



European Security and Defence Assembly  
Assembly of Western European Union

DOCUMENT A/2034

3 June 2009

**FIFTY-SIXTH SESSION**

---

European armoured vehicles: current programmes

**REPORT**

submitted on behalf of the Technological and Aerospace Committee  
by Axel Fischer, Chairman (Germany, Federated Group)  
and Tuija Nurmi (Finland, Federated Group), Rapporteurs



DOCUMENT A/2034

3 June 2009

FIFTY-SIXTH SESSION

---

European armoured vehicles: current programmes

**REPORT**

submitted on behalf of the Technological and Aerospace Committee  
by Axel Fischer, Chairman (Germany, Federated Group)  
and Tuija Nurmi (Finland, Federated Group), Rapporteurs

Report transmitted to: the President of the Council of WEU; the President of the Council of the European Union; the WEU Secretary-General/EU High Representative for the Common Foreign and Security Policy; the President of the European Commission; the EU Commissioner for institutional relations and communication strategy; the Presidents/Speakers and the Chairmen of the Foreign Affairs, Defence and European Affairs Committees of the 39 national parliaments represented in the Assembly; the Presidents of the Parliamentary Assembly of the Council of Europe, the NATO Parliamentary Assembly, the OSCE Parliamentary Assembly, the Baltic Assembly, the Nordic Council, the Parliamentary Assembly of the Black Sea Economic Cooperation, the CIS Parliamentary Assembly; the President of the European Parliament; the Secretaries General of the Parliamentary Assemblies of the Council of Europe, NATO and the OSCE.

*European armoured vehicles: current programmes*

**REPORT<sup>1</sup>**

*submitted on behalf of the Technological and Aerospace Committee  
by Axel Fischer, Chairman (Germany, Federated Group) and  
Tuija Nurmi (Finland, Federated Group) Rapporteurs*

TABLE OF CONTENTS

RECOMMENDATION 837

on European armoured vehicles: current programmes

EXPLANATORY MEMORANDUM

submitted by Axel Fischer, Chairman (Germany, Federated Group) and Tuija Nurmi (Finland, Federated Group), Rapporteurs

- I. Summary
- II. Introduction
- III. The European armoured vehicle market: players and products
  1. Germany: Krauss-Maffei Wegmann and Rheinmetall
    - (a) Krauss-Maffei Wegmann (KMW) and the BOXER
    - (b) Rheinmetall and the Puma
  2. Patria: Finnish know-how
  3. France, Nexter, Renault Trucks Defense and Panhard
  4. Oto Melara-Iveco and the CENTAURO
  5. BAE Systems Hägglunds and the Viking
  6. General Dynamics European Land Systems (GDELS)
    - (a) Santa Barbara and the Pizarro
    - (b) MOWAG and the PIRANHA
    - (c) Steyr and the PANDUR
- IV. European cooperation: governments, industry and the role of the EDA

AMENDMENT

MEMBERS OF THE COMMITTEE

---

<sup>1</sup> Adopted by the Committee on 6 May 2009.

**RECOMMENDATION 837<sup>2</sup>**

***on European armoured vehicles: current programmes***

The Assembly,

- (i) Considering the importance of the European armoured vehicles market for Europe's industrial capacity, current and future orders and as a demonstration of its powers of technological adaptation and innovation;
- (ii) Stressing the crucial operational role played by wheeled and tracked armoured vehicles in European military operations, particularly in Afghanistan, as well as in UN, NATO and EU stabilisation and peacekeeping missions;
- (iii) Considering that European land equipment is among the best in the world in terms of capacity, technical and technological solutions and the protection afforded to transported personnel;
- (iv) Considering that European armoured vehicles of all categories are superior or equal to their American equivalents, which could be conducive to the development of transatlantic synergy in this area;
- (v) Considering in that regard that European states should strive to obtain a US defence equipment market that is more open to the products and solutions proposed by European defence companies;
- (vi) Considering in view of the current state of the market, industry and programmes that there are no real possibilities for common armoured vehicle programmes;
- (vii) Noting that the defence companies in this sector either cooperate among themselves on common projects or work in complementary fashion on platforms, systems and subsystems, while remaining competitive on the national and international markets;
- (viii) Considering that intergovernmental cooperation in the armoured vehicles sector calls for harmonisation of operational requirements among the European states concerned and for the definition of common basic standards;
- (ix) Considering that those two tasks fall as a priority to the European Defence Agency, in consultation and cooperation with the member states participating in the Agency;
- (x) Considering that in the present economic crisis the European states have a special responsibility to ensure that European land equipment companies should continue to benefit from stable orders and from financial loans and guarantees that will enable them to deal with the consequences of the international credit crunch;
- (xi) Stressing that there is already a fair degree of consolidation of the armoured vehicles industry at European level and that states seeking further consolidation should be careful to maintain human, technical and technological resources at a level sufficient to preserve and develop the European defence technological and industrial base;
- (xii) Considering in that regard that it is very important to invest in the education and training of engineers and technicians and in technological innovation in both the civilian and defence sectors, in order to maintain Europe's high standard in the field of armoured vehicles and other land equipment in the face of the current and future competition from the United States, Russia and other countries;
- (xiii) Considering that the European states, in complying with their national legislation and European and international undertakings regarding armaments exports and transfers, must be careful that European companies are not being penalised in comparison to their competitors that do not have the same constraints;

---

<sup>2</sup> Adopted by the Assembly on 3 June 2009 at the 2<sup>nd</sup> sitting.

(xiv) Considering that the two European Commission Directives on defence procurement and defence equipment and technology transfers are conducive to a more transparent and flexible European market;

(xv) Considering that it is necessary also to envisage specific measures for small and medium-sized enterprises in this sector in order to take better into account their particular characteristics and their dependence on the big companies in the land, maritime and air equipment sectors;

(xvi) Considering that in parallel to the European Defence Agency initiatives in this area, it is first and foremost up to the participating member states to agree on pragmatic solutions for offsets in connection with contracts for the sale of defence equipment in Europe,

RECOMMENDS THAT THE COUNCIL INVITE THE WEU NATIONS AS MEMBERS OF THE EUROPEAN UNION TO

1. Ensure that European armoured vehicle and land equipment companies continue to benefit from stable long-term orders;
2. Strive to obtain a US defence equipment market that is open to European products on a reciprocal basis;
3. Encourage, through appropriate tax incentives, investment in the land, maritime and air equipment industries;
4. Ensure that as a result of national and European regulations on the transfer and export of defence equipment European companies are not penalised in comparison to non-European competitors on the international market;
5. Take tangible and pragmatic steps towards harmonising operational requirements and basic standards for defence equipment, defining measurable objectives and a precise timetable;
6. Encourage the member states to define a common European policy on offsets for the European market;
7. Ensure that the defence sector does not suffer lasting consequences as a result of the international economic crisis and strive to preserve the skilled capacity in this sector;
8. Take steps to ensure that Europe continues to produce engineers and technical staff in sufficient numbers to maintain and develop the European defence industrial and technological base;
9. Increase investment at national and European level in research, development and technological innovation in the civilian and defence sectors in order to preserve Europe's competitive edge on the international market;
10. Keep the Assembly informed of national, European and transatlantic cooperative programmes for the development and procurement of defence equipment.

## EXPLANATORY MEMORANDUM

*submitted by Axel Fischer, Chairman (Germany, Federated Group)  
and Tuija Nurmi (Finland, Federated Group), Rapporteurs*

### *I. Summary*

1. In 2005, the defence ministers of the states participating in the European Defence Agency (EDA) decided to make European armoured vehicles the focus of the Agency's activities for that year. Noting that there were 23 separate national programmes to acquire such systems under way, the ministers tasked the EDA to work with the participating member states with a view to identifying common needs and improving cooperation in this area.
2. Four years later, at the beginning of 2009, the situation has hardly changed and the EDA has come to the conclusion that European cooperation in this field – which is currently limited to subsystems, research into interoperability or sharing the logistics chain – can go no further than defining future needs that might or might not give rise to joint programmes.
3. It should be stressed that armoured vehicles cover an extremely diverse range of equipment which include several families of vehicles from heavy tanks to light four-wheeled cars and fulfil a wide variety of functions from combat and command to chemical, biological, radiological and nuclear (CBRN) detection, transport or medical assistance.
4. There is one category in this range that is of particular interest to us: the 6x6 or 8x8 wheeled vehicles. They are the most in demand, attract the lion's share of investment and are the main focus of technological research and development. They are multipurpose, modular and equipped with the latest in electronics and information and communications technology. These vehicles are the object of fierce competition among states and firms in national, European and international markets.
5. The recent campaigns in Afghanistan and Iraq, characterised by frequent and constant attacks with more or less sophisticated and powerful improvised explosive devices (IED), have demonstrated the importance of this class of armoured vehicle for low- and medium-intensity operations. They offer a combination of protection, mobility and fire power, and, in certain conditions, can be airlifted ready to be deployed (light vehicles on C-130s, heavier ones on C-17 and Antonov-124).
6. Beyond the various types and capabilities of armoured vehicles, the main challenge is maintaining, strengthening and developing European industrial capabilities in this field. The European market suffers from overcapacity, which to a large extent is linked to the inherited view of world conflict in Europe (the cold war), but is also dynamic and adaptable, as can be seen by the number of industrial players and solutions put forward to meet the needs of Europe's armed forces.
7. Current needs are being met. It is important now to look ahead and take account of future requirements based on current experience and the medium-term effects of the present economic crisis on European defence programmes. Cooperation among European states and firms would appear to be the best way to encourage the sector to adapt and develop in a highly competitive European and international environment.
8. But cooperation in itself is not an industrial solution; a free and balanced market could be a solution to the challenges that European defence industries face in the European and international markets. Also, no company in this sector can survive if it does not have full competence and capability to design, develop and produce an armoured vehicle.
9. The Technological and Aerospace Committee has decided to look at all these issues in this report drafted by Axel Fischer (Germany, Federated Group), Chairman of the Committee, and Tuija Nurmi (Finland, Federated Group), and to submit recommendations with a view to improving and further developing European cooperation in this field which is a strategic part of the European defence industrial and technological base.

## *II. Introduction*

10. On 23 May 2005, the defence ministers of the EU member states participating in the European Defence Agency (EDA) decided to include European armoured vehicles in the Agency's programme of activities. This was not a random choice; this sector is an important part of the European land defence equipment industry which is generally considered to be difficult to restructure and rationalise, although it has consolidated around a limited number of companies in recent years.

11. At the time, the Head of the Agency, Javier Solana, noted that "this sector is a perfect example why the Agency is needed: these are the vehicles which our future operations will require (...). But the Agency has shown that there is enormous fragmentation in both supply and demand and almost no international cooperation between member states. We agreed that we cannot go on as we are; together we must find a way to change".

12. A press release from the Agency also noted that "some 20 000 such vehicles are currently in service with European armed forces and (...) over the next decade, there would be demand for around 10 000, which could cost up to €30 billion". The number of ongoing national procurement programmes in 2005 was estimated at 23 and only one involved cooperation by different countries: the BOXER programme, managed by the Organisation for Joint Armament Cooperation (OCCAR).

13. The lack of joint programmes is largely due to the mixed feelings generated by experiences from past years, in particular during the 1990s when, in 1996 for example, France, Germany and the United Kingdom attempted to set up a joint programme to develop an armoured vehicle. The programme was entrusted to OCCAR when the organisation first came into being in 2001 and eventually became a bilateral German-Dutch project (the BOXER vehicle) in 2004.

14. The European armoured vehicle began life as a flagship project of European cooperation that eventually came to illustrate the difficulties involved in such cooperation when operational needs differ and industrial arrangements do not serve the economic interests of the participating states and firms. Two consortiums, involving German, British and French firms, were in competition for the project. France was the first to withdraw from the programme, followed by the United Kingdom. Germany teamed up with the Netherlands to pursue the BOXER programme which remained under OCCAR management.

15. More recently in April 2006, the French firm GIAT Industries and the German firm Krauss-Maffei Wegmann (KMW) – both leading land defence equipment manufacturers in their respective countries – signed a cooperation agreement to develop a 6x6 (six-wheel drive) demonstrator vehicle weighing less than 20 tonnes, the Medium Size Multirole Armoured Vehicle (MSMAN). A year later the cooperation was stopped, again because of differences in operational and industrial strategies.

16. Unlike the BOXER programme, the MSMAV project was an industrial cooperation development project, not a procurement project involving different armies. Because of this there were no common operational requirements.

17. A more positive example of harmonised procurement by two countries is that of the Kodiak Armoured Engineer Vehicle. The Swedish procurement authority, FMV, and the Netherlands Ministry of Defence procurement authority have placed orders with Rheinmetall for the Kodiak armoured engineer (breaching) vehicle. The total value of the orders is approximately 100 million euros. Signed on 16 January 2008, the contracts include 10 systems for the Dutch army and six for the Swedish army.

18. The vehicles will be delivered during the period 2011-2012. Based on a bilateral agreement between the two countries, the joint orders represent an innovative way of reducing costs. The two nations have effectively harmonised their procurement programmes, particularly with regard to the configuration of the vehicles and uniform logistics.

19. It should also be noted that in 2007/2008 the two firms were competing for a major equipment programme to provide utility armoured vehicles for British land forces, the Future Rapid Effect System (FRES). The procurement programme for five types of medium-weight vehicles consisting of more than 3 000 vehicles was eventually provisionally awarded in the wheeled military vehicles

category to the American firm General Dynamics and its European subsidiary MOWAG (Swiss, PIRANHA vehicle).

20. Later, however, the UK Ministry of Defence formally recognised that the Future Rapid Effect System Utility Vehicle (FRES UV) acquisition strategy was apparently unworkable in its existing form and withdrew General Dynamics' preferred bidder status.

21. On 20 March 2009 a new invitation to tender was issued for 1 300 specialised tracked vehicles. The selection process is scheduled to last until 2010; the estimated date of entry into service of the first vehicles is 2014. In this category, according to the specialised review Defense News, the front-runners are the CV90 and ASCOD vehicles, produced respectively by BAE Hägglunds (Sweden) and General Dynamics European Land Systems-Santa Barbara (Spain).

22. The FRES programme, however, remains highly controversial in the United Kingdom, where it was described by the House of Commons Defence Committee as a disaster. The more than 1 billion pound contract covering acquisition and the equipment life cycle is due to be completed in 2026.

23. When the European Defence Agency made its first foray into the complex field of armoured vehicles, it focused immediately on the main category of medium-size six- or eight-wheel drive (6x6, 8x8) vehicles weighing from 20 to 30 tonnes. These vehicles are modular, air-transportable under certain weight conditions, well armed and have high levels of protection. They can be deployed in different theatres, in hot or cold weather conditions, in urban environments, on roads or in all terrains.

24. They are usually configured for both troop transport and combat, and the payload capacity – troops and equipment – is proportional to the type of weapons included – machine guns, mortars and guns. As lessons learned in Afghanistan and Iraq and in the recent conflicts between Russia and Georgia and Israel and Hamas have shown, these vehicles offer an ergonomic combination of protection, mobility and fire power.

25. They are also resistant to improvised explosive devices or mines with high-explosive charges such as anti-tank mines. Their speed and stability are major assets, given that they can reach up to 100 km/h on roads. They are highly valued for their modular design which allows different modules, subsystems and equipment to be fitted onto one and the same platform depending on the mission and tasks to be accomplished. This is very important as it facilitates logistics as regards engine type, wheels and shared parts, making for improved interoperability between national fleets of armoured vehicles.

26. Nevertheless, wheeled armoured vehicles have not supplanted tracked vehicles which are still very much in use, such as heavy tanks or other transport, combat or anti-aircraft vehicles. The advantage of such vehicles lies above all in the payload and fire power capacity and their ability to clear obstacles. Heavy battle tanks, which are sometimes too hastily written off, have proved their worth in conflicts at the end of the 20<sup>th</sup> century and into the 21<sup>st</sup> century, with the latest example being the Israeli incursion into the Gaza Strip.

27. However, as regards external projection they present a major drawback in terms of their weight and maintenance and repair needs which are far greater than those of wheeled armoured vehicles. Long-distance transport (and the costs entailed) is their weak point: this requires a robust logistics chain, combining transport by both sea and land, fuel, lubricants, support vehicles, spare parts, maintenance and repair shops and crews (from three to four people per vehicle).

28. Moreover, there are no major new programmes for battle tanks in Europe, with the exception of Turkey (the Altay main battle tank developed in cooperation with South Korea). Nonetheless they are constantly being improved upon, with new equipment and technologies being integrated to provide network-centric command and control systems, enhanced protection, engines and energy consumption.

29. The European fleet (European Union and NATO) has been stable for more than 15 years, with Leopard 2 (Germany), Challenger (United Kingdom), Leclerc (France), ARIETE (Italy), CV90120-T (a heavy infantry fighting vehicle produced by Sweden) and the various Russian T-series tanks used by the armed forces of some central European states (and upgraded to NATO standards).

30. Other types of tracked armoured vehicles are also used, some specially adapted for use in mountain environments and snow and ice. The French army, for example, wanted to acquire as a matter of urgency the Swedish BvS10 Viking tracked armoured vehicles (produced by BAE-Hägglunds) to transport troops to be deployed in the mountains of Afghanistan.

31. This request has still not been granted. Until the new wheeled infantry fighting vehicle, the Véhicule blindé de combat d'infanterie (VBCI, 8x8) produced by the French firm Nexter, is ready, French troops are being equipped with a wheeled (4x4) armoured personnel carrier – Véhicule de l'avant blindé or VAB – that includes a new feature, a Norwegian-made (Kongsberg) remote-controlled turret.

32. There is also a wide range of light armoured vehicles, mainly four-wheeled, that are used for a broad spectrum of missions. Programmes have been launched to improve armouring and crew protection after the conflicts in Afghanistan and Iraq highlighted their initial vulnerability to various types of attacks and ammunition. There are thousands of Mine Resistant Ambush Protected (MRAP) vehicles deployed in Afghanistan and Iraq, mostly produced by American (including BAE North America), South African and Australian companies for the US and other European armed forces.

33. The 6x6 and 8x8 armoured vehicles are a superior class of MRAP vehicles as they were originally designed to deal with such threats.

34. In the interests of coherence and in accordance with the working guidelines of the European Defence Agency, this report focuses primarily on the six- and eight-wheel-drive medium-weight vehicles currently being brought into service. They account for the largest share of the market, given the number of units on order and their export potential inside and outside Europe. The report nevertheless also points up some new programmes for tracked vehicles such as the Puma (Rheinmetall and KMW, Germany).

35. Although very similar, the AMV, BOXER, CENTAURO, PANDUR, PIRANHA, SEP/THOR and VBCI programmes also represent national European know-how and technological and operational approaches. These vehicles (and future programmes under consideration) illustrate the capacities and potential of the defence industrial and technological base to produce land defence equipment but also the difficulties of cooperation between European states and of harmonising (if not converging) industrial strategies in this field.

### ***III. The European armoured vehicle market: players and products***

36. The European armoured vehicle market is like the European defence equipment market in that on the whole it is fragmented and disorganised. While the land armaments sector is in the process of being rationalised and consolidated, it is too soon to say what final shape it will be given.

37. The European Defence Agency had already noted this trend back in May 2005 in an appendix to the above-mentioned press release from the Agency's Steering Board: "In the late 1990s, there were some 13 companies in Europe with a full design, development and production capability for AFVs [armoured fighting vehicles]. In recent years there have been two consolidation thrusts (...). Further consolidation seems inevitable".

38. This process of consolidation has since slowed down though it has once again become a topical issue given that the global economic problems (to which Europe is not immune) will have repercussions on equipment and modernisation programmes for the armed forces. At the same time, the financial burden of external operations means that a delicate balance must be struck between meeting the funding requirements for these operations and pursuing programmes based for the most part on the standard strategic scenarios of major inter-state conflicts.

39. In 2009, on the supply side of the European wheeled and tracked armoured vehicle market there are nine major European firms from six states plus an American company, General Dynamics, which has subsidiaries in four European states (Austria, Germany, Spain and Sweden). These firms have complete control of the design/study, development and production cycle.

40. The firms and countries covered in this report are: Krauss-Maffei Wegmann and Rheinmetall (Germany); Nexter, Renault Trucks Defense and Panhard General Defense (France); Patria (Finland); Oto Melara-Iveco (Finmeccanica Group, Italy); BAE Land Systems and BAE Hägglunds AB (United Kingdom, Sweden); General Dynamics-Steyr (Austria), General Dynamics-MOWAG (Switzerland), General Dynamics-Santa Barbara (Spain).

41. Alongside these established firms, a considerable number of European states have the industrial capacity to produce wheeled or tracked armoured vehicles, systems and subsystems (engines, wheels, transmission gearboxes, sensors, optics, weaponry, for example), and a development potential for armoured vehicles.

42. Examples include the Turkish firm Otokar (the Altay main battle tank and the 8x8 Yavuz developed in cooperation with Singapore Technologies Engineering), the Greek firm Hellenic Vehicle Industry-ELBO (tracked vehicles Leonidas and Kentaurus) and Wojskowe Zakłady Mechaniczne (Military Mechanical Works, WZM) in Poland which produces the Patria AMV (Armoured Modular Vehicle) known as the KTO Rosomak.

43. Among the European firms mentioned above, at least four are both preferred suppliers in their home markets and have considerable government shareholding. This partly protects them from European and international competition (i.e. from the United States in the European framework). There is a drawback to this situation however in so far as they are too dependent on a single client whose priorities can change because of policy changes or domestic and European economic developments.

44. Gaining access to export markets and setting up cooperation projects, partnerships or even industrial alliances can reduce such dependence and enable these firms to survive in a highly competitive environment. That is also why cooperation programmes are important because – at least in theory as in practice national interests are always present – they can help identify centres of excellence and specialisations that one day could lead to a European industrial set-up for land defence equipment similar to that which produced the successful Airbus civilian aircraft.

45. As things stand this idealised scenario is not possible in the short term. The European “seven sisters” and the three subsidiaries of General Dynamics will remain in place at least until the national or cooperation programmes under way have been completed. If there is to be any rationalisation and consolidation, it will take place at the national level first before governments and industries consider forming any European alliances. Nor should it be ruled out that new European companies might emerge in the armoured vehicle sector, in particular in central or south-east Europe.

### ***1. Germany: Krauss-Maffei Wegmann and Rheinmetall***

46. Krauss-Maffei Wegmann and Rheinmetall are without doubt the German and European champions in the class of heavy and medium-weight armoured vehicles. The two firms cooperate (in the BOXER, Puma and AMPV programmes, for example) while at times they are in competition on the national and European market.

47. They also complement each other and could one day form the foundation of a large German and European land defence equipment group capable of meeting the current and future needs of the armed forces of the majority of European states. The two companies also cooperate in industrial programmes with other European and American companies.

#### ***(a) Krauss-Maffei Wegmann (KMW) and the BOXER<sup>3</sup>***

48. Krauss-Maffei Wegmann came into being in 1999 when Krauss-Maffei and Wegmann merged. The origins of these three companies date back to the 19<sup>th</sup> century and the German railroad sector (Joseph Anton von Maffei locomotive factory, 1838). Krauss-Maffei was founded in 1931 and underwent significant development in the 1960s and 70s with the Leopard heavy tank programme. The

---

<sup>3</sup> In 2008 Rheinmetall bought out the Dutch subsidiary responsible for the BOXER and is now the leading BOXER manufacturer responsible for the 200 vehicles series contract for the Netherlands and for 85 of the 272 vehicles for the German Bundeswehr.

Leopard tank, now in its second model and sixth version (Leopard 2A6), has been a major commercial success with 22 client countries, 15 of them in Europe.<sup>4</sup> More than 3 000 Leopard 2 units have been produced to date in Germany and in other countries under licence.

49. Designed for cold war tank combat scenarios, the Leopard has recently been adapted for so-called asymmetric conflicts, particularly based on lessons learned in Afghanistan and Iraq. KMW is also developing the Leopard 2 PSO (Peace Support Operations) which has been specially designed to meet the needs of urban and counterinsurgency warfare. It has improved ballistic and mine protection and a dedicated communications system enabling coordination with nearby troops.

50. KMW produces a wide range of wheeled armoured vehicles, from 4x4 to 8x8 wheel drives. The first category includes the DINGO 1 and 2, FENNEK and MUNGO (12.5 tonnes, 11 tonnes and 5.5 tonnes), used by German and other European armed forces.

51. Three other projects are in the demonstration and development phase: the AMPV (Armoured Multipurpose Vehicle prototype) in a (50/50) joint venture with Rheinmetall, the F2 (from 7.5 to 24 tonnes) and the GFF4 (25 tonnes). The GFF4 has six wheels and can be converted into a four-wheel model. Its chassis is Italian-made by the Iveco company.

52. In the 8x8 class – which more particularly concerns us here – the BOXER programme, which was born out of a failed European cooperation project, is now going into the production phase. The programme brings together KMW, Rheinmetall and the Dutch company Stork (Rheinmetall bought out the Dutch subsidiary responsible for the BOXER in 2008) in a consortium known as ARTEC (ARmoured vehicle TEChnology) and is managed by the Organisation for Joint Armament Cooperation (OCCAR).

53. The BOXER system consists of a family of nine modular vehicles (four types for the German armed forces and five variants for the Dutch armed forces), including a combat vehicle, personnel and cargo carriers, a command and control vehicle, an ambulance and assistance and damage repair vehicle. The BOXER is an 8x8 vehicle, weighs 33 tonnes, has a maximum speed of 100 km/h and can accommodate up to 10 soldiers. It has a high level of protection against various ballistic devices and mines. It has been designed for transport in the future European A400M airlifter and meets the needs of the German future soldier programme (IdZ) and the architecture of network-centric operations under development in Germany.

54. What distinguishes the BOXER from counterparts under development elsewhere in Europe and in the United States is the way the modular design is implemented, that is to say how the modules are managed. The vehicle has been designed as a platform on which different mission modules can be installed and interchanged within 30 minutes. A BOXER ambulance can therefore be adapted for combat or troop transport as required – on condition that the vehicle is close to a rear base where the modules are stored.

55. Nevertheless, even though the BOXER benefits from all the latest technological advances and operational experience in Afghanistan and Iraq, beyond Germany and the Netherlands it is unlikely to enjoy the commercial success of the Leopard tank. 272 and 200 units are on order for Germany and the Netherlands respectively.

56. From an operational viewpoint, an indirect obstacle to the BOXER's quick deployment is the delay in the European A400M transport aircraft programme. The BOXER vehicles, like the other armoured vehicles in the same category, are 30-tonne medium-weight vehicles that would be easily transportable in the European aircraft but have to be made lighter for the C-130J which only has a 20-tonne payload capacity. Until this gap is filled, the only interim solution is to use American C-17 or Russian-Ukrainian Antonov aircraft. For the time being only a limited number of BOXERs can be deployed by air.

---

<sup>4</sup> Austria, Belgium, Denmark, Finland, Germany, Greece, Italy, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and Turkey. Outside Europe: Australia, Brazil, Canada, Chile, Ecuador, Peru and Singapore. Source: [www.kmweg.de](http://www.kmweg.de)

*(b) Rheinmetall and the Puma<sup>5</sup>*

57. Rheinmetall Defence, both a partner and competitor of and complementary to KMW, is also present on the German armoured vehicle market. The two companies are partners in the Puma tracked armoured fighting vehicle programme. Founded in 1889 as a munitions, weapons and engineering company, today Rheinmetall Defence plays a leading role in the German and European defence industry. It also manufactures weapon systems for the Leopard tank and was co-producer with KMW of Leopard 2 tanks for the German Bundeswehr.

58. The company has both a civil and a defence division, the latter accounting for up to 42% of the company's total sales (in 2007). Rheinmetall Landsysteme GmbH (RLS) is responsible for the armoured vehicle market. At the end of 1999 Rheinmetall acquired the defence technology assets of IWKA Aktiengesellschaft in Karlsruhe.

59. These included KUKA Wehrtechnik GmbH in Augsburg and Henschel Wehrtechnik GmbH in Kassel, both leading suppliers of tracked armoured vehicles. The hitherto independently operating companies Henschel Wehrtechnik, KUKA Wehrtechnik and MaK System Gesellschaft mbH were merged to form Rheinmetall Landsysteme GmbH.

60. Rheinmetall Landsysteme boasts a complete family of armoured vehicles specifically designed to support Leopard 1 and Leopard 2 main battle tanks. Two examples are the armoured recovery vehicle ARV 3 and the armoured engineered vehicle AEV 3. Rheinmetall has already produced about 200 Leopard 2-based ARV 3, which are now in service or in production with the armed forces of eight different countries.

61. The Kodiak AEV 3 is being jointly developed and produced by Rheinmetall Landsysteme and Switzerland's RUAG Land Systems. Rheinmetall Landsysteme is tasked with overall responsibility for the system and is also in charge of marketing the new vehicle. Thus far, the Kodiak has been ordered by Switzerland, Sweden and the Netherlands.

62. Among the armoured vehicles manufactured by the firm are the well-known FUCHS 1 and 2, including the 1A8 version with enhanced protection deployed with the German armed forces in Afghanistan. The FUCHS 2 has a much higher capacity with a payload of 8 tonnes and maximum combat weight of 24 tonnes (compared to 17 tonnes for the FUCHS 1).

63. Like KMW's Leopard, the FUCHS has been a great success for the German armoured vehicle industry with over 1 200 units produced and sold in Germany and worldwide. Rheinmetall Landsysteme is manufacturing 32 more FUCHS/Fox NBC-RS in a serial production programme for the United Arab Emirates. FUCHS is practically synonymous with CBRN (chemical, biological, radiological and nuclear) reconnaissance and detection capabilities, one of its most well-known functions.

64. Today nearly 300 of these systems form a key element in the NBC defence capabilities of seven nations (United Arab Emirates, the United States, the United Kingdom, the Netherlands, Norway, Saudi Arabia and Germany). These countries have successfully deployed the systems during various missions worldwide, including in Kosovo, Afghanistan and Iraq.

65. Rheinmetall is a partner of KMW in the BOXER programme and KMW is Rheinmetall's partner in developing the Puma, a tracked armoured infantry fighting vehicle. The Puma meets the modernisation needs of the German armed forces and their gradual transformation into deployable network-centric forces. It weighs 32 tonnes (or up to 40 tonnes depending on the level of protection required), can carry up to eight soldiers (in addition to three crew members) and is equipped with a 30 mm gun.

66. It has enhanced protection against a large array of projectiles and mines and is to be fitted with a guided missile system, the "Mehrrollenfähige Leichte Lenkflugkörper-System" (MELLS). The MELLS is based on the Spike missile developed by Eurospike GmbH, 40%-owned by Rheinmetall, 40%-owned by Diehl (Germany) and 10%-owned by Rafael (Israel). The 68-million euro contract was

---

<sup>5</sup> The Puma is a 50/50 Rheinmetall Defence and KMW project.

awarded to Rheinmetall by Germany's Federal Agency for Defence Technology and Procurement (Bundesamt für Wehrtechnik und Beschaffung, BWB) in February 2009.

67. A launcher for two missiles will be mounted in the Puma's turret. The missiles are controlled by a fibre-optic cable that transmits images captured by optronic sensors in the missile's warhead. The system operator in the vehicle can follow the trajectory of the missile to its target and can even redirect it to another, more important target. The missiles can be used against ground targets, other armoured vehicles and as air defence against helicopters.

68. The Puma programme is managed by a consortium, PSM (Projekt System & Management), formed by Rheinmetall and KMW. Approximately 405 units are scheduled to replace the Marder 1A3 and 1A5 vehicles as they are gradually withdrawn from service between now and 2025. The Marder programme dates back to the 1970s and over 2 100 units were produced for the German armed forces by Henschel Wehrtechnik (now Rheinmetall Landsysteme).

69. 75 Marder were upgraded to the 1A5 version between 2002 and 2005. The Marder 1A5 stands out from the IA3 in that it has enhanced mine protection that has not taken away from the vehicle's performance in terms of mobility. The vehicles weigh between 30 (1A3) and 35 tonnes (1A5). Apart from in Chile (200 Marder acquired from the Bundeswehr fleet), they have not had much success on the export market.

70. It should also be noted that Rheinmetall is developing and producing vehicles for the German Bundeswehr in the framework of the GFF multipurpose vehicle programme (GFF, Geschützte Führungs- und Funktionsfahrzeuge, Armoured Command and Utility Vehicles). The vehicles can be divided into four different weight classes: those weighing a maximum of five tonnes; others weighing five to 10 tonnes; and those with a total weight of 10 to 13 tonnes. Class 4 is for vehicles above 13 tonnes.

71. The Gavial (in cooperation with Panhard, France) and the AMPV 1 (in development together with KMW) represent the Class 1 vehicles. The agile AMPV 1 is the smaller of the two AMPV Family vehicles and makes an ideal liaison vehicle. A higher level of protection and a heavier payload are the primary characteristics of the bigger AMPV 2 which meets the requirements of the GFF Class 2 vehicles.

72. The entire vehicle family is based on standardised engineering principles and technologies. Both type series feature a patrol vehicle with an unprotected floor in the rear section, and an equipment kit carrier with a safety cell extending all the way to the rear of the vehicle.

73. Developed by Rheinmetall Landsysteme, the Yak Class 3 vehicle is a highly mobile armoured 6x6 multi-purpose vehicle (based on MOWAG's DURO) specially designed for international crisis-management operations. It meets the military's increased requirement for protected transport capacity in outstanding fashion, enabling forces to deploy and fight even in the toughest terrain. After purchasing several small quantities for operational requirements, the German Bundeswehr ordered 100 Yaks.

74. In the highest GFF weight class the Wisent is a new modular, multipurpose vehicle for command and control, troop and cargo transport and medical evacuation. The Wisent family comes in 6x6, 8x8 and 10x10 variants, depending on the mission, and as with the BOXER, the modules can be detached from the main platform. These vehicles have enhanced ballistic and mine protection and have an average weight of 25 tonnes.

75. Wisent is competing with KMW's GFF4 for a contract for over 650 systems from 2010-2011. A final decision should be taken in 2009. This type of multipurpose vehicle is intended as a complement to the BOXER which mainly serves as an armoured fighting vehicle.

76. The German army also plans to acquire Rheinmetall's WIESEL 2 light tracked vehicle-based Air-transportable Digitally Networked Advanced Mortar System, an airmobile combination of reconnaissance, C2 and firepower assets. Fully digitised and featuring a near real-time network capability, this system of systems will enable units deployed in future operations to move faster, shoot

more accurately and communicate more effectively than before. Diehl is a major partner in producing the mortar ammunition.

77. The WIESEL 1 and 2 vehicle systems, in service in large numbers within the Bundeswehr, can be airlifted by helicopter and can be used to carry out a wide variety of missions such as reconnaissance and command operations, evacuating wounded personnel and transporting ammunition.

78. Rheinmetall's Lance Modular Turret System also represents the latest development in medium-calibre turret technology; moreover, its modular design means that it can be integrated into a vast array of different tracked and wheeled vehicles. It recently became known that the Spanish marines want to equip four MOWAG-made PIRANHA III vehicles with the MTS Lance, with the prospect of an option for additional turrets.

79. Rheinmetall Defence complements the Rheinmetall Landsysteme activities in the armoured vehicles market with a wide array of products and services such as C-RAM (Counter Rocket, Artillery and Mortar)-capable air defence, precise weapons systems and ammunition, network-enabled sensors and optronics, state-of-the-art naval technology and high-performance simulation and training systems.

80. This presentation of German armoured vehicle capabilities would not be complete without mentioning Diehl. A family company founded in 1902, today Diehl is a German and world leader in the manufacture of equipment for the motor and aeronautics industries, of industrial measuring instruments and consumer products as well as defence systems and subsystems.

81. Diehl has over 11 500 employees and in 2008 had a turnover of 2 billion euros. The company is present in Europe (11 countries), the United States, Mexico, Latin America and Asia. Diehl is involved in a wide range of defence-sector activities including guided missiles (air, ground and sea) and intelligent ammunition, active protection systems, vehicle tracks, updating and maintaining defence vehicles and other platforms, and simulation systems.

82. In the area of missiles, Diehl, in partnership with MBDA, is developing the LFK-NG ("Lenkflugkörper Neue Generation"), a new generation anti-aircraft infrared guided missile. This vertical-launch surface-to-air missile has a range of 10 km and is one of the main components of the German army's new air defence system currently under development, the SysFla ("System Flugabwehr"). Diehl is also cooperating in the development of the C-RAM system.

83. Another area of Diehl's expertise is active protection systems for armoured vehicles and one of its flagship products is the AVePS (Active Vehicle Protection System). According to information provided by Diehl at a presentation given to the sub-committee on European armoured vehicles in Berlin in April 2009, this system has been specifically designed for the protection of vehicles against shoulder-fired anti-tank weapons and guided missiles. Approaching projectiles are detected and tracked by a comprehensive 360° sensor system (search-and-track radar plus IR camera) and engaged using blast/fragmentation or blast grenades before they reach the vehicle. The grenade is fired from a light-weight launcher, which can be aligned extremely rapidly in azimuth and elevation in the direction of the approaching threat and ignited so that the projectile is neutralised at a safe distance from the vehicle. AVePS can engage several approaching projectiles at very short intervals.

84. Diehl is a key partner for German and European defence firms, both in the area of missiles (with the Eurospike consortium, for example) and protection. The company also works on missiles with the United States, mostly through the joint venture Diehl Raytheon Missile Systeme established in 2004. The aim of this jointly owned company is to update and promote sales of air-to-air Sidewinder missiles and AMRAAM (Advanced Medium-Range Air-to-Air Missiles) in Europe. These missiles were originally produced by Raytheon.

## ***2. Patria: Finnish know-how***

85. The Finnish company Patria started out in the 1920s and 30s in the budding Finnish aeronautics industry. It acquired the name Patria towards the end of the 20th century (in 1996). Patria still leads the aeronautics sector in Finland and is responsible for assembling, maintaining and upgrading the

Finnish air force fleet, including the American-made F-18, the BAE Systems Hawk trainer, the EADS CASA CN-295 and Eurocopter's NH-90 helicopters.

86. Patria is majority-owned by the Finnish state which has a 73.2% share in the company, with EADS holding the remaining 26.8% share. Through its wide-ranging technological and industrial activities in both the civil and military domain, Patria by itself constitutes the Finnish military industrial complex. It therefore has a clear edge in the domestic market and remains resourceful and competitive in the European and international markets, with almost 50% of sales coming from export.

87. In the area of land equipment, Patria has a wide range of quality products, some exclusive and some developed in cooperation with other European companies. The Armoured Modular Vehicle or AMV stands for Finnish excellence in the class of medium-weight armoured vehicles.

88. The Patria AMV is an 8x8 multipurpose vehicle with a modular design available in different versions including the personnel carrier, infantry fighting, command post and forward command post, ambulance and medical evacuation, reconnaissance and anti-tank vehicles. The AMV weighs between 16 and 26 tonnes depending on the configuration. Only the lighter version is air-transportable by C-130J aircraft until such time as the Airbus A400M comes into service.

89. The AMV is highly mobile with a maximum speed of 100 km/h and incorporates the latest technological advances in ballistic and mine protection (up to 10 kg TNT). It has chemical, biological, radiological and nuclear (CBRN) protection, which today is standard in this type of armoured vehicle.

90. The AMV also comes in three heavy-armour variants with 120 mm mortar systems, 90 mm and 105 mm guns, and anti-tank and anti-aircraft missile systems. The mortar systems, known as NEMO and AMOS, are one of the features that make the Patria AMV stand out from other competitor vehicles.

91. The Patria-developed NEMO and AMOS are 120 mm mortar systems mounted on the AMV and on other lighter 6x6 vehicles. The system is remote-controlled and consists of a barrel (a twin barrel in the case of AMOS), loader, fire-control system and ammunition. The NEMO system has direct and indirect fire capability, as well as rapid fire MRSI (Multiple Rounds Simultaneous Impact).

92. With these additional systems, the AMV is a formidable weapon and its different modular versions, which can be adapted to the needs of the clients, make it an excellent choice for export. Patria is very well-placed compared to other European manufacturers in this area, with the AMV in service and on order in Poland (690, under the name of KTO Rosomak), in Croatia (126), South Africa (264) and the United Arab Emirates. Negotiations are under way with Slovenia (135) where there had been ethical and legal problems with an initial contract.

93. A total of nearly 1 200 vehicles have been ordered and several hundred have already been produced, some deployed by Poland in Afghanistan<sup>6</sup> and some in Chad where Polish troops are participating in EUFOR Tchad-RCA. The Finnish armed forces have 86 AMV vehicles in their fleet. The AMV was also a candidate for the British FRES programme and an equipment programme for the Portuguese army. The final contract for Portugal was awarded to General Dynamics-Steyr (PANDUR).

94. Another success story for Patria is the Patria XA, also known as the Sisu Pasi. This 6x6 armoured vehicle was originally developed and produced in the 1980s by the Finnish company Sisu. The more modern versions were produced by Patria until the production line was closed. This carrier weighs 13.5 tonnes and can carry 16 soldiers and two crew. More than 1 200 vehicles have been sold since 1984. The five original customers for the Pasi are Finland, the Netherlands, Norway, Sweden and Estonia.

95. The success of the AMV on the export market, as compared to more modest domestic orders (only 86 out of 1 200), is a tribute to Patria's technological and industrial capabilities in a highly

---

<sup>6</sup> According to an article in the Polish "Gazeta Wyborcza" on 2 September 2008, Polish Rosomaks are called "Green Demons" by the Taliban insurgents and other armed groups and prove an effective deterrent on the ground. <http://wyborcza.pl>.

competitive market. In the United States, Patria is also competing in cooperation with Lockheed Martin for a contract to replace the American Marine Corps light armoured vehicle.

### **3. France, Nexter, Renault Trucks Defense and Panhard**

96. Like the German BOXER, the Véhicule blindé de combat d'infanterie (VBCI), of which 298 have been ordered for the French armed forces (with a total requirement of 700), is the result of the failed attempt at European cooperation in the area of wheeled armoured vehicles. France was the first country to leave the "joint" three-party project in 1999 (the United Kingdom stayed in until 2003) to develop its own national programme.

97. There were two arguments that led to this decision, both of which are still valid today. First comes the difficulty of harmonising the operational needs of the different partners and expressing them in technological, technical and industrial terms; and secondly there is the matter of support for national production capacities, maintaining know-how and developing the national industrial and technological base. The desire to "save" the state-owned land equipment company, GIAT Industries, is part and parcel of the latter consideration.

98. The Leclerc battle tank – recognised as one of the best in the world – the VBCI and the Caesar artillery system constitute three of the major programmes that ensure the future of Nexter, the company that took over and replaced GIAT Industries on 22 November 2006. Nexter, like GIAT Industries, is a state-owned company and the question of its changing status is a recurrent theme in France that to date has still not been resolved.

99. Nexter has four main divisions: weapons and armoured systems (Nexter Systems), munitions and warheads (Nexter Munitions), maintenance of mechanical equipment (Nexter Mechanics) and maintenance of electronic equipment (Nexter Electronics). It also cooperates with other French and European companies such as Renault Trucks (a subsidiary of the Swedish group Volvo), SAFRAN, BAE Systems Bofors, Thales and EADS.

100. A direct competitor of the German land armaments industry, Nexter took a blow when Leopard 2 heavy tanks flooded the market at the end of the 1980s and beginning of the 1990s just as the Leclerc tank was entering into service in France. To date 796 tanks have been ordered and delivered to the French armed forces (406, with the last tank being delivered in 2007) and the United Arab Emirates (390 in 2004).

101. As with the Leopard PSO, there is now a version of the Leclerc tank that is adapted to the demands of urban warfare, based on lessons learned in Iraq and the wars in the former Yugoslavia.

102. The VBCI, like its European counterparts, is Nexter's flagship programme in medium-weight eight-wheel-drive (8x8) armoured vehicles. It comes in two main versions: the infantry fighting vehicle (or VCI for Véhicule de combat d'infanterie) and Leclerc tank support vehicle, and the command post vehicle (or VPC for Véhicule poste de commandement). Depending on payload (10 tonnes maximum), modules and missions, the VBCI weighs between 18 and 28 tonnes and has a maximum speed of 100 km/h and 750 km autonomy. It can accommodate 9 soldiers and two crew members.

103. It incorporates the latest technology in enhanced ballistic and mine protection and steel and titanium armour-plating that according to Nexter can be upgraded. Basic weaponry consists of a 25 mm gun and 7.62 mm machine gun. The standard weaponry seems rather weak compared to the possibilities offered by a BOXER or an AMV but it too can be upgraded.

104. The VBCI is adapted for interaction with the French future soldier equipped with the FELIN system. It is also fitted with a Terminal Information System (TIS or SIT in French, developed by EADS), a subsystem of the French network-centric warfare system known as the "Bulle opérationnelle aéroterrestre" (BOA, Air/land Operational Bubble). This system of systems is in the demonstration and implementation phase.

105. Approximately 298 VBCI systems – including 150 VPC or command post vehicles – are on order and the first vehicles (around 40) have been delivered to the armed forces. In principle, the

VBCI will be put through its paces for the first time in Afghanistan in 2009, though once again the question of air transport will arise, as the VBCI has been designed for transport by the A400M airlifter. The VBCI is being produced in a partnership between Nexter and Renault Trucks which supplies the 8x8 driveline.

106. Renault Trucks, a subsidiary of the Volvo Group, also includes a military division that produces and sells armoured vehicles, including the VAB, an armoured personnel carrier. Since 1976 GIAT Industries has produced over 5 000 models in 4x4 and 6x6 versions (the latter especially for export). There are many variants of the VAB which is used by the French armed forces, the Gendarmerie (the VBRG for Véhicule blindé de reconnaissance de la Gendarmerie) and in approximately 15 other states in Europe and elsewhere.

107. As a result of lessons learned in Afghanistan, the VAB TOP (TOP for “tourelleau téléopéré”, remote-controlled turret) has been deployed recently for the French forces in that country. The VAB TOP is fitted with a machine-gun system that is controlled from inside the vehicle by an operator who is no longer exposed to enemy fire. This system, supplied by the Norwegian company Kongsberg at a cost of 300 000 euros each, was adopted after an accident in Afghanistan where a VAB rolled over and a gunner was killed because he did not have time to get back inside the turret. 60 VAB TOPs are currently deployed.

108. Renault Trucks Defense also has a project for an armoured fighting vehicle in 6x6 and 8x8 variants with a maximum weight of between 18 and 23 tonnes (payloads between 6.5 and 8.5 tonnes for the 6x6 and 8x8 models respectively). This multirole vehicle called the AMC (Armoured Multirole Carrier) has features and functions similar to those of the VBCI.

109. According to Renault Trucks Defense it meets four operational needs: armoured personnel carrier, weapon system carrier, infantry fighting vehicle (IFV), and support and command vehicle. This project is under development and no official orders have been made for the French armed forces. However the AMC might be targeted at the export market.

110. The name Panhard, France’s third producer of armoured vehicles, for decades was synonymous with “French armoured vehicle”. Panhard General Defense is the successor to the carmaker Panhard et Levassor founded in 1890. As early as 1904 the company was supplying the French armed forces with its first self-propelled guns. Since then the company has manufactured numerous armoured vehicles for the French and export markets.

111. In January 2005 Panhard, a member of the PSA Peugeot Citroën Group, was taken over by the French company Auverland, specialised in 4x4 all-terrain vehicles, leading to the creation of Panhard General Defense. Panhard, which since 1968 has specialised almost exclusively in military vehicles, produces a wide range of armoured vehicles in four main categories: logistics support, tactical support, combat and reconnaissance.

112. The majority of these are 4x4 vehicles, with the exception of the ERC 90 series (six-wheeled reconnaissance vehicles). The ERC 90 vehicles, of which hundreds have been produced, are mounted with a 90 mm gun, have an average weight of 8 tonnes and a top speed of 100 km/h (ERC Sagaie).

113. In terms of protection these vehicles are inferior to the VBCI and its European counterparts. However they have the advantage of being easily transportable by air using currently available airlift capabilities, as well as offering high mobility and good fire power. The ERC, used by the armed forces of France and other countries, are also keeping pace with the developing requirements in the field of protection against IED, mines and rocket-propelled grenades. A new model, the ERC 90 NG (new generation) presented at the Eurosatory defence equipment fair in 2008, meets the new protection requirements.

#### ***4. Oto Melara-Iveco and the CENTAURO***

114. The Italian defence industry is dominated by the Finmeccanica Group. Like Patria in Finland, Finmeccanica’s activities cover all areas. It has a quasi monopoly nationally and is present on the European and international defence equipment market. The group is active in every sector, from

technological research and development to space (with the VEGA launcher for which a dedicated launch pad is under completion at the European space base in Kourou, French Guyana).

115. Through its different divisions and subsidiaries, Finmeccanica is present in civil and military aeronautics (aircraft and helicopters), land armaments, naval armaments, communications and network-centric systems (SELEX). It is participating in various European and international technological and defence equipment programmes, including the F-35 Lightning II “international” strike fighter (United States and partners), NEURON the European Unmanned Combat Air Vehicle (UCAV) demonstrator (Dassault Aviation, France, and partners), FREMM frigates (France and Italy), and the MEADS (United States, Germany and Italy) and FSAF (France and Italy) missile and air defence systems.

116. Within the Finmeccanica Group, the Oto Melara company has the leading role in armoured vehicles. The company was founded in 1905 through a joint venture between Vickers (United Kingdom) and Terni (Italy) to produce naval and land artillery systems. Based in La Spezia, it produced equipment for the Italian armed forces in the first world war. Vickers left the joint venture in 1922 and in 1929 two shipyards, Oderno and Orlando, joined Terni to form OTO, later to become known as Oto Melara in 1953. In 1994 Oto Melara’s activities were taken over by Finmeccanica and in December 2001 Oto Melara was reborn as a separate company within the Finmeccanica group.

117. The history of Oto Melara is indicative of the process whereby the Italian defence industry has consolidated around a large national group, Finmeccanica, which is state-controlled yet fully integrated into the prevailing European and American free-market economy. It takes risks and is among the most competitive companies in Europe and the United States where, for example, the C-27J Spartan aircraft (also known as the G222 in Italy) is in service in the armed forces. AgustaWestland, the Finmeccanica-owned helicopter manufacturer, is also a partner of Lockheed Martin for the presidential helicopter programme Marine One (based on the AW101 design).

118. In the field of armoured vehicles, Oto Melara together with the Iveco special vehicles division has established a joint company called Società Consortile Iveco-Fiat Oto Melara (CIO). Iveco-Fiat is a well-known group active in the commercial vehicles, trucks and special vehicles sectors. The Consortium (CIO) has three armoured vehicles in its range: the Puma, in 4x4 and 6x6 variants, the medium-weight 8x8 CENTAURO tank destroyer and the Dardo, a tracked infantry fighting vehicle. Oto Melara also makes the Italian heavy tank ARIETE.

119. The CENTAURO production began in 1991 for the needs of the Italian army. To date only Italy and Spain have this armoured vehicle which is first and foremost a tank destroyer. This variant, whose production ended in 2006, is fitted with a 105 mm gun, has a top speed of 105 km/h and maximum weight of 25 tonnes. There are five variants whose development ended just recently: a personnel carrier, an infantry fighting vehicle and mortar carrier (like the Patria AMV NEMO and AMOS), a command post vehicle, a recovery vehicle and an ambulance. Different mission modules can be installed, in particular turrets and their corresponding weapon systems – another speciality of Oto Melara – such as the HITFACT (heavy calibre, 120 and 105 mm), HITFIST (medium calibre, 30 and 25 mm) and HITROLE (small calibre, 12.7 and 7.62 mm) systems.

120. The CENTAURO (personnel carrier and infantry fighting vehicle variants) is also equipped with a 25 mm Oerlikon KBA gun, anti-tank missiles and 7.62 mm machine guns. It can carry eight troops. The Italian army has 400 CENTAURO tank destroyers (300 of which are still operational) and the Spanish army has 84. In 2006, the Italian army placed an order for 54 CENTAURO infantry fighting vehicles, and has already allocated resources for acquiring another 104 out of a total requirement estimated at around 500 units.

121. This variant of the CENTAURO (also known as the VBM Freccia), in addition to being equipped with a new “state of the art turret” armed with a 25 mm main gun and incorporating advanced anti IED protection/solutions, also benefits from the latest innovations in weapon systems, communication systems, sensors, ballistic and mine protection and is interoperable with the Italian future soldier. The Consortium is thus positioning itself in the same niche as the BOXER, AMV and VBCI vehicles. In the international market, in 2008 a Gulf country placed an order for eight CENTAURO tank destroyers armed with a HITFACT 120 mm turret for delivery in 2009.

122. Another Iveco product is the 4x4 LMV (Light Multirole Vehicle), a tactical vehicle in service in the armed forces of several countries. After its adoption by the Italian army under the name VTLM Lince, it won the FCLV (Future Command and Liaison Vehicle) competition of the British army as the Panther and has been adopted by Belgium and Croatia as well as the Norwegian and Spanish armies.

### *5. BAE Systems Hägglunds and the Viking*

123. BAE Systems plc is Europe's biggest defence company, with a global dimension unmatched anywhere else in Europe. It was created in 1999 from a merger between British Aerospace (BAe) and Marconi Electronic Systems and has expertise in all defence sectors, from large air, land, naval and space-based platforms to electronic and IT subsystems.

124. BAE Systems acquired its global dimension as the result of a strategic choice to expand by buying up other companies and to focus substantial resources and efforts on becoming a major defence player in the United States (BAE Systems Inc).

125. In 2005, BAE Systems established a firm foothold on the American land equipment market with the purchase of United Defense, the US manufacturer of, among other things, the M-113 and Bradley tracked armoured vehicles, which it started producing, respectively, in the 1960s and 1980s, and whose production and development continues to this day.

126. With the acquisition of United Defense, BAE Systems reorganised its land equipment division into Land Systems (for the United Kingdom market) and Land Systems Hägglunds, both of which are now subsidiaries of BAE Systems Inc. (the American part of BAE Systems plc).

127. This industrial and financial set-up is indicative of the trend in the British defence equipment sector towards consolidation around the national champion, BAE Systems, which has interests and programmes in the United Kingdom, the United States (BAE Systems Inc. is the fifth prime contractor of the US Department of Defense), continental Europe and elsewhere.

128. BAE Land Systems produces a wide range of armoured vehicles for different types of mission. For the purposes of this report we can mention in particular the Warrior tracked carrier and combat vehicle, the Rooikat 105, an 8x8 vehicle originally produced in South Africa, the CV90 tracked vehicles and the BvS10 Viking. The tracks on the CV90 have become a reference product that can be also found on the Puma and Pizarro vehicles.

129. The Rooikat 105 (export version), whose platform also provides a model for European vehicles, is an 8x8 wheeled vehicle developed in South Africa at the end of the 1970s. Designed for combat reconnaissance and fast travel over desert terrains, the Rooikat is used for counter-insurgency operations, support missions and combat against other vehicles.

130. This vehicle weighs 28 tonnes, has a top road speed of 120 km/h and a crew of four. 242 of these vehicles have been produced and they are used solely in South Africa. In 2006 it underwent various improvements to take account of the lessons learned in Afghanistan and Iraq in the field of protection.

131. The Warrior, of which some thousand units have been produced since the 1980s, is still in service and has been used by the British armed forces during all the major conflicts in which they have been involved since 1987. This tracked vehicle weighs 25 tonnes and can carry up to eight troops plus three crew members.

132. It is armed with a 30 mm gun and has a top road speed of 75 km/h. It is currently undergoing various upgrades in order to extend its lifetime until 2025. In particular it will be armed with a 40 mm gun developed by BAE and Nexter within the company CTA International (Case Telescoped Ammunition).

133. The so-called cased telescoped weapon system "sends in a round from the side, then rotates it 90 degrees into the breech. Another difference from normal cannons is that the shell is placed inside the case" (source BAE Systems). In addition to the United Kingdom, Kuwait has also purchased

Warrior vehicles (254). There are 10 variants of this vehicle the latest of which, the Warrior 2000, was destined for the Swiss army, but the order was cancelled.

134. BAE Systems Hägglunds or Land Systems Hägglunds was created in 2004-2005 when BAE Systems took over the British company Alvis Vickers, until then a leading manufacturer of land equipment – vehicles in particular – for the United Kingdom armed forces as well as for the European and international market.

135. The Swedish company AB Hägglund & Söner was founded in 1899. Originally a timber company, it soon diversified to a number of other sectors including aeronautics and defence. It began developing its armoured vehicle activities in 1957. In 1988, Hägglunds Vehicle AB became an autonomous division of the parent company. Alvis purchased Hägglunds Vehicle in 1997 and was itself taken over by BAE Systems in 2004.

136. BAE Systems Hägglunds is geared more to the Swedish and European markets, although it was not selected for the United Kingdom's FRES Utility Vehicle (wheeled) programme. It develops and produces three types of armoured vehicle: the SEP (in the wheeled modular category, in development), the CV90 tracked infantry fighting vehicle and the Bv206S and BvS10 armoured and tracked all-terrain vehicles. The last two, of which more than 12 000 units have been produced so far (including at least 4 000 of the BvS10 model), have been sold to more than 40 countries worldwide.

137. The Combat Vehicle 90 family of vehicles was developed in the 1980s in Sweden. Production started in 1991 and the thousandth unit was delivered in January 2009 (to the Netherlands). Six European states are clients for these systems: Finland, Denmark, Norway, the Netherlands, Sweden and Switzerland. There are 11 variants, the latest being the CV9035 MkIII, of which Denmark has ordered 45 and the Netherlands 184.

138. The CV90 vehicles have a weight ranging from 20 to 35 tonnes, depending on the type of mission – transport, combat, observation, command post, advanced command, air defence or recovery – a 30/40 mm Bushmaster II or 35/50 mm Bushmaster III gun (the CV9035 MkIII) and can carry up to eight troops in addition to the crew.

139. Other variants are the CV90 AMOS, with a twin-tube mortar system, developed in cooperation with Patria, and the CV90120, a light battle tank with a 120 mm gun (a version equipped with a 105 mm gun also exists). The latter vehicle was developed directly by BAE Hägglunds. It is at the project stage and no orders have as yet been placed in Sweden or elsewhere. Different versions of the CV90 are being used or are in the process of being deployed in Afghanistan by the Norwegian and Swedish armed forces.

140. The SEP (Spitterskyddad enhets platform in Swedish) is the Hägglunds technology demonstrator in the category of medium-weight wheeled armoured vehicles. Work started in 1996 but was halted in 2007 due to budgetary constraints and the resulting limitations on Swedish investments. The company has kept up the SEP programme, consisting of a tracked and wheeled version (6x6 in 2003 and 8x8 in 2007), in order to be in the running for selection of the US Marine Corps' future armoured vehicle (SEP/THOR).

141. The SEP is a modular vehicle consisting of a common platform that can be equipped for a range of transport, combat (direct fire and mortar fire), support (repairs and medical evacuation) and command functions. It has a very small radar signature and an entirely electrical transmission system and is designed, according to BAE Systems Hägglunds, to incorporate different technologies currently in various stages of development such as electric armour, fuel cells, electric guns and remote control (unmanned version).

142. In the six-wheel-drive (and tracked) version it weighs a maximum of 17.5 tonnes. For the 8x8 version its weight ranges from 24 to 27 tonnes, with payloads of six to 12.5 tonnes (8x8 version). All versions except the eight-wheel-drive also include internal and external network-centric communications systems and day- and night-time optical and thermal sensors. It was designed for interoperability with the Swedish soldier of the future. It has a speed of up to 110 km/h and depending on the mission can be equipped with 25 and 120 mm guns and 7.62 and 12.7 mm machine guns as well as a mortar system.

143. In the absence of a government order, the SEP's future appears uncertain, unless it is selected by the US Marine Corps. One objection raised by the Swedish procurement authority (FMV Forsvarets Materialverk) is that there is no European or international cooperation within the programme which would reduce Swedish investment costs. This is a difficult challenge on a European market that is highly fragmented due to the existence of national niches.

144. In 2009 the Swedish Ministry of Defence is due to announce a new call for tenders for a modular armoured vehicle. This is another reason for keeping the SEP development programme going in order to be ready to respond to a tender, although it will concern only 200 to 300 vehicles, half the number foreseen in the initial contract awarded to Hägglunds in 2001. To date fewer than 10 SEP (wheeled and armoured) vehicles have been produced.

145. The BvS206 and BvS10 systems are composed of a traction unit and a trailer and are well suited to operations in mountainous or desert areas, on snow-covered or rocky terrain. The BvS10 was the model that the French armed forces had hoped to have in 2008 for their mountain units in Afghanistan, although finally their request was postponed until 2010. This vehicle, also known as the very high mobility armoured vehicle (VBHM), is being used by the Royal Marines of both the United Kingdom and the Netherlands for their operations in Afghanistan.

146. The BvS10, whose armour has been reinforced as a result of the lessons learned from Afghanistan and Iraq, is a multirole vehicle that can be used as a troop carrier, command post, ambulance or repair vehicle. Its totally automated machine-gun turret can be operated from inside the vehicle (like the remote-controlled turret of France's VAB).

147. This 7 500 to 8 500 tonne vehicle (depending on the version and the equipment being carried) has a three-tonne payload capacity and a maximum speed of 65 km/h. Armed with 7.62 mm machine guns, it can carry up to 12 soldiers, four in the front and eight in the back, including the two crew members (the driver and gunner).

#### ***6. General Dynamics European Land Systems (GDELS)***

148. The European market in armoured vehicles of all descriptions, light, medium or heavy, wheeled or tracked, is not one where European countries have a monopoly. It is open to off-the-shelf foreign imports from the United States and Russia (Russian BMP-3 vehicles feature in the inventory of many central European countries and of Greece, Finland and Turkey for example) and also via takeovers of European firms by a foreign player, the American major General Dynamics (GD), which specialises mainly in land defence equipment.

149. General Dynamics is today the world's fifth largest supplier of defence equipment according to a classification published in the specialist review "Defense News" in 2008 which puts BAE Systems in third place, EADS in seventh and Finmeccanica in ninth in terms of global sales. GD has four main business segments: Aerospace (Gulfstream aircraft), Marine Systems, Combat Systems and Information Systems and Technology.

150. Land defence equipment comes under General Dynamics Land Systems (GDLS), a sub-segment of Combat Systems. GDLS develops and manufactures heavy battle tanks such as the Abrams M1A2 series and the modular Stryker 8x8 armoured combat vehicle, which is already deployed in Iraq.

151. General Dynamics is also one of the main contractors for the land segment of the combat system of systems, the Future Combat Systems (FCS), of the US Army. This programme, led by Boeing, is estimated at several hundred billion dollars and is frequently the subject of debate among specialist commentators and defence experts.

152. Criticism is often levelled at the budget for the FCS and its components and Congress has regularly brought in cutbacks only then to promptly reinstate it, without major disruption to the various areas of production: vehicles (all tracked), network-centric systems, robots and unmanned aerial vehicles or the American soldier of the future.

153. In Europe GD is present in a number of countries, either as a systems provider to cooperation programmes – such as, for example, the Donar remote-controlled artillery system being developed

with KMW – or because it has taken over European firms in the sector, including Santa Barbara (Spain), Eisenwerke Kaiserslautern GmbH (EWK, Germany), MOWAG (Switzerland) and Steyr (Austria). These four companies make up General Dynamics European Land Systems (GDELS) of Austria, which has its headquarters in Vienna.

154. Three of these companies have kept their core industry: Santa Barbara is still involved in maintaining and upgrading the Spanish Leopold 2 tanks under licence to KMW. Through MOWAG and Steyr, GD is assured of a major slice of the European and international market for European-produced wheeled and tracked armoured vehicles, a factor which in turn tends to fragment further the European internal market, making plans for rationalisation and consolidation difficult to achieve, even in the longer term.

155. GDELS employs over 3 200 staff on four sites: in Germany (the M3 amphibious bridging and ferrying system) and in Austria, Spain and Switzerland. Santa Barbara, founded in 1960, became GD's first acquisition in 2000, followed in 2003 by the Swiss company MOWAG and Austria's Steyr Daimler Puch Spezialfahrzeug.

*(a) Santa Barbara and the Pizarro*

156. The Pizarro, a tracked armoured vehicle, known also in the Austrian armed forces by the name Ulan (and produced by Steyr), is the product of cooperation between Spain and Austria under the ASCOD (Austrian-Spanish Cooperation Development) programme which began in the 1990s. This family of vehicles first entered production in 1996 and is available in a number of variants including a light tank armed with a 105 mm gun.

157. In total 374 vehicles have been produced to fulfil an order by Spain – the second phase vehicle Pizarro II is for delivery between 2008 and 2013 – and 112 Ulan are in service with the Austrian armed forces. An Ulan 2 is being developed, equipped with the turret of the Russian BMP-3 vehicle. With a maximum weight of 25 tonnes and a top speed of 70 km/h, the Pizarro/Ulan can carry up to eight troops and three crew members. In 1999, Thailand bought 15 Pizarros fitted with a semi-automatic 105 mm (low recoil tank) gun.

158. Santa Barbara also makes three light and medium-weight armoured vehicles, two 6x6, the BMR and the VEC, and one 4x4, the Dragoon, which is more of a police vehicle. Under the Blindado Medio sobre Ruedas or BMR wheeled armoured personnel carrier programme, dating back to the 1980s, over 1 400 units have been produced. It was exported to a large number of countries and since 1994 has been modernised and regularly updated (BMR II version). It weighs 13 tonnes, can carry up to 13 people and has a maximum road speed of 100 km/h. It is fitted with modern equipment including optical and heat sensors, communications systems and CBRN protection, and carries a 12.7-calibre machine gun.

159. The Vehículo Blindado de Exploración de Caballería or VEC cavalry scout vehicle is a 6x6 reconnaissance vehicle developed in the late 1970s, which entered production in the 1980s. In 1996, Santa Barbara signed a contract for modernisation and replacement of the engines for both the VEC and the BMR with Scania Hispania (the Spanish subsidiary of the Swedish company Scania, of the Volkswagen group). In all some 340 vehicles were manufactured for the Spanish army.

160. The VEC weighs 13.5 tonnes, and can thus be transported in C-130J aircraft, and has a road speed of 100 km/h. It is equipped with a 25 mm gun and machine guns and anti-tank and anti-aircraft weapons can be added as required depending on operational needs. The VEC carries a crew of five and is still in service with the Spanish armed forces, being used particularly in external operations.

*(b) MOWAG and the PIRANHA*

161. MOWAG Motorwagenfabrik AG was founded in Switzerland in 1950 and in October 2003 became a General Dynamics (GDELS) group company. MOWAG provides light and medium-weight armoured vehicles to the Swiss armed forces and to other countries in Europe and elsewhere in the world. A total of 13 000 PIRANHA, DURO and EAGLE vehicles have either been produced or are on order.

162. DURO (DURable RObust) trucks were developed last century in the 1970s and are still in production today. Intended for military use over hard terrain, the most recent DURO IIP 6x6 versions are fitted with modular protection against mines and improvised explosive devices (IEDs) and can also be equipped with self-defence weapon systems. The vehicle is also produced in Germany by Rheinmetall as the Yak.

163. DURO armoured carriers can be transported in C-130J aircraft and have a number of different transport functions (logistics and troop carrier), as mobile ambulances, for command and control and towing. They have a maximum weight of 9 to 13 tonnes, with a payload of 4.2 to 6 tonnes, depending on the model (4x4 or 6x6). They have a maximum road speed of 110 km/h and can if necessary be CBRN-protected.

164. EAGLE IV carriers are 4x4 vehicles in service in the Swiss and Danish armies. Germany is buying the new EAGLE IV and has a requirement for 672, 198 of which are in the process of being delivered. The remainder could be met with orders of AMPV from Rheinmetall, depending on the results of a new invitation to tender. Denmark has also bought 90 EAGLE IVs. 485 EAGLE I, II and III units were produced for the Swiss and Danish armed forces (365 as reconnaissance and 120 as artillery forward observation vehicles).

165. The EAGLE IV is based on the DURO chassis which gives it an edge as far as logistics and spare parts go. The EAGLE IV, introduced in November 2003, has the most up-to-date ballistic, mine and IED protection. Its maximum weight is 8.8 tonnes with a two-tonne payload and a maximum speed of 110 km/h. It can carry up to five troops.

166. As far as medium-weight modular armoured vehicles go the PIRANHA is MOWAG's loss leader par excellence. The PIRANHA family, which consists of 6x6, 8x8 and 10x10 variants, has notched up a production score of more than 6 500 units since the 1970s (mass production began in 1976). Some 1 700 PIRANHA III are currently under production for the Canadian, US and Swiss armed forces. The PIRANHA provides the basis for the American Stryker vehicle produced in the United States by the parent company General Dynamics.

167. The most recent version in production is the PIRANHA III. Version IV is under development and will be followed by a version V if finally selected for the United Kingdom's Future Rapid Effects System (FRES Utility Vehicles) equipment programme. The PIRANHA family has been a wonderful success story for MOWAG and GDELS since the vehicle itself and the vehicle design have been sold and adapted in some 27 countries worldwide (seven of them, counting Switzerland, in Europe).

168. The PIRANHA III and the future PIRANHA IV weigh in at a maximum of 25 tonnes (13.5 empty in the PIRANHA III's case), can attain speeds of 100 km/h and transport up to 13 combat-equipped troops. Like all other European vehicles in this category, PIRANHA are amphibious, armed with a 25 or 105 mm gun (in the case of the 10x10 model) or, depending on the task for which they are used, 7.62 mm machine guns or a turret with a 12.7 mm machine gun. It is also possible to integrate missile systems.

169. The ballistic, mine and CBRN protection systems are of the most modern standards and compliant with those of NATO (NATO STANAGs or standardisation agreements). The PIRANHA IV is still at the development and presentation stages. Two prototypes have been produced (in 2001 and 2004). Its main weapon is a 30 mm gun. The PIRANHA, like their competitors from other countries, carry out a wide range of functions: transport, combat, communication, command and control, and are used as field ambulances and repair vehicles.

*(c) Steyr and the PANDUR*

170. The Austrian firm Steyr-Daimler-Puch was formed in 1934 through the merger of Steyr-Werke (1924, before that Josef und Franz Werndl and Company, founded in 1864) with Austro-Daimler-Puch (founded in 1889). In 2003, Steyr-Daimler-Puch Spezialfahrzeuge GmbH (SSF, the military vehicle division) was taken over by the General Dynamics group (GDELS) but kept its original name.

171. The SSF inventory includes a whole family of armoured vehicles, the PANDUR 6x6 and 8x8, and also produces the Ulan/ASCOD, co-developed with Santa Barbara (Pizarro) and the Steyr SP30, a

modular turret for armoured vehicles. This turret, armed with a 30 mm gun (the MAUSER MK30-2 developed and manufactured by the German company Rheinmetall Defence) and a 7.62 mm machine gun, can be found on the PANDUR and ULAN vehicles.

172. Development of the PANDUR family of modular armoured vehicles began in the 1980s. The first units from the PANDUR I series (a six-wheel-drive model) were purchased by the armed forces of Austria (68 vehicles) in 1994-1995, as well as by Belgium, Kuwait, Slovenia and the United States.

173. In 2001 Steyr-Daimler-Puch launched the development of the PANDUR II, which is the version currently proposed to the Austrian armed forces and to the European and international markets. The PANDUR II (6x6 and 8x8), although a state-of-the-art armoured vehicle, is encountering difficulties on the domestic and export markets. The 8x8 variant has a maximum weight of 22 tonnes and a payload capacity of 8.5 tonnes. It can carry up to 12 troops plus two crew members and has a top road speed of 105 km/h.

174. The 6x6 and 8x8 variants have some 90% of components in common, which facilitates the logistics chain and is conducive to interoperability during multinational operations involving the deployment of both versions (provided that the countries concerned agree to share the logistics chain). The PANDUR II has modular armour incorporating the lessons learned from operations in Afghanistan and Iraq in mine and IED protection.

175. It can be equipped with various weapon systems depending on the type of mission and client requirements: a 105, 90, 30 or 25 mm gun, 120 mm mortars, missile systems, and 12.7 or 7.62 mm machine guns. The Austrian armed forces have expressed an interest in purchasing 128 PANDUR II vehicles, although as yet there has been no firm order.

176. In 2004 Gabon, a regular customer of France, also expressed an interest in the PANDUR II. It ordered one vehicle with a view to the possible purchase of an additional 20, but that order did not materialise.

177. The same year, Steyr-Daimler-Puch (GDELS) signed a large contract with Portugal for the supply of 260 vehicles (240 for the army and 20 for the navy), some to be produced under licence in Portugal. The contract involves 15 variants of the PANDUR II corresponding to the various requirements of the Portuguese armed forces – transport, combat, anti-tank combat, CBRN detection, command and control, medical evacuation, reconnaissance, recovery and repair of damaged vehicles, for example.

178. The contract, which includes an offset clause to the tune of 150% of the value of the order (365 million euros), is currently being executed, with production in Portugal scheduled to start in 2009. However, in 2007 there were complaints about the first delivery of PANDUR II vehicles which did not fully match specifications and some of whose systems did not function properly. The problems were resolved to Portugal's satisfaction and deliveries resumed in 2008.

179. Similar problems arising in connection with a contract signed in 2006 for the supply of 199 PANDUR II to the Czech Republic caused the Czech Defence Ministry to cancel the order in December 2007. This was due not only to technical reasons, but also to budgetary considerations and issues of domestic policy.

180. In April 2008, the Czech authorities announced their intention to resume negotiations with Steyr-Daimler-Puch with a view to placing another order, but this time for 107 vehicles only. The Czech Republic, like Portugal, is asking for offsets worth 153% of the value of the contract for the purchase of the PANDUR II, estimated at 508 million euros. 40% of the offsets are to be direct and will involve the assembly of 90 vehicles in the Czech Republic, primarily at the Novy Jicin military repair depot.

#### ***IV. European cooperation: governments, industry and the role of the EDA***

181. The European armoured vehicles market is all too often depicted as being dispersed, fragmented, partially protected in certain producer states, with capacity in excess of domestic and European demand (making it dependent on European and international exports), limited R&T

investment on the part of states and industry and an abundance of “historical” programmes and products (geared to the cold war context or to traditional peacekeeping operations).

182. While some aspects of that somewhat apocalyptic picture are true, the situation is far more subtle and complex: in reality, the armoured vehicle market is also competitive, open to cooperation and evolving to keep pace with technological developments. The large number of companies is, if anything, a sign of a dynamic and competitive market on which there is still room to do business and generate profits, and where competition goes hand in hand with cooperation, essentially at industrial level.

183. The European companies both compete with and complement each other, and at national level they guarantee jobs and maintain know-how relevant not only for the automotive industry but other sectors such as metallurgy, composite materials, electromechanical systems, sensors, weapon systems, target acquisition and firing systems and various forms of protection against a wide range of threats.

184. Maintaining that European and Euro-American industrial base (with GDELS) must be a priority for the European states concerned, for producers and customers alike. The armoured vehicles built in Europe meet a wide range of requirements but the numerous programmes are fragmented among the different states. Rationalisation and consolidation are not impossible, but are more likely to come from government initiatives or pressure.

185. For the moment, however, orders continue to flow, in particular for protected vehicles for the Afghan theatre or for new deployments such as the EU’s security and stabilisation missions in the Balkans and Africa. For the most part they concern 4x4 or 6x6 vehicles for intelligence and reconnaissance and 8x8 vehicles for tactical support and combat missions.

186. Governments have a decisive role to play in the field of cooperation, but the failed attempt to design, develop and build a common armoured vehicle has somewhat lowered expectations. One lesson learnt is that cooperation has to be founded at least on a shared, if not common, operational basis. Cooperation is not an end in itself, neither is it simply a tool for European political integration.

187. Cooperation contributes to that integration, but the priority must be to build a product (an armoured vehicle) that meets the different operational requirements and that is technologically advanced, able to evolve and easily deployable, with a shared or interoperable logistics chain. The modularity that is a common feature of the vehicles described in the preceding chapters is a response to those criteria.

188. Governments, of the producer states in particular, also have a key part to play in R&T investments. Their task is to define the future operational requirements that will determine which technologies are needed, so that companies are able to adapt in time and also to invest their own resources in order to meet those requirements. This means that governments must undertake to translate their intentions into practical action, either in the form of (preferably firm) orders or the funding of technology demonstrators.

189. An example of the kind of impetus that governments can provide is the Defence Technology Plan published by the British Ministry of Defence in February 2009 in application of the 2006 Defence Technology Strategy and 2007 Defence Industry Strategy. It relates to both current MOD-funded projects and to the future projects for which companies can apply, for which it gives an indication of annual public investments.

190. The document identifies five major areas under the heading of Capability Visions: Electronics Defeat; Future Protected Vehicle; Novel Air Concept; Reducing Operational Dependency on Fossil Fuels; Reducing the Burden on the Dismounted Soldier. Three of these concern armoured vehicles, with particular stress on the Future Protected Vehicle.

191. The aim of this concept is to “provide a land expeditionary capability with the agility and logistic footprint that is traditionally associated with lightweight forces, while delivering the effectiveness and survivability that is associated with a heavyweight force. Dramatic advances are sought in situational awareness, the ability to suppress opposition forces, lightweight protection (including armour, Defence Aids Systems and adaptive camouflage) and in stimulating novel concepts

that negate the need to place personnel in the danger zone. Lightweight structures and agile, highly energy efficient propulsion systems are required”.

192. The future Technology Demonstrator comprises three sub-projects: the “Lethality Study”, “Prototype Vehicle” and “Signature Reduction Study”. The aim of the first is to draw up a concept for a vehicle that is deployable by air and comprises an unmanned turret with a 360° field of view.

193. The second concerns the development of the prototype for an entirely electric vehicle with a maximum weight of 30 tonnes but the same fire power and protection as a battle tank, with a crew of two and the capacity to transport eight troops. The project is to run for four years.

194. The third relates to the vehicle signature in the infrared, radiofrequency, acoustic and optical spectrums, and to camouflage and electronic countermeasures, among other things. This project may also lead to the development of a prototype.

195. The Defence Technology Plan also contains a general chapter on vehicles for mounted close combat which shows small but steadily increasing budgets: 3 to 10 million pounds (3.2 to 10.7 million euros) for 2009 and 10 to 20 million pounds (21.5 million euros) in 2010, and the same amount in 2011.

196. While we cannot say whether these projects will indeed be implemented and whether the objectives will be achieved, this kind of government initiative is nonetheless a good indicator for the armoured vehicles industry, helping them to prepare to respond to future invitations to tender. The public funding of the R&T and technology demonstrators could be supplemented by a contribution from industry provided that the latter perceives a real chance of a substantial programme with series-produced vehicles.

197. This is an example of the positive role the state can play both in maintaining the defence industrial and technological base and – in the case of countries that encourage transparency and competition – promoting technological innovation, competition and cooperation. Indeed, cooperation is a key word, yet we know from our recent experience in Europe that it is not incorporated from the outset in state-funded defence technology development programmes.

198. A major area of state intervention is education and R&T. There is a need in the defence industry in general, and land systems in particular, for engineers, managers, technicians and skilled labour. The State-Education-Industry partnership is crucial for maintaining skills, recruitment, transmitting know-how from one generation to the next and ensuring the replacement of staff as they leave. One must not forget the effects in the medium to long term (20-25 years) in this area of the population decline in Europe.

199. R&T investment is the other aspect that can be combined with education and training. The two elements together are the key to the innovation and excellence characteristic of the European defence industry, notwithstanding the structural problems described above. Innovation requires investments, guidelines, infrastructure (laboratories, test and evaluation centres, for example) as well as staff that is both qualified and motivated (by career opportunities and salaries).

200. A new public-private partnership is the best solution, coupled at European level with a contribution from the European Union in the form of its various initiatives in this area, in particular the framework programmes for technological research and development. The 7<sup>th</sup> Framework Programme (2007-2013) has a budget envelope of 50 billion euros, plus 2.7 billion for nuclear research (EURATOM) until 2011.

201. Education, training, R&T and innovation will enable European industries to confront the emerging international competition in the land equipment sector, in particular from Asia. South Korea, for example, has penetrated the markets of Turkey, India, Pakistan and Singapore.

202. Other countries are developing capacity that is less technologically advanced but attractive in terms of the cost of equipment. Brazil, for example, is in the process of developing, in cooperation with the Italian company Iveco, a 6x6 vehicle known under the generic name Wheeled Medium Armoured Personnel Carrier – Basic Platform (VBTP-MR, to use the Portuguese acronym). The

vehicle will be produced in Brazil in a factory belonging to the Iveco group (Ste Lagoas, Minas Gerais).

203. The determination of individual states is a major factor in a cooperative project but not the only decisive one. Other issues at stake with intergovernmental cooperation are jobs, economic spin-offs (taxes, exports) and industrial restructuring. Thus cooperation among companies has become essential.

204. The approach of the companies concerned is to engage in both competition and cooperation in order to meet the demand at national, European and international level. Factors conducive to such cooperation among companies are requests from state customers, operational specifications and also the offsets that go with defence equipment contracts.

205. Poland, for example, generally asks for part of the production to be conducted on the spot by a Polish company. The resulting transfer of production capacity maintains or creates jobs, develops know-how at national level and contributes to maintaining the national defence industrial and technological base.

206. Hence purchasing states often ask for local production licences in order to maintain jobs and in some cases to avoid letting down national companies that do not supply the requested product. It is a kind of offset that is also conducive to exchanges among companies working in the same field. A case in point is the PzH 2000 tracked artillery system designed, developed and produced by the German company Krauss-Maffei-Wegmann. The vehicles purchased by the Italian army are built under licence by the Italian firm Oto Melara, leading to information exchanges, technology transfers, staff training and hence cooperation among the companies concerned.

207. Operational specifications are another source of industrial cooperation: it is not unusual for a government to decide to equip its armed forces with a combination of systems and subsystems from different suppliers. Variants of the Polish KTO Rosomak built in Poland under licence from the Finnish company Patria, for example, are equipped with Oto Melara turrets and Spike anti-tank missiles produced by Germany's Eurospike GmbH. Oto Melara is also negotiating with the Portuguese Government with a view to equipping certain variants of the PANDUR (GDELS Steyr) with its own turrets. A request for offsets for Portugal forms part of those negotiations.

208. We find similar set-ups at international level. This is the case, for example, with the Patria AMV vehicles purchased by the United Arab Emirates, certain of which are equipped with Russian BMP-3 turrets considered to be better suited to the requirements of the UAE forces (in addition to being cheaper).

209. Operational requirements are also formulated on the basis of observations and comparisons made by the forces deployed in the different theatres of operation. The French land forces in Afghanistan for example, as mentioned earlier, requested BvS10 vehicles (BAE Systems-Hägglunds) having seen how they performed in the field.

210. A slightly different example concerns the renewal of interest in Leopard 2 tanks (KMW), the new PSO variant in particular, following their successful use by the Canadian and Danish forces in Afghanistan. This could lead to new orders or to the retrofitting of the tanks currently being used by Europe's armed forces: good performance on the ground is a powerful sales argument for defence equipment.

211. The planned deployment of an American Stryker brigade (General Dynamics) in Afghanistan will also enable a comparison of the European and American armoured vehicles deployed in the Afghan theatre. This may in turn create a demand on the part of European forces keen to achieve greater operability, even if this means making Stryker vehicles part of the future equipment plans.

212. This also applies the other way round, from Europe to the United States, in regard to certain high-tech and high-performance European systems. Some European companies participate in bids on the American market, for example for the light armoured vehicle for the Marine Corps, or cooperate with General Dynamics, for instance on the KMW/GDELS joint project for the Donar self-propelled artillery system.

213. That cooperative programme was announced in June 2008 at Eurosatory, the European land equipment exhibition. KMW presents Donar as “a new generation, air deployable, autonomous and remotely operated 155mm artillery system”. It weighs in at 30 tonnes (35 tonnes with munitions), has a crew of two (the commander and driver) and can fire six shells a minute (with a range of more than 50 km). Donar, for which a prototype has been undergoing tests since 2008, was designed from the outset as a network-enabled system.

214. The Donar vehicle has the fire power of a PzH 2000 (KMW) and is based on a chassis derived from the ASCOD 2 produced by GDELS-Santa Barbara (Spain). As a result it has been possible to make it much lighter than the PzH 2000, which weighs more than 50 tonnes. Nonetheless, since it too was designed with the A400M aircraft in mind, it will need to be airlifted using Antonovs or C-17 aircraft (American-made, with a payload capacity of up to 77 tonnes), pending the arrival of the European aircraft.

215. These few examples show that there is no common European armoured vehicle programme or a European restructuring, rationalisation or consolidation programme that could lead to the emergence of one or two European champions able to cover the European and international market. Cooperation exists, but more on the side of industry.

216. This is due to pragmatic reasons that have to do with satisfying a wide range of different operational and technical-operational requirements. The companies in this sector adapt to demand and have recourse to cooperation where necessary in order to anticipate operational requirements (the Dingo – a real success story – and the Donar system, produced by KMW, being a case in point).

217. Overall, there is as much complementarity among the European companies in the armoured vehicles sector as there is competition on that part of the European defence equipment market. Those companies engage in dialogue, cooperation and exchanges of information and defend their interests vis-à-vis governments, European institutional players, the EU and NATO via industrial associations such as the European Land Defence Industry Group, ELDIG.

218. ELDIG, which is part of the Aerospace and Defence Industries Association (ASD) brings together 72 companies from this sector in Europe (representing a total of 72 000 direct jobs). The current president of ELDIG is Bruno Rambaud, the president of the French “union” GICAT (French land defence industries’ group). One of ELDIG’s current objectives is to achieve better synergy between the companies in this sector and the European Defence Agency.

219. States continue to explore the possibilities for cooperation, but their efforts are geared more to interoperability, future capability requirements and sub-systems than to ambitious programmes for platforms covering the widest possible range of operational requirements.

220. Indeed, ambitions of that nature, underlying which is the ambitious project of an integrated European defence technological and industrial base, may be subject to costly hold-ups and technical problems if not all participating states agree with the general objective of European political integration.

221. There is currently one European institutional tool enabling the member states to engage in practical cooperation projects with tangible results. That is the European Defence Agency (EDA), which adopted armoured vehicles as one of its core activities at its inception in 2005. Since then, admittedly, these issues have been diluted among the different Directorates of the EDA which has now adopted a more pragmatic approach that no longer challenges the large number of companies, products and programmes that exist in this sector.

222. The EDA, through the activities of its four Directorates and the initiatives launched since its creation in 2004, not only makes a contribution to promoting and developing cooperation among states, but also, in parallel to the recent Commission initiatives, gives impetus to the European Defence Equipment Market of which the armoured vehicles sector is an integral part.

223. In the area of capabilities, the Capability Development Plan (CDP) adopted by the EDA Steering Board in July 2008 defines 12 priority capability areas in order to give guidance on desirable

developments. Obviously it is the member states that must shoulder the real responsibility for pursuing the CDP until it achieves the desired results.

224. European armoured vehicles do not form a capability category in their own right in the way that helicopters do, but they are involved in horizontal fashion in ISTAR (intelligence, surveillance, target acquisition and reconnaissance) architectures, IED protection (improvised explosive devices), logistic support and network-enabled operations (four out of the 12 priority operations).

225. Another of the Agency's main activities is to promote cooperative programmes. Its task is to define possible areas of cooperation among states which in many cases are seeking to acquire the same capabilities, including armoured vehicles. Cooperation among states, even at the level of subsystems, necessarily leads also to cooperation at industrial level.

226. An important step, which could possibly be taken in cooperation with the NATO equipment and standardisation agencies, would be to arrive at a set of European norms that could constitute a minimum European standard or label. That standard could be a useful starting point in particular for bids outside Europe.

227. Indeed, European vehicles are de facto defined and developed on the basis of national criteria that are highly demanding from the technological standpoint and in terms of personnel protection. Countries outside the "transatlantic network" (which includes states like Australia, New Zealand and Japan) in Asia, Latin America and Africa do not necessarily demand the same high standards.

228. This could help exports and make for more balanced competition between Europeans and their regional or Russian, Chinese and Korean competitors with respect to a decisive factor, the price.

229. The armoured vehicles sector will also benefit from R&T within the Agency, or at least from the emergence of a common European culture of sharing. The forces protection programme being coordinated within the EDA, although geared first and foremost to the foot soldier, must also take account of the soldier of the future programme. This is in itself a weapons system which together with the armoured vehicle forms another system that is part of the network-enabled operations concept.

230. The armoured vehicle is a means of transport and protection, as well as a command post or even the station at which the batteries of the electronic equipment of the soldier of the future can be recharged. In Afghanistan, for obvious reasons of security and protection, the soldier and his vehicle form a practically indissociable pair.

231. Finally, as regards the European Defence Equipment Market, the EDA electronic bulletin boards on which companies can announce current and future requirements for equipment, upgrades, architectures, as well as the voluntary codes of conduct concerning transparency and offsets help clarify the competitive but also cooperative environment in which defence companies are working. Two strategies, one on cooperation and the other on European defence R&T, were announced in 2001.

232. The Commission too plays a role with its Directives on intra-community transfers of equipment, systems and technologies and the rules to be followed for the public procurement of defence equipment (within the increasingly restricted confines of Article 296 of the Treaty establishing the European Community).<sup>7</sup> This body of European texts of varying legal status (the Directives are binding, while the Agency codes of conduct are voluntary) is the precursor to a genuine EU-organised and managed system for regulating the European Defence Equipment Market.

---

<sup>7</sup> Article 296 TEC states that:

"1. The provisions of this Treaty [TEC] shall not preclude the application of the following rules:

(a) no Member State shall be obliged to supply information the disclosure of which it considers contrary to the essential interests of its security;

(b) any Member State may take such measures as it considers necessary for the protection of the essential interests of its security which are connected with the production of or trade in arms, munitions and war material; such measures shall not adversely affect the conditions of competition in the common market regarding products which are not intended for specifically military purposes (...)"

233. This process, which is moving forward slowly but surely, brings with it a high potential for integration. In the field of armoured vehicles the large number of different state and industrial players is a fact that is unlikely to change significantly. Operational requirements are not saturated, even if in some cases there does not appear to be a perfect match between supply and immediate demand.

234. Institutional and private operators are also conscious of the uncertainty hanging over the future of security and defence and the economy in general. The survival of companies depends on their ability to adapt to these poorly defined parameters over which they have no long-term control: and indeed, up until now each of the firms that has been mentioned has proven its ability to respond swiftly to a demand that is not always clear nor sure, due above all to each state's domestic economic situation.

235. This is reassuring for European defence technologies and capacities on a highly competitive European and international market. The excellence of European products no longer needs to be demonstrated. It is the divisions among states, national egotism and misguided protectionism that are preventing the European armoured vehicles industry from becoming a genuine international reference for quality, innovation and performance.

236. The diversity of this sector remains a sign of dynamism and competitiveness as long as the different players are operating in an economically free, stable and fair environment. It is up to states to guarantee that this is the case, in which case industry will be able to hold its own for the good of the economy (taxes, exports) and society (jobs, training, know-how) in Europe.

**AMENDMENT 1<sup>8</sup>**

*tabled by Mrs Brasseur (Luxembourg, Liberal Group)*

1. In recital (*iv*) of the preamble to the draft recommendation delete the words: “superior or”:

*Signed: Brasseur*

---

<sup>8</sup> See 2<sup>nd</sup> sitting, 3 June 2009 (Amendment not adopted).



