75	Public offering	IS	–
1994	Brazil	Embraer	55	Private sales	IS	D/F (USA)
1994	Germany	IABG	45	Private sales	C	F (USA)
1995	Germany	IABG	23	Employee buyout	–	D
1995	Argentina	AMC	–	Leasing	C	F (USA)
1995	Australia	ASTA	Majority	Private sales	C	D/F (USA)
1997	Greece	Elefsis Shipyards	. .	Private sales	C	D
1998	Czech Rep.	Aero Vodochody	34	Private sales	C	F (USA)
1998	France	Thomson-CSF	33	Public offering	IS	–
1999	Australia	ADI	100	Private sales	C	D/F (FRA)
1999	Bulgaria	Arsenal	51	Employee buyout	–	D
1999	France	Aérospatiale	–	Merger	–	–
1999	Norway	Norsk Jetmotor	33	Private sales	C	F (SWE)
1999	Spain	Indra	66	Public offering	IS	–
1999	Sweden	Celsius	25	Private sales	C	D
2000	Bulgaria	Trema	50	Employee buyout	–	D
2000	Greece	Hellenic Vehicle Ind.	43	Private sales	C	D
2000	Italy	Finmeccanica	38	Public offering	IS	–
2000	Spain	CASA	–	Merger	–	–
2001	Czech Rep.	Tatra	91.6	Private sales	C	F (USA)
2001	Finland	Patria Industries	26.8	Private sales	C	F (EUR)
2001	Greece	Hellenic Shipyards	51	Private sales	C	D
2001	Italy	Fincantieri	17	Public offering	IS	–
2001	Poland	PZL Warszawa-Okecie	51	Private sales	C	F (EUR)
2001	Poland	WSK PZL Rzeszow	85	Private sales	C	F (USA)
2001	Spain	Santa Barbara	100	Private sales	C	F (USA)

IS = Individual share holders; C = Company; F = Foreign; FRG = Germany; D = Domestic; USA = United States; FRA = France; SWE = Sweden; EUR = Europe.

Sources: SIPRI arms industry files.

Outsourcing of military services and functions

In recent years not only military hardware but also the provision of services has become subject to contracting to private industry (outsourcing). Outsourcing includes a range of services (support services for military equipment, military facilities and military operations), which until recently were the prerogative of government organizations such as units of the armed forces or departments of ministries of defence. Private companies are thus assuming an important role also within the field of military support services.

This practice is the result of increasing budgetary constraints and the view that there is potential for greater efficiency with increased participation by private industry in the provision of government functions. The services supplied by private companies vary with regard to their proximity to war fighting capabilities and range from non-military specific services such as management of housing, to equipment support services and the provision of a variety of military support functions.

The key distinction between public and private, or outsourced, provision is whether the provider is acting as a private entity on contract, subject to profit-making discipline, or is operating within the public sector and subject to direct democratic and civil service accountability systems. A study of the implications of privatization and outsourcing in the USA found that 'the enormity of the difference in behavior and motivation of agents operating under these two very different systems is not well understood or acknowledged by most analysts.'[57]

The study concluded that there are no clear benefits from the privatization of military purchases but there are significant risks. While the main argument in favour of privatization is its positive impact on cost through increased competition, there is broad acknowledgement that it is not the private ownership per se, but competition that can induce better quality services at more reasonable cost. The study found that this is the case only under certain conditions: that there are more than three competitors; that competition persists over time; that the task and performance requirements are clear; and that there is active monitoring by the government customer and sustained capacity to do so. The risks associated with privatization included the potential for corruption and the capture of political decision making by politicians. In the USA privatization is associated with the potential for heightened influence over military policy by private contractors to the DOD—through lobbying and financial campaign support for presidential and congressional candidates, domination of DOD advisory committees and growing monopolization of the expertise needed to design, build and operate modern weapons.[58]

The outsourcing of support services and functions is considered most advanced in the UK.[59] The process has been supported over the past decade by a number of government initiatives, such as the Competing for Quality (CFQ), Private Finance Initiative (PFI) and Public Private Partnership (PPP) programmes. In the USA outsourcing of military support activities was stalled during the first half of the 1990s as a result of strict competition requirements but gained increased importance during the Bill Clinton Administration.[60] In

[57] Markusen, A., 'The case against privatizing national security', *Governance,* vol. 16, no. 4 (forthcoming 2003), available at URL <http://www.hhh.umn.edu/people/amarkusen/writings.htm>.

[58] Sapolsky, H., Gholz, E. and Kaufman, A., 'Security lessons from the cold war', *Foreign Affairs,* vol. 78, no. 4 (1999), pp. 77–89, cited in Markusen (note 57).

[59] RAND, Public–Private Partnerships: Proceedings of the US–UK Conference on Military Installation Assets, Operations, and Services, 14–16 Apr. 2000, URL <http://www.rand.org/publications/CF/CF164/>.

[60] A RAND publication that summarizes US and British efforts in the field found that the US Congress has placed a variety of restrictions on outsourcing and privatization, in particular through Circular A–76. RAND (note 59). See also Bailey Grasso, V., *Defense Outsourcing: The OBM Circular*

Germany the Gesellschaft für Entwicklung Beschaffung und Betrieb, (GEBB) was established in late 2000 with the purpose of freeing the armed forces from service functions that were not part of core military capabilities by finding private industry solutions for them.[61] Similar developments are under way in other countries. As a result, services account for an increasing share of private industry revenues from military customers. In the USA the share of the value of services in the total value of prime contract awards to US companies increased from 12 per cent in 1988 to 29 per cent in 1999.[62] BAE Systems expected the market for outsourcing of defence services to grow by 5 per cent as compared to military procurement by 2.4 per cent.[63] According to Serco, 'In the UK alone the market for defence services is expected to reach £15.1 billion by 2009'.[64]

Equipment support (i.e., life-cycle support of military equipment) is accounting for an increasing share of system costs. The system itself often accounts for less than half of total revenues, the rest being different kinds of services associated with the programme. According to Boeing:

> the design, development and production of a military aircraft system make up only 30 per cent of a government's investment in total ownership cost. The overwhelming 70 per cent of that total cost is in sustainment and support—from program planning and management, through training, technical manuals and support equipment, to maintenance, modifications, upgrades and other ageing-aircraft sustainment activities.[65]

Equipment support services are provided primarily by large prime contractors, which supply services that cover the entire life-cycle of the weapon they produce. Aircraft maintenance and repair services contribute significantly to the arms sales of a large number of major military aerospace companies such as BAE Systems, Boeing and Lockheed Martin (table 7.7). Roughly one-half of Bombardier's arms sales in 2000 were derived from support services to the military. Bombardier not only provides pilot training services but also maintains ownership over the training aircraft ('power by the hour') within the NATO Flying Training in Canada (NFTC) programme.[66]

Services related to command, control, communication and information systems (C^3IS) equipment are assuming particular importance within the broader field of equipment support services. The rapid advance in information

A–76 Policy, Congressional Research Service (CRS) Report to Congress (Library of Congress: Washington, DC, 21 Feb. 2002).

[61] The GEBB Internet site can be accessed at Bundesministerium der Verteidigung, URL <http://wirtschaft.bundeswehr.de/index_.html>.

[62] Department of Defence, Directorate for Information Operations and Reports (DIOR), *Prime Contract Awards*, annual.

[63] BAE Systems, *Annual Report 2000*, p. 6.

[64] Serco, *Annual Report 2000,* p. 9.

[65] Boeing, 'Military aerospace support', URL<http://www.boeing.com/defense-space/military/as.htm>.

[66] See NFTC Internet site, URL <http://www.nftc.net/introduction/ExecutiveSummary.html>.

Table 7.7. Selected companies providing services to the military, 2000
Figures are in US $m.

Company, unit, country	Main military services	Sales to MODs 2000
Anteon, USA	IT services for US Navy	410
BAE Systems, Customer Solutions & Support, UK	Aircraft training and maintenance	2 500
Boeing, Military Aircraft Support Unit, USA	Aircraft training and maintenance	
Bombardier, Defence Services, Canada	Fleet management, aircraft training	[160]
Computer Sciences Corp., USA	IT services	1 610
Dyncorp, USA	IT services; fleet management; policy support	800
EDS, USA	IT services	950
Lockheed Martin, Technology Services, USA	Space operations support, aircraft support, management of nuclear weapon programme	2 280
MPRI, USA	Policy support; armed forces training	
Science Applications Int., USA	IT services	1 950
Serco, UK	Management of facilities	[300]
Silicon Graphics, USA	IT services	370
Titan, USA	IT services	780
Veridian, USA	IT services; R&D, test and evaluation of aircraft and spacecraft	[590]
Vinnell, USA	Management of facilities, armed forces training	. .

Sources: SIPRI arms industry database and SIPRI arms industry files.

technologies is considered to have changed the conduct of warfare and lead to a shift in military requirements from single platforms to integrated networks, so-called Network Centric Warfare (NCW). This is an evolving concept based on the idea that linking various systems together will generate greater military benefits than could be derived from individual weapon platforms.[67] A broad range of companies, from major traditional arms-producing companies to small and fast-growing military IT specialized companies, provide services related to the integration of individual surveillance, information management and combat platforms. Large prime contractors for weapon platforms perceive diversification into federal IT products and services as a way to expand in a growth sector and apply technologies and knowledge they have accumulated through weapon systems integration.[68] IT-specialized companies, such as the large US companies Computer Science Corporation and Science Applications International, play an equally strong role in this market. The largest contract in

[67] Holzer, R., 'Center brings together pieces of Network Centric Warfare puzzle', *Defense News*, 27 Aug.–2 Sep. 2001, p. 26.
[68] Ratnam, G., 'Information technology market draws US firms: flat DoD budgets force contractors to diversify into booming sector', *Defense News*, 26 Feb. 2001, p. 34.

the field was awarded in 2000 to EDS—a contract worth $6.9 billion over eight years to upgrade the US Navy–Marine Corps Intranet.[69]

Military support functions that have been privatized (sold and/or outsourced to private contractors) include: (*a*) management of base facilities and related services, (*b*) logistics (military supply chain), and (*c*) military advice (planning and intelligence) and training services. Examples of companies specializing in this field—often referred to as Private Military Companies—are Serco (UK), which provides facilities management and ground maintenance work for the British Ministry of Defence (MOD), and Dyncorp (USA), which provides a wide range of services to the US military—from policy support to operating and maintaining ships for the US Military Sealift Command (MSC) and providing support services to US forces deployed in peacekeeping operations.[70] MPRI, a US company specializing in the provision of military training services and policy consulting to armed forces, was acquired in July 2001 by the US military electronics and IT company L-3 Communications.

Although small in terms of financial importance in comparison with equipment support services, the provision of military support functions by private companies has raised concerns as regards government control, in particular as a significant share of these support functions are exported from major Western countries to areas of conflict. In a recent initiative—the Green Paper on Private Military Companies—the British Government has started to discuss the necessity and possibilities for regulation of this relatively new sector.[71]

III. Russia

The efforts to transform the Russian arms industry are slowly beginning to produce changes in its structure, ownership and dynamics. During the period since the disintegration of the Soviet Union in 1991, and the subsequent dramatic cuts in Russian arms procurement and arms production, the Russian arms industry has been subject to a range of different policies and strategies. In the first half of the 1990s these policies were aimed primarily at conversion of productive capabilities from military to civil products, but in recent years the overall aim has been to secure a level and capability of Russian arms production comparable to that of major West European countries. Current restructuring efforts are focused on rationalization and consolidation by reduction of excess capacity and concentration of production. In 2001 there were several mergers into larger structures and the government launched new initiatives to reinforce this process, aimed at downsizing, concentration and promoting the technological level of the arms industry.

[69] Wakeman, N., 'Companies ride the e-gov tidal wave', *Washington Technology*, URL <http://www.washingtontechnology.com/top-100-2000/top-100-20002.html>.

[70] See the Dyncorp Internet site, URL <http://www.dyncorp.com/companies/index.htm>. The company also maintains the US State Department's aerial fleet in the Andes. Vest, J., 'State outsources secret war', *The Nation*, 23 May 2001, URL <http://www.thenation.com>.

[71] UK Foreign and Commonwealth Office, Private Military Companies: Options for Regulation, Feb. 2002, HC 577, Stationery Office, London, accessible at URL <http://www.fco.gov.uk>.

Quantitative trends

Russian arms production has been increasing since 1998. Official statistics on output trends in the Russian defence industrial complex (DIC)for the period 1991–2000 show a reduction in the index numbers for military output by more than 90 per cent in 1991–97.[72] This was the result of the dramatic drop in domestic procurement of new weapon systems and loss of major arms export markets in the early 1990s. This was followed by an almost doubling of the level in 1997–2000, a very rapid growth but from a low starting point, resulting in a level of Russian military production in 2000 that was only 18 per cent of the Soviet level in 1991 and one-third of the Russian level in 1992.[73] The expectations of continued growth, although more moderate, do not seem to have been fulfilled in 2001. While official data for DIC output trends no longer include data for military output, it can be derived from these data that there was a slight decline—by 1–2 per cent—in the military output of the DIC in 2001.[74] The official value of foreign currency earnings through arms exports increased from $3.7 billion in 2000 to $4.4 billion in 2001.[75]

However, it is still likely that moderate growth in Russian military output will be resumed in 2002, primarily because of the decision in October 2001 to begin a step-by-step increase in Russian procurement of new weapon systems.[76] This assessment is supported by the government decision on 17 January 2002 to approve a 40 per cent increase in the defence order for 2002, which is a significant increase also in real terms. The prioritized items were R&D on new generations of military hardware, aircraft manufacturing, communications, spacecraft, strategic forces and weapon systems for the land force and navy.[77] Altogether, this suggests that Russian arms production has passed its low point and is set for at least a moderate increase.[78]

[72] The only available official statistics on Russian arms production are the index numbers on the output of the Russian defence industrial complex. They refer to the defence industrial complex (DIC). It was officially designated the *voyenno-promyshlenny kompleks* (VPK)—now *oboronno-promyshlenny kompleks* (OPK). There are no official data on the amount, in monetary terms, of total national arms production in Russia.

[73] Cooper, J., 'Russian military expenditure and arms production', *SIPRI Yearbook 2001: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2001), pp. 311–22.

[74] DIC data for 2001 only include figures for its total output and its civilian output. These show a 5% growth in total DIC output for the period Jan.–Nov. 2001 and a growth of 12% for civilian production. Data provided by Alexander Kabanov, deputy head of the Joint department of defence industries of the Russian Ministry of Industry, Science and Technology; 'The Russia's DIC production volume has grown', *Daily Express* (Internet newsletter of the Center for Army Conversion and Disarmament), 27 Dec. 2001, URL <http://www.defense-ua.com/eng/news/?id=1488>. The trend in military output can be derived from these data on the basis that they constitute roughly one-half of total DIC output.

[75] Boyle, J., 'Putin announces boom in arms sales', *St Petersburg Times*, 28 Dec. 2001, p. 3.

[76] See chapter 6 in this volume.

[77] 'Minister: Russian Government defense orders to almost double in 2002', Interfax (Moscow), 17 Jan. 2002, in Foreign Broadcast Information Service, *Daily Report–Central Eurasia* (*FBIS-SOV*), FBIS-SOV-2002-0117, 18 Jan. 2002.

[78] A new set of figures was presented in late Dec. 2001 according to which total DIC output was forecast to grow by 16% in 2002, with civilian and military output rising at roughly the same rate. However, this was in comparison with new figures for 2001 (showing an increase of 7.6% in DIC total output, of which 16.5% is civilian output), which makes it difficult to compare with previous statistics. Statement by First Deputy Minister of Science, Industry and Technology, Alexander Brindikov. 'Russian minister expects defence industry production to grow 16 per cent in 2002', Interfax (Moscow), 29 Dec. 2001, in FBIS-SOV-2001-1229, 31 Dec. 2001.

Privatization of the Russian arms industry[79]

In the 1990s there was a process of privatization of the Russian arms industry. While most of this process took place during the period 1992–95, it has implications for the structure and dynamics of the Russian arms industry today. The arms-producing enterprises and institutions were privatized according to the same pattern as applied in Russian industry at large, yet, there were great differences in the dynamics and stages of privatization in this sector. It has also been associated with more resistance from actors with vested interests in the status quo—enterprise managers and regional and local governments—as well as with major rivalries between potential private buyers/financiers, which suggests the magnitude of benefits to be gained from acquiring these enterprises.

Privatization of defence enterprises has proceeded according to two different methods in two major stages of relatively short duration. The first stage was concentrated to the second half of 1992 under the decrees of the Yegor Gaidar Government. It included the partial privatization of a considerable number of enterprises, including the Sukhoi design bureau, although the state kept a controlling share. The second stage was based on the system of voucher privatization (large-scale privatization for checks), initiated by Chairman of the State Property Committee Anatoliy Chubais. The vouchers were distributed in the autumn of 1992 and used for privatization in 1993. Decisions on major defence industry privatization using vouchers were taken from the autumn of 1992 and implemented from 1993. This stage lasted until 1995 when the privatization of arms-producing plants was frozen. This was when the bulk of arms industry privatization took place. It included the privatization of two major military industrial plants—the Krasnoe Sormovo shipbuilding plant in Nizhny Novgorod and the Mil helicopter plant in Moscow. During this time two banks, ONEXIMbank and Incombank, became the largest non-state actors in the process of defence industry restructuring and began an intensive battle to gain control over the Sukhoi design bureau and two major shipyards in St Petersburg—Severnaya Verf and Baltiyskiy Zavod.

After the suspension of privatization of the arms industry in 1995 the large banking–industrial empires began a redivision of military–industrial property. This led to an intense tug-of-war in 1997 between, on the one hand, the financial and industrial groups owned by the Russian oligarchs and, on the other hand, the emerging hegemony of the ONEXIMbank, in particular for access to the enterprises with large export orders or in anticipation of such orders. ONEXIMbank won control over several major companies—including the

[79] This section is based partly on an unpublished background paper by Makienko, K. and Pukhov, R., 'Privatization in the Russian defence industry: the situation in 2001', Centre for Analysis of Strategies and Technologies (CAST), Moscow, 24 Dec. 2001. See also Pukhov, R., 'MiG design and production system: post-Soviet transformations', *Eksport Vooruzheniy*, no. 2(24), (Mar./Apr. 2001), pp. 25–33; and Pukhov, R., 'Sukhoi Group: post-Soviet transformation', *Eksport Vooruzheniy*, no. 3(25), (May/June 2001), pp. 21–27.

Table 7.8. Ownership in the Russian arms industry, as of 31 December 2000
Figures in italics are percentages.

Type of enterprise	Number of enterprises	Share	Share of DIC production	Share of DIC employment
State-owned	701	*43.0*	*46.0*	*49.7*
JSC (S)	470	*28.8*	*34.0*	*34.7*
JSC (P)	460	*28.2*	*20.0*	*15.6*
Total	**1 631**	***100.0***	***100.0***	***100.0***

JSC (S) = State-owned joint stock company; JSC = privatized joint stock company.

Sources: Number and share of enterprises: URL <http://i.vpk.ru/rest/vlast>; share of production: URL <http://i.vpk.ru/vpkrus>; and share of employment: URL <http://i.vpk.ru/rest/vpkrus/kadri>.

Severnaya Verf, which some months later received a major contract worth $1 billion for the construction of two Sovremenny Class destroyers for China—and over Baltiyskiy Zavod, another shipyard that had a defence order worth up to $1 billion for the construction of three frigates for India.

The current structure of the private arms industry in Russia has emerged as the result of this tough rivalry between oligarchic empires to redistribute privatized property and from the financial crisis of 1998 that disrupted the financial–industrial groups. In aerospace, the major non-state owner is the Kaskol Group, which has a controlling share in the Gidromash plant, the sole Russian designer and manufacturer of aircraft undercarriages. It also has a minority stake (38 per cent) in the Sokol aircraft manufacturing plant in Nizhny Novgorod, which builds MiG combat aircraft and trainer aircraft. In shipbuilding, the largest non-state owners are the New Programs and Concepts (NPC) holding company (which inherited the arms-producing assets of ONEXIMbank) and the IST Group, which has a controlling share in Baltiyskiy Zavod.

However, the largest increasingly active, and most successful players in the non-state sector of the Russian arms industry are the company managers, who in the process of privatization became owners of the facilities of which they were the managers. The best examples of this are the owners of the IAIA and the Rybinsk Motors plant, who initiated the mergers, until then a prerogative of the government, when they acquired the Russian Avionics and the Lyulka–Saturn design bureau in 2001. A third category of potential non-state owners was introduced in 2001, when President Vladimir Putin announced the possibility of foreign investment in the Russian defence industry.[80]

Of the 1631 enterprises of the Russian DIC at the end of 2000, 28 per cent were completely privatized joint stock companies and 29 per cent were partly privatized joint stock companies (table 7.8). The remaining 43 per cent were

[80] 'Foreigners in our defense sector?', *Moscow News,* 7–13 Nov. 2001, p. 7.

Table 7.9. Major arms-producing companies in Russia, 2000

This is a tentative list of the 20 largest arms-producing companies in Russia. Data on arms sales are to a large extent based on estimated ranges of the share of arms sales in total sales. Figures are in million roubles and percentages. Companies are ranked in order of their estimated arms sales in 2000.

Company (parent)	Ownership type[a]	Sector[b]	Arms sales	Arms share (%)	Export share (%)	Employ-ment
1. PK Antey	State	El Mi	12 770	*99*	*99*	50 000
2. KnAAPO	State	Ac	> 11 400	*> 90*	*95*	18 850
3. Severnaya Verf	Private	Sh	10 500	*70*	*68*	3 500
4. Baltiyskiy Zavod (IST)	Private	Sh	6 500	*99*	*96*	6 100
5. IAIA	Semi-private	Ac	4 950	*96*	*96*	13 814
6. Avitek	State	Ac Mi	> 4 200	*> 90*	. .	7 200
7. Progress	Semi-state	Ac Mi	3 920	*99*	*96*	4 294
8. UMPO	State	Eng	> 3 160	*> 70*	. .	20 172
9. RAC MiG	State	Ac	2 900	*100*	*99*	18 000
10. Defense Systems Group	State	El Mi	[> 2 650]	*[> 90]*	. .	15 181
11. Zvezda-Strela	State	Mi	> 2 600]	*[> 90]*	. .	1 800
12. Izhmash Group	Semi-state	SA/A	< 2 400]	*[< 50]*	*26*	25 400
13. Pirometr (K'AO')	Private	El	>1 800]	*[> 70]*	. .	600
14. Kazan Helicopters[c]	Private	Ac	[1 500]	*[100]*	*72*	7 288
15. Rostvertol (Kaskol)	Private	Ac	[> 1 300]	*[> 90]*	. .	7 058
16. Sokol (Kaskol)	Semi-private	Ac	[> 1 200]	*[> 90]*	. .	10 000
17. Uralvaonzavod	State	MV	[1 200]	*[30]*	. .	28 993
18. Degtyarev (MDM)	Private	Mi SA/A	[> 1 170	*[> 70]*	. .	15 368
19. ALMAZ(OMZ)	Private	Sh	870	*97*	*99*	1 076
20. Zvezdochka	State	Sh	[> 750]	*[> 90]*	. .	8 735

[a] Semi-private = open joint stock company for which the state has a share package but not a control share; semi-state = open joint stock company with state capital control share.

[b] For sector codes, see appendix 7A.

[c] All helicopters produced by Kazan helicopters are dual use, here categorized as military.

Sources: Data provided by the Centre for Analysis of Strategies and Technologies (CAST), URL<http://www.cast.ru/english/index.html>, Moscow, processed in cooperation with SIPRI with comments by Julian Cooper, Center for Russian and East European Studies (CREES), University of Birmingham. See also appendix 7A, table 7A.3.

still state-owned enterprises, about two-thirds of which were prohibited from privatization.[81] The state-owned companies account not only for a proportionately higher share of production and employment in the DIC, but they also manage the prioritized domestic procurement programmes, such as the Topol-M missiles and the nuclear submarines.

Among the 20 largest companies, the degree of privatization was slightly higher: 7 of these were privately controlled companies in 2000; 9 were under continued state control; and the remaining 4 were semi-state or semi-private

[81] 'Russia approves plan to trim defense industry', *Defense News,* 5–11 Nov. 2001, p. 18.

companies (table 7.9). The dependence on arms sales is in general very high. In 14 of the top 20 companies arms sales accounted for 90 per cent or more of their total sales in 2000 and only 1 of these had an arms sales share lower than 50 per cent (table 7.9). Privately owned arms producing companies tend to differ from state-owned enterprises in three ways: first, they appear to be more inclined to diversify into civilian products; second, they display a higher degree of transparency of financial information, since this is a requirement for their access to financial instruments; and third, they are more successful at corporate restructuring and the formation of international alliances.

Industrial structure

The Russian arms industry is still characterized by an extreme degree of over-capacity and a strong dependence on exports, both of which are primarily the result of the collapse of domestic arms procurement that began in 1992. The DIC employs a total of almost 2 million people, and reportedly operates at only 20 per cent of manufacturing capacity.[82]

While reliable data are difficult to obtain, a comparison which illustrates the magnitude of the problem of excess capacity was provided in 2001, according to which the Russian aerospace (including missile and space) sector employs over 800 000 people and has an annual production volume of roughly $2 billion. The comparable sector in Western Europe has a combined employment of 98 000 persons and annual production of $22 billion.[83]

There have been several attempts to speed up the restructuring of the Russian arms industry. The process has been slow, however, and met by resistance from actors with a vested interest in the status quo, including company managers and regional governments. A new plan for the development of the DIC for the period to 2010 was adopted by the government on 30 October 2001.[84] Its aim to give top priority to arms production, and it includes measures to concentrate the industry into new, more competitive structures in order to develop new technology and joint marketing. According to the plan, approximately one-half of the defence enterprises will be merged into not more than 50 holding companies and the rest left without support and thus expected to close down.

A number of company mergers took place in 2001, most of which are associated with the production of the Su-27 family of combat aircraft. These include the merger of 20 aviation-related companies into one avionics company (Aerospace Equipment), which reportedly accounts for 60 per cent of the domestic military avionics market;[85] the decision to merge seven design and production companies into another major aviation holding company (Scientific Produc-

[82] 'Russia approves plan to trim defense industry' (note 81).

[83] 'Getting to grips with Russia's reforms', *Interavia*, Nov. 2001, p. 12.

[84] 'The fundamentals of RF policy on the development of the Defence Industrial Complex in the period to 2010 and beyond', was adopted on 30 Oct. 2001 in a joint session of the State Council Presidium and the Security Council of the Russian Federation. 'Foreigners in our defense sector?' (note 80).

[85] Kozyrev, M., 'Rynok avioniki peredelyat' [Market of avionics will be redivided], *Vedenosti Daily,* 20 July 2001.

tion Center Tekhnokompleks);[86] the merger of two major aero-engine companies into what became the first Russian integrated research and production association (NPO Saturn); and the decision in October 2001 to merge the major parts of the Sukhoi design bureau and two aircraft manufacturing companies (KnAAPO and NAPA) into one holding company (Sukhoi Aviation).[87]

Russian defence industrial policy continues to be strongly focused on arms exports because export revenues are seen as the only feasible option for obtaining the investment finance required for the necessary restructuring of the arms industry. Exports accounted for over 60 per cent of total military output in 2000.[88] Among the top 20 Russian arms-producing companies the export share is significantly higher. Of the 10 companies which provide export data, seven companies had a share of exports in total sales higher than 90 per cent (table 7.9).

In sum, the Russian arms industry is still characterized by an extremely high degree of over-capacity, a low degree of civilian production and a very high dependence on arms exports. The level of military output has been increasing since 1998 and continued, although moderate, growth is probable as the result of plans for increasing domestic procurement and a relatively large stock of export orders. Thus, it appears that the free fall of Russian arms production has been halted and that this will lead to an increased rate of consolidation of the industry, as was reflected in the concentration of the arms industry during 2001. There is an increasing rate of private ownership and control in the industry, primarily by banks but also by company directors, and there may even be some opening up towards foreign investment in the Russian arms industry. These trends will probably change the dynamics of Russian arms production in the direction of increased commercialization, and private sector interests, similar to those prevailing in the West.

IV. Conclusions

The arms industry entered a state of profound restructuring after the cold war. In the first half of the 1990s the arms industry experienced a significant cutback in orders, both domestically and from foreign governments. The level of arms production declined significantly in all major arms-producing countries.

Since the mid-1990s the main goal of the large arms-producing companies that emerged from the process of concentration has been to grow in size and to improve their capability to acquire arms procurement contracts, through takeovers, mergers, joint ventures and other forms of company-to-company cooperation, both nationally and internationally. These developments combined with the processes of commercialization and privatization are resulting in fundamental changes in the global system of arms production and arms trade.

The increasing commercialization of arms production is a result of changes in technology but also of the privatization of the ownership of the arms indus-

[86] Kozyrev (note 85).
[87] 'Russia approves plan to trim defense industry' (note 81).
[88] Cooper (note 73), table 4E.3, p. 319.

try and outsourcing of an increasing range and amount of military services and functions.

The process of concentration of ownership—and to some extent also of production—within the arms industry has continued from the national to the international level, driven by the largest companies in their search for access to military markets. A limited number of extraordinarily large companies—Boeing, General Dynamics, Lockheed Martin, Northrop Grumman, and Raytheon in the USA; and BAE Systems, EADS and Thales in Western Europe—have emerged, each producing military goods and services for an annual value ranging from $5 billion to $19 billion. All are searching for a strong international 'identity', while also increasing their leverage on their 'home' governments by virtue of their dominant role in major current weapon programmes.

The internationalization efforts in Europe are aimed to achieve further concentration, in order for European companies to become larger, which is seen as a prerequisite for becoming competitive with the USA, but also for establishing military industrial partnerships with US companies. However, European industrial integration is proceeding slowly, and there has been renewed interest in the establishment of transatlantic industrial links, largely within the context of government-to-government programmes for the development and production of specific weapon systems.

Market access is also the predominant motive for European and US acquisitions of arms-producing companies in minor producer countries that constitute potential markets. The increased acceptance of foreign ownership in the arms industry by governments in these countries primarily reflects their search for access to advanced technology and to some extent also to foreign markets. Requirements for direct offsets, including foreign investment in the domestic arms industry, are often used as a means to gain such access and sustain some domestic capability.

Both the commercialization and the internationalization of arms production are driven by companies in search of higher profit margins, but carried out within an international political and economic framework marked by (*a*) the end of the cold war and the related change in military requirements and shift in budget priorities, (*b*) a general shift towards the privatization of government functions, (*c*) the rapid development of information technologies, and (*d*) an increasing international interdependence in economic relations. Governments have maintained their role as key supporters of arms producing activities within their countries—through R&D funding, procurement and export support—while at the same time the sustainability of private arms-producing companies assumes an important role in defence industrial policy decisions.

This raises the question of the extent to which the role of national governments is diminishing with regard to the control and regulation of the supply of armaments to national and foreign armed forces. It also raises the issue of transparency in the development of military technology and the production of equipment and services that increasingly take place in privately owned large and powerful companies.