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COLD WAR DINOSAURS OR HI-TECH ARMS PROVIDERS? THE WEST EUROPEAN LAND ARMAMENTS INDUSTRY AT THE TURN OF THE MILLENNIUM

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INSTITUTE FOR SECURITY STUDIES - WESTERN EUROPEAN UNION
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COLD WAR DINOSAURS OR HI-TECH ARMS PROVIDERS?

The West European land armaments industry at the turn of the millennium

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SUMMARY

With considerable delay in comparison to aerospace and defense electronics, a restructuring process is occurring in Europe's land armaments sector. National consolidation in the big arms producing countries is paralleled by an increasing number of transnational link-ups. Moreover, US firms have begun to participate actively in this process through acquisitions of European land system firms. In light of these events, what are the prospects for industry?

In the short-term, there are still too many companies chasing too few contracts, a situation which calls for further consolidation. The new focus in Europe on smaller and lighter forces for crisis management missions has changed the conditions for the land armaments industry, with smaller volumes and fewer heavy systems being procured by governments. On export markets, European companies face increasing competition from the US, Russia, Ukraine, and Asian countries. At the same time, the growing importance of advanced technology for modern warfare means that R&D costs for new land systems drastically increased.

Most land armaments producers have little, if any, turnover in civilian markets, and very few of them are associated with larger commercial groups. As a consequence, they are far more dependent on national governments than aerospace companies, for example. If there is going to be an independent and strong European land armaments sector in the future, it falls to governments to launch intergovernmental programs that can provide the necessary framework for consolidation. European governments must therefore make their strategic priorities clearer and coordinate their procurement decisions better.

In the long-term, the question is whether new technological developments and operational requirements will render today's land system firms and their products irrelevant. The key technologies for future land combat platforms lie not in metal alloys or large caliber guns, but composite materials, stealth technologies, precision guided munitions and C4ISR capabilities. Many of these technologies are not developed by traditional land armaments companies, but, for example, by electronics and shipbuilding firms. The future of land system companies will, therefore, ultimately depend on their ability to incorporate advanced technologies in the development of new products that meet the conflict needs of the future. While it is too early to write off the West European land armaments companies as Cold War dinosaurs, their role as future high-tech arms providers in the new millenium is by no means a given.

INTRODUCTION

In the shadows of the consolidation of the European aerospace and defense electronics industries, a restructuring process is also occurring in the land armaments sector. During the last few years, there have been a number of joint-ventures, mergers, and acquisitions among firms producing tanks, armored vehicles, artillery systems, small arms, and ammunition. For example, after a series of mergers and acquisitions, the land armaments industry in Germany is now controlled by two companies. The land armaments industry in Britain is also restructuring and is now controlled by three companies. In France, too, restructuring is evident. Such national consolidation in the larger arms producing countries is paralleled by a restructuring process on the European level in the form of a number of cross-border alliances, acquisitions, and mergers.

The restructuring of the land armaments sector has also been affected by the entrance of major North American companies onto the European scene. American companies have already bought several European land armaments companies and forged alliances with others. While American penetration of European markets may signify the beginning of US domination of the sector, another result may be that European consolidation of land armaments gathers further momentum. Along these lines, the German government recently requested that the land armaments industry companies prepare themselves for pan-European mega-mergers similar to the one that created the Franco-German-Spanish Aeronautic Defense and Space Company (EADS).¹ European defense industry leaders have also argued that the need for the land armaments industry to restructure and consolidate has increased after these recent American acquisitions.²

Whereas consolidation in aerospace and defense electronics has been widely analyzed,³ developments in the land armaments sector have been somewhat neglected.⁴ Using the armored vehicle producing firms as its primary example, the aim of this Occasional Paper is to outline some of the recent trends in the West European land armaments sector and to explain why and how the industry is restructuring.⁵

The bulk of this paper is divided into four major sections. The first section provides an overview of the development of the land armaments industries in Western Europe from the end of World War II to the early 1990s. The second section outlines how land armaments companies have responded to the challenges of production overcapacity, smaller armed forces, and diminishing government support during the 1990s. In this connection, the strategies of three land armaments companies, Rheinmetall DeTec AG, Alvis PLC, and GIAT Industries AS, are studied in more detail. The third section discusses future markets for main battle tanks and armored vehicles and the prospects for the producers of such vehicles. The final section discusses the role that governments play in structuring the consolidation process and takes a look at the future of the land armaments sector in the long term.

¹ Rudolf Scharping, German Minister of Defense, quoted in *Jane's Defense Weekly*, November 8, 2000, p. 32.

² See, for example, Jacque Loppion, President of GIAT Industries, quoted in *Jane's Defense Weekly*, June 28, 2000, p. 10.

³ For analyses of the restructuring and consolidation processes in the West European aerospace, missiles, and defense electronics sectors, see, for example, Brzoska and Lock 1992; Wilén 1992; Sandström and Wilén 1993; Wulf 1993; Forsberg 1994; Wilén 1994; Bäcklund and Sandström 1996; Bjurtoft 1998; Marcusen and Costigan 1999; Schmitt 2000.

⁴ Among the exceptions are Voß 1992; Bullens 1997b; Bélanger 2000a, b; Lock 2000a, b.

⁵ For recent studies of the ammunitions industry, see Bélanger 2000a, b.

CHAPTER ONE: THE DEVELOPMENT OF THE WEST EUROPEAN LAND ARMAMENTS INDUSTRY

The top priority in Western Europe immediately after World War II was to rebuild domestic economic and political structures. However, the onset of the Cold War in the late 1940s and early 1950s made rapid rearmament necessary, but many countries lacked the resources for both economic recovery and military buildup. In countries such as Belgium, France, Italy, and the Netherlands, the domestic defense industry had either been destroyed or diverted to civilian production. In Germany, the defense industry had been dismantled by the occupying allied powers.⁶ Of the industrialized countries in Western Europe, only Great Britain and Sweden had emerged from the war with intact defense industries. To assist in the rearmament, the United States initiated a program of military aid to its European allies. The Military Aid Program (MAP) was readily accepted in Europe and complemented the Economic Cooperation Act of 1948 between the US and Western Europe.⁷ In 1951, the two aid programs were brought together in a single framework and by the latter half of 1952 military aid overtook economic assistance in size.⁸

American military aid did not only consist of sales and donations of materiel from US surplus stock, but also of assistance in the development of domestic European defense industries. This industrial aid included the granting of production licenses as well as loan of machine tools and production equipment.⁹ In addition to transferring technology, the US also assisted Western Europe by outright orders of and payment for European made equipment.¹⁰ The outbreak of the Korean War provided further justification for increasing American military assistance to the European allies. An added benefit of the MAP was that a standardization of weapon systems in the Western Alliance took place around American designed systems. However, the high level of standardization soon diminished as many countries began fielding indigenously developed and produced weapons.

The most important justification for developing a national defense industrial base is the basic security value of self-reliance. No country wishes to be dependent on weapons from abroad if it can be avoided. Not surprisingly, the countries that have gone furthest in developing defense industries from scratch during the last decades are also the ones that have felt their security most acutely threatened.¹¹ Apart from granting a certain autonomy, a domestic defense industrial base can also be used as a tool in foreign and trade policies. A well developed arms industry grants a government influence in military alliances and cooperative arms projects. Arms transfers can also be used to support allies and winning friends as well as improve the balance of payment.¹² An indigenous defense industry may also be motivated by unique requirements that cannot be met by equipment offered on the international market.¹³

⁶ Germany was deprived of the right to develop and produce arms after W.W.II.

⁷ Also known as the Marshall Plan.

⁸ De Vestel 1995, p. 5.

⁹ Great Britain received help for its nuclear weapons program, France subsidies to its aerospace industry, and Germany production technology. Edmonds 1981, pp. 4-7; Moravcsik 1991, p. 33.

¹⁰ The United States, for example, financed an order for 225 Dassault Mystère IV fighter aircraft in 1953 and subsequently gave them to the French Air Force. De Vestel 1995, p. 5.

¹¹ Some modern examples are Israel, Egypt, India, and South Africa. Stanley and Pearton 1972, p. 65.

¹² Buzan and Herring 1998, p. 34.

¹³ Stanley and Pearton 1972., p. 99.

However, the buildup of domestic defense industries in Western Europe was not only motivated by national security but also for industrial, technological, and employment policy reasons.¹⁴ The desire in Europe to acquire competence in the production of weapons was not simply a bid for military independence from the United States, but more importantly to ease the economic cost of buying arms abroad and be able to use arms procurement as a tool in the domestic economy. Spin-off from military technology to civilian industry was also viewed as an essential driving force of national innovation and competitiveness, and governments across Europe set up military R&D infrastructures as well as encouraged existing private industry to enter military research and production. For example, in West Germany, defense industry companies that had been forced to close after the end of WW II were quickly brought back to production with the membership in NATO in 1955.¹⁵ In France, the rebuilding of the defense industry took on particular importance after the decision in 1958 to seek an autonomous national defense policy.¹⁶ Even smaller European countries, such as Sweden and Switzerland, developed significant domestic defense industries during this period.

The technological development increased rapidly in the post-war era. As a consequence of ever more complex systems, the cost of developing and producing new weapons began to be felt in Europe.¹⁷ In aerospace in particular, pressure from escalating R&D costs and weak domestic economies led European governments to propose cross-border cooperation as early as in the 1960s.¹⁸ The land armaments sector, however, remained unaffected by this trend and stayed nationally focused. Despite many attempts to initiate cross-border development and production, each major arms producing country in Europe continued to develop and field their own small arms, artillery systems, armored vehicles, and tanks throughout the Cold War. Of the 59 cooperative armaments programs launched in Western Europe since the early 1950s, 40 concerned aerospace (24 in aeronautics and 16 in missiles) and only 12 in land armaments.¹⁹ Of these 12 programs, only one concerned armored vehicles.²⁰ In 1993, there were still 4 types of main battle tanks, 16 types of armored infantry fighting vehicles, 3 types of 155 mm howitzers, and 7 types of assault rifles being developed and produced in Western Europe.²¹

¹⁴ Edmonds 1981, pp. 4-6.

¹⁵ Companies such as Rheinmetall, for example, reentered arms production to provide the first generation of new arms for the recently created *Bundeswehr*. Somewhat surprisingly, the ten year absence from arms manufacturing turned out to be not a major problem. With the exception of the aerospace industry, where major technological leaps had taken place, the pre-1945 arms industry knowledge base in conventional submarines, armored vehicles, artillery and small arms had been successfully mothballed. Edmonds 1981, p. 7; Lock 2000b, pp. 103-104.

¹⁶ Kolodziej 1987.

¹⁷ Edmonds 1981, p. 6.

¹⁸ Pressure from the persistent weakness of the domestic economy and the need to restructure the defense industry, for example, led the British government to seek international partners to share the financial burden of developing new aircraft in 1964. Edmonds 1981, p. 6. Other factors also played a role. Defense industry cooperation with France and Germany would reinforce British links to the European Community (EC). Meanwhile, both France and Germany pursued international cooperation with Britain as a way of learning and acquiring expertise in aerospace technology. De Vestel 1995, pp. 10-11.

¹⁹ Some of the more well known European cross-border aircraft programs are the British-French Jaguar fighter-bomber (first flight 1968), French-German Alpha Jet trainer/light attack (1973), British-German-Italian Tornado fighter-bomber (1979), British-German-Italian-Spanish Typhoon fighter (1994). Well-known cross-border programs in the missile sector include the French-German Roland, Milan, and Hot missile systems, the French-Italian Otomat anti-ship missile, the British-Belgian Swingfire missile launcher, and the British-French Martel anti-radar missile. Cross-border helicopter programs include the British-French Gazelle, Lynx, and Puma helicopters, as well as the French-German Tiger anti-tank helicopter.

²⁰ European Cooperation is also weak in naval shipbuilding with only 3 programs since the 1950s. For a full list of collaborative armaments programs in Europe, see Dussauge and Cornu 1998, p. 118.

²¹ The then 12 EU + 5 EFTA countries. See De Vestel 1994, pp. 26-27.

1.1 A European tank?

A common tank is probably one of the oldest and most highly prized projects among NATO defense planners. Common specifications for a joint Main Battle Tank (MBT) was even set in 1956 by the FINABEL committee, comprising the army chiefs of staff from Belgium, France, Germany, Holland, Italy, and Luxembourg. However, despite the many compelling military, political, and economic reasons for a joint MBT, all cross-border projects in Europe have failed.²² In 1957, a bilateral accord between Germany and France was signed on the development of a joint tank based on the common specifications set the previous year by the FINABEL committee. However, major disagreements soon surfaced between the French and German partners.²³ They turned out to be irreconcilable and finally led each side to announce the development of their own tank in 1963. The result was that each of the three major arms producing countries in Europe developed a new MBT for introduction in the mid 1960s. France built the AMX 30, Germany the Leopard, and Britain the Chieftain.²⁴

A second attempt at a European multinational tank was made in 1972. Following two years of negotiations, Britain and Germany announced that they would jointly develop a new future MBT, designated the FMBT/KPz3. Despite the political backing from the respective governments, intense disagreements over design, component details, and production schedule erupted.²⁵ After several years of fruitless negotiations, both sides agreed to drop the project in 1976.²⁶

Only a year later, a third attempt was made. In 1977, Britain, France, and Germany again tried to promote cross-border cooperation in the armored vehicle industry by launching formal negotiations on a joint project to develop a successor to their existing tanks. Burned by their recent experience with Germany, Britain withdrew early from the project. However, Germany and France continued the talks but disagreements over design and potential export markets once again led to the collapse of the negotiations.²⁷ The failure to come to terms between the leading arms producers once again led to the deployment of several types of MBTs in Western Europe.²⁸ France pushed forward with the Leclerc, Germany continued to develop the Leopard II, and Britain introduced the Challenger. In addition to these three national MBT programs, Italy began developing the Ariete MBT in 1984.²⁹

²² There are many reasons for a common tank. Among the military reasons are increased cross-national flexibility and efficiency in fighting as well as in supply and maintenance. Economically, R&D costs can be amortized over a longer production run and unit costs kept down by increased economy of scale. Politically, a common tank, arguably the most symbolic piece of army equipment, is an important symbol of unity. Metcalf and Edmonds 1981, p. 145; Moravcsik 1993.

²³ According to Metcalf and Edmonds (1981, p. 146), the major issue undermining the project was disagreements between France and Germany over which side excelled in certain components. Moravcsik (1993, p. 144), in turn, holds that a major reason for the break-up of the negotiations was commercial rivalry from competing export interests.

²⁴ The United States was out of phase with the Europeans and had already introduced a new tank into service, the M60. Metcalf and Edmonds 1981, p. 146. Italy, for example, chose to license produce the M60, and then the Leopard I, rather than develop its own MBT in the 1960s and 1970s. Weidacher 1998, p. 51.

²⁵ In addition to the plans for a joint Anglo-German tank, Sweden already had developed a new tank in the 1970s, the Strv 103.

²⁶ Formal termination of the project was concluded in March 1977. Metcalf and Edmonds 1981, pp. 49-51.

²⁷ Moravcsik 1993, pp. 143-150.

²⁸ In addition, the United States was developing the M1 Abrams MBT which entered into production in 1978. Sweden, however, gave up its capability to design and develop MBTs in the 1980s when a decision was taken by the government to acquire a foreign designed tank.

²⁹ The Ariete entered into production for the Italian Army in 1995. The order was for 200 tanks and final deliveries are due in 2002. No other country has so far ordered the Ariete. The tank has been developed by the

There has not been much more success in cross-border cooperation and integration in other sub-sectors of the land armaments industry during the past decades. More than a dozen countries in Western Europe had companies designing and producing armored vehicles, artillery and ammunition without almost any cooperation with each other.³⁰ Despite the lack of cross-border cooperation, many land armaments companies remained successful in economic terms during the Cold War. Even when divided into national markets, demand was sufficient to sustain the large number of West European companies.

Demand for land armaments was given a large boost when, in the 1960s, NATO began to de-emphasize the role of nuclear weapons in the defense of Western Europe. The new doctrine of “flexible response”, which was introduced in 1967, demanded greater attention to conventional warfare. To counter the Soviet and Warsaw pact superiority in conventional forces, all West European countries began to reequip their land forces with large numbers of tanks, armored vehicles, and artillery. This conventional buildup provided the land armaments industry with good business during the 1970s and 80s. Britain, France, Germany, Sweden and many other Western countries increased their holdings of tanks during this time. West Germany alone had acquired more than 5,000 MBTs by the end of the 1980s (see Table 1).

Table 1. Size of selected European armies and airforces

	Britain	France	Germany	Sweden
1970 Army (+ reserves)	190,000 (+108,000)	328,000 (+ n/a)	326,000	54,000
MBTs + IFVs/APCs	n/a	435 + n/a	(+540,000)	(+600,000)
Combat aircraft (+ stored)	750	740	3,300 + 4910 980	300 + n/a 650
1980 Army (+ reserves)	167,250 (+195,000)	321,320 (+280,000)	373,200	44,500
MBTs + IFVs/APCs	900 + 5,431	1,220 + 4,965	(+ 700,000)	(+ 655,500)
Combat aircraft (+ stored)	713	460	3,826 + 9,031 561	600 + 800 430 (+20)
1989 Army (+ reserves)	155,500 (+255,200)	292,500 (+267,000)	382,400	44,500
MBTs + IFVs/APCs	1,290 + 4,898	1,340 + 5,572	(+717,000)	(+725,000)
Combat aircraft (+ stored)	570 (+251)	598 (+30)	5,005 + 3,542 507 (+29)	785 + 800 417
1999 Army (+ reserves)	113,500 (+191,000)	178,300 (+242,500)	228,300	35,100
MBTs + IFVs/APCs	542 + 2858	1,207 + 6,116	(+276,000)	(+450,000)
Combat aircraft (+ stored)	462 (+132)	531	3,136 + 6,290 451 (+106)	298 + 2,179 253

n/a: Figures not available

Source: The Military Balance, IISS, 1970/71; 1980/81; 1989/90; 1999/00.

1.2 Diminished demand

However, the end of the Cold War severely diminished the demand for military equipment. The land armaments industry in Western Europe became directly affected by two major developments. First, the Conventional Armed Forces in Europe (CFE) Treaty between NATO and the Warsaw Pact meant that the numbers of tanks, artillery, and armored vehicles were to

Consorzio Iveco Fiat - OTO Melara, a consortium formed by Iveco SpA, Defence Vehicles Division and the Otobreda Division of Alenia Difesa. See <http://www.army-technology.com/projects/ariete/index.html> (January 22, 2001).

³⁰ Countries (with number of companies) capable of designing and manufacturing armored vehicles in 1996: Austria, Britain (x3), Finland, France (x3), Germany (x4), Greece, Ireland, Italy (x2), the Netherlands, Norway, Spain, Sweden, Switzerland. In Western Europe, there were around 35 major land systems companies in 1998. *Defense News*, August 31-September 6, 1998.

be limited in Europe. Following the signing of the CFE Treaty in 1990, large quantities of equipment were transferred within NATO as they could not be accommodated within the country sub-limits of the treaty. This transfer of second hand equipment diminished the need for new tanks and armored vehicles in several potential European markets. Turkey, for example, was expected to receive more than 1,000 tanks from the stocks of the German and US armies.³¹

A second major development affecting the land armaments industry was the shift in strategic thinking after the end of the Cold War. In light of the diminished threat from Russia, the experiences from the 1991 Gulf War and the conflicts in the former Yugoslavia, many European countries launched commissions to analyze the future missions of, and requirements for, their armed forces. Several European governments set out to restructure their national armed forces and to prioritize the aerospace and electronics sectors of their defense industries. On the most radical level, existing large conscript armies equipped with heavy armor for territorial defense were to be transformed into smaller, more professional, and lighter equipped rapid reaction forces for out-of-area power projection and crisis management missions.³²

The shift in strategic doctrine and the resulting procurement priorities dramatically altered the conditions for Europe's land armaments industry. For example, both France and Germany decided to create armed forces structures capable of deploying up to 60,000 men each in prolonged out-of-area operations.³³ New procurement decisions were to focus on the needs of these smaller rapid reaction forces and emphasize strategic lift, reconnaissance, and communications equipment. In Germany, new land systems equipment such as tanks and artillery for remaining territorial defense forces will follow later, if at all.³⁴ In Britain, the 1998 Strategic Defense Review confirmed that earlier efforts to enhance strategic mobility and international crisis management capabilities with the acquisitions of new transport aircraft, assault ships, and aircraft carriers would continue.³⁵ Major armed forces reforms also took place in Sweden in the mid to late 1990s. The Swedish army was cut from 29 war-time field brigades in 1991 to only 6 in year 2000. Meanwhile, international crisis management missions have become one of four core tasks of the Swedish armed forces.³⁶

The abandonment of large and heavy equipped territorial defense forces in favor of smaller, lighter, and more mobile rapid reaction forces not only meant that much smaller volumes of equipment would be procured, but also a different type of equipment. What is needed for out-of-area crisis management operations is strategic transport, communications and control equipment, helicopters, and light air-portable armored vehicles, but only limited numbers of artillery systems and MBTs. National markets supplemented by occasional exports would no longer be large enough to sustain all the land armaments companies in Western Europe.

The low demand in Europe resulted in fierce competition for a limited number of export contracts in the Middle East and Asia. Competition in these markets was further increased by the export push from American land armaments companies that were trying to compensate declining demand in the United States. The success of American made weapons in the 1991

³¹ Anthony and Wolf 1992, pp. 30-33.

³² Major reforms were, for example, proposed in France in 1994 and 1996, in Germany in 1994 and 2000, in Sweden in 1995 and 1999, and in Britain in 1993 and 1998.

³³ See, Ministère de la Defense 1994; Bundesministerium der Verteidigung 1994.

³⁴ *Jane's Defense Weekly*, July 7, 1999, p. 26.

³⁵ UK Ministry of Defense 1998.

³⁶ Regeringens proposition 1996/97: 4; Regeringens proposition 1999/2000:30.

Gulf War against Iraq, as well as US government pressure on its Middle East allies to buy American, helped in opening up these traditional European dominated markets to US firms. Saudi Arabia, a traditionally large French customer, and Kuwait, a traditionally large British customer, for example, both opted for American tanks instead of French or British after the Gulf War.³⁷

³⁷ Saudi Arabia purchased 315 M1A2 Abrams tanks in 1993 and Kuwait 218 M1A2s in 1994 from the US company General Dynamics Land Systems.

CHAPTER TWO: INDUSTRY'S RESPONSE

Despite the fact that there were not enough contracts to support all the existing companies, the West European land armaments industry saw few major restructuring initiatives in the early 1990s.³⁸ Although some ammunition plants were closed down, a few small arms companies taken-over by foreign competitors, and several international cooperation programs initiated in the light armored vehicle industry, no significant reduction in production capacity took place.³⁹ As a result, by the mid 1990s, production overcapacity in military vehicles, for example, had become larger than in any other defense industrial sector in Europe.⁴⁰

Faced with the challenges of production overcapacity, smaller armed forces structures, and diminishing government support, land armaments companies across Western Europe were forced to adapt.⁴¹ Different strategies have been employed. The declining domestic demand for defense equipment and increasing export competition led some companies to leave the armaments business in the 1990s by selling their arms producing divisions or subsidiaries. This has often been the case with companies with only limited defense interests and/or in highly competitive sectors. The classic German defense industry company, Krupp GmbH, for example, decided to sell its tank business after the production of the Leopard II wind down in the late 1980s. After tying its civilian production areas of engine manufacturing and rail-traffic technology closer to the parent company, Krupp transferred its military production to a new company, MaK Systems GmbH, that in turn was sold to Rheinmetall in 1990.⁴² Incentive AB of Sweden is another example of a company pulling out of the armaments business. After deciding to focus on medical technologies in the mid 1990s, Incentive sold its armored vehicle producing subsidiary, Hägglunds Vehicle AB, to Alvis PLC of Britain in September 1997.⁴³ Oerlikon-Bührle Holdig AG, in turn, sold its defense division, Oerlikon Contraves, to Rheinmetall of Germany in September 1999 despite enjoying a strong position in land-based anti-aircraft gun systems and medium caliber ammunition. Similar to Incentive, Oerlikon-Bührle decided to focus on its core activities and to realign itself towards selected technologies and develop competencies in thin-film and vacuum technologies. The financial resources for implementing the new strategy were to be procured through divestment of activities unrelated to the group's core business, among them was the defense activities.⁴⁴

However, many companies chose to remain in the defense sector. Most of these firms adapted to the new situation after the end of the Cold War by cutting their work forces but maintaining

³⁸ The French land armaments company GIAT Industries, for example, was saved from bankruptcy after two years of heavy losses in 1994 by a FF 1.5 billion French Government aid package. *SIPRI Yearbook* 1995, pp. 468-469.

³⁹ *SIPRI Yearbook* 1995, p. 468-469.

⁴⁰ *SIPRI Yearbook* 1995, p. 468.

⁴¹ Others like the Belgian company PRB, owned by Astra in the UK or the Dutch firm Eurometaal went bankrupt (in 1990 and 1991 respectively). The two small arms manufacturers, FN-Herstal in Belgium and Heckler and Koch in Germany, were both on the verge of bankruptcy before being acquired by GIAT of France and Royal Ordnance of the UK, respectively. Wulf 1993, p. 158.

⁴² Voß 1992, p. 138.

⁴³ Incentive later adopted the name of its medical technology subsidiary, Gambro, to reflect the change in corporate focus. *Den strategiska resan* 1998; Interview with a senior director of Hägglunds Vehicle AB, Sälen, Sweden, January 2000.

⁴⁴ See <http://www.oerlikoncontraves.com/news/> (November 14, 2000).

their production lines while waiting for an up-turn in the market.⁴⁵ In addition, many chose to diversify within the defense sector by entering into new markets and market niches.⁴⁶ Royal Ordnance, the ammunition and gun making subsidiary of British Aerospace, for example, acquired the heavily indebted German small arms producer Heckler & Koch in 1991 even after it had replaced its own small arms facility at Enfield with an entirely new plant. GIAT of France, in turn, also maintained its small arms production facility at Versailles-Sartory outside Paris after it had acquired the Belgian small arms producer FN-Herstal.⁴⁷ Another example is the defense electronics and tank component producer Diehl, which acquired all the large tank repair facilities in Germany as well as entered the ammunition disposal business.⁴⁸ Other companies increased their civilian production. The German tank maker, Krauss Maffei, for example, successfully diversified into locomotives and machinery for the plastics industry.⁴⁹

Land armaments companies also employed political strategies in attempts to extend existing domestic contracts, extract export subsidies and to delay any proposed restructuring of the armed forces. In Germany, several land armaments companies were involved in intensive lobbying for continued emphasis on heavy armor and territorial defense in the post-Cold War German Army.⁵⁰ In Britain, Vickers Defence Systems, employed “enormous political pressure” in the early 1990s to force the government to buy its Challenger II main battle tank even before reliability trials had been completed and, reportedly, against the wishes of the British Army.⁵¹ The land armaments industry in France was also active in lobbying for continued subsidies and against government demands to reduce costs in the sector.⁵² In the following sections, the corporate strategies of three European land armaments companies that have chosen to remain in defense production will be looked at in more detail.

II.1 Rheinmetall DeTec AG (Germany)

Rheinmetall has been a leading manufacturer of artillery and ammunition for more than 100 years.⁵³ The first serviceable barrel recoil system for a field gun was developed in 1896 and by the turn of the last century, artillery batteries were successfully exported to Austria, Britain, Norway, and the United States. All weapons production was, however, terminated after the defeat of Germany in World War I. The company converted into consumer products during the immediate inter-war period, but production of ammunition and artillery resumed in the mid 1930s and continued through World War II. Due to Germany's defeat, Rheinmetall

⁴⁵ Anthony and Wolf 1992, p. 28; Lock 2000b; Voß 1992, pp. 137-138. Between 1990 and 1998, the number of employees fell, for example, in the German defense industry from 280,000 to 100,000, in Sweden from 25,500 to 14,225, and in Italy from 56,000 to 28,000. Schmitt 2000, p. 13, note 18.

⁴⁶ Anthony and Wolf 1992, p. 29.

⁴⁷ Gander and Hoggs 1995, pp. 148f. However, GIAT sold FN-Herstal in 1997.

⁴⁸ Brzoska and Lock 1992b, p. 129.

⁴⁹ Brzoska and Lock 1992b, p. 129; Bullens 1997b, pp. 43-45; http://www.mdkm.com/ind_mdkm.htm (January 5, 2000).

⁵⁰ Bullens 1997, p. 45; Knutsson and Oxelius 1994, p. 35. One senior Defense Ministry official contends that industrial lobbying played a significant part in the continued emphasis on heavy armor and territorial defense in the German 1994 White Paper on Defense. Interview with a senior German Defense Ministry official, Berlin May 22, 2000.

⁵¹ Demchak 1994, p. 23. It is widely asserted that the British Army preferred the German Leopard II tank but was overruled by the government. *The Times*, June 23, 1991, Sec 2, p. 2; Demchak 1994, p. 23

⁵² *SIPRI Yearbook 1995*, p. 458.

⁵³ Rheinmetall DeTec AG is a wholly owned subsidiary of Rheinmetall AG, which, in turn, is controlled by the Röchling Group. For an in-depth study of Rheinmetall and an overview of the ownership structure, see Lock 2000a, appendix 1-2; and <http://www.rheinmetall.com/index1.htm> (January 5, 2000).

was once again forced to close down in 1945. The production of artillery and ammunition, however, restarted with German rearmament in the 1950s.⁵⁴ During the 1960s, Rheinmetall experienced boom years in arms production. Nevertheless, in the early 1970s, the company began a diversification process into civilian products, such as automotive industry parts. Although Rheinmetall had diminished its share of military production well before the end of the Cold War, it was still the fifth largest defense contractor in Germany in the late 1980s. In 1988, arms sales made up 35% of total group turnover at a value of almost DM 1.2 billion.⁵⁵ Even during the first years after the end of the Cold War, the defense share of the Rheinmetall Group increased and was nearly 43% of total group turnover in 1992.⁵⁶

Although dramatically diminished procurement budgets in the early 1990s severely affected Rheinmetall, the company chose to remain in the defense business. Instead of exiting the sector, Rheinmetall began to acquire competing arms manufacturers in order to become a European-wide leader in army equipment and ammunition.⁵⁷ The goal of these acquisitions was both to diversify the production within the military sector and to dominate certain product ranges in the generally declining defense market. A majority stake in the armored vehicle and tank producer, MAK Systems, was acquired from Krupp GmbH in 1990. In 1992 the gun powder and propellants producer WNC-Nitrochemie Aschau was acquired as well as the remaining stake in MAK Systems. Additional acquisitions were undertaken in 1995 when the medium caliber canon producer Mauser-Werke Oberndorf was bought from Diehl (a competitor in many fields), and in 1996, when Rheinmetall together with Badenwerk AG acquired 51 percent in the defense electronics company STN Atlas Elektronik.⁵⁸ In 1998, Rheinmetall assumed majority ownership in STN Atlas by acquired the 25 percent stake held by Badenwerk. Further acquisitions in the 1990s, such as the purchase of the defense activities of Buck Werke GmbH&Co in 1999, helped Rheinmetall to consolidate its position in the military markets through targeted vertical integration (from basic chemicals to applied electronics) in its various fields of established competence.

Further opportunities for Rheinmetall emerged with the launching of the joint British-German Multi Role Armored Vehicle (MRAV/GTK) program in November 1999.⁵⁹ The initial phase calls for the construction of a first batch of 600 vehicles for the German and British armies. The total requirement could, however, be as many as 4,000 vehicles.⁶⁰ The competition for the German part in the program was won by a consortium, ARTEC (Armored Technology), led by Rheinmetall, Wegmann, and Krauss-Maffei. Companies belonging to the losing consortium began selling their armored vehicle divisions as no alternative domestic contract existed and export opportunities were slim due to strong competition and strict German arms export laws. Thyssen sold its tank producing subsidiary Henschel to Kuka, a subsidiary of IWKA. Rheinmetall, in turn, acquired Kuka and Henschel from IWKA in 1999. In the deal,

⁵⁴ Lock 2000a.

⁵⁵ SIPRI 1990.

⁵⁶ Rheinmetall AG Annual Reports 1991 and 1992, cited in Bullens 1997, p. 33. Although the arms share of total turnover in Rheinmetall AG had declined from 70% to 41% between 1979 and 1991, the arms business increased from DM 500 million to over DM 1.4 billion. See Bullens 1997, p. 35.

⁵⁷ According to the Chairman of the Board of Rheinmetall AG, the definite decision to stay in arms production was taken in 1992. Quoted in Bullens 1997, p. 35.

⁵⁸ British Aerospace (now BAE Systems) acquired the other 49 percent of STN Atlas Elektronik

⁵⁹ Germany will receive some initial vehicles to boost its rapid deployment forces in 2004, although the full delivery to both armies only starts in 2006. Reuters, November 5, 1999.

⁶⁰ <http://www.army-technology.com/projects/mrav/index.html> (January 21, 2001).

the civilian engineering division of Rheinmetall Jagenberg was sold to IWKA. For Rheinmetall, this “swapping of units” meant a partial reconversion to military production.⁶¹

In order to further consolidate its position in the land armaments sector, Rheinmetall merged its three independently operating armored vehicle producing subsidiaries (Henschel Wehrtechnik GmbH, in Kassel, KUKA Wehrtechnik GmbH, in Augsburg, and MaK System Gesellschaft mbH, in Kiel) into a single company, Rheinmetall Landsysteme GmbH in year 2000.⁶² Consolidation also took place among the firms in the winning consortium. Mannesmann AG, owner of Krauss-Maffei sold 51% of its defense activities to Wegmann as it pulled back from the arms sector in 1999. The result of this consolidation was that Rheinmetall and Krauss-Maffei Wegmann emerged as the two dominating major land armaments suppliers in Germany.⁶³ More recently, Rheinmetall and Krauss-Maffei Wegmann entered into a strategic alliance with Diehl Stiftung & Co to strengthen the German position in the consolidation processes of the European land armaments sector.⁶⁴

Rheinmetall has not only focused on consolidating its national position but also on establishing itself in foreign markets. In 1998, Rheinmetall acquired a 55 percent stake in the Swiss company Nitrochemie Wimmis AG from Schweizerische Munitionsunternehmung. Rheinmetall, in turn, sold 45 percent of Nitrochemie Aschau to Schweizerische Munitionsunternehmung. Rheinmetall has also acquired a majority stake in the Dutch ammunition company Eurometaal. In 1999, Rheinmetall further strengthened its European presence by acquiring the military production of the Swiss company Oerlikon Contraves from Oerlikon Bührle in 1999. Presently, Rheinmetall is negotiating together with Krauss-Maffei Wegmann (in competition with General Dynamics of the USA) to acquire the Spanish state-owned armored vehicle and gun making company Santa Barbara.⁶⁵ Earlier, Rheinmetall has unsuccessfully negotiated to take-over companies in both Sweden and Britain. First it failed in its attempts to acquire the Swedish companies, Hägglunds Vehicle and Bofors Weapon Systems, and then negotiated with BAE Systems of Britain to buy its land arms division, Royal Ordnance, before withdrawing from the talks in 1999.⁶⁶

By 2000, Rheinmetall has both consolidated its German home market as well as gained positions in the Netherlands, Switzerland, and, through its Swiss subsidiary Oerlikon

⁶¹ Lock 2000a, p. 106.

⁶² Rheinmetall Detec AG press release, September 8, 2000 (<http://www.rheinmetall-detec.com/>).

⁶³ Lock 2000a.

⁶⁴ This alliance may eventually lead to a merger between the land armaments activities of these three firms. There are some questions concerning the future ownership of KMW. In 1999, Mannesmann AG, the owner of the Demag Krauss-Maffei group, sold 51 percent of the shares in Krauss-Maffei's defense production to Wegmann GmbH. Mannesmann was then bought by the British telecommunications firm, Vodafone AirTouch, in early 2000. Vodafone, in turn, sold Mannesmann's engineering and automotive division (including the Demag Krauss-Maffei group with its 49 percent in Krauss-Maffei Wegmann), renamed Atecs-Mannesman, in April 2000 to a consortium led by Siemens AG and Robert Bosch GmbH. The long term interests of either Siemens and Bosch to stay in defense production is unclear as their joint bid on the Atecs Mannesmann group was sparked by their interest in the automotive engineering and technology subsidiaries (VDO, Dematic, and Rexroth) and not the defense production of the Demag Krauss-Maffei subsidiary. Under the take-over agreement, Siemens will manage the VDO and Dematic companies, Bosch will control Rexroth, while Demag Krauss-Maffei will be jointly operated by the two companies. See Atecs Mannesmann press releases, April 14 and 17, 2000 (<http://www.bosch-presse.de/TBWebDB/en-US/SearchResult.cfm>); Bosch and Siemens joint press release, April 18, 2000 (<http://www.bosch-presse.de/TBWebDB/en-US/SearchResult.cfm>).

⁶⁵ The Spanish government is still considering the rival bids from Rheinmetall/Krauss-Maffei Wegmann and General Dynamics.

⁶⁶ BAE Systems has since merged Royal Ordnance with Marconi's Land Systems division into RO Defence.

Contraves, in Italy and North America. Rheinmetall is now a leading producer of large and medium caliber guns and ammunition, and commands the production of all classes of armored vehicles except MBTs.⁶⁷ A new family of 105 mm smoothbore tank guns and associated ammunition has been developed to suit the many new types of light wheeled armored vehicles,⁶⁸ and a future large caliber tank gun and ammunition is being developed in cooperation with the US Army.⁶⁹ The participation in the ARTEC joint-venture company, with Krauss-Maffei Wegmann and Alvis of Britain, and production of the MRAV/GTK has strengthened the long-term future of Rheinmetall. In addition to the MRAV, the company is also independently developing a family of lighter Armored Fighting Vehicles (AFVs), to meet emerging requirements for airportable wheeled armored vehicles.⁷⁰ Given its position in these important European and US programs, Rheinmetall seems likely to continue to consolidate in land systems while maintaining its role as niche supplier of naval components, fighter aircraft armaments and military simulators.⁷¹ Rheinmetall must therefore be considered to be one of the most important players in the continuing restructuring of the land armaments sector in Europe.⁷²

II.2 Alvis PLC (UK)

Alvis was founded as a motor car producer in Coventry in 1919. The company became known for its innovative cars and quickly became one of the prestige names in British automobile industry. In the 1930s, Alvis moved into armored vehicles and aero-engine manufacturing which continued during and after World War II. However, both car and aero engine manufacturing ceased in the 1960s. Meanwhile, Alvis had become a leading producer of light AFVs for both the British army and the export markets. In 1981, Alvis Ltd was acquired by United Scientific Holdings PLC, a leading developer and manufacturer of military sighting equipment, from the then British Leyland. In the early 1990s, United Scientific Holdings increasingly concentrated on its military and vehicle engineering business. In 1992, the Alvis name was adopted for the Group to reflect the company's change of focus. A year later, in 1993, Alvis underwent a major reconstruction in which the remaining optical companies were transferred to its subsidiary in Singapore, Avimo.⁷³

Since restructuring in 1993, Alvis has continued to focus on its military vehicle business. In a major strategic move, Alvis bought the Swedish armored vehicles manufacturer Hägglunds Vehicle AB in 1997. The deal was one of the first cross-border acquisitions of a defense industry platform producer in Europe and brought Alvis complementary products as well as

⁶⁷ The 120 mm smooth bore barrel of the Leopard II MBT is, however, produced by Rheinmetall.

⁶⁸ *Jane's Defence Weekly*, November 15, 2000, p. 30.

⁶⁹ The US Army is already using a license produced version of Rheinmetall's 120 mm smoothbore gun on its M1A1/A2 Abrams MBTs. *Jane's International Defense Review*, February 2000, p. 12; *Jane's International Defense Review*, December 1998, p. 18.

⁷⁰ According to news reports, the first prototype could be completed as early as in 2002. With a typical combat weight around 20 tons, the NAWV will be airportable in a C-130 Hercules in contrast to the heavier MRAV/GTK. See *Jane's Defence Weekly*, November 8, 2000, p. 12.

⁷¹ Lock 2000a.

⁷² However, continuing low procurement budgets in Germany and restrictive export rules together with the recent inroads in Europe of the American firms warrants a word of caution regarding the long-term future in defense even for Rheinmetall.

⁷³ Avimo is listed on the Singapore stock exchange. Alvis has since reduced its stockholding in Avimo in various stages. <http://www.alvis.plc.co.uk> (October 3, 2000). See also note 76.

positions in several important markets. An equally significant company development took place a year later. In September 1998, Alvis acquired GKN's land systems division, GKN Defence, its major domestic armored vehicle producing rival. In the transaction, GKN, in turn, took a 29.9% stake in the enlarged group and became the largest shareholder in Alvis.⁷⁴ The merger of Alvis and GKN Defence created a company, "New Alvis", with a product portfolio covering the full range of light to medium sized armored vehicles.

As GKN and Alvis increasingly had been the two key candidates in many of the most recent armored vehicles contests, the merger meant that marketing and export efforts of the two companies could be pooled. Furthermore, by becoming a major shareholder in Alvis, GKN is able to reassure customers that Alvis would not be bought up in the near future. A link-up with the remaining British armored vehicle producer, Vickers Defence Systems (the manufacturer of the Challenger II MBT) is, however, unlikely in the near term. Vickers Defence Systems lacks an existing order book and executives at Alvis see no demand for MBTs in the foreseeable future.⁷⁵ Alvis has instead continued to concentrate on its core light and mid-weight armored vehicle business and embarked on a program to dispose non-core interests.⁷⁶

Like in Germany, the major consolidation of the fragmented British armored vehicle industry took place after the announcement of the winning team in the competition for the British-German MRV/GTK program (see above). Although GKN's armored vehicle division was on the winning consortium for the prestigious and valuable contract, it lacked any substantial orders until production of the MRV would commence in 2004. Alvis, on the other hand, had a good existing order book with secured production for several of its own models as well as of those of its Swedish subsidiary, Hägglunds, but lacked long term stability as it was on the losing consortium in the competition for the MRV program.⁷⁷ The merger between Alvis and GKN's armored vehicle division solved both companies' problem. After the merger, the combined group now stands a good chance of winning the majority of the future British armored vehicle contracts, despite the attempts of Vickers Defence Systems to branch out into the production of lighter vehicles (see below).

From having been a small and weak actor in the fragmented armored vehicle industry in the early 1990s, Alvis has become one of the market drivers in Europe. The decision to focus on light to mid-weight armored vehicles despite a generally declining defense market has paid off well. The acquisition of Hägglunds in 1997 brought with it several important markets, a full order book and complementary products, while the merger with GKN's land systems division in 1998 strengthened Alvis' position in Britain and the export markets by adding size. Alvis is presently a key contender for many of the outstanding armored vehicle contracts in the international market and stands out as one of the European land armaments companies with the best looking future.

⁷⁴ Alvis also agreed to concentrate the combined group's production to GKN's plant in Telford while shutting down its own factory in Coventry. Alvis Press Release, September 15, 1998. The deal was approved by Alvis shareholders and the UK Office of Fair Trading on November 2, 1998.

⁷⁵ Interview with a defence industry executive, London, June 19, 2000.

⁷⁶ During 1999, Alvis sold Automotive Export Supplies, Barracuda Technologies, a large share of its stake in Avimo, and sought a buyer for its specialist heavy truck division, Alvis Unipower. In Avimo, Alvis sold 59 percent of its previous holding of 42 percent. Under an agreement with Thomson-CSF (now Thales), Alvis will sell its remaining shares in Avimo to them no later than June 1, 2001. See Alvis Press Releases, July 2, 1999, and October 15, 1999; Results For Fifty Weeks Ended 31 December 1999, Chairman's Statement http://www.alvis.plc.uk/accounts/preliminary_accs.htm (May 31, 2000).

⁷⁷ *Defence Analysis*, October 1998, Vol. 1, No. 2, p. 1.

II.3 GIAT Industries AS (France)

After the end of World War II, the French defense industry was rebuilt and reorganized. In contrast to the mostly privately held defense industry in Britain, Germany, and Sweden, the French defense industry was mainly state-owned. The various state armaments arsenals were after World War II grouped under the DEFA (*Direction des Etudes et Fabrications d'Armements*). With the onset of the Cold War in the late 1940s, domestic arms production became of primary importance and the DEFA expanded. For example, nearly 7,500 of the AMX-13 tanks were built for the French and exports markets during the late 1940s and 1950s. In 1965, the DEFA became the DTAT (*Direction Technique des Armements Terrestres*), included in the DMA (*Direction Ministerielle des Armements*). The 1960s were also good years for the French land armaments industry with more than 3,000 AMX 30 tanks being delivered to the French and Foreign armies. In 1971, a new reorganization took place when GIAT (*Groupement Industriel des Armements Terrestres*) was created and all the land armaments arsenals were grouped within it. Finally, in 1990, in a major reconstruction, GIAT was turned into a company, GIAT Industries SA, wholly owned by the French Government.⁷⁸

Soon after its incorporation in 1990, GIAT set out to become the leading land armaments company in Europe. A number of early domestic acquisitions took place which consolidated the French land armaments industry but also created problems as many of these acquisitions were politically motivated rather than economically sound.⁷⁹ However, the acquisition of the Belgian small arms producer FN-Herstal was a strategic attempt to break into new markets in Europe and the United States. FN-Herstal controlled the Winchester and Browning brands in the US and the hope was to use these subsidiaries to gain access to the American market.⁸⁰ However, GIAT soon ran into economic difficulties. The land armaments market rapidly declined in the early 1990s and GIAT was slow to adapt. The structure of the company with production plants in 14 different locations across the country made it very difficult to implement an overall strategy and rationalize production. As former state arsenals, each plant was highly autonomous with its own local power base, political support, and business strategy.⁸¹ The arsenal heritage and state-ownership also meant that there was a serious lack of economic management culture in the company and that it was nearly impossible to cut the work force as all were state employees.⁸²

In 1992, GIAT finally began serial production of the Leclerc MBT. The tank was heralded as the first of the 3rd generation with a completely new design and level of computerization, and only requiring a crew of three. The AMX 56 as the new tank was originally known as, was designed as a follow-on to the AMX 30, of which more than 3,000 had been produced during the 1960s and 1970s. It was named "Leclerc" in the 1980s in an attempt to increase public and political support for a project that had become criticized by many for its steep costs.⁸³ Much of GIAT's future depended on the success of the Leclerc since the focus on its development had forced the company to give up its ambitions in missiles and electronics.⁸⁴ The French

⁷⁸ <http://www.giat-industries.fr.ukgat/corp> (October 6, 2000).

⁷⁹ Interview with a GIAT-Industries company official, Versailles-Sartory, October 10, 2000.

⁸⁰ Interview with a French defense industry analyst, Paris October 9, 2000. GIAT sold FN Herstal in 1997.

⁸¹ Interview with a GIAT-Industries company official, Versailles-Sartory, October 10, 2000.

⁸² Interview with a French defense industry analyst, October 9, 2000.

⁸³ The Leclerc MBT is named after *Jacques-Philippe Leclerc de Hauteclocque*. A French general and World War II hero who achieved fame as the liberator of Paris. He was posthumously named marshal of France after his death in an airplane accident in Algeria in 1947.

⁸⁴ Interview with a French defense analyst, Paris, October 9, 2000.

Government has to date placed orders for 406 Leclerc MBTs.⁸⁵ In 1993, GIAT won a contract in the United Arab Emirates for 390 Leclerc MBTs and 46 ARVs. The order was at first seen as the “saving” of the company but soon turned out to be a financial disaster with the \$3.4 billion contract turning into a \$4.5 billion loss. Not only did GIAT sell the tanks at a low cost but a failure to hedge against currency fluctuations also made the company lose vast sums of money.⁸⁶ The export deal with the United Arab Emirates proved to be too big for the inexperienced GIAT management to handle and pushed the company to the brink of bankruptcy before being bailed out by the French Government.

In 1995, the managing director of GIAT was replaced and a restructuring process began. The goal was to restore financial stability and make GIAT a viable candidate for cross-border alliances by the year 2002. The restructuring plan consisted of two major components. The first concerned the introduction of a “social plan” to successively cut the work force through early retirements and golden handshakes and close several of the production sites in France. The work force was successfully reduced from 12,000 in 1995 to 8,000 in 1999. Further cuts is underway and the goal is to be down to 6,700 employees by 2002.⁸⁷ The second component of the plan consisted of focusing on the core businesses of armored systems and weapons and ammunition. GIAT no longer only offers complete systems, such as the Leclerc MBT or the Cesar artillery system, but also subsystems, such as turrets and gun barrels adaptable to existing chassis, as well as license production of its products abroad.⁸⁸ GIAT has also engaged in a number of cooperation agreements to develop and market new products with companies such as Bofors Defence of Sweden, RO Defence of Britain, Diehl of Germany, as well as with the French companies Renault VI (RVI) and Matra Systems.⁸⁹

However, despite the efforts of the new management to turn GIAT around, the restructuring has been slow.⁹⁰ The company has continued to bleed and the losses over the past decade amount to a staggering FFr 22 billion.⁹¹ GIAT recently received a much needed boost by the awarded contract for an expected 700 wheeled armored vehicles for the French Army. It will provide important production for GIAT as well as the possibilities for synergies through the joint venture company with Renault VI that will act as the prime contractor for the program. The remaining French armored vehicle producer, Panhard, has also been invited to join the

⁸⁵ These vehicles will equip four armored and mechanized brigades by 2006. *Jane's Defence Weekly*, January 12, 2000, p. 28; <http://www.giat-industries.fr/ukgiat/actu/actu00.htm> (January 21, 2001).

⁸⁶ *Defense Analysis*, Vol 3, No 7, July 2000, p. 19.

⁸⁷ *Jane's Defence Weekly*, May 3, 2000, p. 18; Interview with a GIAT-Industries company official, Versailles-Sartory, October 10, 2000.

⁸⁸ See *Jane's International Defense Review*, 9/2000, p. 64, *Jane's Defence Weekly*, July 5, 2000, pp. 3, 13; Interview with an official at GIAT-Industries, Versailles-Sartory, October 10, 2000.

⁸⁹ See, <http://www.giat-industries.fr/ukgat/corp> (January 20, 2001); A much heralded joint-venture agreement to develop a future MBT with the British company, Vickers Defence Systems, has, however, stalled. Interview with a GIAT-Industries company official, Versailles-Sartory, October 10, 2000.

⁹⁰ GIAT posted a net loss of FFr 2.85 billion in 1997, and FFr 874 million in 1998. French analysts see little real underlying improvement in the performance of the company. Production rates are also very slow and were estimated in late 1999 to fall from 10 tanks a month in 1999 to 33 a year in 2000 if no new major order was received. GIAT has previously stated that a production rate of 20-25 tanks a month is needed to become profitable. See *Defense Analysis*, October 1999, Vol 2, No 10, p. 16.

⁹¹ Over the years, the French government has injected FFr 18.5 billion to keep GIAT afloat and more may be needed. *Jane's Defence Weekly*, November 15, 2000, p. 2. For example, in 1998, the French state injected FFr 4.3 billion in GIAT. GIAT Press Release, February 8, 1998 (<http://www.giat-industries.fr/ukgiat/actu/actu00.htm>).

partnership.⁹² Deliveries of Leclerc tanks to the French Army are also expected to continue until 2005.⁹³ Nevertheless, the long-term future is uncertain. GIAT's future is now regarded as being dependent on winning a major MBT export contract as the French government is increasingly unwilling to continue covering the losses of the company.⁹⁴ There are discussions about privatizing GIAT but no major change in the ownership structure is expected before the French presidential election in 2002.⁹⁵

⁹² The French government announced on November 6, 2000, that a GIAT-Renault VI consortium had won the contract for an expected 700 VBCI. GIAT Press Release, November 7, 2000 (<http://www.giat-industries.fr/ukgiat/actu/actu00.htm>). *Jane's Defence Weekly*, December 20, 2000, p. 15

⁹³ GIAT Press Release, November 10, 2000 (<http://www.giat-industries.fr/ukgiat/actu/actu00.htm>).

⁹⁴ Officials quoted in *Defence Analysis*, July 2000, Vol 3., No 7, p. 19; Interview with a GIAT-Industries company official, Versailles-Sartory, October 10, 2000.

⁹⁵ Interview with a French defense ministry official. Paris, December 11, 2000.

CHAPTER THREE: THE FUTURE MARKETS

III.1 Main battle tanks

It is not only GIAT that is in trouble among the European MBT manufacturers. The armies of Britain, France, Germany, and several other countries all have large holdings of modern tanks that are expected to remain in service for another 25 to 30 years.⁹⁶ The British Army's Challenger II tanks, for example, only became operationally ready at the end of 1999, and the French army continues to take deliveries of Leclerc tanks. The German Army is currently modernizing a large number of its Leopard II tanks which will allow them to remain in service for another two decades.⁹⁷

Although there are a number of studies on future battlefield vehicles to succeed the present generation of tanks in 20-25 years, the current generation of MBTs with their 120 mm solid-propellant guns will most likely be retained for the foreseeable future. A Krauss-Maffei Wegmann official recently stated that there is no imperative for a new generation of tanks as there is no projected future threat (even by missiles) that could not be countered by defensive aid suits.⁹⁸ Nevertheless, in Russia, a newly designed tank, designated T-95, has been unveiled. A radical design with the main armament, a 135 mm smoothbore gun, in a small unmanned turret fed from an automatic loader inside the hull gives the T-95 a very low silhouette. Despite its innovative design, it is unclear whether the T-95 will receive enough funding to be able to reach production.⁹⁹

The increasing role and use of attack helicopters in the armed forces of Western Europe is also having an impact on the demand for MBTs. Attack helicopters can now provide a punch comparable to heavy tanks while increasing flexibility and rapid response in crisis management missions by being airtransportable over long distances. The introduction of fire-control radar, electronic-support receivers and high-performance thermal imagers is now allowing armed helicopters to detect, identify, and engage targets at much longer ranges than was previously possible.¹⁰⁰ The improvement of sensors in combination with new missiles and guns is making helicopters an integral part of new army doctrines and organizations. To respond to regional conflicts, the US Army, for example, recently unveiled a plan that calls for the establishment of multi-function aviation battalions.¹⁰¹ These battalions will operate a combination of attack, armed reconnaissance, and utility helicopters. In Europe, the French and the German armies plan to introduce a total of 427 Eurocopter Tiger helicopters in anti-

⁹⁶ In the United States, General Dynamics Land System's Abrams tanks is no longer in production but 1,535 M1A1s and 1,174 M1A2s are to be upgraded between 2000 and 2008. See, *Jane's International Defense Review*, April 2000, p. 49.

⁹⁷ The Leopard II MBTs ordered by the Swedish and Spanish armies could in principle remain in service until 2040. *Jane's International Defense review*, April 2000, pp. 43-46.

⁹⁸ Interview with a Krauss-Maffei Wegmann official, quoted in *Jane's Defense Review*, April 2000, p. 45.

⁹⁹ *Jane's Defense Review*, March 29, 2000, 4.

¹⁰⁰ The anti-tank missiles of the Eurocopter's Tiger helicopter has a range of more than 5,000 m. *Jane's International Defense Review*, July 2000, p. 42.

¹⁰¹ The Aviation Modernization Plan of the US Army was developed during 1999 and unveiled in April 2000. The plan reflects the Army's current strategy to respond to regional conflicts using fewer personnel and long-range aircraft based in the continental US. See *Jane's International Defense Review*, July 2000, p. 41.

tank and escort/support versions while the British Army has ordered 67 WAH-64 Apache attack helicopters.¹⁰²

The lack of domestic markets, make the West European tank producing companies all dependent on export. The three main companies, GIAT, Krauss-Maffei Wegmann, and Vickers Defence Systems, are currently competing for a very limited number of tank contracts in Europe and the Middle East with many other companies from countries such as Israel, Russia, the Ukraine, and the United States (see table 2).¹⁰³ In addition to the current competitions in Europe and the Middle East, there is a potential market for tanks in Asia, Africa, and South America.¹⁰⁴ However, West European MBTs are often too sophisticated, heavy, difficult to maintain, and/or expensive to be of interest to customers in these regions.¹⁰⁵ Instead, markets there are dominated by Russian and Ukrainian companies which can offer modern tanks, such as T-80s, T-84s, and T-90s, at lower prices.¹⁰⁶ Pakistan, for example, recently bought 320 T-80 UD MBTs from Ukraine while India announced in December 2000 that it will acquire 310 T-90S MBTs from Russia.¹⁰⁷

Table 2. Current Competitions for tanks

Recipient Country	Number of tanks ¹	Country of competing company
Turkey	1,000	Fr, Ger, Pak, Rus, Ukr, US, It, Israel
Greece	500	Fr, Ger, Rus, Ukr, UK, US
Saudi Arabia	450	Fr, UK, US

Source: SIPRI Yearbook 2000, p. 356, table 7.3. and Jane's Defense Weekly, July 5, 2000, p. 3.

A contributing factor to the lack of world demand for new MBTs is the significant numbers of surplus tanks that in recent years have been transferred from the United States and Western Europe to allied and friendly governments. The end of the Cold War and the following shift in strategic thinking resulted in large surpluses of tanks and armored vehicles. These have, in many cases, been given to third countries in the form of gifts or sold for the price of transport (see table 3).¹⁰⁹ Although there is a considerable potential market for upgrading older MBTs, prime contractors prefers selling new tanks since it provides higher profit margins and more work for their employees.¹¹⁰ The outcome of the present competitions for MBTs in Greece, Turkey and the Middle East will most likely lead to one or more of the West European

¹⁰²These Apache helicopters will equip three Army Air Corps attack regiments that together with troops from the Parachute Regiment will make up the British Army's newly created 16 Air Assault Brigade. *Jane's International Defense Review*, July 2000, p. 41.

¹⁰³For example, the Russian Omsk Machine Construction Plant entered the T-80U and the Ukrainian Malyshev Plant the T-84 in the Greek tank competition. *Jane's Defence Weekly*, May 31, 2000, p. 3.

¹⁰⁴The Malaysia Army has recently stated that it seeks to acquire a regiment of 78 MBTs and 211 APCs during the period 2001-2005. *Jane's Defence Weekly*, March 29, p. 32.

¹⁰⁵That there is a market for lighter and less sophisticated tanks is demonstrated by the fact that Steyr-Daimler-Puch has restarted production after several years of its SK 105 light tank/tank destroyer. Botswana and Brazil are understood to have ordered SK 105s. See *Jane's Defence Weekly*, August 23, 2000, p. 34.

¹⁰⁶The Uralvagnzavod State United Enterprise in Russia has, for example, developed an enhanced version of the T-90S MBT to meet emerging requirements in the Asian Markets. *Jane's Defence Weekly*, May 31, 2000, p. 37. Other potential exporters of less sophisticated tanks are Pakistan and China. Pakistan has announced that the 46-ton Al Khalid MBT will soon begin production. The Al Khalid has been developed in cooperation with China which is also marketing a similar vehicle on the export market under the name MBT 2000. *Jane's Defence Weekly*, November 22, 2000, p. 12.

¹⁰⁷*Jane's Defence Weekly*, December 20, p. 15.

¹⁰⁸These numbers are likely to decrease, and the delivery dates have continuously been postponed. See, for example, *Jane's Defence Weekly*, May 31, 2000, p. 4.

¹⁰⁹Foss 1999.

¹¹⁰There is also considerable competition in the upgrading market. See Foss 1999.

companies having to give up its tank making business as there are very few outstanding tank programs planned for the coming ten years in the world.¹¹¹

Table 3. Recent examples of tanks transferred free or at low cost

Recipient country	Number and type of tanks	Donor Country
Brazil	87 Leopard I	Belgium
Chile	200 Leopard I	The Netherlands
Egypt	700 M60	USA
Greece	170 Leopard I	The Netherlands
Greece	245 Leopard I	Germany
Jordan	288 Challenger I	Britain
Morocco	240 M60	USA
Spain	407 M60	USA
Turkey	230 Leopard I	Germany

Source: Foss 1999, p. 26; Jane's Defence Weekly, January 12, 2000, p. 24.

A major export contract is especially important for the British Vickers Defence System.¹¹² It will complete the production run of Challenger II MBTs for the British Army in 2001/2002 and has to date only attracted one minor customer.¹¹³ In the 1980s, Vickers Defence Systems privately financed the development of a new tank intended for the export markets, the Valiant, but it never reached production or deployment.¹¹⁴ The success of the Challenger II is therefore crucial to the future of the company. The tank is a radical improvement of the Challenger I with a completely new turret which makes it comparable to the later versions of the US Abrams M1 and the German Leopard II.¹¹⁵ However, the Challenger II has been plagued by many technical difficulties and considered inferior in several evaluations with its closest competitors.¹¹⁶

In an attempt to compensate for the bleak outlook for MBTs, the Vickers Group unveiled a new strategy for its land systems division in September 1999 that focused on branching out into the lighter armored vehicle sector. This strategy included the acquisition of the South African armored vehicle company OMC from the Reumech group and agreements to jointly develop and market lighter armored vehicles with MOWAG of Switzerland, Krauss-Maffei Wegmann of Germany, and Singapore Technologies.¹¹⁷ However, just a few days after the

¹¹¹Saudi Arabia's demand that France buy back 290 older GIAT AMX-30 MBTs and other vehicles bought from France in the event it decides to buy new Leclerc MBTs from GIAT is an example of how competitive the tank selling business is. *Jane's Defense Weekly*, July 5, 2000.

¹¹²Although Vickers Defence Systems received an order for engineer tanks from the British Army in October 2000, a major export order is necessary to ensure long-term stability. The £250 million order for 66 vehicles was also smaller than the 100 vehicle order expected. An additional 32 recovery vehicles for non-tank units are also expected to be awarded in the near future. See *Defence Analysis*, October 2000, Vol. 3, No. 10, p. 19; *Jane's Defence Weekly*, September 6, 2000, p. 14.

¹¹³Oman ordered a total of 38 Challenger II MBTs in 1993 and 1997. *Jane's Defence Weekly*, November 15, 2000, p. 14.

¹¹⁴Foss and MacKenzie 1988, pp. 204-208.

¹¹⁵The Challenger I system was not designed by Vickers Defence Systems but by the British Government's Royal Armament Research and Development Establishment (RARDE) in Chertsey and produced by the Royal Ordnance tank factory in Leeds. Vickers Defence Systems, however, took over the Challenger program and the Leeds factory from the government in 1985. See Foss and MacKenzie 1988, pp. 204-208, 220-222.

¹¹⁶The Challenger II received poor ratings in both the Kuwaiti and Qatari tank competitions and failed to win either contract. See *Defence Analysis*, Vol 1, No 4, pp. 1-2. In the most recent evaluations in Greece, the Challenger II was outranked by both the Leopard II and M1A2 Abrams, as well as the Leclerc. See *Jane's Defence Weekly*, May 31, 2000, p. 3.

¹¹⁷*Defence Analysis*, October 1999, Vol 2, No 10, p. 6; Vickers Defence Systems press release, September 9, 1999 (<http://www.vickersdefence.co.uk/LatestFrameset.htm>).

announcement of the new strategy, the Vickers Group was bought by the engineering group, Rolls Royce. The target for Rolls Royce's £576 million bid on Vickers was the group's marine division and not its land armaments division. Indeed, Vickers Defence Systems, has since been put on the market by Rolls Royce.¹¹⁸

Germany's Krauss-Maffei Wegmann seems to be in a better position. The company has delivered 4,500 Leopard I and close to 3,000 Leopard II MBTs to many countries around the world and the chances for winning the present Greek and Turkish MBT contracts are good.¹¹⁹ Krauss-Maffei Wegmann is also looking forward to upgrading many of the earlier models of the Leopard I and II.¹²⁰ In addition, the self-propelled artillery system PzH 2000 is now in production for the German Army with exports to Italy and the Netherlands confirmed and several other customers interested.¹²¹ Similar to many other European land armaments companies, Krauss-Maffei Wegmann has attempted to broaden its product range as well as breaking into new markets. In addition to MBTs and self propelled howitzers, it is now offering several lighter wheeled armored vehicles suitable for reconnaissance missions, and peace support operations.¹²² Krauss-Maffei Wegmann is also (as has been mentioned above) bidding together with Rheinmentall on the Spanish land armaments company Santa Barbara. Furthermore, the recently concluded strategic alliance between the major German land armaments companies should provide benefits to Krauss-Maffei Wegmann as it will be able to draw on the combined strength of the German land armaments industry (see above). Nevertheless, continuing low German procurement budgets and restrictive export regulations keep Krauss-Maffei Wegmann under pressure in both home and export markets.¹²³

III.2 Armored vehicles

In contrast to the depressed prospects for MBTs, the markets for light to mid-weight armored vehicles look better over the coming ten years (see table 4). The demand for lighter armored vehicles is partly due to the need to replace and upgrade aging vehicles in many countries but also to changing operational requirements for crisis management missions. As future conflicts are widely thought to be more like the ones in Kosovo and Sierra Leone rather than the Gulf War, there is an increased focus in Europe and the United States on light and medium-weight forces and airportable armored vehicles.¹²⁴ The mission in East Timor required versatile

¹¹⁸*Defense Analysis*, October 1999, Vol 2, No 10, p. 6.

¹¹⁹See *Jane's Defence Weekly*, May 31, 2000, p. 3.

¹²⁰The German army is upgrading 350 and the Dutch army 180 Leopard II tanks from A4 standard to A5, while the Danish army is upgrading 51 Leopard IIs to A5+ standard. *Jane's International Defense Review*, April 2000, p. 45. Krauss-Maffei Wegmann has also begun upgrading 114 of the Canadian Army's Leopard C1 tanks to the C2 standard. Foss 2000, p. 34.

¹²¹However, the requirements for several countries, such as Italy, are not as large as was once thought *Defence Analysis*, October 1998, Vol. 1, No 2, p. 2.

¹²²One such vehicle is the Dingo all-protected carrier vehicle (APCV). The Dingo was developed by Krauss-Maffei Wegmann as a private venture before the German Army ordered 56 vehicles in 1999 for deployment with its rapid reaction units, presently serving in Kosovo. *Jane's Defence Weekly*, September 6, 2000, p. 14. Two other light wheeled vehicles developed by Krauss-Maffei Wegmann are the Fennek reconnaissance vehicle and the Terrier light armored unit vehicle. These vehicles are offered in partnership with firms in Italy and the Netherlands. See <http://www.kmweg.de/english/index.html> (January 8, 2000).

¹²³The German government's hesitation to allow arms exports to Turkey is an example of this.

¹²⁴The US is, for example, looking to set up light brigades equipped with wheeled armored vehicles for world wide "fire fighting". *Defense Analysis*, January 2000, Vol 3, No 1, p. 7; Light Armoured Vehicles, supplement to *Jane's Defence Weekly*, October 4, 2000, p. 3; *Jane's International Defense Review*, April, 2000, pp. 18-20. In November 2000, the US Army awarded a joint-venture between General Motors Defense and General Dynamics Land Systems the contract for the army's emerging brigade combat teams requirement

armored vehicles for direct fire support while the mission in Sierra Leone required lightly armored, air-transportable vehicles. In Bosnia, armored vehicles were needed for both reconnaissance missions and convoy escort.¹²⁵ Kosovo, in turn, demonstrated a need for wheeled and tracked armored vehicles capable of combat missions but with greater strategic mobility than heavy tanks.¹²⁶

To meet the new requirements and demands, armored vehicle manufacturers around the world have adapted existing models of light and medium weight armored vehicles for crisis management missions.¹²⁷ Several international joint-ventures have been created to develop and market new armored vehicles: ASCOD (a joint-venture between Steyr-Daimler-Puch of Austria and Santa Barbara of Spain), Patria-Hägglunds (a joint-venture between Patria of Finland and Hägglunds of Sweden), and the previously mentioned ARTEC (a joint venture between Alvis of Britain, and Krauss-Maffei Wegmann and Rheinmetall of Germany). Many of these vehicles are wheeled rather than tracked as wheels provide better strategic mobility, fuel economy, and project a less threatening image.¹²⁸ The future market potential for light armored vehicles is further emphasized by the recent American acquisitions of some leading European land armaments companies. Diesel Division, General Motors of Canada bought the Swiss armored vehicle specialist MOWAG (the designer of the Pirhana/LAV 8x8) in 1999.¹²⁹ General Dynamics Land Systems, in turn, took a 25 percent stake in the Austrian armored vehicle manufacturer Steyr-Daimler-Puch AG (producer of the Pandur 6x6) before laying a bid on the Spanish land armaments company Santa Barbara in April 2000.¹³⁰ United Defense, moreover, owns a controlling stake in the armored vehicle joint venture FNSS in Turkey and acquired the Swedish gunmaker Bofors Weapon Systems AB (renamed Bofors Defence) in June 2000.¹³¹

The most important armored vehicle program in progress in Europe is the British-German MRV program. In November 1999, Britain and Germany finally signed an agreement to co-develop and procure the MRV. At the very least, Britain and Germany intend to acquire around 1,000 MRVs each. In addition, the Netherlands have expressed interests in acquiring 4-600 vehicles and potential exports have been estimated at 4,000 vehicles over the following 10-15 years.¹³² The French government was originally part of the MRV program but pulled out and recently launched a purely national program for 700 wheeled armored vehicles (VBCI). The French decision was partly due to differences in the specification of the

of wheeled armored vehicles. The estimated cumulative value of the contract is \$4 billion and a total of 2,131 vehicles is expected to be ordered for six combat teams. See *Jane's Defence Weekly*, November 22, 2000, p. 3.

¹²⁵ *Defense Analysis*, September 2000, Vol 3, No 9, p. 9.

¹²⁶ A major deficiency noted in the French experience from the Kosovo conflict was the lack of a modern tracked IFV. The existing French AMX-10 RI was obsolete and wheeled VABs were unable to keep up with the Leclerc MBTs in broken terrain. *Defense Analysis*, May 2000, Vol 3, No 5, p. 14.

¹²⁷ See, for example, the selection of vehicles in the editorial supplement to *Jane's International Defense Review*, October 2000, and *Jane's Defence Weekly*, October 4, 2000, on Light Armored Vehicles.

¹²⁸ All these aspects are considered to be important in peacekeeping missions. As a sign of the changing times, the focus at the 2000 Eurosatory arms exhibit in Paris was on light armored vehicles for crisis management and peacekeeping missions and not on the traditional MBTs and artillery systems.

¹²⁹ <http://www.mowag.ch/En/UeberUnsEn.htm> (January 21, 2001). Before the purchase, General Motors of Canada had for many years produced wheeled armored vehicles under license from MOWAG for the North America and other selected markets.

¹³⁰ As mentioned above, the bid from General Dynamics and a rival bid from Rheinmetall/Krauss-Maffei Wegmann are still under review by the Spanish government. *Armed Forces Journal*, September 2000, p. 96;

¹³¹ See <http://www.uniteddefense.com/about/location/internat.htm> (January 21, 2000); United Defense press release, June 15, 2000, (<http://www.uniteddefense.com/news/releases/pr000615.htm>).

¹³² *Defense Analysis*, October 1998, Vol 1, No 2., p. 2, *Defense Analysis*, December 1999, Vol 2, No 12, p. 9.

vehicle,¹³³ but the failure of GIAT in gaining a leading position in the joint program was a key factor in the French decision to go its own way.¹³⁴ It was also hoped that a national program would encourage consolidation in the French armored vehicle industry.¹³⁵

In addition to the MRV program, Britain announced in May 2000, the start of the competition for a second major armored vehicle program for the army, the Armored Battlefield Support Vehicle (ABSV).¹³⁶ The ABSV is to have an in-service date of 2008 and Britain is to order around 1,000 vehicles. On top of the MRV and the ABSV, there are two programs for a future reconnaissance vehicle (Tracer), and a Future Command and Liaison Vehicle (FCLV) for the British Army (see table 3).¹³⁷ The Belgian Army has also a requirement for 169 future reconnaissance vehicles and has launched a competition for the contract.¹³⁸ Recently, the French Army announced that it has an operational requirement for between 500 and 1,000 new light protected armored vehicles (PVP) and the invitation to tender was issued in the fall 2000.¹³⁹ However, there is severe competition for all outstanding contracts, and many companies lack orders. Twelve companies competed for the recent contract to deliver 40 Armored Personnel Carriers (APCs) to Ireland, and at least 8 companies have thus far registered interest to supply the British Army with the requested 800-1,000 ABSVs.¹⁴⁰

Modern armored vehicles are increasingly sophisticated and approach the latest generation of MBTs in their technological complexity. There are only a limited number of companies capable of developing and producing modern IFVs and the technological development has resulted in an increasing gap between armored vehicles equipped with the latest technologies for the markets in the West, and less sophisticated vehicles produced for the rest of the world.¹⁴¹ At the same time, armored vehicle companies in Western Europe are not able to compete with producers from countries such as Russia, Singapore, South Korea, and the Ukraine in third world markets.¹⁴² In short, a shake-out among the many manufacturers of armored vehicles in Europe is bound to take place soon.

¹³³Germany and Britain required an armored personal carrier, while France needed an infantry fighting vehicle to supplement the Leclerc tank. Interview with a French defense industry leader, Paris, October 24, 2000; Interview with a GIAT-Industries company official, Versailles-Sartory, October 10, 2000.

¹³⁴Interview with a French defense industry analyst, Paris, October 9, 2000; Interview with a French defense industry leader, Paris, October 24, 2000.

¹³⁵In November 2000, the French government announced that a joint bid by GIAT and Renault VI had won the contract for the expected 700 VBCI. Following the decision, the remaining French armored vehicle producer, Panhard, was invited by GIAT and Renault VI to join their partnership. A purely French program will provide much needed production for GIAT. *Defence Analysis*, July 2000, Vol 3, No 7, p. 19

¹³⁶Supposedly, the ABSV is to operate closer to the front line - in the direct fire zone - whereas the MRV will operate further back in the indirect fire zone. *Defence Analysis*, June 2000, Vol 3, No 6, p. 8.

¹³⁷*Defence Analysis*, June 2000, Vol 3, No 6, p. 9; *Defence Analysis*, September 2000, Vol 3, No 9, p. 5.

¹³⁸*Jane's Defence Weekly*, August 23, 2000, p. 17.

¹³⁹The Petit Véhicule Protégé (PVP) will bridge the gap in the French Army between the Panhard P4 protected vehicle and the Panhard VBL scout car. The PVP is expected to be used extensively in peacekeeping operations such as those in the former Yugoslavia. *Jane's Defence Weekly*, October 4, 2000.

¹⁴⁰*Jane's Defence Weekly*, December 15, 1999, p. 5; August 9, 2000, p. 10.

¹⁴¹Telephone interview with a senior defense industry director. January 9, 2000.

¹⁴²Korea, for example, provided Malaysia with 111 IFVs between 1992-1995. *Jane's Defence Weekly*, March 29, 2000, p. 32.

Table 4. Major light and medium armored vehicle contracts awarded or pending in year 2000

Country	Type	Numbers	Delivery	Status
Australia	ASLAV	150	2002-	Awarded to General Motors of Canada
Austria	IFV	112	2002-2004	Awarded to Steyr-Daimler-Puch
Belgium	Reece 2000	169	2002	Undecided
Finland	IFV	57	2002-2005	Awarded to Hägglunds (Alvis)
France	VBCI (IFV)	700	2006-	Awarded to GIAT/Renault VI
France	PVP	500-1,000	?	Undecided
Germany	APCV	56	2000	Awarded to KMW
Germany	MRAV/GTK	1,000+	2004-	Awarded to Alvis/Rheinmetall/KMW
Italy	VBL (APC)	580	2001-2004	Awarded to IVECO-OTOBreda
Ireland	APC	40	2000-2002	Awarded to MOWAG (General Motors Defense of Canada)
The Netherlands	MRAV/GTK	4-600	?	Undecided
New Zealand	AFV	104	?	Undecided
Oman	LAV	80	2001-2002	Awarded to Alvis
Switzerland	AFOV	120	?	Awarded to MOWAG (General Motors Defense of Canada)
Switzerland	ACP	10	2001-2002	Awarded to MOWAG (General Motors Defense of Canada)
Switzerland	IFV	186	2002-2005	Awarded to Hägglunds (Alvis)
Turkey	APC	551	2001-2004	FNSS/United Defense
UK	FCLV	4-500	2006-	Undecided
UK	MRAV/GTK	1,000+	2006-	Awarded to Alvis/Rheinmetall/KMW
UK	ABSV (APC)	800-1,000	2008-	Undecided
UK	Tracer	3-400	?	Undecided
UK	IFV (Warrior) upgrade	789	2008-12	Undecided
USA	IAV (ICV/MGS)	2,131	2001-	Awarded to General Motors of Canada/General Dynamics Land Systems

Sources: Defence Analysis, June 2000, Vol 3, No 6, p. 9; Jane's Defence Weekly, January 5, 2000, p. 13; January 12, p. 11; August 9, p. 4; August 23, 2000, p. 17; September 6, 2000, p. 14; September 8, 2000, p. 5; November 15, 2000, p. 2; November 22, 2000, p. 3; November 29, 2000, p. 14; December 20, 2000, p. 15.

CONCLUSION

The land armaments sector in Europe has undergone significant changes over the past few years. A study of countries such as Germany and Britain not only reveals a move towards national consolidation, but joint-ventures, mergers, and acquisitions are also occurring in increasing numbers on European and transatlantic levels. In light of these events, what are the short and long term prospects for the industry? Will the trajectory of consolidation in the land armaments sector resemble that of the aerospace industry, or will it take a different route?

Earlier defense industry research has indicated that there are considerable differences between the restructuring process in aerospace vis-à-vis land armaments.¹⁴³ This paper's findings confirm this earlier conclusion and suggests that aerospace and land armaments have followed different paths for both economic and political reasons. Rapidly increasing R&D costs and shorter production runs made cross-border cooperation in the aerospace sector a financial imperative as early as in the 1960s. During the following decades, intergovernmental programs structured the sector. These programs, in turn, provided the foundation for later cross-border integration moves in the European aerospace industry.

In contrast, the restructuring process in the European land armaments sector began much later. Although different concepts of military strategy and national prestige may account for some of the difficulties in harmonizing operational requirements and technical specifications on a European level, commercial interests have also played an important role in the failure to reach consensus.¹⁴⁴ The increase in R&D costs was more modest for land systems than for aerospace, and production runs for tanks, artillery, and armored vehicles continued to be comparatively long.¹⁴⁵ This made it financially possible to maintain nationally focused land armaments programs and production facilities throughout the Cold War.¹⁴⁶

Without very strong economic pressure, it has proved politically difficult for governments to overcome the vested interests of groups that benefit more from local production than from European cooperation (e.g. domestic defense industry firms, labor unions, and local politicians in arms producing regions). However, the end of the Cold War and the decision by many countries in the mid to late 1990s to restructure their armed forces fundamentally altered the market conditions. The new focus on smaller and lighter forces for out-of-area crisis management missions in both Europe and the United States has already changed the land armaments industry. Smaller volumes and fewer heavy systems are being procured in the West while competition in third world markets has increased as producers from the US, Russia, Ukraine, and several Asian countries enter the market. At the same time, the growing importance of what has been called the Revolution in Military Affairs (RMA) in modern

¹⁴³See, for example, Schmitt 2000; Cornu 2001.

¹⁴⁴Creasey 1987; Moravcsik 1993.

¹⁴⁵For example, the cost of bringing in a front line fighter, such as the US F-15, into service in 1976 was seven times that of an F-86 in 1950. In comparison, the cost of bringing in the M1 tank into service in 1980 was only three times higher than that of the M60 in 1960. *The Economist*, June 14, 2000, pp. 1-18 (special survey on defense industry).

¹⁴⁶In 1988, there were still six countries in Western Europe (Britain, France, Germany, Italy, Spain, and Sweden) with the ambition to independently develop a new generation of MBTs. Britain placed its first order on the Challenger II in 1991, France began production of the Leclerc in 1992, and the Italian Army received its first Ariete in 1995. Germany, however, cancelled its plans for the Kampfswagen 2000, while Sweden and Spain eventually decided to procure Leopard II MBTs from Germany. Wulf 1993, p. 156.

warfare means that R&D costs for new land systems equipment have drastically increased.¹⁴⁷ In short, Europe's land armaments industry is presently struggling with problems similar to those that aerospace companies have learnt to live with since the mid 1960s.

Meanwhile, restructuring the European land armaments sector along the lines of the aerospace industry will not be an easy task. First, the land armaments industry lacks the decades of cross-border cooperation and joint projects that preceded such integration within the aerospace industry. Second, the land armaments industry remains fragmented within national borders (despite the recent developments in Germany and Britain) whereas national consolidation was an important intermediate stage before major cross-border mergers took place in the aerospace industry. Third, and unlike aerospace again, the land armaments sector does not experience pressure from commercial markets to consolidate due to their limited civilian activities.¹⁴⁸ Last but not least, political support for restructuring the land armaments industry on a European level is weaker and less coherent than it has been for the aerospace industry.¹⁴⁹

Although industry is primarily responsible for selecting who will merge with whom in the ongoing consolidation, national governments may strongly influence the process by establishing long-term strategic priorities and passing out contracts.¹⁵⁰ In aerospace, consolidation would not have been possible without the many intergovernmental programs launched during and after the Cold War. Programs like the Tornado and Typhoon fighters, the Tiger helicopter, the Airbus airliners and several missile projects not only encouraged national consolidation, but also kick-started cross-border cooperation and integration.¹⁵¹ For the restructuring process of the land armaments industry, intergovernmental programs are even more important. Since land system companies are less diversified, have smaller, if any, turnover in civilian markets and seldom are associated with larger commercial groups (except in Germany), they are necessarily more dependent on government contracts than aerospace companies.¹⁵² Thus, national governments have a crucial role to play in the consolidation of the sector.¹⁵³ If there is going to be an independent and strong European land armaments

¹⁴⁷RMA includes: Sophisticated command, control, communications, computers, intelligence, surveillance and reconnaissance capabilities (C4ISR), and precision guided munitions. Modern IFVs, for example, are very different from the ones produced twenty years ago and approach MBTs in technological complexity. Telephone interview with a senior defense industry executive. January 10, 2001.

¹⁴⁸The commercial pressure from civilian markets was a major factor in the push for integration in the aerospace industry during the 1990s. The turnover in the European aerospace industry from civilian activities had become greater than that from military activities by the early 1990s. Schmitt 2000, pp. 20-23.

¹⁴⁹In the middle of the 1990s, a perception of an American high-technology "threat" became widespread in European politico-military circles. The fear of an American monopoly in the high-technology defense sectors led to a consensus between the European aerospace industry and governments on the necessity for consolidation of the aerospace sector. Schmitt 2000, p. 28. In contrast, several European land systems companies have been sold to American firms with few, if any, objections from national governments.

¹⁵⁰On the other hand, if governments are unable to clarify their priorities, necessary restructuring will be delayed, unfocused, or both.

¹⁵¹The ad-hoc, program-based nature of cooperation evolved over time into more long-term and integrated collaboration in the form of joint-venture companies in the early 1990s. These joint-ventures, in turn, provided the foundations for the outright mergers of several parent companies in the late 1990s. See Schmitt 1999; 2000.

¹⁵²I thank Burkard Schmitt for clarifying this point.

¹⁵³That this is a highly sensitive role is indicated by the fact that two secretaries of state responsible for procurement during the 1990s in the German Ministry of Defense have been charged with bribery. See Lock 2000b, p. 4.

industry in the future, governments must begin to make their strategic priorities clearer and procurement projects better coordinated.¹⁵⁴

On the other hand, the land armaments industry will continue to undergo rapid change in the short-term, regardless of whether more intergovernmental programs are forthcoming or not. There are simply too many companies chasing too few contracts. The recent entry of the American companies into Europe has shown the dynamics of the consolidation process, and without a clear government policy, the latter might well follow a political "incorrect" path. However, in the long-term, the decisive question for the West European land system companies is whether technological developments and conceptual thinking will render them and their core products redundant or not. Will RMA-related technologies and future operational needs make MBTs and armored vehicles relics of the past? MBTs have been at the center of land combat since 1940, but its primacy is under challenge by increasingly sophisticated missiles and attack helicopters. Moreover, the increasing role of out-of-area missions puts a premium on lighter vehicles for improved strategic mobility.¹⁵⁵ These factors work against the use of traditional MBTs and other types of heavy equipment.

The fact that the projected MODIFIER (Mobile Direct Fire Equipment Requirement) vehicle planned to succeed the present generation of MBTs in Britain has deliberately not been called a tank is an indication of how unclear the future role of combat vehicles is. DERA officials believe that the people in the vehicles observing a target will not necessarily be the ones who shoot at it in the future. By using advanced sensors and high-speed "sensor-to-shooter" links, it is envisioned that targets will be engaged by stand-off missiles, precision guided munitions, and multi-launch rocket systems (although there will still be a need for certain direct precision-fire capabilities). The key technologies for these future land combat platforms are not metal armor or large caliber guns, but rather composite materials, stealth technologies, precision guided munitions, and C4ISR capabilities.¹⁵⁶

Many of these technologies are being developed outside of the traditional land armaments sector (by aerospace, electronics, and shipbuilding firms, for example).¹⁵⁷ The long-term prospect of land system companies will, therefore, ultimately depend on their willingness and ability to incorporate advanced technologies in the development of new products that meet the conflict needs of the future. While it is too early to dismiss the West European land armaments companies as Cold War dinosaurs, their role as future hi-tech arms providers in the new millenium is by no means a given.

¹⁵⁴For example, the sale of several European land armaments companies to American firms rather than European was motivated by the belief that the American firms would be better able to maintain local jobs. *Armed Forces Journal*, September 2000, p. 96.

¹⁵⁵Current MBTs and many other armored vehicles are too heavy to be airlifted directly into theatres of operations and require time-consuming surface transport.

¹⁵⁶*Jane's International Defense Review*, January 1997, p. 10; and *Jane's International Defense Review*, April 2000, pp. 45-48.

¹⁵⁷For example, new composite materials, such as plastic/glass-fiber, that provide better protection at lower weights than traditional armor are being developed in the shipbuilding industry. *Jane's Defence Weekly*, March 22, 2000, p. 5. Navy 2000.

ABBREVIATIONS

ABVS	Armored Battlefield Support Vehicle
ACP	Armored Command Post
AFOV	Artillery Forward Observation Vehicle
AFV	Armored Fighting Vehicle
APC	Armored Personnel Carrier
APCV	All-Protected Carrier Vehicle
ASLAV	Australian Light Armored Vehicle
ARV	Armored Recovery Vehicle
BAES	British Aerospace Systems
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CFE	Conventional Armed Forces in Europe
DAS	Defensive Aid Suits
DEFA	<i>Direction des Etudes et Fabrications d'Armements</i>
DERA	Defence Evaluation and Research Agency
DIB	Defense Industrial Base
DMA	<i>Direction Ministerielle des Armements</i>
DTAT	<i>Direction Technique des Armements Terrestres</i>
EADS	European Aeronautic, Defense and Space Company
FCLV	Future Command and Liaison Vehicle
FMBT	Future Main Battle Tank
GIAT	<i>Groupment Industriel des Armements Terrestres)</i>
GTK	<i>Gepanzertes Transport-Kraftfahrzeug</i>
IAV	Interim Armored Vehicle
ICV	Infantry Carrier Vehicle
IFV	Infantry Fighting Vehicle
KMW	Krauss-Maffei Wegmann
KPz	<i>Kampfpanzer</i>
LAV	Light Armored Vehicle
MAP	Military Aid Program
MBT	Main Battle Tank
MGS	Mobile Gun System
MODIFIER	Mobile Direct Fire Equipment Requirement
MRAV	Multi Role Armored Vehicle
NATO	North Atlantic Treaty Organization
NAWV	New Armored Wheeled Vehicle
PVP	<i>Petit Véhicule Protégé</i>
PzH	<i>Panzerhaubitze</i>
R&D	Research and Development
RMA	Revolution in Military Affairs
VBCI	<i>Véhicule Blindé de Combat d'Infanterie</i>
VBL	<i>Veicolo Blindato Leggero</i>
VBL	<i>Véhicule Blindé Léger</i>
WEU	Western European Union

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