

# **Transatlantic Defence Industrial Relationships: An Audit and Commentary**

Andrew James • John Rigby



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THE UNIVERSITY  
*of* MANCHESTER

**PREST**

POLICY RESEARCH IN  
ENGINEERING, SCIENCE & TECHNOLOGY

## REPORT

### **Transatlantic defence industrial relationships: an audit and commentary**

A study for  
CNA Corporation

**Andrew James  
John Rigby**

July 2001

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# CENTER FOR NAVAL ANALYSES

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27 December 2001

Captain Ernest Anastos  
Deputy DASN (Planning, Programming and Resources)  
Pentagon 5E785  
Washington, DC 20350-1000

Dear Captain Anastos:

Ref: CNA Project No. 03-042-1883100 (Delivery Order No. 0008)

Enclosure: *Transatlantic Defence Industrial Relationships: An Audit and Commentary*, by Andrew James and John Rigby

During a meeting last year, Mr. Schaefer expressed interest in the participation of major U.S. defense contractors in the European defense market, in terms of their:

- Current and potential future foreign military sales
- Defense-related strategic alliances, joint ventures, and acquisitions or divestments involving European firms.

In addition, Mr. Schaefer asked for a study of two European companies (BAE Systems and Rolls-Royce), in terms of their:

- Corporate organization and strategy
- Recent defense-related acquisitions or divestments
- Current and potential future participation in U.S. defense programs
- Strategic alliances and joint ventures involving U.S. firms.

In order to satisfy Mr. Schaefer's interests in these areas, CNA hired a noted British expert, Mr. Andrew James of the University of Manchester. I have enclosed two copies of Mr. James' report, and I am available to discuss his findings at your convenience.

Matthew S. Goldberg, Director  
Cost and Acquisition Team  
Resource Analysis Division

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## **Executive Summary**

In August 2000, PREST (Policy Research in Engineering, Science & Technology), a research institute of the University of Manchester in the United Kingdom was asked by CNA Corporation of Alexandria, Virginia to undertake a study of the participation of ten leading US defence contractors in the European defence market. PREST was also asked to profile two leading European defence contractors – BAE Systems and Rolls-Royce – and analyse their participation in the US defence market. The study was set against a background of growing interest amongst policy makers and defence industry executives about the scope for a transatlantic dimension to defence industrial restructuring.

For each US company the report describes and analyses the company's participation in the European defence market in terms of its current and potential future foreign military sales and its defence-related strategic alliances, joint ventures and acquisitions/divestments involving European firms. The report finds that the companies have differing exposure to the European market as a consequence of their corporate strategies, the types of systems they produce and the extent of European capabilities in those fields.

The report also shows that the participation of US companies in the European defence market has evolved over the last fifty years from predominantly government-led arrangements driven by Cold War concerns about Western European military capabilities towards increasingly industry-led relationships driven by commercial concerns about market access. At the same time, there is a growing recognition amongst US companies that they need to do more than offer offsets if they are to secure European contracts in the future. US companies that are seeking to expand their position in Europe are increasingly pursuing strategies that involve teaming arrangements and consortia with European companies and they are supporting these strategies with a growing footprint of European strategic alliances, joint ventures and wholly-owned subsidiaries. In this way they are seeking to address growing European demands for greater technology transfer and industrial participation in transatlantic procurement programmes.

The report also profiles BAE Systems and Rolls-Royce, describing and analysing their corporate organisation, corporate strategy, recent defence-related acquisitions/divestments, current and potential future participation in US defence programmes, strategic alliances and joint ventures involving US firms, their wholly-owned subsidiaries in the US and their corporate financial performance. The report emphasises the position of BAE Systems and Rolls Royce in the US defence market. Through direct sales – but particularly through acquisition - both companies have established very significant positions as contractors to the US Department of Defense and suppliers of highly sensitive and technologically advanced defence systems.

Looking to the future, the report makes clear that companies in the newly consolidated European defence industry and their US counterparts will face significant and on-going business pressures to expand their international activities, and transatlantic relationships are likely to be an important dimension of their strategies. As part of this, non-UK European companies will be increasingly active in seeking to enter the US defence market through acquisition and joint venture. Amongst these Thales and EADS are likely to play a prominent role.

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## Glossary of terms used in the report

### ***Key to abbreviations used in supporting tables***

A classification of types of programme are used in the supporting tables in this document as follows:

- A=artillery
- Ac=aircraft
- El=electronics
- Eng=engines
- Hel=helicopter
- Mi=missiles
- MV=military vehicles
- SA/O=small arms/ordnance
- Sh=ships
- Oth=other

### ***Programme typology***

This report also divides programmes in terms of the type of international collaboration involved as follows<sup>1</sup>:

- *FMS* – government-to-government sales under the US Foreign Military Sales programme
- *Commercial sale* – direct sale by company to a government customer or as a supplier to another company
- *Licensed production* – assembly under license of the parts and components of a weapon system supplied by another country.
- *Co-production* – joint production of a part, component or weapon system by firms of different nations.
- *Co-development* – joint development (research, design and/or engineering) of a part, component or weapon system by firms of different nations.
- *Teaming* – an agreement among firms to collaborate to meet the requirements of a particular programme.
- *Off-set* – counter-trade related to the sale of a weapons system to a foreign customer.

### ***Definition of corporate relationships***

The report also makes reference to a range of corporate relationships used in transatlantic defence industry relationships and these are defined as follows:

- *Strategic alliance* – a formal statement of intent between two or more business entities to work together in a particular business area that may well be articulated through a Memorandum of Understanding (MoU).
- *Joint venture* – a corporate entity jointly owned by two or more companies to pursue the development and/or production of a particular military technology or weapon system or to pursue business opportunities in a particular market segment.
- *Wholly-owned subsidiary* – a foreign business unit owned and controlled by a single corporate parent.

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<sup>1</sup> These definitions are adapted from William W. Keller, *Arm in Arm – The Political Economy of the Global Arms Trade* (New York: Basic Books, 1995).

# **Transatlantic Defence Industrial Relationships: An Audit and Commentary**

## **1. Introduction**

In August 2000, PREST (Policy Research in Engineering, Science & Technology), a research institute of the University of Manchester in the United Kingdom was asked by CNA Corporation of Alexandria, Virginia to undertake a study of the participation in the European defence market of ten leading US defence contractors. PREST was also asked to profile two leading European defence contractors – BAE Systems and Rolls-Royce – and study their participation in the US defence market.

### **1.1 Context**

This study is set against a background of growing interest in the scope for a transatlantic dimension to defence industrial restructuring. In particular:

- Growing efforts by US and European defence manufacturers to increase exports as a means of increasing revenues and recouping development costs.
- Growing concerns amongst policy makers that defence industry restructuring might lead to a “Fortress Europe” facing a “Fortress America”.
- Policy initiatives by the last Clinton administration to encourage transatlantic mergers and acquisitions and joint ventures and the launch of the Defense Trade Security Initiative (DTSI) to amend the regulatory context for US arms exports to allies in Europe and the Pacific.
- A number of merger and acquisition and joint venture transactions that have led to the acquisition of US defence businesses by European companies.

### **1.2 Purpose of the study**

The objective of this study is as follows:

- For ten US defence firms identified by CNA Corporation, describe and analyse their participation in the European defence market in terms of their current and potential future foreign military sales and their defence-related strategic alliances, joint ventures and acquisitions/divestments involving European firms.
- For two European companies (BAE Systems and Rolls-Royce) identified by CNA Corporation, describe and analyse their corporate organisation, corporate strategy, recent defence-related acquisitions/divestments, current and potential future participation in US defence programmes, strategic alliances and joint ventures involving US firms, their wholly-owned subsidiaries in the US and their corporate financial performance.

### **1.3 Research approach**

To address these questions PREST employed the following research approach:

#### **Companies studied**

The ten US companies studied were selected by CNA Corporation as follows: Boeing, Lockheed Martin, General Dynamics, Raytheon, Litton Industries, Northrop Grumman, Textron, General Electric, Newport News Shipbuilding and United Technologies. Litton Industries-Northrop Grumman and General Dynamics-Newport News Shipbuilding are treated as separate entities although they announced merger

plans during the course of the study. CNA Corporation also selected two European companies for study - BAE Systems and Rolls-Royce. Both have their corporate headquarters in the United Kingdom.

### Countries studied

For the purposes of this study, "Europe" was defined as the western European members of NATO (Belgium, Denmark, France, Germany, Greece, Italy, Netherlands, Norway, Spain, United Kingdom) plus Sweden (which has some important relationships with the US defence industrial base).

### Data collected

In support of the study objectives, data was collected through a detailed review of publicly available secondary sources. These included certain aerospace/defence databases as well as aerospace and defence industry publications (*Aviation Week & Space Technology*, *Defense News*, *Jane's Defence Weekly*, etc), financial newspapers (*Financial Times*, *Wall Street Journal*, *Les Echos*, etc.) and publications and reports by think tanks, government agencies, national governments as well as academic authorities. In addition, we undertook a detailed analysis of company Annual Reports & Accounts as well as company web sites. The data collected was complemented by PREST's established knowledge in the subject area and – in particular – a series of studies undertaken by Andrew James during the period 1998-2000<sup>2</sup>.

### Limitations of the data collected

It ought to be emphasised that the data on defence programmes contained in this report does not purport to be a complete listing of all programmes in which the study companies may have an interest but it is intended to capture all of the significant interests of the companies studied. The objective has been to identify key programmes and illustrate the types of programmes in which the companies are engaged. The data primarily focuses on programmes for which there were orders or deliveries during the period 1998-2000 although – in some cases – notable programme wins during 2001 are included. The data focuses on company participation as prime contractor or supplier of major sub-systems and thus may well not capture company participation on programmes at lower levels of the supply chain. In general, orders and deliveries of less than \$10 million are excluded. An exchange rate of £ = \$1.45 is used throughout the report.

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<sup>2</sup> Andrew D. James *Post-Merger Strategies of the Leading US Defence Aerospace Companies*, FIND Programme User Report (Stockholm: FOA Defence Research Establishment, 1998); Andrew D. James *Medium Sized Defence Electronics Companies and US Defence Industry Restructuring*, FIND Programme User Report (Stockholm: FOA Defence Research Establishment, 2000); Andrew D. James and Mattias Axelson *The Defence Industry and Globalisation – Challenging Traditional Structures*, FIND Programme User Report (Stockholm: FOA Defence Research Establishment, 2001); Andrew D. James "The prospects for a transatlantic defence industry" in Schmitt, B (ed). *Between Cooperation and Competition: the Transatlantic Defence Market*, Chaillot Paper 42 (Paris: Institute for Security Studies Western European Union, 2001).

## 2. The evolution of transatlantic defence industrial relationships

The last fifty years have seen the evolution of transatlantic defence industrial relationships from predominantly government-led arrangements driven by Cold War concerns about Western European military capabilities towards increasingly industry-led relationships driven by commercial concerns about market access.

### 2.1 Government-led programmes

Transatlantic defence industrial relationships have a long history. In the first decades after the end of the Second World War, the United States maintained an almost unchallenged position in advanced military technology and industry. Europe was struggling to re-build its war-torn economy, most of its military industry was exhausted or destroyed and the former Axis powers were prohibited by treaty from rebuilding an independent defence industrial base. In response, the United States gave or sold military equipment to its allies in Europe to support the NATO Alliance and maintain a coordinated conventional deterrent against the threat of Warsaw Pact invasion of Western Europe.<sup>3</sup> Thus, the 1950s and 1960s saw the United States license the production of a number of weapons systems to Europe. These included the F-104 fighter to Belgium, Germany, Italy and the Netherlands, the F-4 fighter to the United Kingdom, the M-60 tank to Italy and the *Sidewinder* and *Hawk* missiles to a number of European NATO countries.<sup>4</sup>

The 1970s saw the emergence of new forms of transatlantic collaboration in response to growing NATO concerns about the standardisation, rationalisation and interoperability of defence equipment and a desire on the part of European countries to create more of a 'two-way street' in the transatlantic relationship. Thus, under a co-production agreement, the US-developed F-16 fighter aircraft was produced in two European countries (Belgium and the Netherlands) for a number of European partner countries that initially included Denmark and Norway and later also Greece and Turkey. These partners were guaranteed a work share in sub-assemblies for the entire European and US production.<sup>5</sup> The next three decades also saw a series of other government-to-government initiatives to promote arms cooperation within NATO, all of which were to meet with rather limited success and often-conspicuous failure. The 'family of weapons' concept emerged, under which a group of NATO countries would develop and produce a range of similar weapons systems. In 1978, NATO agreed that the United States would lead the development of one family member (AMRAAM) and the Europeans would lead the development of another (ASRAAM). Both sides were to buy the equipment from each other but the programmes were to eventually collapse as a result of cost overruns and programme delays.<sup>6</sup>

<sup>3</sup> Jeffrey Becker, 'The future of Atlantic defense procurement', *Defense Analysis*, vol. 16, no. 1, 2000, pp. 9-32. William W. Keller, op cit in note 1.

<sup>4</sup> Richard A. Bitzinger, 'The globalization of the arms industry', *International Security*, vol. 19, no. 2, Fall 1994, pp. 170-98; Elisabeth Sköns 'Western Europe: internationalization of the arms industry' in H. Wulf ed., *Arms Industry Limited* (Oxford: Oxford University Press for SIPRI, 1993).

<sup>5</sup> Idem.

<sup>6</sup> Trevor Taylor, 'Transatlanticism versus regional consolidation', in David G. Haglund and S. Neil MacFarlane (eds.), *Security, Strategy and the Global Economics of Defence Production* (Montreal

Similarly, in the late 1980s, the US government engaged in a number of government-to-government joint weapons development programmes with NATO European allies. Several of these so-called 'Nunn amendment' programmes were abandoned at an early stage, including the NATO Frigate Replacement (NFR90), the Autonomous Precision-Guided Munitions (APGM) programme and the Modular Stand-Off Weapon (MSOW). Their failure reflected the difficulty of harmonising military requirements, as well as limited political commitment on the part of the governments involved in the programmes.<sup>7</sup>

Undaunted by this troubled history, the Clinton administration also gave high-level political support to the goal of NATO armaments cooperation, not least through cooperative initiatives on three particular programmes. The US Joint Strike Fighter (JSF) programme was the largest and most significant programme that the United States opened to cooperative development with participation by Canada, Denmark, the Netherlands, Norway and the United Kingdom. The United States also entered the Multifunction Information Distribution Systems (MIDS) programme – a digital-information-distribution system to provide integrated battlefield communications, navigation and identification – with European participation by France, Germany, Italy and Spain.<sup>8</sup> The Medium Extended Air Defence System (MEADS) was the other government-to-government programme launched under the first-term of the Clinton administration, and the disputes and disagreements between the US and Germany over technology transfer and security highlight some of the challenges that have so often dogged these types of transatlantic industrial relationships.

## **2.2 Growing industry-led collaboration**

Whilst government-to-government relationships have been dogged by problems, industry-to-industry collaborative arrangements became increasingly common in the 1990s. Thus, a number of transatlantic strategic alliances have been established over the last decade. For example, General Dynamics Corp. and the then British Aerospace entered into a relationship in the early 1990s to explore cooperation on armoured vehicles.<sup>9</sup> The US-Italian Lockheed Martin-Alenia Tactical Transport Systems joint venture was established to develop the C-27J medium transport aircraft<sup>10</sup> and – in April 2000 – DASA/EADS and Northrop Grumman signed a memorandum of understanding to explore opportunities in the defence market.<sup>11</sup> At the same time, European acquisitions of US defence companies grew in number. Between 1988 and 1992, according to one estimate, sixty US defence companies were sold – mostly to European companies – for some \$10 billion. These included the 1988 acquisition of Singer Electronic Systems division by Plessey of the United Kingdom, the 1989 sale of Fairchild Space & Defense to Matra of France and the Aerospatiale-Alcatel-Alenia

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& Kingston: McGill-Queen's University Press, 1999). Also see Richard A. Bitzinger op. cit. in note 4.

<sup>7</sup> William W. Keller, op. cit. in note 1.

<sup>8</sup> Robert P. Grant 'Transatlantic armament relations under strain', *Survival*, vol. 39, no. 1, 1997, pp. 111-37.

<sup>9</sup> See Richard A. Bitzinger; Elisabeth Sköns, op. cit. in note 4.

<sup>10</sup> Pierre Sparaco, 'US, Europe explore transatlantic partnerships', *Aviation Week & Space Technology*, 13 September 1999, pp. 37-8.

<sup>11</sup> John D. Morrocco, 'EADS, Northrop Grumman broaden cooperative links', *Aviation Week & Space Technology*, 12 June 2000, pp. 35-6.

acquisition of a 49 per cent stake in Ford Aerospace's Space Systems division in 1990.<sup>12</sup>

However, the development of such transatlantic relationships has not always been without controversy, as the French company Thomson was to find when it sought to acquire the Missiles Division of the LTV Aerospace and Defense Company in the early 1990s. Thomson – in a consortium with the Hughes Aircraft Company – successfully outbid Martin Marietta and Lockheed to take control of the US missile house only to see the deal become the object of a concerted lobbying campaign in Congress by Martin Marietta and others. Congressional hearings followed and opposition from leading US politicians eventually caused Thomson to decide to withdraw its bid.<sup>13</sup> The LTV Missile debacle may have been an unusually public case but it does serve to emphasise the political sensitivities that can be stirred up by foreign participation in a country's defence industrial base – especially where it threatens the business interests of powerful domestic rivals.

Certainly, the experience soured Franco-US relations and only served to heighten French suspicions about 'Fortress America'. However, it did not put an end to European acquisition activity in the United States, and the 1990s were to see UK companies in particular take control of a number of important and sensitive US defence industrial assets. Thus, in 1994, UK company Rolls-Royce acquired Allison Engine Company – a major manufacturer of military aircraft engines. More significant still was the US government's decision in 1998 to allow GEC Marconi to acquire the defence electronics company Tracor. Many industry observers saw this at the time as a path-breaking acquisition, not least because of the nature of many of the technologies developed by Tracor and the role of the company in a number of highly sensitive US government programmes in the defence and intelligence fields.

In addition, other modes of transatlantic industrial cooperation became increasingly important during the 1990s, not least the continued growth of the transatlantic sourcing of subsystems and components by prime contractors.<sup>14</sup> The transatlantic market in this area was estimated to be worth over \$11 billion in 1997, with European sales of components and subsystems to the United States worth \$6.1 billion.<sup>15</sup> Offset arrangements associated with major US equipment sales accounted for an important share of this figure and – according to one estimate – European components represented some 10 per cent of the value of F-16 aircraft bought by the United States Air Force.<sup>16</sup> US components and subsystems also play an important part in European systems. Thus, Litton Industries estimates that each *Eurofighter* aircraft contains Litton avionics worth \$1 million supplied from either direct transatlantic sales or Litton's European subsidiaries.<sup>17</sup> Similarly, Sweden's JAS-39 *Gripen* fighter aircraft depends on more than a dozen foreign suppliers of key subsystems and components, including US companies UTC Sundstrand, Honeywell and General Electric.<sup>18</sup>

<sup>12</sup> Figures cited in William W. Keller, op. cit. in note 1.

<sup>13</sup> Idem.

<sup>14</sup> Andrew D. James, op cit in note 2.

<sup>15</sup> International Institute for Strategic Studies, *The Military Balance 1998/99* (Oxford: Oxford University Press for The International Institute for Strategic Studies, 1999).

<sup>16</sup> William W. Keller, op. cit. in note 3.

<sup>17</sup> Andrew D. James op. cit. in note 1.

<sup>18</sup> Maria Andersson and Johan Lilliecreutz, *Supply Chain Strategies and Sub-Tier Structures*, FOA User Report, FOA Defence Research Establishment, Stockholm, March 2000.

### **2.3 Business pressures for closer transatlantic relationships**

What is clear is that the companies in the newly consolidated European defence industry and their US counterparts face significant business pressures to expand their international activities, and transatlantic relationships are likely to be an important dimension of their strategies.

#### **Limited defence spending**

Both US and European defence companies are facing growing pressures to internationalise their activities, not least because their home markets do not offer sufficient prospects to sustain them in the future. Since the end of the Cold War, European countries have made considerable cuts in their defence budgets. Between 1989 and 1998, France, Germany and the United Kingdom – which together accounted for 58 per cent of the Western European total in 1998 – reduced their defence expenditure by 12, 28 and 24 per cent respectively.<sup>19</sup> Even sustaining defence budgets at their reduced levels is likely to represent a political challenge for the majority of NATO European governments, especially as they seek to meet the Maastricht Treaty criteria for government debt. At the same time, many governments are faced with the management of competing priorities such as the professionalisation of their armed forces and equipment modernisation within static or shrinking defence budgets.<sup>20</sup> Certainly, there is little sign that any European country shares the US intention to increase defence spending (particularly on procurement) during the next five years. Indeed, even in the United States – where the Clinton administration's budget for 2000 contained the first sustained and long-term increase in US defence spending since the end of the Cold War – companies will continue to struggle to meet the financial expectations of their investors. The end of merger-driven opportunities for expansion has left US defence contractors struggling to raise growth rates in their defence businesses, and Wall Street remains sceptical about their ability to utilise defence-related technologies to diversify into civil markets. Thus, US companies are increasingly seeking new defence contracts by expanding their international presence.<sup>21</sup>

#### **Cost and risk sharing**

At the same time, companies are increasingly looking to share the costs and risks of new programmes in the face of the growing cost and technological complexity of designing and developing advanced weapons systems.<sup>22</sup> In practical terms, these pressures mean that it is increasingly difficult for any single company – whether in the United States or Europe – to find the investment funds and technological capabilities needed to develop such programmes alone. Thus, internationalisation is also being driven by a desire on the part of even the largest US contractors to share programme costs, access specific non-US technologies and seek new sources of capital. For European companies, transatlantic industrial relationships promise opportunities to

<sup>19</sup> Stockholm International Peace Research Institute, *SIPRI Yearbook 1999* (Oxford: Oxford University Press for SIPRI, 1999).

<sup>20</sup> International Institute for Strategic Studies, op. cit. in note 15; Douglas Barrie, 'Defense budgets remain tight throughout Europe', *Defense News*, 20 December 1999, p. 26; 'The European way of defence', *The Economist*, 24 June 2000, p. 23.

<sup>21</sup> See Andrew D. James, op. cit. in note 2.

<sup>22</sup> See 'Linking Arms: A Survey of the Global Defence Industry', *The Economist*, 14 June 1997, and Burkard Schmitt, *From Cooperation to Integration: Defence and Aerospace Industries in Europe*, Chaillot Paper 40 (Paris: Western European Union Institute for Security Studies, July 2000)

access US technology that will enable them to meet European programme requirements.

### **Access to markets and programmes**

Above all, budget trends mean that – for the foreseeable future – there will be few new weapons programmes, and existing programmes face the prospect of being scaled-down or even cancelled. Thus, the challenge for defence companies is to ensure that they are able to participate in as many new programmes as possible and that they reduce their dependence on any one particular contract or national government customer. This emphasises the importance to companies of having a presence in both the US and European markets, and of capturing an increasing share of markets elsewhere in the world. Accordingly, defence firms in both the United States and Europe have aggressively pursued arms exports as a way of making up for some of the post-Cold War decline in their home markets, and this has brought US and European companies into often intense and sometimes acrimonious head-to-head competition in third countries.<sup>23</sup>

Nevertheless, the size of the US and European markets is such that it is inevitable that they are becoming the focus for new transatlantic business strategies, and the nature of the defence market means that the leading companies appear to be concluding that a local presence is vital if they wish to participate in major foreign programmes. The extent to which this is becoming the case for the US Navy's ten largest contractors – and the strategies that they are adopting with regard to the European market – is the central focus of this study.

## **3. US participation in the European defence market**

The previous section emphasised that US defence contractors have long had access to European markets through a combination of government-to-government programmes, licensing and Foreign Military Sales. However, in the face of increasing European demands for greater technology transfer and industrial participation in major procurement programmes there appears to be a growing recognition amongst US companies that they need to do more than offer offsets if they are to secure European contracts in the future. Thus, building strong European programme teams, supported by significant technology transfer from the United States, is seen as increasingly important by US companies seeking to participate in European programmes.<sup>24</sup>

### **3.1 Differing exposure to the European market**

US defence companies have differing exposure to the European market as a consequence of the types of systems they produce, the extent of European capabilities in those fields and the corporate strategies that they have pursued. The ten companies can be categorised into four types according to the extent of their participation in European programmes and the extent of their European “footprint” of strategic alliances, joint ventures and wholly-owned subsidiaries.

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<sup>23</sup> Jens Van Scherpenberg, ‘Transatlantic competition and European defence industries: a new look at the trade-defence linkage’, *International Affairs*, vol. 73, no. 1, 1997, pp. 99-122.

<sup>24</sup> See Andrew D. James, op. cit. in note 2. Raytheon's bid strategies for the UK ASTOR and BVRAAM programmes are good illustrations of these new strategies.

### **US-centric companies**

At one extreme is Newport News Shipbuilding. The company's defence-related business activities are almost entirely focused on the US market and – in particular – the requirements of the US Navy. The company does not participate in European programmes nor does it have any European strategic alliances, joint ventures or wholly-owned subsidiaries.

### **Export-focused companies**

A second group of companies can be seen to be pursuing a traditional US approach to the European defence market. Thus, participation in the European market is principally based on Foreign Military Sales and these may be accompanied by off set deals and – in some cases – licensed production by European companies. Boeing, Textron and United Technologies (particularly Sikorsky) can be characterised as export-focused companies although – as this study will go on to note – Boeing's strategy is evolving towards a more international approach to its defence business.

### **Emerging transatlantic companies**

A third group of companies can be seen to be pursuing a rather different approach. These companies have relatively extensive participation in the European defence market that extends beyond FMS to teaming arrangements and consortia with European companies and is supported by a sizeable footprint of European strategic alliances, joint ventures and wholly-owned subsidiaries. Lockheed Martin, Raytheon, Litton Industries and General Electric can be characterised as emerging transatlantic companies.

### **Aspiring transatlantic companies**

A final group can be seen to be aspiring to increase their presence in the European market beyond that provided by Foreign Military Sales. These companies have entered into strategic alliances and joint ventures and have – in some cases – acquired European defence-related business. However, the extent of their participation in the European market remains rather less than that of the emerging transatlantic companies. General Dynamics, Northrop Grumman, Pratt & Whitney and Boeing can be argued to fall into this category..

## **3.2 Emerging transatlantic alliances**

An analysis of the strategies of the companies suggests an emerging pattern of alliances between leading US and European companies:

- *Boeing-BAE Systems* – building on BAE Systems' long-standing relationship with McDonnell Douglas, this study will go on to note that Boeing and BAE Systems appear to deepening that relationship through a number of formal and informal alliances across a range of activities.
- *Lockheed Martin-EADS* – Aerospatiale-Matra (a partner in EADS) and Lockheed Martin have long discussed collaborative relationships on mission aircraft and this report will go on to note that there is some evidence that this relationship is growing.
- *Raytheon-Thales* – the announcement in 2000 of the planned creation of Thales Raytheon Systems Co. – a joint venture in air defence, command and control and ground-based radar - represents a major development in US-

French defence industrial relationships and an extension of long-standing relationships between the two companies.

- *Northrop Grumman-EADS* – Northrop Grumman has established a number of relationships with EADS.

### **3.3 Potential future programmes**

The study identifies a number of potential future programmes that present opportunities for US companies and/or transatlantic defence industrial collaboration. These programmes include:

- *Joint Strike Fighter* – the scale of the JSF programme and the formal participation of the United Kingdom as a full development partner, Denmark, the Netherlands and Norway as associated partners and Italy as an informal partner – means that it represents by far the largest potential transatlantic programme.
- *Bowman* – the decision of the UK government to re-compete this military communications system project presents a significant opportunity for certain US companies, not least General Dynamics.
- *TRACER/Future Scout Cavalry System* – this programme represents a significant opportunity for US-UK collaboration in the military vehicle segment although changes in US Army requirements mean that there is some uncertainty as to whether it will reach the full production stage.
- *NATO Theatre Ballistic Missile Defence (TBMD)* – this forthcoming requirement has already been the focus of considerable US-European teaming activity in preparation for the letting of feasibility studies during 2001.
- *NATO Alliance Growth Surveillance project (AGS)* – where there is growing pressures within NATO to merge competing European and US efforts in the area.

## **4. Boeing**

Since its merger with McDonnell Douglas, Boeing has placed considerable emphasis on the importance of international collaboration in its strategy for its military aircraft and missiles business. In this, Boeing is seeking to build on McDonnell Douglas' established international partnerships. Boeing has talked about "global strategies" driven by the recognition that without collaboration the company will not have access to all the technology necessary for its products to stay at the leading edge and the fact that it is no longer possible for US companies to rely solely on domestic markets if they are to prosper.<sup>25</sup> In support of this strategy, Boeing has been reported as actively seeking to establish a presence in Europe and Asia, and is said to be evaluating joint venture and acquisition opportunities in key markets.<sup>26</sup> Indeed, the company's strong balance sheet and healthy cash flow means that it may have more strategic options open to it than Raytheon or Lockheed Martin.

<sup>25</sup> 'The future of aerospace defense manufacturing: collaboration or competition', presentation by Michael Sears, President, Military Aircraft and Missile Systems group, The Boeing Company, to World Aerospace and Air Transport Conference, 4 September 1998.

<sup>26</sup> See John D. Morrocco, 'Boeing looks to boost global presence', *Aviation Week & Space Technology*, 3 April 2000.

Such developments start from a relatively small base. Historically, Boeing's defence business tended to focus almost exclusively on the US market and - for a company of its size - Boeing has a surprisingly small footprint in Europe. The company has made a number of large European sales through FMS and licensed production. However, it has little in the way of European joint ventures and wholly-owned subsidiaries. Boeing's membership of the European *Meteor* consortium that is developing a Beyond Visual Range Air-to-Air Missile (BVRAAM) to meet future European requirements ought to be emphasised as a potentially important development for the company.

#### **4.1 Current European defence programmes (orders and deliveries 1998-2000)**

Table 4.1 (pages 19-21) identifies Boeing's current participation in European defence programmes (based on orders and deliveries 1998-2000). The key points are as follows:

- *Helicopters* – Boeing (and especially the former McDonnell Douglas business) has made significant sales of helicopters to Europe. Most significantly, the company has sold the AH-64D Apache to the UK (licensed production together with extensive UK off sets) and the Netherlands and the AH-64A to Greece. The company has also sold the CH-47 to the Netherlands and Greece under the FMS programme.
- *Strike missiles/ordnance* – orders and deliveries for the AGM84 Harpoon, Hellfire II, JDAM, Tomahawk and Meteor.
- *Special mission aircraft* – NATO AWACS and a sub-contractor to BAE Systems on the Nimrod 2000 programme
- *Tactical fighters* – F/A-18A has been purchased by Spain and Spain and Italy operate the AV-8B for which Boeing benefits from on-going spares and support contracts.
- *Military transports* – in 2000, the UK became the first foreign customer for the C-17 when it announced that it would lease four aircraft as an interim solution before delivery of the Airbus A400-M.

#### **4.2 Potential future programmes**

Boeing has an interest in a number of future European programmes and these are listed in Table 4.2 (pages 22-24). The most significant include:

- *Tactical fighters* – as the largest transatlantic military programme, the Joint Strike Fighter is the most important potential future programme for Boeing and the outcome of the competition will also have a significant impact on the company's European partners. In addition, the Dutch government has a requirement for a replacement fighter aircraft and an order is expected between 2010-2015.
- *Helicopters* – the UK has a requirement for a Support, Amphibious, Battlefield Rotorcraft (SABR) and Boeing-Bell are offering the V-22 Osprey.
- *Special mission aircraft* – Italy and the UK have requirements for tanker aircraft.
- *NATO TBMD* – Boeing is part of a consortium including EADS.

### **4.3 European alliances, joint ventures and wholly-owned subsidiaries**

Boeing has a surprisingly small footprint in Europe. The company has one joint venture – with Agusta-Westland Helicopters – to deliver training to the British Army in support of sales of the AH-64D Apache. The company has no wholly-owned subsidiaries engaged in the production of defence-related equipment.

#### **Boeing's participation in the Meteor programme**

A major development for Boeing was its entry onto the Meteor programme. The Meteor air-to-air missile is a Beyond Visual Range Air-to-Air Missile (BVRAAM). The Meteor will equip Britain's fleet of Eurofighter 2000 aircraft, and would have an inside track on being fitted on the Eurofighters purchased by Germany, Italy, and Spain. Contracts from the four nations could total \$5 billion. Sweden is also seeking an advanced AAM for its JAS-39 Gripen, and is considering purchasing such a missile jointly as part of the Eurofighter AAM missile buy. The BVRAAM missile would also be positioned in world markets as a replacement for AMRAAM.

Boeing's entry onto the European *Meteor* team may well open up a range of new possibilities for both Boeing and its European partners. Boeing was added to the team in October 1999 to give the European project credibility in the US market. Boeing is providing aircraft-weapon systems integration, risk management and marketing activities in selected markets and Boeing will lead future sales efforts to US customers for Meteor and Meteor-derived technology. Boeing's participation offers the possibility that the missile could be fitted to Boeing's F/A-18 and F-15 aircraft as part of their upgrades. For Boeing, it offers an opportunity to strengthen its presence in a sector where it is currently relatively weak with the possibility that *Meteor* could offer an alternative to Raytheon in arming the Joint Strike Fighter.<sup>27</sup>

#### **An emerging alliance between Boeing and BAE Systems?**

Boeing and BAE Systems have long-standing relationships through the AV-8B and T-45 aircraft programmes in the United States as well as the UK *Nimrod* maritime reconnaissance aircraft upgrade programme. The two companies appear to be deepening these established relationships through a number of formal and informal alliances across a range of activities. Thus, Boeing has entered the *Meteor* BVRAAM (Beyond Visual Range Air-to-Air Missile) team that is led by Matra BAe Dynamics, and BAE Systems is said to have lobbied the UK Ministry of Defence on Boeing's behalf to secure the lease of Boeing C-17 transport aircraft for the RAF. Also, the two companies have jointly acquired a minority stake in Korea Aerospace Industries.

### **4.4 Acquisitions and divestments involving European companies**

Boeing has made no defence-related acquisitions in Europe although there has been periodic speculation in the financial press about a potential merger between Boeing and BAE Systems. However, such a deal appears highly unlikely not least because the political and regulatory barriers to such a deal are significant. Any development of

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<sup>27</sup> See John D. Morrocco, 'Looming missile decision to shape transatlantic ties', *Aviation Week & Space Technology*, 7 February 2000.

this kind seems likely to require changes to current US security regulations and BAE Systems has indicated that a large-scale merger is out of the question until a framework has been created that allows US and UK companies to handle sensitive technologies in each other's countries.<sup>28</sup> At the same time, BAE Systems' 20% stake in Airbus Industries presents a further barrier to a corporate-level link-up with Boeing although there has been speculation that Airbus may not be a future core business for BAE Systems.

In the United States, Boeing has divested one defence-related business to a European company. In 2000, Boeing's structural fabrication assets in St Louis were acquired by the UK company GKN in a deal worth \$64.1 million.

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<sup>28</sup> See Andrew James (2000), *op cit* in note 2.

**Table 4.1 Boeing - Current European defence programmes (orders and deliveries 1998-2000)**

| Programme             | European country(s) involved | Programme classification | Quantity | Order date | Delivery date | Type of programme   | European companies involved                                                                                                                                                                                                                      | Comments |
|-----------------------|------------------------------|--------------------------|----------|------------|---------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Tomahawk              | United Kingdom               | Mi                       | 65       |            | 1995-98       | FMS                 |                                                                                                                                                                                                                                                  |          |
| AH-64D Longbow Apache | The Netherlands              | Hel                      | 30       | 1995       |               | FMS with offset     | SP Aerospace & Vehicle Systems (NL)<br>Fokker Special Products (NL)                                                                                                                                                                              |          |
| AH-64D Longbow Apache | United Kingdom               | Hel                      | 67       | 1995       | 2002          | Licensed production | Agusta Westland IT/UK) acting as prime contractor in UK<br>Estimated 180 UK companies guaranteed work including:<br>Rolls-Royce<br>Turbomeca (UK/FR) – engines<br>BAE Systems (UK) – TADS/PNVS<br>Smiths – avionics<br>Racal/Thales (FR) - radar |          |
| CH-47C                | The Netherlands              | Hel                      | 7        | 1995       | 1997          | FMS                 |                                                                                                                                                                                                                                                  |          |
| F/A-18A               | Spain                        | Ai                       | 30       |            | 1998          | FMS                 |                                                                                                                                                                                                                                                  |          |

**Table 4.1 Boeing - Current European defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme        | European country(s) involved | Programme classification | Quantity | Order date              | Delivery date | Type of programme   | European companies involved                                                                                   | Comments                                                                         |
|------------------|------------------------------|--------------------------|----------|-------------------------|---------------|---------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| AH64 training    | United Kingdom               | Oth                      |          |                         |               | Joint venture       | Aviation Training International Ltd (Agusta Westland:Boeing)                                                  |                                                                                  |
| Hellfire II      | United Kingdom               | Mi                       |          | Sept 1996               |               | Licensed production | Shorts Missile Systems Ltd (UK//France)                                                                       | For British Army's AH-64D Apaches                                                |
| Harpoon missiles | Greece                       | Mi                       | 32       | Requested December 1998 |               | FMS                 | Offset expected                                                                                               | For Greek KIDD class guided missile destroyer order                              |
| AH-64A Apache    | Greece                       | Hel                      | 4        | Requested June 1999     |               | FMS                 |                                                                                                               |                                                                                  |
| CH-47D           | Greece                       | Hel                      | 7        | Requested Nov 1999      |               | FMS                 |                                                                                                               | Contract worth over \$200m                                                       |
| Nimrod 2000      | United Kingdom               | Ac; El                   |          |                         |               | Sub-contractor      | BAE Systems                                                                                                   | Boeing supplying tactical command system for upgrade to maritime patrol aircraft |
| NATO AWACS       | NATO                         | Ac/El                    |          |                         |               |                     | Boeing Operations International supports NATO AWACS via IADS (Germany), Air France (France); BAE Systems (UK) |                                                                                  |
| HELLFIRE II      | Greece                       | Mi                       | 200      | Feb 2000                | Nov 2001      | FMS                 |                                                                                                               |                                                                                  |

**Table 4.1 Boeing - Current European defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme     | European country(s) involved                                           | Programme classification | Quantity          | Order date  | Delivery date | Type of programme                      | European companies involved                                                                                               | Comments                                                                                                                          |
|---------------|------------------------------------------------------------------------|--------------------------|-------------------|-------------|---------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Predator      | Italy                                                                  | Ac/EI                    | 6                 |             |               | Sub-contractor to General Atomics (US) | Meteor (Italy)                                                                                                            | Intelligence workstation and mission planning system for UAVs.                                                                    |
| Meteor        | United Kingdom                                                         | Mi                       |                   | 2000        |               | Teaming                                | Matra Bae Dynamics (UK/France)<br>Alenia Marconi Systems (Italy)<br>EADS (France/Germany/Spain)<br>Saab Dynamics (Sweden) | Orders from France, Germany, Spain, Italy & Sweden expected to follow. Potential joint development of Meteor BVRAAM for US market |
| C-17          | United Kingdom                                                         | Ac                       | 4                 | 2000        |               | Leasing                                | BAE Systems                                                                                                               |                                                                                                                                   |
| AV-8B Harrier | Spain                                                                  | Ac;EI                    | 2 (+ option on 7) | May 2000    | 2003+         | FMS                                    | Rolls-Royce (UK)<br>BAE Systems (UK)<br>Raytheon (US)                                                                     | Remanufacturing to Harrier II Plus configuration                                                                                  |
| JDAM          | Denmark                                                                | SA/O                     | 400               | July 2000   |               | Offset agreements likely               |                                                                                                                           | JDAM kits worth \$40m                                                                                                             |
| Harpoon       | Germany<br>Greece<br>Denmark<br>Netherlands<br>Spain<br>United Kingdom | Mi                       |                   | August 2000 |               | FMS                                    |                                                                                                                           | Sale of spares                                                                                                                    |
| Hellfire II   | Greece                                                                 | Mi                       | 200               | Feb 2000    | Nov 2001      | FMS                                    |                                                                                                                           |                                                                                                                                   |
| French AWACS  | France/NATO                                                            | EI                       | 4                 | Feb 2001    | October 2002  | Subcontract                            | Air France Industries                                                                                                     | \$25.5m                                                                                                                           |

**Table 4.2 Boeing - potential future programmes**

| Programme                                     | European country(s) involved                                                                                        | Programme classification | Type of programme | European companies involved                                                                                                                                                                                                                                                                                      | Comments                                                                                        |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Joint Strike Fighter                          | United Kingdom (full partner)<br>Denmark, Norway, The Netherlands (associated partners)<br>Italy (informal partner) | Ac                       | Co-development    | Aerosystems International (UK)<br>BAE Systems (UK)<br>Dowty Aerospace (UK)<br>Fokker (The Netherlands)<br>FHL (UK)<br>Flight Refuelling (UK)<br>IFAD (Denmark)<br>Martin-Baker (UK)<br>Messier-Dowty (UK)<br>Perot Systems (The Netherlands)<br>Philips (The Netherlands)<br>Rolls-Royce (UK)<br>Terma (Denmark) | Concept demonstrator                                                                            |
| NATO Theatre Ballistic Missile Defence (TBMD) | NATO                                                                                                                | Mi                       |                   | EADS (FR)<br>IABG (GER)<br>DERA (UK)<br>TNO (NL)                                                                                                                                                                                                                                                                 | Consortium established to bid for one of two feasibility studies expected to be let in May 2001 |
| Brimstone                                     | United Kingdom                                                                                                      | Mi                       | Co-development    | Alenia Marconi Systems (UK/Italy)                                                                                                                                                                                                                                                                                |                                                                                                 |

**Table 4.2 Boeing - potential future programmes (cont)**

| Programme                                       | European country(s) involved | Programme classification | Type of programme          | European companies involved              | Comments                                                                                                                                                            |
|-------------------------------------------------|------------------------------|--------------------------|----------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strategic Tanker Aircraft                       | United Kingdom               | Ac                       | Teaming                    | BAE Systems                              | Offering B-767 for UK requirement                                                                                                                                   |
| Tanker-transport                                | Italy                        | Ac                       | Offset                     | Alenia<br>Officine Aeronavali<br>Venezia | 4 aircraft worth \$726M against Airbus A330-200                                                                                                                     |
| UK Support, Amphibious & Battlefield Rotorcraft | United Kingdom               | Hel                      | Licensed production likely | Either BAE Systems or Augusta Westland   | Offering V-22 Osprey to UK Royal Navy & Royal Air Force                                                                                                             |
| C-17                                            | United Kingdom               | Ac                       |                            |                                          | Potential that C-17 will be used to fulfil UK's Short Term Strategic Airlifter requirement if the Airbus Military Co. A400M does not result in an acceptable offer. |

**Table 4.2 Boeing - potential future programmes (cont)**

| Programme                          | European country(s) involved | Programme classification | Type of programme | European companies involved                                                                              | Comments                                                                                                                                                                  |
|------------------------------------|------------------------------|--------------------------|-------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dutch fighter aircraft requirement | Netherlands                  | Ac                       | ?                 | ?                                                                                                        | F/A-18E/F versus Dassault; SAAB/BAES; Eurofighter; JSF; Lockheed Martin. The order is expected to be for 100-120 aircraft and is expected to be placed between 2010-2015. |
| UK Bomb Enhancement Program (BEP)  | United Kingdom               | SA/O                     | Teaming           | Boeing part of Striker Team:<br>Alenia Marconi Systems (Netherlands) (prime)<br>Hunting Engineering (UK) | Schedule, program value & competitive field have yet to be determined. Boeing offering JDAM                                                                               |

**Table 4.3 Boeing - European alliances, joint ventures and wholly-owned subsidiaries**

| Name                                | Type of relationship | European partner(s)         | Sector | Comments                        |
|-------------------------------------|----------------------|-----------------------------|--------|---------------------------------|
| Aviation Training International Ltd | 50:50 joint venture  | Agusta-Westland Helicopters | Oth    | AH-64 training for British Army |

**Table 4.4 Boeing - acquisitions and divestments involving European companies**

| Year | Transaction | European company involved | Sector | Comment                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------|-------------|---------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2000 | Divestment  | GKN PLC (UK)              | Ai/Mi  | \$64.1m - GKN Plc completed its acquisition of Boeing Co.'s structural fabrication assets in St Louis, Missouri. The new GKN Aerospace Services-St. Louis becomes a strategic supplier to the US firm's military aircraft and missile systems group. The facility makes carbon fibre and aluminium frame and fuselage parts for Boeing F/A-18E/F and C-17 planes, and is also a supplier for Boeing's Joint Strike Fighter candidate. |

## 5. Lockheed Martin

Lockheed Martin has a strong position in the European defence market. The company is participating on a range of current European defence programmes and has a significant European footprint through a network of alliances, joint ventures and wholly-owned subsidiaries.

### 5.1 Current European defence programmes (orders and deliveries 1998-2000)

Lockheed Martin's participation in current European defence programmes is set out in Table 5.1 (pages 29-33). Key programmes include:

- *Aircraft* – Lockheed Martin has made significant sales of aircraft to Europe not least through the F-16 programme. The F-16 was co-produced in Europe by Belgium and the Netherlands for Denmark, Norway and Greece. The F-16 Middle Life Update (MLU) programme is on-going and – in 2000 - Greece announced its intention to buy a further 50 F-16s. The C-130 is used extensively by European air forces and the UK and Italy are customers for the C-130J.
- *Missiles and fire control systems* – Lockheed Martin has made significant sales of PAC-3 to Germany (licensed production), Greece and the Netherlands (FMS) and MLRS/GMLRS to the UK, France, Germany, Italy, the Netherlands, Denmark and Norway (through licensed production in Europe by MLRS Europäische Produktion and GLVS GmbH and FMS). In addition, it has sold Hellfire II to the UK (licensed production) and Greece (FMS), ATACMS to Greece (FMS) and Javelin to Spain (FMS). Longbow FCR as part of the sale of the AH-64 Apache to the UK, the Netherlands and Greece. Lockheed Martin is also part of the MEADS consortium.
- *Naval systems* – Lockheed Martin is supplying the AEGIS combat system to Spain for its new F-100 frigates and integrated weapon systems to Norway for its new frigate programme. The sale to Norway is as part of the AFCON consortium with Bazan of Spain and General Dynamics/Bath Iron Works.
- *Platform integration* – Lockheed Martin is acting as prime contractor on the UK EH-101 Merlin programme and was prime for the Sikorsky SH-60B helicopters sold to Spain and Greece.
- *Space* – Lockheed Martin is prime contractor for the UK's Trident ballistic missile programme.

### 5.2 Potential future programmes

Lockheed Martin also has positions on a range of potential future European programmes. Table 5.2 (pages 34-36) highlights the company's interest in programmes such as:

- *Aircraft* – the Joint Strike Fighter is the dominant future aircraft programme and the largest potential future European programme for Lockheed Martin. In addition, Lockheed Martin is likely to bid the Advanced F-16 to meet the Dutch government's fighter aircraft requirement. Lockheed Martin is also part of the team performing feasibility and concept studies for the UK's Future Offensive Air Capability programme and is teaming on a bid for the UK's Watchtower UAV programme.

- *Naval Systems* – Lockheed Martin is teamed with Thales (France) and Raytheon to bid for the UK's Future Aircraft Carrier programme estimated to be worth \$2,450 million.
- *Systems integration* – with BAE Systems, Lockheed Martin is bidding for the UK/US TRACER/Future Scout Cavalry System.
- *C4I* – Lockheed Martin is bidding for the UK's Cooperative Engagement Capability programme and is teamed with Thales (France) and several UK companies on a bid for the UK Air Command and Control System.
- *Space* – the UK, France and Germany have a major requirement for military communications satellites. In the UK, the Skynet 5 competition is estimated to be worth \$2,000 million.

### **5.3 European alliances, joint ventures and wholly-owned subsidiaries**

Lockheed Martin has a significant footprint in Europe as a consequence of strategic alliances, joint ventures and wholly-owned subsidiaries and these are listed in Table 5.3 (page 37).

#### **Strategic alliances – the Advanced Frigate Consortium (AFCON)**

AFCON is worthy of comment. A strategic alliance between Bazan (Spain), General Dynamics/Bath Iron Works and Lockheed Martin, the consortium has been established to design and manufacture frigates for international naval customers. Lockheed Martin and Bazan are currently working together on the Spanish F-100 frigate programme where Lockheed Martin is supplying the AEGIS combat system. The consortium is actively exploring other opportunities. AFCON is significant because the European naval systems business has traditionally been almost impervious to transnational sales and programmes and recent European/NATO efforts to develop collaborative programmes in the area have run into trouble (not least the Horizon frigate programme and before that the NATO AFR90 programme).

#### **Joint ventures**

Lockheed Martin is a partner in a number of joint ventures:

- A number of the joint ventures are products of NATO collaborative armaments programmes not least those related to the MLRS programme (MLRS Europäische Produktion and Euro Rocket System) and MEADS (MEADS International).
- Lockheed Martin is also a partner with BAE Systems in Team Sika established to bid for the TRACER/Future Scout Cavalry System programme.
- Lockheed Martin-Alenia Tactical Transport Systems joint venture was established to develop the C-27J medium transport aircraft as part of the off-set deal accompanying Italy's purchase of the C-130J<sup>29</sup> LMATTS is developing and marketing the C-27 transport aircraft.

<sup>29</sup> Pierre Sparaco, 'US, Europe explore transatlantic partnerships', *Aviation Week & Space Technology*, 13 September 1999, pp. 37-8.

### Wholly-owned subsidiaries

Lockheed Martin UK was established in 2000 to combine all of Lockheed Martin's defence, civil and commercial interests in the UK. The company has annual sales of around £600m (\$840m) and employs more than 1,000 people at over 20 UK facilities.

### An emerging alliance with EADS?

EADS appears to be building on Aerospatiale-Matra's links with Lockheed Martin to form a broader alliance. Aerospatiale and Lockheed Martin have been exploring links for some time, not least in the area of the proposed Multi-Role Tanker/Transport derivative of the Airbus A310 commercial transport as a potential bid for the KC-X. In 1999, the companies joined forces to bid for a British requirement for tanker aircraft.<sup>30</sup>

## **5.4 Acquisitions and divestments involving European companies**

In October 1999, Lockheed-Martin announced a radical restructuring of its organisation, including a major disposal programme. The objective was said to be to focus the company on what it regarded as its core business of systems integration and reduce the company's debt burden through the divestment of non-core businesses representing \$1.8 billion in sales for 1998. This disposal programme provided UK-company BAE Systems with the opportunity to significantly increase its position in the US. In May 2000, BAE Systems acquired Lockheed Martin Control Systems and in July 2000 Lockheed Martin Aerospace Electronics Systems. The significance of these transactions is discussed in the profile of BAE Systems later in this study.

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<sup>30</sup> Pierre Sparaco and John D. Morrocco, 'Aerospatiale to explore Lockheed Martin link', *Aviation Week & Space Technology*, 20 January 1997, p. 26; John D. Morrocco, 'Lockheed Martin talks with Airbus partners', *Aviation Week & Space Technology*, 5 May 1997, pp. 20-1; Pierre Sparaco, 'US, Europe explore transatlantic partnerships', *Aviation Week & Space Technology*, 13 September 1999, pp. 37-8.

**Table 5.1 Lockheed Martin - Current European defence programmes (orders and deliveries 1998-2000)**

| Programme                       | European country(s) involved         | Programme classification | Quantity | Order date | Delivery date | Type of programme | European companies involved                                                                                                                                                                                                                                          | Comments                                                                                          |
|---------------------------------|--------------------------------------|--------------------------|----------|------------|---------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| EH-101 Merlin                   | United Kingdom                       | Hel                      | 44       | 1979       | 1999          | Teaming           | Agusta Westland (Italy/UK)                                                                                                                                                                                                                                           | Lockheed Martin ASIC of Portsmouth is carrying out systems integration for the Merlin helicopter. |
| Trident D-5                     | United Kingdom                       | Mi                       | 48       | 1982       | 1999          | FMS               |                                                                                                                                                                                                                                                                      |                                                                                                   |
| P-3C                            | Netherlands                          | Ac; El                   | 7        | 1991       | 2001          | FMS               |                                                                                                                                                                                                                                                                      | Upgrade                                                                                           |
| Spanish F-100 frigate programme | Spain                                | Sh                       | 4        | 1992       | 2002          | FMS               | Bazan                                                                                                                                                                                                                                                                | Supplying AEGIS combat system                                                                     |
| F-16                            | Belgium<br>The Netherlands<br>Norway | Ac                       | 110      | 1993       | 1998          | Co-production     | SABCA (Belgium)<br>SONACA (Belgium)<br>Techspace Aero (Belgium)<br>MBLE (Belgium)<br>Fokker (Netherlands)<br>Hollandisk Signaal (Netherlands/France)<br>Dutch Research Laboratory (Netherlands)<br>Nordisk Aluminium (Norway)<br>Kongsberg (Norway)<br>NERA (Norway) |                                                                                                   |

**Table 5.1 Lockheed Martin - Current European defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme             | European country(s) involved | Programme classification | Quantity | Order date | Delivery date      | Type of programme   | European companies involved                                                                                                |
|-----------------------|------------------------------|--------------------------|----------|------------|--------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------|
| C-130J                | United Kingdom               | Ac                       | 25       | 1994       | 1999 (but delayed) | FMS with offset     | Offset involved established of LMATTS<br>Offset to value of 20% of each aircraft provided by consortium of 50 UK companies |
| AH-64D Longbow Apache | The Netherlands              | Hel                      | 30       | 1995       |                    | FMS                 |                                                                                                                            |
| AH-64D Longbow Apache | United Kingdom               | Hel                      | 67       | 1995       | 2002               | Licensed production | Agusta Westland acting as prime contractor in UK<br>Lockheed Martin (US)<br>Northrop Grumman (US)<br>Shorts (UK)           |
| TADS/PNVS             | United Kingdom               | El                       | 71       |            | 1998+              | Teaming             | BAE Systems (UK)<br>Pilkington Optonics (UK/FR)                                                                            |
| C-130                 | Spain                        | Ac                       | 12       | 1995       | 1999               | FMS                 |                                                                                                                            |
| M270 MLRS             | Denmark<br>Norway            | Mi                       | 436      | April 1996 | Nov 2000           | FMS                 |                                                                                                                            |
| ATACMS                | Greece                       | Mi                       | 81       | Sept 1996  | 1998               | FMS                 |                                                                                                                            |
| Hellfire II           | United Kingdom               | Mi                       |          | Sept 1996  |                    | Licensed production | Shorts Missile Systems Ltd (UK/France)                                                                                     |

**Table 5.1 Lockheed Martin - Current European defence programmes (orders and deliveries 1998-2000) (cont)**

| Programme     | European country(s) involved                        | Programme classification | Quantity | Order date          | Delivery date | Type of programme   | European companies involved                                                                   |
|---------------|-----------------------------------------------------|--------------------------|----------|---------------------|---------------|---------------------|-----------------------------------------------------------------------------------------------|
| F-16 MLU      | Belgium<br>Denmark<br>Netherlands<br>Norway         | Ai                       |          | Nov 1996            | 2006          | FMS                 | SABCA (Belgium)                                                                               |
| C-130J        | Italy                                               | Ai                       | 18       | Nov 1997            |               | FMS with offset     |                                                                                               |
| Patriot PAC-3 | Germany<br><br>Greece                               |                          |          | 1998                |               | Licensed production | EADS                                                                                          |
| Mk 41 VLS     | Germany<br>Netherlands<br>Spain                     | Mi                       |          | Jan 1998            | Sept 2006     | FMS                 |                                                                                               |
| COBRA         | United Kingdom<br>Germany<br>France                 | El                       | 29       | Mar 1998            | Dec 2005      | Co-development      | Euro-ART                                                                                      |
| Longbow FCR   | United Kingdom                                      | El                       |          | April 1998          | 2002          |                     | BAE Systems (UK)                                                                              |
| GMLRS         | UK<br>France<br>Germany<br>Italy<br>The Netherlands | Mi                       |          | Nov 1998            | Oct 2002      | Co-development      | Diehl (Germany)<br>Aerospatiale Missiles (FR)<br>Fiat Avio (IT)<br>Matra BAE Dynamics (UK/FR) |
| MEADS         | NATO                                                | Mi/El                    | \$300m   | May 1999            | 2002          | Co-development      | DASA/EADS (Germany)<br>Alenia Marconi Systems (Italy/UK)                                      |
| TADS/PNVS     | Greece                                              | El                       |          | Requested June 1999 |               | FMS                 |                                                                                               |

**Table 5.1 Lockheed Martin - Current European defence programmes (orders and deliveries 1998-2000) (cont)**

| Programme          | European country(s) involved | Programme classification | Quantity               | Order date           | Delivery date | Type of programme | European companies involved                                                                 |
|--------------------|------------------------------|--------------------------|------------------------|----------------------|---------------|-------------------|---------------------------------------------------------------------------------------------|
| M26A1 ERR MLRS     | Denmark                      | Mi                       | 225                    | Oct 1999             |               | FMS               |                                                                                             |
| Javelin            | Spain                        | Mi                       | 12 systems worth \$25m | Aug 1999             |               | FMS               |                                                                                             |
| SH-60B             | Spain                        | Hel                      | 6                      | Sept 1999            | Nov 2003      | FMS               |                                                                                             |
| PAC-3              | Netherlands                  | Mi                       | \$515m for 128 PAC-3   | Requested Nov 1999   |               | FMS               |                                                                                             |
| APG-78 Longbow FCR | Netherlands                  | El                       | 30 worth \$225m        | Requested Nov 1999   |               |                   |                                                                                             |
| UK Sender          | United Kingdom               | Ac                       |                        |                      |               | Teaming           | Lockheed Martin UK<br>Hunting Engineering (UK)<br>Defence Evaluation & Research Agency (UK) |
| Hellfire II        | Greece                       | Mi                       | 200                    | Feb 2000             | Nov 2001      | FMS               |                                                                                             |
| F-16 MMC Phase III | Belgium<br>Denmark<br>Norway | El                       |                        | March 2000           | Dec 2004      |                   |                                                                                             |
| AN/AAQ-14 LANTIRN  | Belgium                      | El                       | \$25m                  | Requested April 2000 |               | Commercial sale   |                                                                                             |

**Table 5.1 Lockheed Martin - Current European defence programmes (orders and deliveries 1998-2000) (cont)**

| Programme                                  | European country(s) involved | Programme classification | Quantity | Order date | Delivery date | Type of programme | European companies involved                                                                         |
|--------------------------------------------|------------------------------|--------------------------|----------|------------|---------------|-------------------|-----------------------------------------------------------------------------------------------------|
| Royal Norwegian Navy frigate programme     | Norway                       | Sh                       | 5        | June 2000  | June 2010     | Teaming           | Bazan (Spain)<br>Kongsberg Defence & Aerospace (NOR)<br>NERA (Norway)<br>Mjellum & Karlsen (Norway) |
| F-16C/D                                    | Greece                       | Ac                       | 50       | June 2000  | April 2004    | FMS               |                                                                                                     |
| P-3C upgrade                               | Netherlands                  | El                       | \$200m   | Aug 2000   | Feb 2003      | FMS               |                                                                                                     |
| CEC Phase I study                          | United Kingdom               | El                       |          | Oct 2000   |               |                   |                                                                                                     |
| TRIDENT                                    | United Kingdom               | Oth                      |          | Nov 2000   | Jan 2003      | FMS               |                                                                                                     |
| F-16                                       | Italy                        | Ac                       | 34       | March 2001 | 2003-         | Lease             |                                                                                                     |
| Danish Aerotech                            | Denmark                      | Oth                      |          |            |               | Joint venture     | TERMA Manufacturing (Denmark)<br>FLS Aerospace (UK)                                                 |
| Medium Extended Air Defence System (MEADS) | NATO (US; Germany; Italy)    | Mi; El                   |          |            |               | Co-development    | EADS/LFK (Germany)<br>Alenia Marconi Systems (Italy/UK)                                             |
| MLRS                                       | Denmark                      | Mi                       |          |            |               | Co-production     | Kvaerner Eureka                                                                                     |

**Table 5.2 Lockheed Martin - Potential future programmes**

| Programme                                  | European country(s) involved                                                                                        | Programme classification | Type of programme | European companies involved                                                                                                              | Comments                                                                                                                           |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| UK Air Command and Control System (UKACCS) | United Kingdom                                                                                                      | El                       | Teaming           | Hunting Engineering (UK)<br>Smiths Industries (UK)<br>Thales (FR)                                                                        | Requirement announced Sept 1999                                                                                                    |
| Dutch fighter aircraft requirement         | Netherlands                                                                                                         | Ac                       | ?                 | ?                                                                                                                                        | Advanced F-16 versus Dassault; SAAB/BAES; Eurofighter; JSF; Boeing.<br>Order for 100-120 aircraft expected to be placed 2010-2015. |
| Joint Strike Fighter                       | United Kingdom (full partner)<br>Denmark, Norway, The Netherlands (associated partners)<br>Italy (informal partner) | Ac                       | Co-development    | BAE Systems (UK)<br>Rolls-Royce (UK)<br>Fokker (Netherlands)<br>Airbus Industrie (Europe)<br>National Aerospace Laboratory (Netherlands) | Concept demonstrator                                                                                                               |

**Table 5.2 Lockheed Martin - Potential future programmes (cont.)**

| Programme                                     | European country(s) involved | Programme classification | Type of programme     | European companies involved                                                                                                                                                                        | Comments                                                                                                           |
|-----------------------------------------------|------------------------------|--------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| NATO Theatre Ballistic Missile Defence (TBMD) | NATO                         | Mi                       | Teaming               | Aerospatiale Matra Missiles (France)<br>Alenia Marconi Systems (UK/Italy)<br>BAE Systems (UK)<br>EADS/LFK (Germany)<br>Matra-Bae Dynamics (France/UK)<br>TRW Space & Missile Systems Division (US) | Team Janus consortium established to bid for one of two Feasibility Study Contract expected to be awarded May 2001 |
| UK Skynet 5                                   | United Kingdom               | EI                       | Co-development        | BAE Systems, British Telecom                                                                                                                                                                       | LM part of Rosetta consortium in military communications satellite competition. Delivery date 2017.                |
| TRACER/Future Scout Cavalry System            | United Kingdom               | MV                       | Co-development        | BAE Systems & others in SIKA<br>International joint venture                                                                                                                                        |                                                                                                                    |
| UK Future Aircraft Carrier (CVF)              | United Kingdom               | Sh                       | Teaming               | Thales (France)<br>BMT Defence Services<br>Raytheon                                                                                                                                                | Programme assessment phase                                                                                         |
| Cooperative Engagement Capability             | United Kingdom               | EI                       | Foreign Military Sale | Lockheed Martin UK                                                                                                                                                                                 | Assessment Phase – bidding against Raytheon                                                                        |

**Table 5.2 Lockheed Martin - Potential future programmes (cont.)**

| Programme                       | European country(s) involved | Programme classification | Type of programme | European companies involved                                                                                                                                                             | Comments                                                                                                         |
|---------------------------------|------------------------------|--------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Sonar 2087                      | United Kingdom               | El                       | Teaming           | Babcock Defence Systems (prime)<br>Cogent<br>J&S Marine<br>BMT (UK)<br>Indal Technologies (Canada)<br>STN Atlas Elektronik (Germany)<br>Ultra Electronics (UK)<br>Northrop Grumman (US) | ASW system for British Royal Navy's Type 23 frigate (currently at assessment phase).                             |
| UK Watchtower UAV               | United Kingdom               | Ac;El                    | Teaming           | Lockheed Martin Tactical Systems (UK)<br>Hunting Engineering (UK)                                                                                                                       | Assessment phase began 2000                                                                                      |
| Future Offensive Air Capability | United Kingdom               | Ac;Mi                    | Teaming           | Matra BAe Dynamics<br>BAe Airbus<br>Flight Refuelling Limited                                                                                                                           | Team has been by UK Ministry of defence to perform feasibility & concept studies for FOAC CALCM system & missile |
| UK NLAW                         | United Kingdom               | Mi                       |                   | MatraBAE Dynamics                                                                                                                                                                       | Next-generation Light Anti-Armour weapon                                                                         |

**Table 5.3 Lockheed Martin - European alliances, joint ventures and wholly-owned subsidiaries**

| Name                                                                    | Type of relationship    | European partner(s)                                                                      | Sector      | Comments                                                                                  |
|-------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------------|
| AFCON (Advanced Frigate Consortium)                                     | Strategic alliance      | Bazan (Spain)<br>General Dynamics Bath Iron Works (US)                                   | Sh          | Alliance to design & manufacture frigates for international naval customers               |
| Next-generation computer-based aircraft development tools and processes | Strategic alliance      | Dassault Systemes (France)<br>IBM (US)                                                   | Oth         |                                                                                           |
| Lockheed Martin Alenia Tactical Transport Systems                       | Joint venture           | Alenia (Italy)                                                                           | Ai          | Developing & marketing C-27 transport aircraft as part of off-set deal for Italian C-130J |
| Euro-Art Radar Technology GmbH                                          | Joint venture           | Siemens (Germany)<br>Thales (France)                                                     | El          | To produce COBRA artillery locating radar                                                 |
| Euro Rocket System GmbH                                                 | Joint venture           | Diehl (Germany)                                                                          | Mi          | Marketing MLRS launchers                                                                  |
| MLRS Europäische Produktion GmbH                                        | Joint venture           | Diehl (Germany)<br>BPD (Italy)<br>Matra BAe Dynamics (UK/France)<br>Hunting Defence (UK) | Mi          | Joint venture for licensed production of Multiple Launch Rocket System                    |
| GLVS GmbH                                                               | Joint venture           | DASA/EADS (Germany)                                                                      | Mi          | Co-production & marketing of PAC-3 missile to Patriot user nations                        |
| MEADS International                                                     | Joint venture           | DASA/EADS (Germany)<br>Alenia (Italy)                                                    | Mi          | MEADS programme                                                                           |
| Team Sika International                                                 | Joint venture           | BAE Systems (UK)                                                                         | MV          | TRACER/Future Scout Vehicle Project                                                       |
| Lockheed Martin UK                                                      | Wholly-owned subsidiary |                                                                                          | Ai; El; Oth | Annual sales of £600m (\$840m), employing more than 1,000 people at over 20 facilities    |
| LM GmbH                                                                 | Wholly-owned subsidiary |                                                                                          | El; Sh      | Works with German companies Blohm & Voss, HDW and STN upgrading German Navy surface ships |

**5.4 Acquisitions and divestment involving European companies**

| Year      | Transaction                                            | European company involved | Sector | Comment  |
|-----------|--------------------------------------------------------|---------------------------|--------|----------|
| May 2000  | Sale of Lockheed Martin Control Systems                | BAE Systems (UK)          | EI     | \$0.51bn |
| July 2000 | Sale of Lockheed Martin aerospace electronics business | BAE Systems (UK)          | EI     | \$1.67bn |

## 6. General Dynamics

General Dynamics has established itself in the European market through the acquisition of Computing Devices International and Spanish tank manufacturer Santa Barbara. Whilst Foreign Military Sales to Europe have been modest in recent years, the company is competing for a major contract for tanks from Greece. At the same, its UK wholly-owned subsidiary Computing Devices International has a position on a range of European military aircraft programmes. In addition, General Dynamics has made it clear that it would be interested in more European acquisitions if the cross-border consolidation of Europe's armoured vehicle industry were to get underway.

### 6.1 Current European defence programmes (orders and deliveries 1998-2000)

General Dynamics' participation in current European programmes is set out in Table 6.1 (pages 42-43):

- *Information systems/avionics* – through its UK subsidiary Computing Devices Ltd, General Dynamics has a position on a range of European military aircraft programmes. Computing Devices Ltd describes itself as one of the largest avionics suppliers to the EF-2000 Eurofighter providing twelve of the avionics sub-systems to the programme. In addition, Computing Devices Ltd. Supplies mission computers and navigation computers to the Tornado GR1, Harrier GR7 and Nimrod MR2. The company also supplies weapon management systems to the Hawk, Marlin HAS1, Tornado ADV and Mirage III. Through the FMS programme, General Dynamics has sold AN/UYS-2A(V) DEM E signal processing computers to Spain as part of the F-100 frigate programme and in support of its AEGIS combat system.
- *Weapons systems* –General Dynamics has sold its Hydra-70 air-to-ground rocket system to Germany (for its Tiger attack helicopter programme) and to the Netherlands.

### 6.2 Potential future programmes

General Dynamics has an interest in a number of potential future European programmes and these are set out in Table 6.2 (page 44). Significant programmes include:

- *Bowman* – Computing Devices Canada, a General Dynamics subsidiary company, is bidding for the UK's requirement for a communications system for the British Army. The contract is estimated to be worth \$2,500 million and this is the second time the competition has been let. The original winners – the Archer consortium including ITT (US) and BAE Systems – were removed from the programme by the UK Ministry of Defence as a consequence of programme failures and cost overruns. Computing Devices Canada is offering a system developed and introduced for the Canadian military.
- *Greek main battle tank* – General Dynamics is bidding for a contract to supply 250 main battle tanks to Greece under FMS followed by licensed production in Greece. The procurement process entered its final phase in January 2001 although there has been speculation that Greek budget constraints been that the size of the programme may be scaled back.
- *TRACER/Future Scout Cavalry System* – a team of Vehicle Armour & Armament Ltd – a joint venture between General Dynamics and Vickers

Defence Systems of the UK – and BAE Systems is bidding for this US-UK programme for 1,050 armoured vehicles for the US Army and 335 for the British Army. There has been considerable speculation as to whether this programme will go ahead because of changes in US Army requirements.

### **6.3 European alliances, joint ventures and wholly-owned subsidiaries**

General Dynamics has a significant European footprint through strategic alliances, joint ventures and – in particular – wholly-owned subsidiaries and these are set out in Table 6.3 (page 45).

#### **Strategic alliances - AFCON**

With Lockheed Martin, General Dynamics/Bath Iron Works is part of the AFCON consortium with Bazan (Spain) that has been established to design and manufacture frigates for international naval customers. It has already been noted that AFCON is significant because the European naval systems business has traditionally been almost impervious to transnational sales and programmes. Potentially, AFCON provides an opportunity for Bath Iron Works to enter the European and other international markets.

#### **Joint ventures**

In May 1999, General Dynamics established Vehicle Armour & Armament Ltd. - a joint venture with Vickers Defence Systems (UK) – to design and produce a demonstrator chassis and weapon systems for the UK-US TRACER-Future Scout Cavalry System.

#### **Wholly-owned subsidiaries**

It has already been noted that Computing Devices Ltd. has positioned General Dynamics in a range of European programmes. The acquisition of Spanish tank and armaments manufacturer Santa Barbara will provide General Dynamics with a wholly-owned subsidiary that can potentially participate in any future consolidation of the European land systems sector.

### **6.4 Acquisitions and divestments involving European companies**

General Dynamics has made two important acquisitions that have provided it with a significant position in the European defence market (see Table 6.4 page 46).

#### **Computing Devices International**

The acquisition of Computing Devices International in December 1997 not only broadened General Dynamics' businesses in electronics, large-scale system integration and high-speed data processing but – through Computing Devices Ltd. – placed the company on a range of European defence programmes.

#### **Santa Barbara**

In April 2000, it was announced that General Dynamics was to acquire Empresa Santa Barbara de Industrias Militares (ENSB), the Spanish combat vehicle and munitions

manufacturer.<sup>31</sup> The acquisition of Santa Barbara by General Dynamics can be seen as significant for a number of reasons. Firstly, it is one of very few examples of sizeable acquisitions of European defence assets by a US company. Secondly, it is the only example of a transatlantic acquisition of a platform manufacturer. Thirdly, it involved the land systems sector which – in Europe – has been the subject of little consolidation, continues to be fragmented and remains politically sensitive.

General Dynamics' acquisition of Santa Barbara illustrates some of the challenges that can face defence companies (either American or European) when they make overseas acquisitions. The announcement provoked a considerable political dispute in which the German government – on behalf of Krauss-Maffei Wegmann – raised its concerns over the deal with the Spanish government. Krauss-Maffei Wegmann had also bid for Santa Barbara and there is little doubt that part of the protest was stimulated by its concern about the entry of a powerful US competitor into Europe. However, the company also had another concern. Santa Barbara is manufacturing the German Leopard 2 tank under license and there were German concerns about the leakage of technology to General Dynamics.

In April 2001, it was reported that German firm Krauss-Maffei Wegmann had signed a technology transfer agreement freeing the sale of Santa Barbara to General Dynamics and the sale of the state-owned company was approved by the Spanish government. The final price was \$4.4m and General Dynamics has promised to invest \$60 million in the company. The acquisition gives General Dynamics a position in the European land systems sector and also positions it to take advantage of Spanish plans to modernise its armoured vehicle fleet.

#### **Future consolidation of the European land systems sector**

Significantly, General Dynamics has made it clear that it would be interested in more European acquisitions if the cross-border consolidation of Europe's armoured vehicle industry were to get underway<sup>32</sup>. Indeed, there has been speculation that General Dynamics may seek to acquire Vickers Defence Systems in the UK. The Vickers Group was acquired by Rolls-Royce in 2000 and it seems likely that Rolls-Royce will divest Vickers Defence Systems.

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<sup>31</sup> General Dynamics Corp. 'General Dynamics to buy Spain's ENSB, maker of combat vehicles and munitions', *News Release*, 13 April 2000, General Dynamics Corp., Falls Church, VA.

<sup>32</sup> Comments by General Dynamics Chairman Nicholas Chabreja quoted in Alexander Nicholl 'General Dynamics interested in more European deals', *Financial Times*, April 1 2001.

**Table 6.1 General Dynamics - Current European defence programmes (orders and deliveries 1998-2000)**

| Programme                         | European country(s) involved                | Programme classification | Quantity                                                                                                                                     | Order date | Delivery date | Type of programme | European companies involved                                | Comments                                                            |
|-----------------------------------|---------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|-------------------|------------------------------------------------------------|---------------------------------------------------------------------|
| Eurofighter Typhoon               | United Kingdom<br>Germany<br>Italy<br>Spain | Ac;El                    | Computing Devices Ltd is one of the largest avionics suppliers contributing to 12 of the avionics sub-systems through Computing Devices (UK) |            |               |                   |                                                            |                                                                     |
| Tornado GR1                       | United Kingdom<br>Germany<br>Italy          | Ac;El                    | Computing Devices Ltd (UK) supplies mission computers & navigation computers                                                                 |            |               |                   |                                                            |                                                                     |
| Harrier GR7                       | United Kingdom                              | Ac;El                    |                                                                                                                                              |            |               |                   |                                                            |                                                                     |
| Nimrod MR2                        | United Kingdom                              | Ac;El                    |                                                                                                                                              |            |               |                   |                                                            |                                                                     |
| Hawk                              | United Kingdom & exports                    | Ac;El                    | Computing Devices Ltd (UK) supplies weapon management systems                                                                                |            |               |                   |                                                            |                                                                     |
| Merlin HAS1                       | United Kingdom                              | Hel;El                   |                                                                                                                                              |            |               |                   |                                                            |                                                                     |
| Tornado ADV                       | United Kingdom<br>Germany<br>Italy          | Ac;El                    |                                                                                                                                              |            |               |                   |                                                            |                                                                     |
| Mirage III                        | France                                      | Ac;El                    |                                                                                                                                              |            |               |                   |                                                            |                                                                     |
| MINDER                            | United Kingdom                              | Oth                      | \$8.7m                                                                                                                                       | Nov 2000   | August 2002   | Teaming           | Ultra Electronics (UK)<br>Hunting Engineering (UK)         | Computing Devices (Canada) part of team on mine detection programme |
| Future Tank Main Armament Program | United Kingdom<br>Germany<br>France         | MV/Oth                   |                                                                                                                                              |            |               | R&D programme     | BAE Systems (UK)<br>Rheinmetall (Germany)<br>GIAT (France) | Programme to develop main gun & ammunition                          |
| HYDRA 70 unguided rocket          | Germany                                     | Mi                       |                                                                                                                                              | Oct 1998   |               | Direct sale       |                                                            | For Tiger attack helicopters                                        |

**Table 6.1 General Dynamics - Current European defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme                                                   | European country(s) involved | Programme classification | Quantity                       | Order date | Delivery date | Type of programme | European companies involved | Comments                                                                                |
|-------------------------------------------------------------|------------------------------|--------------------------|--------------------------------|------------|---------------|-------------------|-----------------------------|-----------------------------------------------------------------------------------------|
| HYDRA-70 rocket                                             | Netherlands                  | Mi                       | 9,036<br>(to NL<br>&<br>Egypt) | 1997       | April 1999    | FMS               |                             |                                                                                         |
| AN/UYS-2A(V)<br>DEM E.                                      | Spain                        | El                       | 4                              |            | FMS           |                   |                             | Signal processing computer                                                              |
| Technical support contract in support of the Hydra Program. | Sweden                       | Oth                      | \$6.1m                         |            | Direct sale   |                   |                             | Computing Devices is supporting development of Swedish Hydra underwater sonar programme |

**Table 6.2: General Dynamics - Potential future programmes**

| Programme                           | European country(s) involved | Programme classification | Type of programme                   | European companies involved                                                                 | Comments                                                                                 |
|-------------------------------------|------------------------------|--------------------------|-------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| TRACER/Future Scout Vehicle Project | United Kingdom               | MV                       | Co-development                      | Vehicle Armour and Armament Ltd (joint venture with Vickers Defence Systems)<br>BAE Systems | 335 for UK<br>1050 for US Army                                                           |
| Greek main battle tank              | Greece                       | MV                       | FMS followed by licensed production |                                                                                             | 250 tanks.<br>Procurement entered final phase Jan 2001                                   |
| UKACCS                              | United Kingdom               | EI                       |                                     |                                                                                             | Computing Devices Ltd has expressed interest in participating.<br>Delivery date is 2006. |
| Bowman                              | United Kingdom               | EI                       |                                     |                                                                                             | Computing Devices Canada bidding for \$2.5 bn. military communications system            |

**Table 6.3: General Dynamics - European alliances, joint ventures and wholly-owned subsidiaries**

| Name                                | Type of relationship                          | European partner(s)                   | Sector   | Comments                                                                                                                                                                |
|-------------------------------------|-----------------------------------------------|---------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AFCON (Advanced Frigate Consortium) | Strategic alliance                            | Bazan (Spain)<br>Lockheed Martin (US) | Sh       | Alliance between Bath Iron Works and partners to design & manufacture frigates for international naval customers                                                        |
| Vehicle Armour and Armament Ltd.    | Joint venture                                 | Vickers Defence Systems (UK)          | MV       | Established in May 1999 to design and produce a demonstrator chassis and weapon systems for the UK-US TRACER-Future Scout Cavalry System (FSCS).                        |
| Computing Devices Ltd               | Wholly-owned subsidiary                       |                                       | El       | Located in the UK, Computing Devices designs electronics & software for reconnaissance systems, avionics & digital battlespace.                                         |
| Santa Barbara                       | Wholly-owned subsidiary (subject to approval) |                                       | MV; SA/O | In April 2001, it was reported that German firm Krauss-Maffei Wegmann had signed a technology transfer agreement freeing the sale of Santa Barbara to General Dynamics. |
| Page Europa S.p.A. is a             | Wholly-owned subsidiary                       |                                       | El       | Italy-based supplier of military communications equipment. A leading customer is the North Atlantic Treaty Organization (NATO).                                         |

**Table 6.4: General Dynamics - Acquisitions and divestment involving European companies**

| Year          | Transaction                     | European company involved | Sector | Comment                                                                                                                                                                                                                             |
|---------------|---------------------------------|---------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| December 1997 | Acquisition                     | Computing Devices Limited | El     | Part of acquisition of Computing Devices International from Ceridian Corporation                                                                                                                                                    |
| April 2000    | Acquisition (awaiting approval) | Santa Barbara (Spain)     | MV     | Final approval of \$0.05bn acquisition expected April 2001. In April 2001, it was reported that German firm Krauss-Maffei Wegmann had signed a technology transfer agreement freeing the sale of Santa Barbara to General Dynamics. |

## 7. Raytheon

Raytheon has a substantial position in the European defence market and - unlike many other major US defence contractors - has an overseas production presence. Raytheon executives are on record as saying that the company's continued growth will require even closer collaboration and enhanced teaming relationships with industry in Europe. To this end, Raytheon announced in 2000 the formation of Thales Raytheon Systems Co. – a joint venture with French company Thales that represents one of the most significant developments in transatlantic defence industrial relationships in recent years – not least because it signifies an unprecedented level of US-French defence industrial collaboration.

### **7.1 Current European defence programmes (orders and deliveries 1998-2000)**

Raytheon's participation in current European programmes is set out in Table 7.1 (pages 50-54):

- *Missile systems* – As the world's largest missile manufacturer, Raytheon has a range of European customers both through FMS, licensed production and teaming. In the period studied, Raytheon has received orders or made deliveries of the AIM-120 AMRAAM to the United Kingdom, Belgium, Greece, the Netherlands, Norway, Spain, Italy and Greece. In addition, there have been sales of the SM-2 Standard missile (Spain, the Netherlands, Germany and Italy), Harpoon missiles (Greece), MK 46 torpedoes (Greece), AGM Maverick (Belgium and Italy), Javelin anti-tank weapons (Spain), Stinger (United Kingdom, Greece and Italy), AGM-88 HARM (Germany) and Rolling Airframe Missile (co-produced with Germany). Also, the United Kingdom has ordered UGM-109 Tomahawk missiles. Raytheon has also benefited from spares and engineering service contracts for installed systems such as the Hawk (the Netherlands, Spain and Sweden) and Harpoon (Germany, Greece, Denmark, the Netherlands, Spain and the United Kingdom).
- *Air defence systems* – Raytheon is part of the Patriot PAC-3 programme with customers in Germany, Greece and the Netherlands. In addition, Raytheon is supplying radar and AMRAAM for the Norwegian Advanced Surface-to-Air Missile System (NASAMS).
- *Airborne surveillance* – Raytheon was the successful bidder for the UK Airborne Stand-off Radar (ASTOR) programme worth \$1,300 million.
- *Radar systems* – Raytheon is part of a team led by BAE Systems that is supplying the FCR-90 radar for the EF2000 Eurofighter programme and the AN/APS-137B(V)5 radar to the Dutch P-3 aircraft upgrade programme. Raytheon is also supplying the AN/APG-65 radar as part of the upgrade of Spain's AV-8B aircraft.
- *Naval systems* – Raytheon is supplying sonar systems to the Spanish Navy for its minesweepers and F-100 frigate programme through a co-production agreement with Spanish company Indra and Raytheon's Spanish joint venture company ENOSA.
- *Ordnance* – Raytheon has made significant sales of Paveway laser guided bombs to France and the United Kingdom.

- *Aircraft and aircraft integration* – In August 1999, Raytheon announced the sale of T-6A training aircraft to Greece and is teamed with Airbus in the sale of Airbus A310 Multi-Role Tanker Transport aircraft to Germany.
- *Other programmes* – Raytheon is the contractor (with a UK team) on the UK Successor Identification Friend or Foe programme that is estimated to be worth \$148 million.

## **7.2 Potential future programmes**

Raytheon has an interest in a considerable number of potential future European programmes and these are set out in Table 7.2 (pages 55-56). Programmes of particular note include:

- *NATO Theatre Ballistic Missile Defence (TBMD)* – Raytheon is part of a team that includes European companies Thales (France) and EADS (Germany).
- *UK Future Aircraft Carrier* - Raytheon is part of a team which – again – includes Thales (France).
- *Cooperative Engagement Capability* – a programme to integrate the UK Royal Navy's air defence assets.

## **7.3 European alliances, joint ventures and wholly-owned subsidiaries**

Raytheon has a relatively large European footprint of strategic alliances, joint ventures and a number of wholly-owned subsidiaries and these are set out in Table 7.3 (page 57).

### **Strategic alliances**

Raytheon has a relationship with Airbus to use its aircraft as platforms for AEW and tankers. In addition, the company has a relationship with the German missile manufacturer BGT

### **Joint ventures - Thales Raytheon Systems Co.**

There is little doubt that the most significant recent development has been the establishment of Thales Raytheon Systems Co – a joint venture between French company Thales (formally known as Thomson-CSF) and Raytheon in the area of air defence, command and control and ground-based radar. In December 2000, Raytheon and Thales entered into an agreement to form an equally owned joint venture encompassing air defence/command and control centres and ground-based air surveillance and weapons locating radar. The air traffic management businesses of both companies are not included in the joint venture and will continue to compete in the ATM market place. Raytheon's C3I segment has responsibility for the company's participation in the joint venture that will have approximately 1,300 employees worldwide and pro forma revenues of approximately \$500-700 million.

The Raytheon-Thales relationship can be seen as another emerging axis of transatlantic defence industrial cooperation. Raytheon's relationship with Thales/Thomson-CSF goes back a number of years and the companies collaborate as joint developers, integrators and suppliers to each other on 17 industrial

programmes.<sup>33</sup> A Raytheon-Thales consortium is installing a new air defence system for Switzerland and a Raytheon-Thales joint venture – Air Command Systems International – was awarded the NATO air command and control contract. Raytheon is also part of Thales's team bidding to supply new aircraft carriers to the United Kingdom. In many respects, the establishment of Thales Raytheon Systems Co. is a more significant development in transatlantic defence industrial relationships than BAE Systems' acquisitions of Lockheed Martin's businesses. Whilst UK companies have a history of participation in the US defence market (including through acquisition), the Thales Raytheon joint venture represents a step-change in US-French relationships in the defence industrial field which have traditionally been clouded by suspicions and distrust.

#### **Wholly-owned subsidiaries**

Raytheon's principal European wholly-owned subsidiary is its UK-based company Raytheon Systems Ltd, which employs approximately 1,900 people, many as a consequence of the Hughes merger in 1997. Raytheon's capabilities in the UK include the design, development and production of advanced defence electronic systems, such as global positioning systems, battlefield communications systems, power devices, integrated electronic systems, identification systems and radar systems. Indeed, under the company's reorganisation plans, the company's Glenrothes plant in Scotland will be the only manufacturer of control systems for Raytheon's Amraam missiles.

#### **7.4 Acquisitions and divestments involving European companies**

Table 7.4 (page 58) shows that Raytheon has been involved in few transatlantic acquisitions and divestments. Both of the deals identified involved naval and maritime systems. In 1995, Raytheon acquired Anschutz & Co., a German manufacturer of integrated bridge systems. In December 1998, as part of Raytheon's effort to reduce its debt level, the company sold its sonobuoy business to Ultra Electronics. Ultra is a UK aerospace and defence electronics group that has built up business positions in the US and Canada primarily through acquisition.

More significant, however, was Raytheon's aborted attempt to acquire UK defence electronics company Racal Electronics which was the subject of speculation during 1999/2000. Raytheon's plans to acquire the defence electronics business of the United Kingdom's Racal came to a stop in large part because of Raytheon's financial and management problems. The failure of Raytheon's bid is significant both because it shows that the company has considered the possibility of a major European acquisition and because it reminds us that the strategic options open to Raytheon (and Lockheed Martin) are likely to be constrained until current management actions to improve the company's financial health begin to bear fruit.

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<sup>33</sup> Brooks Tigner, 'Raytheon and Thomson-CSF plan joint venture in radar', *Defense News*, 3 July 2000, pp. 1-18.

**Table 7.1: Raytheon - Current European defence programmes (orders and deliveries 1998-2000)**

| Programme                       | European country(s) involved                        | Programme classification | Quantity | Order date                 | Delivery date | Type of programme | European companies involved                           | Comments                                                                                            |
|---------------------------------|-----------------------------------------------------|--------------------------|----------|----------------------------|---------------|-------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| AIM-120 AMRAAM                  | United Kingdom                                      | Mi                       |          | 1994                       | 1998          | FMS               |                                                       |                                                                                                     |
| AN/SSQ-32                       | Spain                                               | El                       | 4        |                            | 1994-2000     | Co-production     | Indra (Spain)<br>ENOSA (Raytheon-Indra joint venture) | Sonars for 4 minesweepers. In Feb 2001 it was announced that the Spain has ordered further systems. |
| AGM-65G/F/D Maverick            | Belgium<br>Italy                                    | Mi                       | N/a      | Jan 1997                   | July 1999     | FMS               |                                                       |                                                                                                     |
| AIM-120 AMRAAM                  | Belgium<br>Greece<br>Netherlands<br>Norway<br>Spain | Mi                       | 276      | Jan 1997                   | Sept 1999     | FMS               |                                                       |                                                                                                     |
| AIM-120 AMRAAM                  | Italy<br>Greece                                     | Mi                       | 33<br>90 | Requested<br>Dec 1997      |               | FMS               |                                                       |                                                                                                     |
| Spanish F-100 frigate programme | Spain                                               | Sh                       | 4        | 1998                       |               | Sub-contractor    | Bazan                                                 | Supplying sonar system                                                                              |
| AIM-120 B/C AMRAAM              | Spain                                               | Mi                       | 100      | 1998                       |               | FMS               |                                                       |                                                                                                     |
| AIM-120 AMRAAM                  | Greece<br>Italy                                     | Mi                       | 90<br>33 | April 1998                 | July 2000     | FMS               |                                                       |                                                                                                     |
| Harpoon missiles                | Greece                                              | Mi                       | 32       | Requested<br>December 1998 |               | FMS               | Offset expected                                       | For Greek KIDD class guided missile destroyer order                                                 |
| MK 46 MOD 5 torpedoes           | Greece                                              | Mi                       | 48       | Requested<br>December 1998 |               | FMS               | Offset expected                                       | For Greek KIDD class guided missile destroyer order                                                 |

**Table 7.1: Raytheon - Current European defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme                                                | European country(s) involved   | Programme classification | Quantity               | Order date | Delivery date | Type of programme | European companies involved                                       | Comments                                              |
|----------------------------------------------------------|--------------------------------|--------------------------|------------------------|------------|---------------|-------------------|-------------------------------------------------------------------|-------------------------------------------------------|
| HAWK missile system engineering services                 | Netherlands<br>Spain<br>Sweden | Mi/Oth                   |                        | Feb 1999   | Dec 2000      | FMS               |                                                                   | Engineering services for installed systems            |
| ECR-90 radars for Eurofighter                            |                                | EI                       | 147                    | Feb 1999   |               | Teaming           | Team led by BAE Systems (UK)<br>FIAR (IT)<br>ENOSA (SP)           |                                                       |
| AIM-120 AMRAAM                                           | Spain<br>Italy                 | Mi                       | 100<br>60              | March 1999 | July 2001     | FMS               |                                                                   |                                                       |
| UGM-109 TOMAHAWK BLOCK IIIC Land Attack Missiles (TLAMs) | United Kingdom                 | MI                       | 30                     | April 1999 |               | FMS               |                                                                   | \$100m contract                                       |
| NATO Air Command and Control System (ACCS)               | NATO                           | EI                       | \$800m                 | July 1999  |               | Direct sale       | Air Command Systems International (Raytheon-Thales joint venture) | Phase I worth \$800m – total programme worth \$8,000m |
| AGM-65 Maverick                                          | Italy                          | Mi                       | N/a                    | Aug 1999   |               | FMS               |                                                                   |                                                       |
| Javelin                                                  | Spain                          | Mi                       | 12 systems worth \$25m | Aug 1999   |               | FMS               |                                                                   |                                                       |
| 45 T-6A Texan 2 joint training aircraft                  | Greece                         | Ai                       | \$238m contract for 45 | Aug 1999   | 2000-2003     | Direct sale       |                                                                   |                                                       |
| Paveway II/III                                           | France                         | SA/O                     | \$100m                 | Nov 1999   | 2000          | FMS               |                                                                   |                                                       |

**Table 7.1: Raytheon - Current European defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme                     | European country(s) involved        | Programme classification | Quantity          | Order date         | Delivery date | Type of programme | European companies involved                                                                | Comments                                                                                          |
|-------------------------------|-------------------------------------|--------------------------|-------------------|--------------------|---------------|-------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| ASTOR                         | United Kingdom                      | El                       | \$1,300m          | Dec 1999           |               | Teaming           | Bombardier Short Brothers (UK)<br>Motorola UK<br>Ultra Electronics (UK)<br>Marshall's (UK) |                                                                                                   |
| Phalanx CIWS support contract | Spain<br>United Kingdom             | SA/O                     |                   | Feb 2000           | Jan 2005      | FMS               |                                                                                            | Support contract for installed Phalanx systems                                                    |
| AGM-88 HARM                   | Germany                             | Mi                       | 250               | March 2000         |               | Teaming           | BGT (Germany)                                                                              | BGT provides local support                                                                        |
| AV-8B Harrier                 | Spain                               | Ac/El                    | 2 (+ option on 7) | May 2000           | 2003+         | FMS               | Boeing (US)<br>Rolls-Royce (UK)<br>BAE Systems (UK)                                        | Raytheon providing AN/APG-65 radar in programme to remanufacture to Harrier II Plus configuration |
| SM-2 Standard missile         | Spain<br>The Netherlands<br>Germany | Mi                       | 89                | May 2000           | Dec 2003      | FMS               |                                                                                            | Contract includes undisclosed number being sold to Japan                                          |
| F-16 MMC Phase III            | Belgium<br>Denmark<br>Norway        | El                       |                   | March 2000         | Dec 2004      | FMS               |                                                                                            |                                                                                                   |
| AV-8B Harrier                 | Spain                               | El                       | 2 (+ option on 7) | May 2000           | 2003+         | FMS               | Boeing (US)<br>Rolls-Royce (UK)<br>BAE Systems (UK)                                        | AN/APG-65 radar as part of remanufacturing to Harrier II Plus configuration                       |
| AIM-120 AMRAAM                | Greece                              | Mi                       | 560               | Requested May 2000 |               | FMS               | Offset requested                                                                           |                                                                                                   |

**Table 7.1: Raytheon - Current European defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme                               | European country(s) involved                                           | Programme classification | Quantity        | Order date          | Delivery date | Type of programme | European companies involved                                                  | Comments                                                                                                 |
|-----------------------------------------|------------------------------------------------------------------------|--------------------------|-----------------|---------------------|---------------|-------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| AIM-120 B/C                             | United Kingdom                                                         | Mi                       |                 | 2000                |               | FMS               |                                                                              | Interim until delivery of Meteor                                                                         |
| NASAMS                                  | Spain                                                                  | El/Mi                    | 4 worth \$82m   | July 2000           |               | Direct sale       | Teaming with Kongsberg Defence & Aerospace (Norway)                          | Raytheon supplying AN/MPQ-63D radar & AMRAAM as part of Norwegian Advanced Surface-to-Air Missile System |
| SM-2 Standard missiles                  | Italy                                                                  | Mi                       | 50 worth \$135m | Requested July 2000 |               | FMS               | 50% offset likely                                                            |                                                                                                          |
| RIM-116 Rolling Airframe Missiles (RAM) | Greece                                                                 | Mi                       | N/a             |                     |               |                   | Lead contractor RAMSYS (Germany)                                             |                                                                                                          |
| Harpoon                                 | Germany<br>Greece<br>Denmark<br>Netherlands<br>Spain<br>United Kingdom | Mi                       |                 | August 2000         |               | FMS               |                                                                              | Sale of spares                                                                                           |
| AN/APS-137B(V)5 radar                   | Netherlands                                                            | El                       | 11              | Sept 2000           | Dec 2002      | FMS               |                                                                              | For P-3 aircraft programme                                                                               |
| AGM-65G2 Maverick                       | United Kingdom                                                         | Mi                       | \$59.7m         | Sept 2000           |               | FMS               |                                                                              |                                                                                                          |
| CEC Phase I study                       | United Kingdom                                                         | El                       |                 | Oct 2000            |               | Direct sale       |                                                                              |                                                                                                          |
| Successor Identification Friend or Foe  | United Kingdom                                                         | El                       | \$148m          | Dec 2000            |               | Teaming           | GKN Westland Helicopters (UK)<br>Marshall Aerospace (UK)<br>BAE Systems (UK) |                                                                                                          |

**Table 7.1: Raytheon - Current European defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme            | European country(s) involved         | Programme classification | Quantity      | Order date | Delivery date | Type of programme   | European companies involved                                                                                         | Comments                                                                                   |
|----------------------|--------------------------------------|--------------------------|---------------|------------|---------------|---------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Enhanced Paveway III | United Kingdom                       | SA/O                     | \$33.2m       | Jan 2001   |               | FMS                 | Portsmouth Aviation Ltd (UK)<br>MBM technology (UK)<br>Thomson-Thorn Missile Electronics (France/UK)<br>SEI (Italy) |                                                                                            |
| Stinger              | United Kingdom<br>Greece<br>Italy    | Mi                       | Total of 1007 | Jan 2001   | Jan 2004      | FMS                 |                                                                                                                     |                                                                                            |
| Airbus A310 MRTT     | Germany                              | Ai                       | 4             | Jan 2001   |               | Teaming             | Airbus                                                                                                              | Multi-role tanker transport                                                                |
| Patriot PAC-3        | Germany<br>Greece<br>The Netherlands |                          |               |            |               |                     |                                                                                                                     | German version to be co-developed by LM_EADS jv<br><br>The Netherlands has requested PAC-3 |
| Stinger              | Germany                              | Mi                       |               |            |               | Licensed production | LFK/EADS (Germany)                                                                                                  |                                                                                            |
| UK Type 45 destroyer | United Kingdom                       | EI                       |               | March 2001 |               | Direct sale         |                                                                                                                     | Supplying integrated navigation system                                                     |

**Table 7.2: Raytheon - Potential future programmes**

| Programme                                     | European country(s) involved | Programme classification | Type of programme | European companies involved                                                                                                                                                                          | Comments                                                                                                        |
|-----------------------------------------------|------------------------------|--------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Future Strategic Tanker Aircraft              | United Kingdom               | Ai                       | Teaming           | BAE Systems/Airbus                                                                                                                                                                                   | 30-year contract worth \$13.5bn                                                                                 |
| NATO Theatre Ballistic Missile Defence (TBMD) | NATO                         | Mi                       | Teaming           | Thales Raytheon Systems (FR/US)<br>EADS (GER)<br>Hollandse Signaalapparaten (NL)<br>Dassault Aviation (FR)<br>Hunting Defence (UK)<br>Indra (SP)<br>BGT (GER)<br>Info data (Italy)<br>Elfon (Greece) |                                                                                                                 |
| Bowman                                        | United Kingdom               | El                       |                   |                                                                                                                                                                                                      | Nov 2000 - Raytheon did not receive invitation to tender but is offering its services on the \$2,500m programme |
| Cooperative Engagement Capability             | United Kingdom               | El                       | FMS               | Raytheon Systems Ltd (UK)                                                                                                                                                                            | Assessment Phase – bidding against Lockheed Martin                                                              |
| UK Future Aircraft Carrier (CVF)              | United Kingdom               | Sh                       | Teaming           | Thales (France)<br>BMT Defence Services (UK)<br>Lockheed Martin                                                                                                                                      | Programme assessment phase                                                                                      |

**Table 7.2: Raytheon - Potential future programmes (cont.)**

| Programme | European country(s) involved | Programme classification | Type of programme | European companies involved | Comments                                                                                        |
|-----------|------------------------------|--------------------------|-------------------|-----------------------------|-------------------------------------------------------------------------------------------------|
| SEA RAM   | United Kingdom               | Mi                       | Teaming           |                             | Private venture by Raytheon with UK Royal Navy as potential launch customer – currently testing |

**Table 7.3: Raytheon - European alliances, joint ventures and wholly-owned subsidiaries**

| Name                              | Type of relationship    | European partner(s)          | Sector | Comments                                                                                        |
|-----------------------------------|-------------------------|------------------------------|--------|-------------------------------------------------------------------------------------------------|
| Raytheon/Airbus                   | Strategic alliance      | Airbus                       | Ac;El  | Raytheon has an exclusive arrangement with Airbus to use its platforms for AEW & tankers        |
| Raytheon/BGT                      | Strategic alliance      | BGT (Germany)                | Mi     |                                                                                                 |
| ENOSA                             | Joint venture           | Indra Dtd (Spain) (51%)      | El; Mi | Spanish manufacturer of electro-optics, missiles & weapon control systems.                      |
| Indra-Raytheon                    | Joint venture           | Indra Sistemas (Spain) (51%) | El     | Spanish developer of ATC systems                                                                |
| Air Command Systems International | Joint venture           | Thales (France)              | El     | To provide Air Command & Control System Level of Capability 1 (ACCS LOC1) to NATO               |
| Thales Raytheon Systems Co        | Joint venture           | Thales (France)              | El     | Equally-owned joint venture focused on air defence command & control and ground-based radar     |
| ELCAN Optical Technologies        | Wholly-owned subsidiary | -----                        | El     | Spanish subsidiary                                                                              |
| Raytheon Anschultz                | Wholly-owned subsidiary | -----                        | El     | German-based manufacturer of integrated bridge navigation systems                               |
| Raytheon Microelectronics Espana  | Wholly-owned subsidiary | -----                        | El     | Spanish subsidiary                                                                              |
| Raytheon Systems Ltd              | Wholly-owned subsidiary | -----                        | El; Mi | Umbrella company for Raytheon operations in the UK, employing more than 1,000 people. Services. |

**Table 7.4: Raytheon - Acquisitions and divestments involving European companies**

| Year          | Transaction                     | European company involved        | Sector | Comment                                                                                                                                  |
|---------------|---------------------------------|----------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------|
| 1995          | Acquisition                     | Anschutz & Co (Germany)          | El     | Manufacturer of integrated bridge systems                                                                                                |
| December 1998 | Divestment of sonobuoy business | Ultra Electronics (Holdings) PLC | El     | Deal worth \$21.6. Ultra Electronics is a UK-based aerospace and defense electronics group with operations in the UK, Canada, and the US |

## 8. Litton Industries

Litton Industries has a number of European defence-related manufacturing facilities as well as established experience of international business activities in the defence field. Litton is positioned on European programmes through:

- Being designed-in to US systems that are then the subject of FMS
- As a supplier to European programmes through its European subsidiaries
- Some FMS of its own systems.

Litton's European activities come through its advanced electronics activities. Whilst its Ingalls shipyard has sought European orders it has had little success in this market to date.

### 8.1 Current European defence programmes (orders and deliveries 1998-2000)

Litton's participation in current European programmes is set out in Table 8.1 (pages 61-62):

- *EF2000 Eurofighter* – Litton estimates that each EF2000 Eurofighter contains Litton avionics worth around \$1 million. Much of this comes from programme participation by Litton's European subsidiaries LITEF and TELDIX.
- *Radar* – a UK subsidiary, Litton Marine Systems, has sold navigation radars to the UK and French navies.
- *Inertial navigation* – Litton's LN-100G inertial navigation system is used in the F/A-18 (Spain), SH-60B LAMPS helicopters (Spain and Greece), Tomahawk cruise missile (UK), Sweden's Puma helicopter, UK Sea Harriers, Spanish C-130s and is being used in the Tornado upgrade for Germany, United Kingdom and Italy. Spain has purchased Litton's AN/WSN-7 ring laser gyros.
- *Electronic warfare* – AN/ALR-67B(V)2 countermeasures receivers are installed in the Spanish F/A-18s, AN/APR 39A(VE)(V)3 radar warning receivers have been sold to Norway and Litton is working with EADS/DASA (Germany) to supply radar warning receivers to the German Tornado upgrades.
- *Litton Ingalls* – is the prime contractor for two Dutch-designed diesel electric submarines for the Egyptian Navy that are being produced with the collaboration of Dutch company RDM Submarines.

### 8.2 Potential future programmes

The databases and other sources that we used revealed rather few potential future programmes for Litton. These are set out in Table 8.2 (page 63) but are likely to understate the extent of Litton's forward sales given that many of those sales are related to the sale of platforms by other US companies through the FMS programme. Important future programmes include:

- *The UK's Battle Group Thermal Imaging programme* where Litton is seeking to supply its thermal imaging equipment in a team led by the UK's Hunting Engineering.
- *IRIS-T missile system* – Litton Italia is acting as a subcontractor to prime contractor BGT on this air-to-air missile programme.

- *On-going efforts by Litton Ingalls* to supply combatants to European customers (as well as customers in the Middle east and Pacific Rim). Ingalls' family of international combatant ship designs includes a 203-foot Multimission Missile Boat, a 203-foot Customs Patrol Ship, a 279-foot Customs Patrol Ship, a 279-foot Corvette, a 420-foot Frigate, and a 492-foot Multipurpose Amphibious Ship.

### ***8.3 European alliances, joint ventures and wholly-owned subsidiaries***

Through wholly-owned subsidiaries, Litton has a manufacturing presence in Germany, Italy and the UK. LITEF (Germany) and LITAL (Italy) are long established companies created as part of offset deals more than 30 years ago. In addition, German wholly-owned subsidiary TELDIX manufactures head-up displays and computer systems for military aircraft (including Tornado and Eurofighter) as well as space systems. Litton Marine Systems (UK) manufactures radar and marine electronic equipment company.

### ***8.4 Acquisitions and divestments involving European companies***

Litton has made a number of European Litton acquired the German company TELDIX in 1996 that manufactures head-up displays and computer systems for military aircraft (including Tornado and Eurofighter) as well as space systems. Similarly, in 1997 Litton acquired Racal Marine a UK radar and marine electronic equipment company and TEC Electrical Components in 1999.

Litton also sold a semiconductor business to Filtronic of the UK.

**Table 8.1: Litton - Current European defence programmes (orders and deliveries 1998-2000)**

| Programme                                  | European country(s) involved                          | Programme classification | Quantity    | Order date | Delivery date                                                     | Type of programme | European companies involved | Comments                                                                                          |
|--------------------------------------------|-------------------------------------------------------|--------------------------|-------------|------------|-------------------------------------------------------------------|-------------------|-----------------------------|---------------------------------------------------------------------------------------------------|
| Eurofighter                                | United Kingdom<br>Germany<br>Italy<br>Spain(?)<br>??? | Ai                       | Direct sale |            | Value of Litton avionics estimated to be \$1 million per aircraft |                   |                             |                                                                                                   |
| Tornado upgrade                            | Germany<br>United Kingdom<br>Italy                    | EI                       | \$500m      | 1997       | 1999+                                                             | Direct sale       | LITEF (GER)                 | LITEF using Litton's LN-100G navigation system supplied by Litton Guidance & Control Systems (US) |
| Tornado upgrade                            | Germany                                               | Ai/EI                    | \$50-100m   | 1997       | Order still pending                                               | Direct sale       | EADS/DASA (GER)             | Litton Applied Technology (US) working with DASA to supply radar warning system                   |
| AN/APR-39A(VE)(V)3 radar warning receivers | Norway                                                | EI                       | \$3m        | 1997       | 1998+                                                             | Direct sale       |                             | Upgrade to existing system on Bell 412 helicopters                                                |
| F/A-18                                     | Spain                                                 | EI                       |             | Nov 1997   | 1998+                                                             | FMS               |                             | AN/ALR-67B(V)2 countermeasures receiving sets                                                     |
| Norwegian Hellfire Shore Defense System    | Norway                                                | EI                       | \$12m       | Dec 1997   | Dec 1998                                                          | Direct sale       |                             | Upgrade to established system                                                                     |

**Table 8.1: Litton - Current European defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme                           | European country(s) involved                   | Programme classification | Quantity        | Order date          | Delivery date | Type of programme | European companies involved                                                          | Comments                                                                                                                                         |
|-------------------------------------|------------------------------------------------|--------------------------|-----------------|---------------------|---------------|-------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| AN/WSN-7 Ring Laser Gyro Navigators | Spain                                          | El                       | \$15.6m         | Feb 1998            |               | FMS               |                                                                                      |                                                                                                                                                  |
| IRIS-T development contract         | Germany<br>Italy<br>Greece<br>Norway<br>Sweden | Mi                       | \$284.2m        | May 1998            | Nov 2002      | Subcontractor     | BGT (Germany)<br>Raufoss (NO)<br>Saab Dynamics (SW)<br>Fiat Avio (IT)<br>Pyrkal (GR) | Litton Italia acting as subcontractor to BGT                                                                                                     |
| BridgeMaster navigation radars      | France                                         | El                       | \$2.2m          | April 1999          | 2002          | Direct sale       |                                                                                      | 42 French Navy ships being retrofitted by Litton Marine Systems (UK)                                                                             |
| AN/PVS-7B night vision goggles      | Greece                                         | El                       | N/a             | May 1999            |               | FMS               |                                                                                      |                                                                                                                                                  |
| BridgeMaster navigation radars      | United Kingdom                                 | El                       |                 | March 2000          | June 2000     |                   | Litton Marine Systems (UK)                                                           | Systems for 19 Royal Navy & British Army ships                                                                                                   |
| SM-2 Standard missiles              | Italy                                          | Mi                       | 50 worth \$135m | Requested July 2000 |               | FMS               | 50% offset likely                                                                    | Litton Marine Systems (US)                                                                                                                       |
| Future Escort R&D programme         | United Kingdom                                 | El                       | \$21.3m         | Jan 2001            |               |                   | Litton Marine Systems (UK)                                                           | Prototype three-hulled warship being produced by Vosper Thornycroft (UK) – LMS has total systems responsibility for vessel's electronics package |
| Type 45 destroyers                  | United Kingdom                                 | El                       |                 | March 2001          |               |                   | Litton Marine Systems (UK)                                                           | Platform Management System                                                                                                                       |
| Tiger helicopter                    |                                                | El                       |                 |                     |               |                   | LITEF                                                                                |                                                                                                                                                  |

**Table 8.2: Litton - Potential future programmes**

| Programme                       | European country(s) involved                   | Programme classification | Type of programme | European companies involved                                                          | Comments                                                           |
|---------------------------------|------------------------------------------------|--------------------------|-------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| UK Battle Group Thermal Imaging | United Kingdom                                 | El                       |                   | Hunting Engineering (UK)<br>BAE Systems (UK)<br>GIAT Industries (FR)                 | Litton Technische GmbH (LITEF)<br>member of Hunting's "Team Viper" |
| IRIS-T missile                  | Germany<br>Italy<br>Greece<br>Norway<br>Sweden | Mi                       | Subcontractor     | BGT (Germany)<br>Raufoss (NO)<br>Saab Dynamics (SW)<br>Fiat Avio (IT)<br>Pyrkal (GR) | Litton Italia acting as subcontractor to BGT                       |

**Table 8.3: Litton - European alliances, joint ventures and wholly-owned subsidiaries**

| Name                                          | Type of relationship    | European partner(s) | Sector | Comments                                                                                                                          |
|-----------------------------------------------|-------------------------|---------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------|
| Dutch Moray-class submarine for Egyptian Navy | Alliance                | RDM Submarines (NL) | Sh     | Ingalls prime contractor for two Dutch-designed diesel-electric submarines for Egyptian Navy worth \$750m. Order began Oct 2000.  |
| LITEF                                         | Wholly-owned subsidiary |                     | El     | German company manufacturing airborne, marine & land navigation systems. Contracts include TIGER helo, F-4, Tornado & Eurofighter |
| TELDIX                                        | Wholly-owned subsidiary |                     | El     | German company manufacturing avionics & navigation systems. Contracts include Eurofighter                                         |
| LITAL                                         | Wholly-owned subsidiary |                     | El     | Italian company                                                                                                                   |
| Litton Marine Systems                         | Wholly-owned subsidiary |                     | El     | UK manufacturer of radar & marine electronic equipment                                                                            |
| C Plath                                       | Wholly-owned subsidiary |                     | El     | German supplier of maritime steering & navigation systems                                                                         |

**Table 8.4: Litton - Acquisitions and divestment involving European companies**

| Year          | Transaction | European company involved                 | Sector | Comment                                                                                                                                                                    |
|---------------|-------------|-------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| February 1996 | Acquisition | Teldix (Germany)                          | El     | Acquisition for an undisclosed sum of German manufacturer of avionics & navigation systems.                                                                                |
| March 1997    | Acquisition | Racal Marine                              | El     | \$49m acquisition of UK manufacturer of radar and navigation systems.                                                                                                      |
| August 1998   | Divestment  | Filtronic PLC (UK)                        | El     | \$43m disposal of manufacturer of semiconductors used in commercial wireless communications systems, automotive electronics, and in military and commercial space systems. |
| October 1999  | Acquisition | TEC Electrical Components Group Ltd. (UK) | El     | \$8.6m acquisition of manufacturer and supplier of electrical connectors to the military, aerospace and commercial industries.                                             |

## 9. Northrop Grumman

Northrop Grumman has established itself in the European defence market through Foreign Military Sales and wholly-owned subsidiaries. The company is seeking to expand that presence and its growing alliance with EADS is worthy of particular note.

### 9.1 Current European defence programmes (orders and deliveries 1998-2000)

Northrop-Grumman's participation in current European programmes is set out in Table 9.1 (pages 68-69). Noteworthy programmes include:

- *Military aircraft* – Northrop Grumman has supplied E2-C Hawkeyes to France and – as a major subcontractor – benefited from the sales of the F/A-18 to Spain and the lease of C-17s to the United Kingdom.
- *Electronic warfare* – Northrop Grumman is supplying the AN/ALQ-131 system to Norway as part of the upgrade of its F-16 aircraft.
- *Fire control systems* – Longbow FCR to the UK and the Netherlands as part of the sale of the AH-64 Apache. ATACMS to Greece.
- *Sensors* – Northrop Grumman supplies the AN/AAR-54(V) radar for the German C-160 transport aircraft.
- *Marine* – teamed with Rolls-Royce, Northrop Grumman is developing and supplying the WR-21 gas turbine for the UK Royal Navy's Type-45 destroyer programme.

### 9.2 Potential future programmes

Northrop Grumman has an interest in a number of potential future programmes and these are listed in Table 9.2 (pages 70-71). In particular, it is worth noting:

- *Military aircraft/UAVs* – The Joint Strike Fighter is an important programme for Northrop Grumman as a member of the Lockheed Martin team. In addition, Northrop Grumman is potentially strong placed to benefit from future European UAV programmes. The UK Watchtower UAV programme is currently in the assessment phase and Northrop Grumman is teamed with UK companies Smiths Industries and Ultra Electronics for this programme. Also, Northrop Grumman is supplying synthetic aperture radars for the Italian Predator requirement. Northrop Grumman has also positioned itself for future European and NATO requirements through a Memorandum of Understanding signed with EADS in July 2000 to cooperate on HALE UAV development.
- *Sensors* – Northrop Grumman has teamed with EADS to bid for the NATO Alliance Ground Surveillance requirement and to offer Northrop Grumman's AN/APN-241E weather and navigation radar for the Airbus A400-M. Northrop Grumman is also teamed with Raytheon on the Multi-Platform Radar Technology Insertion programme being offered for the NATO Transatlantic Advanced Radar platform. In addition, Northrop Grumman is teamed with Lockheed Martin and a number of European companies on the Sonar 2087 for the UK Royal Navy's Type 23 frigate. Babcock Defence Systems is the prime on this programme.
- *Marine* – the WR-21 marine gas turbine being co-developed by Northrop Grumman and Rolls-Royce (UK) with DCN (France) as a marketing partner

has been selected for the UK Royal Navy's Type 45 destroyer programme and has the potential for sales to the French Navy and US Navy.

### **9.3 European alliances, joint ventures and wholly-owned subsidiaries**

Northrop Grumman's footprint in Europe is described in Table 9.3 (page 72) and the emerging relationship between Northrop Grumman and EADS is worthy of particular note.

#### **Strategic alliances with EADS**

2000 saw the evolution of Northrop Grumman's position in Europe towards an emerging relationship with EADS. The relationship has evolved out of long standing business linkages DASA of Germany (a part of the new EADS). In 2000, Northrop Grumman and EADS announced two strategic alliances. In July 2000, they signed a Memorandum of Understanding to cooperate on the high altitude long-endurance unmanned aerial vehicle (HALE UAV) and, in a separate agreement, they have established a strategic relationship to offer Northrop Grumman's AN/APN-241 weather and navigation radar for the Airbus A400M military transport aircraft programme. In addition, the two companies are working together to promote Northrop Grumman's Platform Radar Technology Insertion Programme (RTIP) for the NATO Air Ground Surveillance programme.

#### **Wholly-owned subsidiaries**

Whilst we were unable to identify any joint ventures, Northrop Grumman does have a number of wholly-owned subsidiaries including UK-based Northrop Electronics Systems International which is responsible for the DIRCM programme in the UK, two companies in the air traffic control equipment sector (Navia Aviation of Norway and Park Air Electronics in the UK) and INRI UK, a subsidiary that develops C4I software originating in the US.

### **9.4 Acquisitions and divestments involving European companies**

Table 9.4 (page 73) notes that Northrop Grumman made two European acquisitions in 2000. The acquisition of Navia Aviation in Norway broadened the company's position in commercial and military ATC systems and the acquisition of Alvis Logistics (UK) complemented Northrop Grumman's existing capabilities in explosive ordnance handling and disposal.

We identified one divestment of a Northrop Grumman business to a European company. In 1995, Northrop Grumman sold certain gyro manufacturing operations to Meggitt of the UK.

**Table 9.1: Northrop Grumman - Current European defence programmes (orders and deliveries 1998-2000)**

| Programme                                 | European country(s) involved | Programme classification | Quantity      | Order date | Delivery date | Type of programme | European companies involved       | Comments                                                                        |
|-------------------------------------------|------------------------------|--------------------------|---------------|------------|---------------|-------------------|-----------------------------------|---------------------------------------------------------------------------------|
| AN/AAQ-24(V) DIRCM                        | United Kingdom               | El                       | \$271 million | 1995       | 1997+         | Teaming           | BAE Systems                       | Directed Infrared Countermeasures system installed on ten different UK aircraft |
| ATACMS                                    | Greece                       | Mi                       | 81            | 1996       | 1998          | FMS               |                                   | With Lockheed Martin                                                            |
| E2-C                                      | France                       | Ai/El                    | 3             | 1994       | 1999          | FMS               | Potez (France)<br>Thales (France) | For use on Charles De Gaulle nuclear powered aircraft carrier                   |
| Longbow FCR                               | United Kingdom               | El                       |               | 1998       | 2002          | Teaming           | BAE Systems (UK)                  | For British Army's Apache attack helicopters                                    |
| C4I technical support to Italian Navy     | Italy                        | Oth                      |               | Sept 1998  | Sept 1999     | FMS               |                                   | Logicon Tactical Systems                                                        |
| Submarine Acoustic Warfare Control System | United Kingdom               | El                       | \$15.4m       | March 1999 |               | Subcontractor     | Alenia Marconi Systems            | Subsystem supplier                                                              |
| AN/ALQ-131 ECM system                     | Norway                       | El                       | 16            | May 1999   | May 2001      | FMS               |                                   | Upgrade to Block II                                                             |
| AEGIS software                            | Spain                        | El                       |               | Sep 1999   | Sep 2000      | FMS               |                                   | Test & evaluation of AEGIS combat system & software                             |

**Table 9.1: Northrop Grumman - Current European defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme                | European country(s) involved | Programme classification | Quantity                | Order date         | Delivery date | Type of programme | European companies involved | Comments                                                         |
|--------------------------|------------------------------|--------------------------|-------------------------|--------------------|---------------|-------------------|-----------------------------|------------------------------------------------------------------|
| APG-78 Longbow FCR       | Netherlands                  | El                       | 30 worth \$225m         | Requested Nov 1999 |               | FMS               |                             |                                                                  |
| AN/ALQ-162 ECM system    | Denmark<br>Norway            | El                       | 4 units<br>29 units     | May 2000           |               | FMS               |                             |                                                                  |
| C-160 transport aircraft | Germany                      | El                       |                         | July 2000          | March 2001    | Supplier          |                             | AN/AAR-54(V) radar selected                                      |
| AV-8B                    | Italy<br>Spain               | El                       | 4<br>2                  | July 2000          |               | Supplier          |                             | Litening II targeting pods                                       |
| Trident D5               | United Kingdom               | Mi                       | \$45.4m                 | Dec 2000           | April 2003    | Supplier          |                             | Back fit support for launcher subsystem for Royal Navy & US Navy |
| Type-45 destroyer        | United Kingdom               | Sh                       | 12 engines for \$121.7m | March 2001         |               | Co-development    | Rolls-Royce                 | WR-21 advanced cycle gas turbine                                 |

**Table 9.2: Northrop Grumman - Potential future programmes**

| Programme                                     | European country(s) involved                                                                                        | Programme classification | Type of programme                      | European companies involved                                                                                                              | Comments                                                                                        |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Joint Strike Fighter                          | United Kingdom (full partner)<br>Denmark, Norway, The Netherlands (associated partners)<br>Italy (informal partner) | Ai                       | Co-development                         | BAE Systems (UK)<br>Rolls-Royce (UK)<br>Fokker (Netherlands)<br>Airbus Industrie (Europe)<br>National Aerospace Laboratory (Netherlands) | Concept demonstrator<br>Northrop Grumman is part of the Lockheed Martin team                    |
| NATO Theatre Ballistic Missile Defence (TBMD) | NATO                                                                                                                | Mi                       |                                        | EADS Missiles (FR)<br>EADS Defence Electronics (GER)<br>Alenia Aerospazio (IT)                                                           | Consortium established to bid for one of two feasibility studies expected to be let in May 2001 |
| Predator                                      | Italy                                                                                                               | Ac/EI                    | Sub-contractor to General Atomics (US) | Meteor (Italy)                                                                                                                           | AN/ZPQ-1 synthetic aperture radar for 6 UAVs.                                                   |
| UK Watchtower UAV                             | United Kingdom                                                                                                      | Ai/EI                    | Teaming                                | Smiths Industries (UK)<br>Ultra Electronics (UK)                                                                                         | Assessment phase began 2000                                                                     |
| NATO Alliance Ground Surveillance             | NATO                                                                                                                | Ai/EI                    | Teaming                                | EADS                                                                                                                                     | Agreement to cooperate on integration of Airbus aircraft with Northrop Grumman's RTIP           |

**Table 9.2: Northrop Grumman - Potential future programmes (cont.)**

| Programme                                  | European country(s) involved                                                           | Programme classification | Type of programme          | European companies involved                                                                                                                       | Comments                                                                                                                                                           |
|--------------------------------------------|----------------------------------------------------------------------------------------|--------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NATO Transatlantic Advanced Radar Platform | NATO                                                                                   | EI                       | Teaming                    |                                                                                                                                                   | Multi-Platform Radar Technology Insertion program (teamed with Raytheon) being offered for NATAR                                                                   |
| Sonar 2087                                 | United Kingdom                                                                         | EI                       | Teaming                    | Babcock Defence Systems (UK prime)<br>Cogent (UK)<br>BMT (UK)<br>STN Atlas Elektronik (Germany)<br>Ultra Electronics (UK)<br>Lockheed Martin (US) | ASW system for British Royal Navy's Type 23 frigate (currently at assessment phase).                                                                               |
| WR-21                                      | France<br>United Kingdom                                                               | Eng                      | Co-development             | Rolls-Royce<br>DCN                                                                                                                                | Intercooled recuperated marine gas turbine being developed for US Navy, British Royal Navy & French Navy                                                           |
| AN/APN-241E for Airbus A400-M              | France<br>Germany<br>United Kingdom<br>Italy<br>Turkey<br>Spain<br>Belgium<br>Portugal | EI                       | Co-development & licensing | EADS                                                                                                                                              | A Memorandum of Understanding was signed by the companies in 2000 for the production and support of the Northrop Grumman AN/APN-241E weather and navigation radar. |

**Table 9.3: Northrop Grumman - European alliances, joint ventures and wholly-owned subsidiaries**

| Name                                                             | Type of relationship    | European partner(s) | Sector | Comments                                                                                                                                           |
|------------------------------------------------------------------|-------------------------|---------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| High-altitude, long-endurance unmanned aerial vehicle (HALE UAV) | Strategic alliance      | EADS                | Ai/EI  | Memorandum of Understanding to cooperate on HALE UAV signed July 2000                                                                              |
| AN/APN-241 weather and navigation radar project                  | Strategic alliance      | EADS                | EI     | Will be offered for the A400M military transport aircraft                                                                                          |
| Alvis Logistics                                                  | Wholly-owned subsidiary |                     | Oth    | UK-based explosive ordnance disposal business of Alvis Plc acquired in 2000                                                                        |
| INRI UK Ltd                                                      | Wholly-owned subsidiary |                     | EI     |                                                                                                                                                    |
| Park Air Electronics Ltd                                         | Wholly-owned subsidiary |                     | EI     | Supplier of air traffic control systems for commercial aviation                                                                                    |
| Navia Aviation AS (Norway)                                       | Wholly-owned subsidiary |                     | EI     | Supplier of instrument landing systems, digital voice switching systems and air traffic control systems for commercial aviation                    |
| Northrop Electronics Systems International Inc.                  | Wholly-owned subsidiary |                     | EI     | The entity responsible for performing the AN/AAQ-24(V) directed infrared countermeasures (DIRCM) program in Britain.                               |
| INRI UK Ltd                                                      | Wholly-owned subsidiary |                     | EI     | Established in 1992, the company develops COTS C4I systems based on software and software architectures developed in the US by its parent company. |

**Table 9.4: Northrop Grumman - Acquisitions and divestment involving European companies**

| Year          | Transaction | European company involved  | Sector | Comment                                                                                                                                                                           |
|---------------|-------------|----------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| December 1995 | Divestment  | Meggitt Holdings PLC       | Oth    | Divestment of the micro-machined silicon accelerometer and micro-machined accelerometer gyro manufacturing operations of Northrop Grumman Corp.                                   |
| 2000          | Acquisition | Alvis Logistics Ltd (UK)   | Oth    | Acquisition of UK-based explosive ordnance disposal business of Alvis Plc for approximately \$2.2 million (US).                                                                   |
| 2000          | Acquisition | Navia Aviation AS (Norway) | El     | Acquisition for US\$35 million of Norwegian-based supplier of instrument landing systems, digital voice switching systems and air traffic control systems for commercial aviation |

## 10. Textron

Textron has a very limited exposure to the European defence market. Historically, Bell Helicopter has made major sales of military helicopters to Europe. However, we could find no records of new orders or deliveries during the 1998-2000 study period although there are likely to have been sales of spares and engineering support during the period and Bell Helicopter also bid – unsuccessfully – on two major programmes in the recent past.<sup>34</sup> Bell Helicopter and other Textron businesses are bidding on a number of forthcoming potential European programmes.

### 10.1 Current European defence programmes (orders and deliveries 1998-2000)

Table 10.1 (page 76) shows that Textron had a very limited exposure to the European defence market during the study period:

- Through its UK-based wholly-owned subsidiary *David Brown Defence Equipment (DBDE)*, Textron has responsibility for all British tracked armoured vehicle transmissions except the Perkins Engines X-300-5 series made for the GKN Defence Warrior and Swedish CV 90 series vehicles. DBDE is the builder of the TN54 transmission for the Challenger 2 main battle tank and the Challenger Armoured Repair and Recovery Vehicle.
- *Textron's sale of mobile microwave landing systems to Italy* is the only European contract identified for the study period.
- To the best of our knowledge, *Bell Helicopter* had no new orders or deliveries during the study period. Bell Helicopter competed for the Nordic Standard Helicopter programme but was unsuccessful during the down-select. Similarly, Bell Helicopter bid for the UK's attack helicopter programme teamed with the then GEC Marconi (UK): offering AH-1 "Cobra Venom" gunship, featuring four-bladed AH-1 upgrade by Bell, with avionics upgrade by GEC. That programme was won by a team of (then) McDonnell Douglas Helicopter Systems (now Boeing) and GKN Westland Helicopters Ltd. (now Agusta Westland) offering the AH-64D Apache attack helicopter.

### 10.2 Potential future programmes

Table 10.2 (page 77) identifies a number of potential future European programmes where Textron has an interest. These include:

- *Helicopters* – Bell Boeing is offering the V-22 Osprey to meet the UK Royal Navy and Air Force requirement for a replacement for more than 100 helicopters. Bell Boeing appears likely to offer licensed production of the V-22 teamed with either BAE Systems or Agusta Westland.
- *UAVs* – Bell is teamed with BAE Systems, General Atomics and Flight Refuelling in a bid for the UK's Watchtower UAV based on Bell Textron's Eagle Eye UAV.
- *Munitions* – Textron's XM93 Wide Area Munition is expected to win the UK competition for an Area Defence Weapon.

<sup>34</sup> Whilst Bell Helicopter may have had little success in the European countries we have studied, it ought to be noted that its AH-1Z King Cobra was selected by Turkey. The programme – for 145 helicopters – has been valued at \$4 billion, although the weakening Turkish economy means that there is speculation that the programme may be scaled back.

- *Through its UK subsidiary DBDE* – Textron is a supplier of transmissions for the Challenger IIE being offered by Vickers Defence in the Greek main battle tank competition.

### ***10.3 European alliances, joint ventures and wholly-owned subsidiaries***

Table 10.3 (page 78) shows that Textron has a limited European footprint. The wholly-owned subsidiary David Brown Defence Equipment gives Textron an important interest on almost all UK tracked vehicles as a supplier of transmissions. Bell Helicopters joint venture with Agusta Westland – Bell Agusta Helicopter Co. is developing and marketing the Bell Boeing V-22 for European markets.

### ***10.4 Acquisitions and divestments involving European companies***

Textron's 1998 acquisition of David Brown Group of the UK included David Brown Defence Equipment and this – as has been noted – has given Textron an interest in UK tracked vehicle production.

**Table 10.1: Textron - Current European defence programmes (orders and deliveries 1998-2000)**

| Programme                        | European country(s) involved             | Programme classification | Quantity | Order date | Delivery date | Type of programme | European companies involved | Comments                                                      |
|----------------------------------|------------------------------------------|--------------------------|----------|------------|---------------|-------------------|-----------------------------|---------------------------------------------------------------|
| Mobile Microwave Landing Systems | Italy                                    | EI                       | 5        | 1998       | 1999          | Direct sale       |                             |                                                               |
| Challenger II main battle tank   | United Kingdom & exports to Saudi Arabia | MV                       | 386      | 1993       | 1998          | Supplier          |                             | Transmissions produced by Textron's UK-based DBDE subsidiary. |

**Table 10.2: Textron - Potential future programmes**

| Programme                                       | European country(s) involved | Programme classification | Type of programme    | European companies involved                                        | Comments                                                                                             |
|-------------------------------------------------|------------------------------|--------------------------|----------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Area Defence Weapon                             | United Kingdom               | SA/O                     | Teaming              | BAE Systems Royal Ordnance (UK)<br>Hunting Engineering Ltd (UK)    | Competitive Evaluation Phase offering Textron's XM93 Wide Area Munition (Hornet),                    |
| Watchtower UAV                                  | United Kingdom               | Ai/EI                    | Teaming              | BAE Systems (UK)<br>General Atomics (US)<br>Flight Refuelling (UK) | Assessment phase began 2000 – bid based on Bell Textron's Eagle Eye UAV                              |
| UK Support, Amphibious & Battlefield Rotorcraft | United Kingdom               | Hel                      | Licensed production? | BAE Systems or Augusta Westland?                                   | Offering V-22 Osprey as replacement of more than 100 helicopters for UK Royal Navy & Royal Air Force |
| Greek main battle tank                          | Greece                       | MV                       | Supplier             | Vickers Defence Systems (UK)                                       | Textron UK-based subsidiary DBDE supplier of transmissions for Challenger IIE                        |

**Table 10.3: Textron - European alliances, joint ventures and wholly-owned subsidiaries**

| Name                                 | Type of relationship    | European partner(s)        | Sector | Comments                                                                                                                                                                                                                                                    |
|--------------------------------------|-------------------------|----------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bell Agusta Aircraft Company         | Joint venture           | Agusta Westland (UK/Italy) | Hel    | To develop & market Bell Agusta BA609 Tilt Rotor and Bell Boeing V-22                                                                                                                                                                                       |
| David Brown Defence Equipment (DBDE) | Wholly-owned subsidiary |                            | MV     | UK-based business producing transmissions for tracked armoured vehicles, final drives, test drives, gears and gear-related products, test rigs, and test equipment. The company also performs overhaul and upgrade work on transmissions and drive systems. |

**Table 10.4: Textron - Acquisitions and divestments involving European companies**

| Year         | Transaction | European company involved  | Sector | Comment                                                                                                                                     |
|--------------|-------------|----------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------|
| October 1998 | Acquisition | David Brown Group plc (UK) | MV     | Deal worth \$326 million (£233 million), plus the assumption of debt. Included in the acquisition was David Brown Defence Equipment (DBDE). |

## **11. General Electric**

General Electric has a strong position in the European market through a combination of FMS sales, direct participation in certain European programmes and a major joint venture - CFM International – that produces turbofan engines for narrow body commercial air transports and some military aircraft.

### **11.1 Current European defence programmes (orders and deliveries 1998-2000)**

Table 11.1 (page 81) shows that General Electric has a strong position in the European market both as a consequence of being designed-in to US aircraft subsequently sold to Europe and also through the co-development of engines with European partners:

- *Foreign Military Sales* – General Electric has benefited from the sale of F-16s, the F/A-18 to Spain and SH-70B Seahawks to Spain and Greece.
- *Co-development* – General Electric has successfully collaborated in the co-development of engines for European programmes. GE co-developed the RM12 engine for the Saab/BAE Systems Gripen in collaboration with Sweden's Volvo Aero and based on GE F404 engine. GE has collaborate with Fiat Avio in the co-development of a variant of the T700-GE-701C that will power the Italian Navy's NH-90 helicopters. The C-27J transport aircraft being developed by the Lockheed Martin Alenia Tactical Transport Systems is also powered by a GE engine.

### **11.2 Potential future programmes**

Table 11.2 (page 82) notes that General Electric has an interest in a number of potential future programmes.

- GE is collaborating with Rolls-Royce to produce the F120 engine for the Joint Strike Fighter.
- CFM International is bidding for the contract to re-engine NATO's E3A Sentry aircraft.
- CFM International's CF6-80C2 is one of the engines available to power the Airbus Multi Role Tanker Transport aircraft.

### **11.3 European alliances, joint ventures and wholly-owned subsidiaries**

CFM International is a major joint venture between General Electric and Snecma of France that produces turbofan engines for narrow body commercial air transports and some military aircraft. General Electric is also collaborating with Rolls-Royce to produce the F120 engine for the JSF. GE has a 60% share of the programme and Rolls-Royce a 40% share (split between Allison Engine Co. and Rolls-Royce Military Aero Engines, UK).

#### ***11.4 Acquisitions and divestments involving European companies***

General Electric has been involved in no acquisitions and divestments involving European companies at least in the last ten years.

**Table 11.1: General Electric - Current European defence programmes (orders and deliveries 1998-2000)**

| Programme       | European country(s) involved | Programme classification | Quantity                                   | Order date          | Delivery date | Type of programme      | European companies involved | Comments                                                                 |
|-----------------|------------------------------|--------------------------|--------------------------------------------|---------------------|---------------|------------------------|-----------------------------|--------------------------------------------------------------------------|
| F-16            |                              |                          |                                            |                     |               |                        |                             | F110-GE-129                                                              |
| AH-64A Apache   | Greece                       | Hel/Eng                  | 8 engines                                  | Requested June 1999 |               | FMS                    |                             | T-700-GE-701 engines                                                     |
| F/A-18          | Spain                        | Ai/Eng                   |                                            |                     |               | FMS                    |                             | F414-GE-400                                                              |
| BAE/Saab Gripen | Sweden                       | Ai/Eng                   |                                            |                     |               | Co-development         | Volvo Aero (Sweden)         | RM12engine supplied by Volvo Aero is a development of the GE F404 engine |
| NH-90           | Italy                        | Hel/Eng                  | 196 helicopters ordered in \$300m contract | June 2000           | 2004          | Co-development         | Fiat Avio                   | For Italian Naval Aviation's planned fleet of 196 NH-90 helicopters      |
| SH-70B Seahawk  | Spain                        | Hel/Eng                  | Contract for 6 helicopters                 |                     |               | FMS                    |                             | T700-GE- 701C engines                                                    |
| SH-70B Seahawk  | Greece                       | Hel/Eng                  | Contract for 2 helicopters                 |                     |               | Direct commercial sale |                             | T700-GE- 701C engines                                                    |

**Table 11.2: General Electric - Potential future programmes**

| Programme             | European country(s) involved | Programme classification | Type of programme | European companies involved | Comments                                                 |
|-----------------------|------------------------------|--------------------------|-------------------|-----------------------------|----------------------------------------------------------|
| JSF                   |                              |                          |                   | Rolls-Royce                 | GE collaborating with Rolls-Royce to produce F120 engine |
| NATO E3A re-engining  | NATO                         | Eng                      |                   | SNECMA (FR)                 | Bid by CFM International (GE-SNECMA joint venture)       |
| Airbus Industrie MRTT |                              |                          |                   |                             | powered by either General Electric CF6-80C2              |

**Table 11.3: General Electric - European alliances, joint ventures and wholly-owned subsidiaries**

| Name              | Type of relationship | European partner(s) | Sector | Comments                                                                                        |
|-------------------|----------------------|---------------------|--------|-------------------------------------------------------------------------------------------------|
| CFM-International | Joint venture        | SNECMA (France)     | Eng    | producing turbofan engines for narrow body commercial air transports and some military aircraft |

## **12. Newport News Shipbuilding**

Newport News remains almost entirely focused on its US Navy business. To our knowledge, it has no European contracts nor does it appear to be bidding for European contracts although it is competing for the Turkish Navy's \$2 billion plan for co-production of six frigates and is offering its FF-21. The only point of contact between Newport News and the European defence industry appears to be French company CMN's 20% holding in Newport News' operation in Abu Dhabi.

Conceivably, Newport News could bid its FF-21 for European programmes and – if its acquisition by General Dynamics announced in April 2001 were to go ahead – it could conceivably join Bath Iron Works in the AFCON consortium. However, this is purely speculation on our part.

### **13. United Technologies (Pratt & Whitney, Sikorsky)**

United Technologies is positioned on European defence programmes through the activities of Pratt & Whitney, Sikorsky and also its Sundstrand subsidiary. Whilst GE may have succeeded in co-developing engines with European partners, Pratt & Whitney's European sales have been through FMS involving US military aircraft. Sikorsky has successfully sold its SH-70B Seahawk to Spain and Greece in recent years and has been short-listed for the major Nordic Standard Helicopter Programme. Together with potential future programmes involving Pratt & Whitney, such developments have the potential to increase United Technologies' position in Europe.

#### **13.1 Current European defence programmes (orders and deliveries 1998-2000)**

Table 13.1 (page 87) illustrates current European defence programmes in which United Technologies has an interest. These include:

- *Pratt & Whitney* - Pratt & Whitney's position in the European defence market is based on FMS contracts for US aircraft. Thus, Pratt & Whitney engines power some European F-16s and in June 2000 were selected by Greece as part of its F-16C/D order. Pratt & Whitney F117 engines power the C-17 aircraft that are to be leased to the United Kingdom.
- *Sikorsky* – has successfully sold SH-60B Seahawks to Spain and Greece.
- *Hamilton Standard/Sundstrand* – this subsidiary of United Technologies has a position on various European aircraft programmes – including the Saab/BAE Systems Gripen – and its Ratier-Figeac subsidiary in France supplies the Eurocopter Super Puma and Tiger helicopters as well as Airbus and Rolls-Royce.

#### **13.2 Potential future programmes**

United Technologies has an interest in a number of potential forthcoming programmes and these are listed in Table 13.2 (pages 88-89). Significant programmes include:

- *Pratt & Whitney* – developing the JSF119 engine for the Joint Strike Fighter. Volvo Aero Norge – a joint venture in which Pratt & Whitney has a stake – is also part of the JSF119 programme. In addition, Pratt & Whitney is teamed with Northrop Grumman in a bid for the contract to re-engine NATO's E3A Sentry aircraft and its PW4152 are one power plant for the Airbus Multi-Role Tanker Transport aircraft. Also, Pratt & Whitney would benefit if the UK government were to purchase further C-17 aircraft – an option that the UK Ministry of defence has mentioned if the Airbus A400M does not meet its cost, performance and in-service date targets.
- *Sikorsky* – the sole US company short-listed for the Nordic Standard Helicopter Programme where it is offering the S-92 which would be produced under license by Patria Finavetec (Finland). Saab Military Aircraft (Sweden) is another partner in the bid team. Sikorsky has also made a contingency offer of its S-70B Seahawk in response to Norwegian indications that it might withdraw from the NSHP because of difficulties in agreeing a common requirement. Sikorsky is offering the S-92 for the UK's Support, Amphibious and Battlefield Rotorcraft (SABR) requirement.

### **13.3 European alliances, joint ventures and wholly-owned subsidiaries**

Pratt & Whitney has a modest European footprint and this is described in Table 13.3 (page 89).

- *Volvo Aero Norge* – a Norwegian joint venture between Volvo Aero Corp. (Sweden), Pratt & Whitney and SNECMA (France) that manufactures civil and military aircraft and components and is involved in the JSF119 programme.
- *Licensing* - an on-going agreement with Agusta-Westland.
- *Ratier-Figeac* – a wholly-owned subsidiary that is part of Hamilton Standard and manufactures aviation equipment and components for the commercial and military sectors.

### **13.4 Acquisitions and divestments involving European companies**

In January 2000, the UK *Sunday Times* newspaper ran a story saying that Rolls-Royce was rumoured to be in merger talks with Pratt & Whitney. Such rumours have circulated periodically for a number of years and have been advocated by financial commentators as a way of addressing the market position of General Electric.

United Technologies has acquired a number of European businesses – some as a consequence of its acquisition of Sundstrand. In February 1998, Hamilton Standard acquired Ratier-Figeac of France, in the UK IMI Marston's Heat Transfer and Fluids management business was acquired in March 1999 and Claverham Group was acquired in 2000. United Technologies has also divested certain businesses to European companies. In 1994, it sold its equity stake in the UK helicopter manufacturer Westland to Westland Group (UK). In 1999, it sold Dow-UTC Composites (a joint venture with Dow) to GKN Westland Aerospace of the UK.

**Table 13.1: United Technologies - Current European defence programmes (orders and deliveries 1998-2000)**

| Programme        | European country(s) involved     | Programme classification | Quantity                         | Order date | Delivery date | Type of programme      | European companies involved | Comments                                                                                          |
|------------------|----------------------------------|--------------------------|----------------------------------|------------|---------------|------------------------|-----------------------------|---------------------------------------------------------------------------------------------------|
| F-16             | Belgium<br>Netherlands<br>Norway | Ac; Eng                  | 110 aircraft                     | 1993       | 1998          | FMS                    |                             | F100-PW-229 engines                                                                               |
| F16C/D Block 50+ | Greece                           | Ac; Eng                  | £226m<br>(\$316.5m)              | June 2000  |               | FMS                    |                             | F100-PW-229 selected to power 50 new F16C/D Block 50+ aircraft                                    |
| C-17             | United Kingdom                   | Ac; Eng                  | 16 engines worth \$100m          | 2000       |               | Leasing                |                             | F117 engines for four C-17 aircraft being leased to UK government                                 |
| SH-70B Seahawk   | Spain                            | Hel                      | \$77.4 for 6                     |            |               | FMS                    |                             | Contract includes upgrades to the six SH-60B aircraft already serving the Spanish Navy.           |
| S-70B SEAHAWK    | Greece                           | Hel                      | \$107m contract for 2 & upgrades |            |               | Direct commercial sale |                             | Contract includes upgrades to the eight S-70B aircraft already in service with the Hellenic Navy. |

**Table 13.2: United Technologies - Potential future programmes**

| Programme                                       | European country(s) involved           | Programme classification | Type of programme       | European companies involved                                                                                                                                                                      | Comments                                                                                                    |
|-------------------------------------------------|----------------------------------------|--------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Nordic Standard Helicopter Program (NSHP)       | Finland<br>Sweden<br>Denmark<br>Norway | Hel                      | Teaming Gamesa in Spain | Patria Finavetic Oy (Finland) would provide helicopter final assembly, test and some completion operations<br>Saab Military Aircraft (Sweden) would provide NSHP systems design and integration. | Offering S-92 in contract to procure 73 helicopters for search-and-rescue, transport and maritime missions. |
| S-70B Seahawk                                   | Norway                                 | Hel                      |                         | Sikorsky has made contingency offer of S-70B Seahawk following Norwegian concerns about NSHP                                                                                                     |                                                                                                             |
| Boeing JSF                                      |                                        |                          |                         | Volvo Aero Norge                                                                                                                                                                                 | JSF119                                                                                                      |
| Airbus Industrie MRTT                           |                                        |                          |                         |                                                                                                                                                                                                  | PW 4152 engines.                                                                                            |
| UK Support, Amphibious & Battlefield Rotorcraft | United Kingdom                         | Hel                      |                         | Offering S-92 as replacement of more than 100 helicopters for UK Royal Navy & Royal Air Force                                                                                                    |                                                                                                             |
| NATO E3A re-engining                            | NATO                                   | Eng                      |                         |                                                                                                                                                                                                  | Team being led by Northrop Grumman                                                                          |

**Table 13.2: United Technologies - Potential future programmes (cont.)**

| Programme | European country(s) involved | Programme classification | Type of programme | European companies involved | Comments                                                                                                                                                            |
|-----------|------------------------------|--------------------------|-------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C-17      | United Kingdom               | Ac; Eng                  | ?                 | ?                           | Potential that C-17 will be used to fulfil UK's Short Term Strategic Airlifter requirement if the Airbus Military Co. A400M does not result in an acceptable offer. |

### **13.3 European alliances, joint ventures and wholly-owned subsidiaries**

| Name                      | Type of relationship    | European partner(s)                                                             | Sector             | Comments                                                                                                                                                                                                                                                    |
|---------------------------|-------------------------|---------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Volvo Aero Norge (Norway) | Joint venture           | Volvo Aero Corp. (Sw) (67%)<br>Pratt & Whitney (US) (22%)<br>SNECMA (FR) (11%). | Eng                | Manufacturer of civil and military aircraft engines and components.                                                                                                                                                                                         |
| Ratier-Figeac (France)    | Wholly-owned subsidiary |                                                                                 | Aerospace supplier | Manufactures a wide variety of aviation equipment and components for the commercial, military and regional markets, including propellers, mechanical flight controls, cockpit controls, hydraulic actuators and ballscrews and helicopter rotor components. |

### **13.4 Acquisitions and divestment involving European companies**

| Year          | Transaction          | European company involved                                                   | Sector | Comment                                                                                                                |
|---------------|----------------------|-----------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------|
| February 1994 | Sale of equity stake | Westland Group PLC                                                          | Hel    |                                                                                                                        |
| February 1998 | Acquisition          | Ratier-Figeac (France)                                                      | Eng    | Acquired by Hamilton Standard                                                                                          |
| January 1999  | Divestment           | GKN Westland Aerospace                                                      | Oth    | \$62.5m disposal of Dow-UTC Composite Products a maker of airframe structures & engine components                      |
| March 1999    | Acquisition          | IMI Marston's Aerospace Heat Transfer and Fluids Management businesses (UK) | Eng    | \$26m                                                                                                                  |
| December 2000 | Acquisition          | Claverham Group PLC (UK)                                                    | Oth    | UTC's Hamilton Sundstrand subsidiary acquired the UK-based manufacturer of hydraulic actuators for an undisclosed sum. |

## **14. European participation in the US defence market**

The previous sections of this report have considered the participation of US companies in the European defence market. In the following three sections, we will consider the participation of European companies in the US defence market. We begin with an overview of European company participation in the US defence market and consider the principal drivers of, and barriers to, European participation in the US market. We also provide short profiles of some of the European companies that have an interest in the US market. Sections 15 and 16 contain detailed profiles of the two leading European defence contractors in the US defence market – BAE Systems and Rolls-Royce.

### **14.1 Key drivers of European interest in the US defence market**

European companies have sought to access the US defence market for three main reasons:

- *Market size* – the position of the US as the world's single largest market for defence equipment means that it is inevitable that European companies have considered strategies to access that market.
- *Budget trends* – this is particularly the case given that the defence procurement budget in the US appears to be rising – whilst defence budgets in Europe remain flat or are continuing to decline.
- *Access to advanced technologies* – at the same time, the US market is attractive given the US government's on-going spending on R&D and procurement in advanced defence systems technologies.

### **14.2 Barriers to European entry into the US defence market**

The US defence market may be attractive to European companies but it has long proved difficult for them to penetrate that market. Sales volumes from Europe to the United States have been consistently low provoking European criticism of a "Fortress America" and a "one-way street" in transatlantic arms sales in which US companies have been able to sell weapons systems to Europe but European companies have effectively been blocked from the US market.<sup>35</sup> Barriers to entry that have often been cited by European companies include:

- "Buy American" regulations that limit the scope for direct sales of European defence equipment to the US market.
- A perceived reluctance on the part of the US military services to consider European solutions to US military requirements or to develop joint transatlantic programmes.
- US controls on technology transfer and export control that make collaboration difficult, not least because any project with a non-US company requires US government approval for data sharing and any weapon system containing US components requires re-export approval from the US government.

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<sup>35</sup> For a review of these arguments see, for instance: Jeffrey Becker (2000), op cit in note 3; Gordon Adams 'Fortress America in a changing transatlantic defence market' in Schmitt, B (ed). *Transatlantic Armaments Cooperation*, Chaillot Paper 42 (Institute for Security Studies Western European Union, Paris, 2001).

- The CFIUS (Committee on Foreign Investments in the United States) process is perceived by many European companies as a major bureaucratic hurdle to foreign companies seeking to enter the US defence market through the acquisition of US defence contractors.
- Controls over the operations of US defence contractors under foreign ownership control or influence (FOCI) such as the requirement for special security arrangements (SSAs) or non-voting trusts can also make investments in the US defence market unattractive to overseas investors. Such regulations limit the scope for achieving technological synergies between the non-US parent and its US subsidiary and can cause managerial inefficiencies.
- A political environment in which the US Congress has historically been perceived by European (especially non-UK) companies as hostile to foreign participation in the US defence market.

### **14.3 Current European participants in the US market**

In the US market, barriers to direct sales by foreign companies mean that European companies have often concluded that the only way to gain access to US programmes has been to acquire a US company. In practice, UK companies have almost exclusively executed these acquisitions and non-UK European (and particularly French) contractors have found entry into the US market far more challenging. On the one hand, this is because – until relatively recently – many of their heritage companies were state-owned. On the other hand, this reflects what is perceived as long-standing tensions and suspicions in the US-French relationship.

UK companies that have positions in the US defence market include:

- *BAE Systems* – the acquisition of Lockheed Martin's Control Systems and Aerospace Electronic Systems businesses during 2000 established the UK company as the largest defence contractor in the world and a leading supplier to the US Department of Defense (see Section 15 for a detailed profile of BAE Systems).
- *Rolls-Royce* – plays a significant role in the US defence market through its Allison Aero Engine subsidiary (acquired in 1995) and direct sales by Rolls-Royce Military Aero Engines (UK) to US programmes such as the T-45 and AV-8B (see Section 16 for a detailed profile of Rolls-Royce)
- *Smiths Aerospace* – one of the world's major suppliers of advanced avionics and mechanical and electrical equipment to the defence and civil aircraft sectors. Through acquisition and direct sales, Smiths has established itself as a leading supplier of aerospace sub-systems and components to the US aerospace industry. Amongst its products are the all-composite propellers on the C-130J Hercules transport and electrical power management systems on the Apache helicopter. Smiths Aerospace also produces gas turbine engine components that are used on every major engine programme in the western world.
- *Meggitt* – an aerospace and electronics supplier that has made a number of US acquisitions in recent years. In the US, Meggitt Avionics specialises in the design and manufacture of innovative solid state displays, sensors and systems for the aerospace and defence sector. Meggitt Defense Systems is the world's leading designer and manufacturer of aerial towed vehicle systems and related equipment for special applications.

- *Ultra Electronics* – a UK-headquartered global leader in sonobuoys and sonobuoy systems with strong market positions in a number of defence electronic businesses. Ultra has made a number of acquisitions in the US – including that of Raytheon's sonobuoy business.

#### **14.4 A focus on BAE Systems and Rolls Royce**

These short profiles emphasise that there are a number of UK-owned sub-system suppliers in the US defence industry. The activities of such companies – and their acquisition activity – has generated little or no political comment not least because their relatively small size – and position in the lower-tiers of the supply chain – mean that they have limited visibility. In contrast, two European companies – BAE Systems and Rolls Royce – have established very significant positions as contractors to the US Department of Defense and suppliers of highly sensitive and technologically advanced defence systems. Again, both companies are headquartered in the United Kingdom and the next two sections will provide descriptions of their corporate organisation and strategy and participation in US defence programmes as well as their recent financial performance.

### **15. BAE Systems**

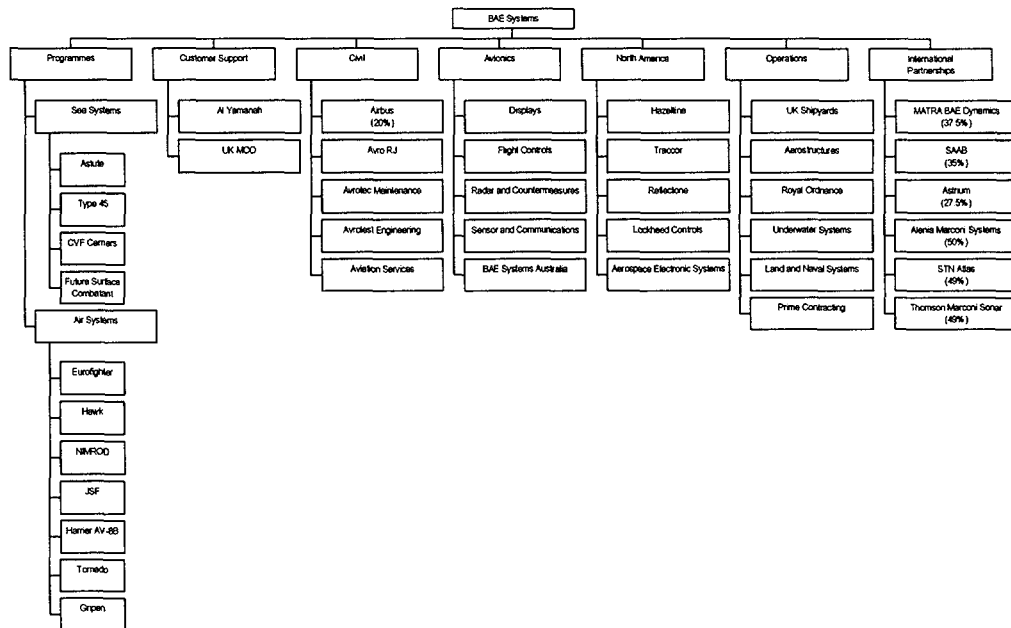
BAE Systems is the largest defence contractor in the world. The product of the 1999 merger between two UK companies – British Aerospace and GEC Marconi Electronic Systems – BAE Systems is multi-national in scope and employs more than 100,000 people in nine countries - the United Kingdom, France, Germany, Sweden, Italy, Australia, Saudi Arabia and the United States. In the United States, BAE Systems is the fifth largest defence contractor with sales exceeding \$4 billion and 22,000 employees in 30 states. Indeed, the US Department of Defense is now a larger customer than is the UK Ministry of Defence.

#### **15.1 Corporate organisation**

BAE Systems corporate headquarters is at Farnborough in the United Kingdom. Three divisions have an interest in the US market:

- *BAE North America* - comprises all of BAE System's US operations with a separate management structure and trustee boards to comply with US security regulations. BAE Systems North America is a US corporation, subject to US laws and regulations and is cleared by the Department of Defense's Defense Security Service to operate on classified programmes at all security levels through TOP SECRET.
- *Programmes Division* - has responsibility for the T-45 Goshawk, AV-8B and the Joint Strike Fighter programmes and is based in the UK.
- *Avionics Division* - a leading supplier of avionic displays, flight controls and associated sub-systems for the F-16 and F-22 and is based in the UK.

Figure 15.1: BAE Systems Company Organisation



## 15.2 Corporate strategy

At the heart of BAE Systems' strategy has been the objective of reducing its dependence on any one programme or customer and to become a global company with a breadth of "home" markets. BAE Systems has done this as follows:

- *Diversifying its customer base in defence* – Whilst the old British Aerospace was heavily dependent upon the UK market and the Al Yamamah contract with Saudi Arabia, BAE Systems has sought to diversify its customer base. Recent acquisitions in the United States mean that BAE Systems is more evenly balanced between the US, the UK and the rest of the Europe and the rest of the world. Indeed, it ought to be emphasised that less than 20% of the company's sales are to the UK and the US Department of Defense is now a bigger customer for BAE Systems than is the UK Ministry of Defence.
- *Growing its position in electronics and systems* – BAE Systems has pursued a strategy of vertical integration and has sought to expand its footprint in electronics and systems. The acquisition of GEC Marconi Electronic Systems in 1999 added substantial business in avionics and this has been complemented by the acquisition from Lockheed Martin of two businesses in the United States. The company has stated that its objective is to become a "one-stop shop" for its defence customers.
- *Strengthening its position in naval and land systems* – BAE Systems is also seeking to spread its risks across a range of platforms and the acquisition of GEC Marconi Electronic Systems substantially increased BAE Systems' position as a naval platforms builder.

## 15.3 Acquisitions and divestments involving US companies

BAE Systems, more than any other US or European company, has pursued a truly transatlantic business strategy. The company has pursued this strategy through a

number of acquisitions involving US companies and these are listed in Table 15.3 (page 99). The key acquisitions have been:

- *GEC Marconi Electronic Systems* - In 1999, British Aerospace's acquisition of GEC's Marconi Electronic Systems provided the company with a bridgehead into the US market, not least because it brought with it GEC's recently acquired Tracor business.
- *Lockheed Martin Control Systems* - In May 2000, the newly established BAE Systems built on this US presence when it announced its \$510 million acquisition of Lockheed Martin's Control Systems business. The Control Systems business produced fly-by-wire flight controls, full authority digital engine controls, mission computers and integrated systems combining flight, propulsion and/or weapon control functions. The acquisition not only increased BAE Systems' presence in the US market but boosted its position on the Lockheed Martin Joint Strike Fighter bid (Control Systems produced its vehicle management computer and is conducting related systems integration work) and strengthened the company's existing ties with Boeing (Control Systems was an important supplier to Boeing commercial and military aircraft).
- *Lockheed Martin Aerospace Electronics Systems* - In July 2000, BAE Systems complemented this move when it announced its \$1.67 billion acquisition of Lockheed Martin Aerospace Electronics Systems.<sup>36</sup> The acquisition was significant not only because it included within it Lockheed Martin Sanders – the leading company in the electronic warfare market – but it also meant that BAE Systems replaced Lockheed Martin as the largest defence company in the world.<sup>37</sup> Major Aerospace Electronics Systems products included aircraft self-protection systems, tactical surveillance and intelligence systems, reconnaissance and navigation systems, automated mission planning systems, microwave electronics and infrared sensors. The deal increased the turnover of BAE Systems North America by 50% to near \$4 billion and further strengthened BAE Systems' position on a range of US programmes – not least the Joint Strike Fighter.

### **15.4 Current US defence programmes**

BAE Systems' participation in US defence programmes is set out in Table 15.4 (pages 100-106):

- *Military aircraft* – BAE Systems co-developed the T-45 trainer for the US Navy with Boeing as prime contractor. In addition, BAE Systems – together with Boeing – provides on-going technical support to the Harrier AV-8B aircraft in service with the US Marines.
- *Combat Systems* - Electronic identification systems on aircraft and helicopters including the E2-C Hawkeye, EA-6B Prowler, F/A-18 Hornet, P-3C Orion, S-3 Viking and SH-60 Seahawk.
- *Electronic Warfare Systems* - BAE Systems Integrated Defense Solutions produces the AN/ALE-47 Countermeasures Dispenser System that is used on

<sup>36</sup> Alexander Nicoll, 'GEC in \$1.4bn takeover of US defence group Tracor', *Financial Times*, 22 April 2000, p. 1; John D. Morrocco, 'BAE Systems boosting North American clout', *Aviation Week & Space Technology*, 1 May 2000, p. 31; Andrew Edgecliffe-Johnson and Christopher Parkes, 'BAE in \$1.6bn US purchase', *Financial Times*, 14 July 2000.

<sup>37</sup> Kevin Done, 'BAE set to top the defence league', *Financial Times*, 15/16 July 2000, p. 14.

almost all US military combat and transport aircraft and helicopters. BAE Systems also supplies the AN/ALQ-178 RF countermeasures system on the F/A-18 Hornet, DECM system on the AV-8B and countermeasures systems on the B1-B.

- *Avionics and Navigation* – avionic displays for the F-16 and F-22 are supplied by BAE Systems' UK-based Avionics Division.
- *Aeronautics Products* - fuel and vehicle management systems for aircraft and helicopters such as the KC-135 and UH-60 Blackhawk.
- *Systems Technical Support* - command, control and communications engineering including that for Naval Sea Systems Command, Trident and the Air Force Mission Support System. Range systems and support for the US Army.
- *Simulation and training* – including for the Patriot missile system.

### **15.5 Potential future programmes**

BAE Systems has an interest in a number of potential future US programmes and these are set out in Table 15.5 (pages 107-108). Significant programmes include:

- *Joint Strike Fighter* – BAE Systems is a member of both the Boeing and Lockheed Martin teams and – through the acquisition of Lockheed Martin's Control Systems and Aerospace Electronics Systems businesses - the company further increased its interest in the programme.
- *C-130X Avionics Modernisation Program* – BAE Systems is leading one of the four teams bidding for the AMP program.
- *F-22 Raptor* – BAE Systems is supplying avionics displays and flight controls, electronic warfare systems and vehicle management system modules.
- *Global Hawk* – BAE Systems is supplying mission planning software.
- *RAH-66 Comanche* – BAE Systems is supplying the fly-by-wire control system.
- *V-22 Osprey* – BAE Systems is supplying the primary/automatic control system as well as countermeasure systems.
- *Tracer/FSCS* – BAE Systems is a member of both of the teams competing for the US-UK Tracer/Future Scout Cavalry System programme.

### **15.6 Financial performance**

BAE Systems has a strong market position in defence, a strong balance sheet and cash flows and record order books. However, whilst there is agreement amongst most financial analysts that its medium-term financial prospects appear strong, 2001-2003 are likely to prove difficult as the company transitions to full production of the EF-2000 Eurofighter.

#### **Key financial data**

The following figures provide a summary financial profile of the company at year end 2000:

- Sales of £9.65 billion (\$13.5 billion).
- Earnings before interest, taxes, depreciation and amortization (EBITA) were £704 million (\$985.6 Million) or 7.3% of sales.
- The current order book was £41 billion (\$57.4 billion), up from £37 billion (\$51.8 billion) at the 1999 year end.

- Long-term debt was £1.06 billion (\$1.5 billion) and the long-term debt to equity ratio was 0.15.

### Share price weakens in response to short-term difficulties

Figure 15.6 (page XX) illustrates the stock market performance of BAE Systems over the last five years. From 1997 until late 2000, British Aerospace/BAE Systems consistently outperformed the FTSE 100 on the back of a consistent earnings and profit record and stock market expectations regarding potential industry consolidation.<sup>38</sup> However, the announcement of the British Aerospace-Marconi Electronic Systems merger caused a sharp fall in the company's share price. More significantly, on January 10<sup>th</sup> 2001, shares in BAE Systems fell by nearly 25% in response to an announcement from the company of one-off restructuring charges of £525 million (\$735 million) and a warning of slower profits growth for the next two years. The causes of these problems are as follows<sup>39</sup>:

- BAE Systems is experiencing a gap between the phasing out of some of its biggest military programmes – not least the Tornado combat aircraft – and the move to full production of the EF-2000 Eurofighter. Eurofighter output does not build up significantly until 2002 and beyond.
- BAE Systems has been overoptimistic about the level of potential export orders for its Hawk aircraft and engineering and maintenance contracts from the UK Ministry of Defence.
- Returns from the Al Yamamah contract with Saudi Arabia are falling.
- Delays and cost overruns on the Nimrod maritime patrol aircraft programme.
- BAE Systems hopes that the decline in profits from its Programmes business will be offset in part by earnings from Airbus – the European civil aircraft manufacturer in which it holds a 20% stake – and profitable growth from Avionics and BAE Systems North America.

### Prospects

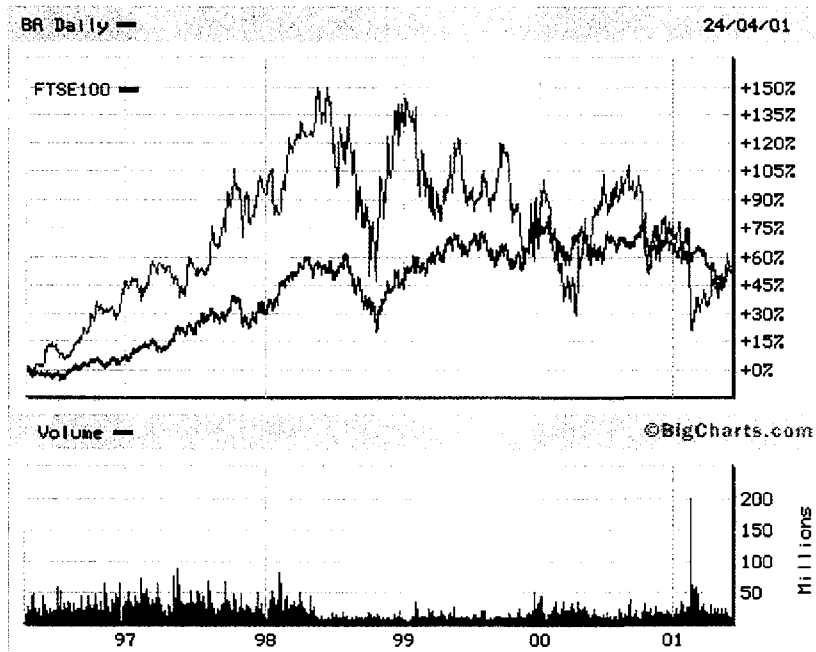
Despite its recent problems, BAE Systems has a strong market position in defence, a strong balance sheet and cash flows and record order books. There is agreement amongst most financial analysts that its medium-term financial prospects appear strong. The key issues for BAE Systems over the next five years will be its ability to bridge the gap before full production of the EF2000 Eurofighter and the capacity of the company's management to effectively integrate Marconi Electronic Systems and its recent US acquisitions. At the same time, BAE Systems faces a danger that it may be excluded from certain European markets by the dominance of EADS.

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<sup>38</sup> The FTSE 100 (Financial Times/Stock Exchange 100) is a composite of the 100 largest companies listed on the London Stock Exchange.

<sup>39</sup> Kevin Done 'Why BAE is between landing and take-off' *Financial Times*, 11 January 2001, p.26.

**Figure 15.6: BAE Systems Five Year Share Profile Against the FTSE 100**



**Table 15.3: BAE Systems - Acquisitions and divestments involving US companies**

| Year      | Transaction                                                   | European company involved      | Sector     | Comment                                                                                               |
|-----------|---------------------------------------------------------------|--------------------------------|------------|-------------------------------------------------------------------------------------------------------|
| 1996      | Acquisition of Hazeltine                                      | GEC Marconi Electronic Systems | El         | \$110m acquisition of IFF manufacturer                                                                |
| Feb 1997  | Acquisition of Reflectone                                     | British Aerospace              | El         | Acquisition for \$39m of the 47% BAe did not already own.                                             |
| 1998      | Acquisition of Tracor                                         | GEC Marconi Electronic Systems | El         | \$1.4 billion deal represented largest foreign acquisition of a US defence company                    |
| Nov 1999  | Acquisition of GEC Marconi Electronic Systems                 | British Aerospace              | El; Mi; Sh | Marconi North America (including Tracor) became part of the renamed BAE Systems                       |
| Feb 2000  | Acquisition of Femtometrics, Inc.                             | BAE Systems                    | Oth        | A technology company specializing in chemical agent detection – terms of the deal were not disclosed. |
| May 2000  | Acquisition of Lockheed Martin Control Systems                | BAE Systems                    | El         | \$0.51bn                                                                                              |
| July 2000 | Acquisition of Lockheed Martin aerospace electronics business | BAE Systems                    | El         | \$1.67bn becomes largest ever foreign acquisition of a US defence company                             |
| 2001      | Divestment of BAE Systems Flight Simulation and Training      |                                | El         | Acquired by CAE (Canada)                                                                              |

**Table 15.4: BAE Systems - Current US defence programmes (orders and deliveries 1998-2000)**

| Programme     | US customer                       | Programme classification | BAE Systems contribution                                                                                                                                                                                              | Comments                                                                                                                                                                                                                                                      |
|---------------|-----------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Harrier AV-8B | Marine Corps                      | Ac;El;Oth                | Co-development<br><br>Digital flap control<br>AN/ALQ-164 defensive electronic countermeasure (DECM) system                                                                                                            | BAE Systems (UK) with Boeing as prime contractor<br>BAE Systems Controls<br>BAE Systems, Information & Electronic Warfare Systems, Countermeasures                                                                                                            |
| T-45 Goshawk  | Navy                              | Ac                       | Co-development                                                                                                                                                                                                        | BAE Systems (UK) with Boeing as prime contractor                                                                                                                                                                                                              |
| E-2C Hawkeye  | Navy                              | Ac;El                    | OL-76/AP IFF detector processor<br>OL-483/AP airborne interrogator system                                                                                                                                             | BAE Systems, CNI Div.<br><br>BAE Systems, Advanced Systems Div.                                                                                                                                                                                               |
| EA-6B Prowler | Navy                              | Ac;El                    | AN/ALQ-99 transmitters<br>AN/APX-72 IFF System<br>Improved Capability III                                                                                                                                             | BAE Systems, Aerospace Electronics<br>BAE Systems, CNI Div.<br>BAE Systems, Information & Electronic Warfare Systems                                                                                                                                          |
| F/A-18 Hornet | Navy<br>Marine Corps<br>Air Force | Ac;El                    | Flight control electronics<br>AN/ALQ-178 RF countermeasures<br><br>AN/APX-111 CIT (Combined Interrogator Transponder)<br>Advanced Tactical Airborne Reconnaissance System (ATARS)<br>AN/ALE-47 Countermeasures system | BAE Systems Controls<br>BAE Systems, Information & Electronic Warfare Systems, Threat Warning & Defensive Systems<br>BAE Systems, Advanced Systems<br><br>BAE Systems, Reconnaissance & Surveillance Systems<br><br>BAE Systems, Integrated Defense Solutions |
| HH-60H        | Navy                              | Hel;El                   | AN/ALE-47 Countermeasures system                                                                                                                                                                                      | BAE Systems, Integrated Defense Solutions                                                                                                                                                                                                                     |

**Table 15.4: BAE Systems - Current US defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme                       | US customer | Programme classification | BAE Systems contribution                                                                                                                                                   | Comments                                                               |
|---------------------------------|-------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Mk 41 Vertical Launching System | Navy        | Mi;Oth                   | Support services                                                                                                                                                           | BAE Systems Applied Technologies, Systems development & Integration    |
| P-3C Orion                      | Navy        | Ai;El;Oth                | AN/APX-76A IFF interrogator<br>AN/TPX-54 IFF<br>AN/ARR-78(V)<br>AN/ALE-47<br>Countermeasures system                                                                        | BAE Systems, CNI Div.<br><br>BAE Systems, Integrated Defense Solutions |
| S-3 Viking                      | Navy        | Ai;El                    | AN/APX-76 IFF interrogator<br>AN/ARR-78(V)2                                                                                                                                | BAE Systems, CNI Div.                                                  |
| S-3B Viking                     | Navy        | Ai;El                    | Flight control system                                                                                                                                                      | BAE Systems Controls                                                   |
| SH-60 Seahawk                   | Navy        | Hel;El;Oth               | AN/APX-76A(V) IFF transponder<br>AN/ALE-47<br>Countermeasures system                                                                                                       | BAE Systems, CNI Div.<br><br>BAE Systems, Integrated Defense Solutions |
| Tactical Tomahawk               | Navy        | Mi                       | Weapon Control System strike coordination software                                                                                                                         | BAE Systems Mission Solutions, Imagery & Information Systems           |
| Strategic Systems Programmes    | Navy        | Mi;Oth                   | System integration support for Trident C4 & Trident D5                                                                                                                     | BAE Systems Applied Technologies                                       |
| Naval Sea Systems Command       | Navy        | Oth                      | System engineering, system integration, software development & technical assistance for standard missile system integration & weapon direction system design agent efforts | BAE Systems Applied Technologies                                       |
| AN/ARR-78(V)1/2                 | Navy        | El                       | Advanced Sonobuoy Communication Link                                                                                                                                       | BAE Systems, Advanced Systems Div.                                     |

**Table 15.4: BAE Systems - Current US defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme                                                          | US customer  | Programme classification | BAE Systems contribution                                                                                                                                                            | Comments                                                                                                                                   |
|--------------------------------------------------------------------|--------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| AN/UPX-37                                                          | Navy         | El                       | Digital IFF Interrogator                                                                                                                                                            | BAE Systems, Advanced Systems Div.                                                                                                         |
| DIWSA                                                              | Navy         | El                       | Digital Imagery Workstation Suites Afloat                                                                                                                                           | BAE Systems Mission Solutions, Imagery & Information Systems                                                                               |
| Integrated Defensive Electronic Countermeasure (IDECM)             | Navy         | El                       | AN/ALE-55 Fiber Optic Towed Decoys.                                                                                                                                                 | BAE Systems, Information & Electronic Warfare Systems, Countermeasures                                                                     |
| Intelligence and Information Technology Management (IITM) program. | Navy         | El                       | Software and systems; network and communications; computer hardware and maintenance; as well as other architectural, engineering, administrative, security, and management services | BAE Systems, Applied Technologies                                                                                                          |
| USMC Ground Weapons                                                | Marine Corps | Oth                      | Engineering & Technical Services                                                                                                                                                    | BAE Systems, Applied Technologies                                                                                                          |
| A-10 Thunderbolt II                                                | Air Force    | El                       | Upgrade of LASTE computer                                                                                                                                                           | BAE Systems Controls                                                                                                                       |
| B-52                                                               | Air Force    | El                       | Integration of Air Force Mission Support System (AFMSS)<br>AN/AAQ-23 infrared sensor                                                                                                | BAE Systems, Information & Electronic Warfare Systems, Information Dominance Systems<br>BAE Systems, Reconnaissance & Surveillance Systems |

**Table 15.4: BAE Systems - Current US defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme            | US customer              | Programme classification | BAE Systems contribution                                                                                                                                                     | Comments                                                                                                                                                                              |
|----------------------|--------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| B-1B                 | Air Force                | El;Oth                   | Integration of Air Force Mission Support System (AFMSS)<br>Intermediate Automatic Test Equipment (IATE)<br>AN/ALQ-178 RF countermeasures                                     | BAE Systems, Information & Electronic Warfare Systems, Information Dominance Systems<br><br>BAE Systems, Information & Electronic Warfare Systems, Threat Warning & Defensive Systems |
| B-2                  | Air Force                | El                       | Flight control electronics                                                                                                                                                   | BAE Systems Controls                                                                                                                                                                  |
| C-5                  | Air Force                | El                       | AN/ALE-47 Countermeasures system                                                                                                                                             | BAE Systems, Integrated Defense Solutions                                                                                                                                             |
| C-17 Globemaster III | Air Force                | El                       | Central processing unit (CPU)<br>Core Integrated processor, electronic flight control system<br>Systems controllers & cockpit indicators<br>AN/ALE-47 Countermeasures system | BAE Systems Information & Electronic Warfare Systems, Avionics Div.<br>BAE Systems Controls<br><br>BAE Systems Controls<br><br>BAE Systems Integrated Defense Solutions               |
| C-130                | Air Force<br>Marine Corp | El                       | AN/APX-76C air-to-air radar<br>AN/ALE-47 Countermeasures system                                                                                                              | BAE Systems, CNI Div.<br><br>BAE Systems Integrated Defense Solutions                                                                                                                 |

**Table 15.4: BAE Systems - Current US defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme            | US customer              | Programme classification | BAE Systems contribution                                                                                                                                                        | Comments                                                                                                                                                                                                                                                                             |
|----------------------|--------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C-130J               | Air Force<br>Marine Corp | EI                       | Advanced cockpit displays<br><br>AN/ALQ-157 infrared jammer<br>AN/ALR-57 radar warning receiver<br><br>AN/ALE-47 Countermeasures system                                         | BAE Systems Information & Electronic Warfare Systems, Avionics Div.<br>BAE Systems Information & Electronic Warfare Systems, Countermeasures<br>BAE Systems Information & Electronic Warfare Systems, Threat Warning & Defensive Systems<br>BAE Systems Integrated Defense Solutions |
| C-141                | Air Force                | EI                       | AN/ALE-47 Countermeasures system                                                                                                                                                | BAE Systems Integrated Defense Solutions                                                                                                                                                                                                                                             |
| E-3 AWACS            | Air Force                | EI                       | Colour monitors                                                                                                                                                                 | BAE Systems, Advanced Systems Div.                                                                                                                                                                                                                                                   |
| F-15 Eagle           | Air Force                | EI                       | AN/APX-76 interrogator<br>Flight control computer<br>AN/ALQ-178 RF countermeasures<br><br>AN/AVD-5 electro-optical long-range oblique photography system (EO-LOROPS)            | BAE Systems, CNI Div.<br>BAE Systems Controls<br>BAE Systems, Information & Electronic Warfare Systems, Threat Warning & Defensive Systems<br>BAE Systems, Reconnaissance & Surveillance Systems                                                                                     |
| F-16 Fighting Falcon | Air Force                | EI                       | Avionics displays & flight controls<br>Avionics Intermediate Shop (AIS)<br>AN/ALR-56M(V) advanced radar warning receiver<br>AN/APX-113 IFF<br>AN/ALE-47 Countermeasures systems | BAE Systems Avionics (UK)<br><br>BAE Systems Controls<br><br>BAE Systems, Information & Electronic Warfare Systems, Threat Warning & Defensive Systems<br>BAE Systems, Advanced Systems Div.<br>BAE Systems Integrated Defense Solutions                                             |

**Table 15.4: BAE Systems - Current US defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme                                | US customer                                         | Programme classification | BAE Systems contribution                                                                                                  | Comments                                                                                                                           |
|------------------------------------------|-----------------------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| EF-111 Raven                             | Air Force                                           | El                       | AN/APX-64 IFF transponder                                                                                                 | BAE Systems, CNI Div.                                                                                                              |
| F-111 Aardvark                           | Air Force                                           | El                       | AN/APX-64 & AN/APX-76 IFF transponder                                                                                     | BAE Systems, CNI Div.                                                                                                              |
| KC-135 Stratotanker                      | Air Force                                           | El                       | Fuel Savings Advisory System (FSAS)                                                                                       | BAE Systems Controls                                                                                                               |
| U-2                                      | Air Force                                           | El                       | Autopilot/Air Data System                                                                                                 | BAE Systems Controls                                                                                                               |
| Air Force Mission Support System (AFMSS) | Air Force                                           | Oth                      |                                                                                                                           | BAE Systems, Information & Electronic Warfare Systems, Information Dominance Systems                                               |
| MIDS                                     | US Air Force<br>France<br>Germany<br>Italy<br>Spain | El                       | Data link between air, ground, and naval forces, for installation aboard the F/A-18, France's Rafale, & Eurofighter 2000. | BAE Systems, Electronic Systems a part of MIDSCO joint venture with Thales (FR), Siemens (GER), Italtel (IT) & Indra Sistemas (SP) |
| AH-65D Apache                            | Army                                                | El                       | AN/ALQ-212 Advanced Threat Infrared Countermeasures (ATIRCM)                                                              | BAE Systems, Information & Electronic Warfare Systems, Countermeasures                                                             |
| Javelin                                  | Army                                                | El                       | Focal plane array detector subassembly (second source)                                                                    | BAE Systems, Information & Electronic Warfare Systems, Infrared & Imaging Systems                                                  |
| Longbow Hellfire                         | Army                                                | El                       | Millimeter-wave transceivers                                                                                              | BAE Systems, Information & Electronic Warfare Systems, Microwave, Space & Mission Electronics                                      |
| MH-47D                                   | Army                                                | El                       | AN/ALE-47 countermeasures system                                                                                          | BAE Systems, Integrated Defense Solutions                                                                                          |
| MH-60L/K                                 | Army                                                | El                       | AN/ALE-47 countermeasures system                                                                                          | BAE Systems, Integrated Defense Solutions                                                                                          |

**Table 15.4: BAE Systems - Current US defence programmes (orders and deliveries 1998-2000) (cont.)**

| Programme                                              | US customer | Programme classification | BAE Systems contribution                                                              | Comments                                                                                                          |
|--------------------------------------------------------|-------------|--------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Patriot                                                | Army        | El                       | AN/TRX-46(V)7 IFF interrogator<br>Conduct of Fire Trainer<br>Operator Tactics Trainer | BAE Systems, CNI Div.<br><br>BAE Systems, Information & Electronic Warfare Systems, Information Dominance Systems |
| SINCGARS                                               | Army        | Oth                      | Automatic test equipment                                                              | BAE Systems Mission Solutions, Test & Space Systems                                                               |
| UH-60 Black Hawk                                       | Army        | El                       | Auxiliary fuel management system                                                      | BAE Systems Controls                                                                                              |
| US Army Electronic Proving Ground                      | Army        | Oth                      | Support services                                                                      | BAE Systems Technical Services                                                                                    |
| US Army Garrison Hawaii, Logistical Support & Services |             | Oth                      | Support services                                                                      | BAE Systems Technical Services                                                                                    |
| AN/ALQ-144A(V)                                         | Army        | El                       | IRCM systems for various Army helicopters                                             | BAE Systems, Information & Electronic Warfare Systems, Countermeasures                                            |

**Table 15.5: BAE Systems - Potential future programmes**

| Programme                             | US customer                  | Programme classification | BAE Systems contribution                                                                                                                                                                    | Comments                                                                                                                                                                                        |
|---------------------------------------|------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Joint Strike Fighter                  | Air Force<br>Marines<br>Navy | Ac;El                    | Co-development<br>Electronic warfare suite<br><br>Flight control processor, vehicle management system<br>Electronic warfare system, ICP subsystem integrator<br>Vehicle management computer | BAE Systems (UK)<br>BAE Systems, Reconnaissance & Surveillance Systems<br>BAE Systems Control<br><br>BAE Systems Information & Electronic Warfare Systems, Avionics Div.<br>BAE Systems Control |
| C-130X Avionics Modernization Program | Air Force                    | Ac;El                    | Avionics modernisation                                                                                                                                                                      | Teamed with Honeywell, Logicon, Snow Aviation & BAE Systems (UK)                                                                                                                                |
| F-22 Raptor                           | Air Force                    | Ac;El                    | Avionics displays & flight controls<br>AN/ALR-94 electronic warfare suite<br>Display suite<br>Vehicle management system modules                                                             | BAE Systems Avionics (UK)<br><br>BAE Systems Information & Electronic Warfare Systems<br><br>BAE Systems Controls                                                                               |
| RQ-4A Global Hawk (Tier II+)          | Air Force                    | Ac;El                    | Mission planning software                                                                                                                                                                   | BAE Systems Mission Solutions, Imagery & Information Systems                                                                                                                                    |
| RAH-66 Comanche                       | Army                         | Hel;El                   | Fly-by-way flight controls                                                                                                                                                                  | BAE Systems Controls                                                                                                                                                                            |
| V-22 Osprey                           | Navy<br>Marine Corp          | Ai;El                    | Primary/automatic flight control system<br>AN/ALE-47 Countermeasures system                                                                                                                 | BAE Systems Controls<br><br>BAE Systems, Integrated Defense Solutions                                                                                                                           |

**Table 15.5: BAE Systems - Potential future programmes (cont.)**

| Programme                             | US customer       | Programme classification | BAE Systems contribution | Comments                                                                                                            |
|---------------------------------------|-------------------|--------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------|
| TRACER/FSCS                           | Army              | MV                       | Co-development           | BAE Systems is a member of both the competing teams (Lancer Consortium & SIKA International)                        |
| XM777 Lightweight Towed 155m Howitzer | Marine Corps Army | A                        | Prime contractor         | BAE Systems Royal Ordnance Defence (UK) with 70% of production effort in US through United Defense & Hydromill Inc. |

## 16. Rolls-Royce

UK company Rolls-Royce is a leading manufacturer of aero engines and industrial derivatives for commercial aircraft, regional aircraft and military aircraft and helicopters. The company is the 18th largest defence contractor in the world by sales<sup>40</sup> and the second largest aero engine manufacturer after General Electric. The company plays a significant role in the US defence market through its Allison Aero Engine subsidiary (acquired in 1995) and direct sales by Rolls-Royce Military Aero Engines (UK) to US programmes such as the T-45 Goshawk and the Harrier AV-8B. In 1999, defence accounted for sales of £1138m (\$1593.2m) or 24% of total sales.

### 16.1 Corporate organisation

The corporate organisation of Rolls-Royce is set out in Figure 16.1 below (page 110). The key organisational features of particular relevance to its participation in the US defence market are as follows:

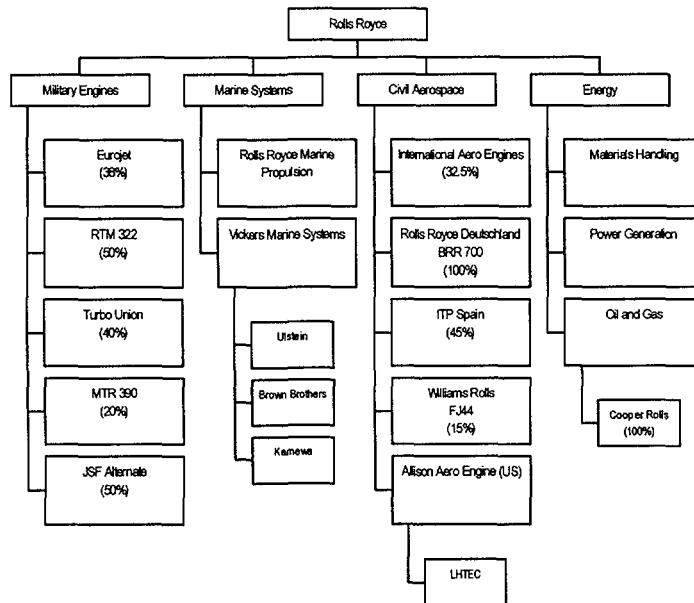
- *Allison Engine Co.* is Rolls-Royce's principal US operation. A wholly-owned subsidiary of Rolls-Royce, Allison Engine Co. designs, manufactures, markets and supports gas turbine engines for aerospace, industrial and marine markets.
- *Allison Advanced Development Co. (AADC)* is an operation of Allison Engine Co. established to meet US government requirements for a company under foreign ownership, control or influence. AADC performs secret US government development programmes and has an independent proxy board, its own management and additional US Department of Defense security procedures. In 2000, the US DoD announced that certain security restrictions pertaining to Allison would be amended in recognition of the company's exemplary security record under Rolls-Royce. The proxy company that operated within Allison Engine Co. was eliminated and all Allison's activities now operate under a single Special Security Agreement.<sup>41</sup>
- *Rolls-Royce Military Aero Engines Ltd.* based in Bristol (UK) is responsible for direct sales to the US of engines for the T-45 and AV-8B programmes and is participating in the Joint Strike Fighter Alternate Engine Program.
- *Joint Strike Fighter Alternate Engine Program* - Rolls-Royce has a 40% share in the JSF alternate engine programme comprised General Electric (60%); Allison Advanced Development Co. (25%), and Rolls-Royce Military Aero Engines Ltd. (UK) (15%).
- *Rolls-Royce Marine Systems* is responsible for its marine gas turbine business for defence and civil applications.

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<sup>40</sup> Source: Defense News 'Top 100' survey.

<sup>41</sup> This eliminated the strange situation where security restrictions meant that engineers in one part of Allison were unable to talk with colleagues in another unit on the same site without receiving authorisation from the Department of Defense.

Figure 16.1: Rolls Royce Company Organisation



## 16.2 Corporate strategy

Rolls-Royce's strategy is focused on establishing leading positions in the aerospace, marine and energy markets for gas turbine engines. The company has sought to do this as follows:

- *To enhance its position in marine propulsion segment* - In November 1999, Rolls-Royce acquired Vickers PLC in a £576 million (\$806 million) transaction. The objective of the deal was to acquire Vickers' marine engine division and in particular its marine waterjet technology which Rolls-Royce sees as an important element in the growth of its marine business. Significantly, Rolls-Royce announced that it would be looking to sell Vickers' land-based defence business and has been in talks with – amongst others – Carlyle Group/General Dynamics.
- *To strengthen its position in the aerospace segment* - In December 1999, Rolls-Royce acquired the 50% it didn't already own of joint venture BMW Rolls-Royce GmbH (now Rolls-Royce Deutschland) from partner BMW AG. In return BMW received a 10% overall stake in Rolls-Royce plc.
- *Broaden its range of products and services* within the gas turbine sector through expanded repair and overhaul activities and expanding aftermarket activity.

## 16.3 Acquisitions and divestment involving US companies

Rolls-Royce has executed two defence-related acquisitions in the United States:

- *Allison Engine Co* – acquired by Rolls-Royce in 1995 for \$525m. At the time, the transaction was seen as a ground-breaking development for European participation in the US defence market not least because of Allison Engine Co.'s position on a range of sensitive US military programmes.

- *National Airmotive Corp.* – acquired in 1999 for \$73m. The acquisition of this engine repair and overhaul business can be seen as part of an effort at vertical integration by Rolls-Royce. In 1998, National Airmotive had won its largest ever contract from the US Navy worth a potential \$189m for the repair of T56 engines manufactured by Allison. Thus, it built on Rolls-Royce's engine services business (an area in which it had lagged rivals GE and Pratt & Whitney) and complemented its 1995 acquisition of Allison.

### **16.4 Current US defence programmes**

Through its acquisition of Allison Aero Engine, as well as direct sales, Rolls-Royce has established a strong position on a range of US defence programmes. Rolls-Royce's participation in those programmes is set out in Table 16.4 (pages 115-116):

- *Aircraft* – Allison engines power the P-3 Orion. Allison engines also power the Lockheed Martin C-130 and the C-130H and the new generation engine from Allison – the AE 1200 turboprop – is used as the engine for the C-130J transport aircraft. Through direct sales, Rolls-Royce Military Aero Engines supplies engines for the AV-8B and the US Navy T-45.
- *Helicopters* – Allison has a strong market share in helicopter engines and its AE250 series of engines power the Bell TH-67 and OH-58D. Allison's T-406 engine powers the Boeing-Bell V-22 Osprey.
- *Naval systems* – Allison is providing Redundant Independent Mechanical Start-Up Systems for the DDG-51.
- *Armoured vehicles* – Allison provides auxiliary power units for the Army's M1A2.

### **16.5 Potential future programmes**

Rolls-Royce has an interest in a number of potential future US programmes and these are set out in Table 16.5 (page 117). Significant programmes include:

- Joint Strike Fighter – Rolls-Royce has a 40% share (GE 60%) in the Joint Strike Fighter Alternate Engine Program with General Electric & is providing the STOVL lift system for Pratt & Whitney.
- WR-21 – Rolls-Royce has co-developed the WR-21 marine turbine engine with Northrop Grumman (US) & DCN (France) and it is the goal of the US Navy and the contractor team to introduce the WR-21 into existing US surface combatant designs as well as future applications.
- Global Hawk – Allison's AE3007H engine powers the Global Hawk UAV.
- C-5 Upgrade - Allison Engine Co. is bidding the Rolls-Royce Trent engine as an upgrade for the C-5 transport aircraft.

### **16.6 Financial performance**

For year end 2000, Rolls-Royce was able to announce a record order book of \$18.5 billion reflecting a strengthening position in its defence/aerospace, marine and energy businesses. However, the company's shares have continued to under perform the stock market, reflecting investor concerns about poor profitability and cash flow.

#### **Key financial data**

The following figures provide a summary financial profile of the company at year end 2000:

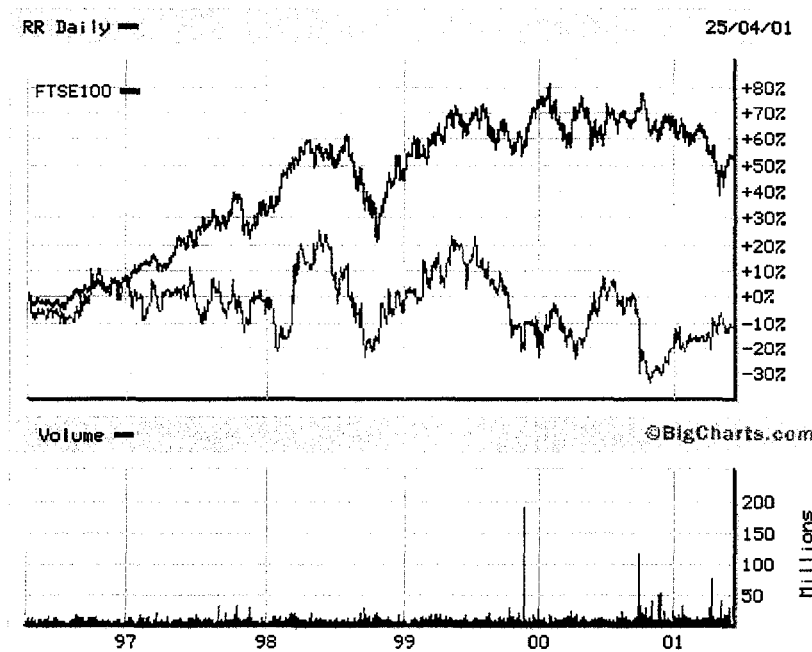
- Sales of \$5.86 billion (approximately \$8.2 billion), up 27% over the previous year.

- Earnings before interest, taxes, depreciation and amortization (EBITA) were £318 million (\$445 million) or 5.4% of sales.
- The current order book was £13.2 billion (\$18.5 billion).
- Long-term debt was £1.06 billion (\$1.5 billion) and the long-term debt to equity ratio was 0.52.

#### Battling against investor sentiment

A period of steady but slow growth in revenue during the early and mid 1990s were followed by faster growth in revenue from 1995, largely as a result of the success of Rolls' civilian programmes. At the same time, problems experienced by its main competitors, General Electric and Pratt & Whitney, in launching new engines have allowed Rolls to win a larger share of the civilian aerospace market. However, historical financial returns have been poor and this is reflected in investor sentiment towards the company's shares and its management. Figure 16.6 shows the stock market performance of Rolls-Royce over the last five years. Shares in Rolls-Royce have consistently under performed the FTSE-100 and – as has already been noted – investor pressures have driven management to pay greater attention to cash flow and profitability. Under pressure from investors to demonstrate improved performance, Rolls-Royce has placed considerable focus on efficiency and reducing costs. Major supplier and cost initiatives were started in 2000 and the number of suppliers is being reduced. At the same time, an increasing share of work is being outsourced in a bid to increase sales per employee. Restructuring and rationalisation has led to announcements of job losses in the United Kingdom. Restructuring proposals announced in 2000 could lead to 2,000 redundancies per annum for the next three years, reducing the workforce from the current 40,000 to below 35,000<sup>42</sup>.

**Figure 16.6: Rolls Royce Five Year Share Profile Against the FTSE 100**



<sup>42</sup> *Rolls-Royce*, report by Credit Suisse First Boston, 5 March 2001.

### Prospects

Rolls-Royce has built up a strong market position in both commercial and defence aero-engines and internal restructuring combined with a forecast growth in spares and support service business is likely to greatly improve its profitability. Nevertheless, the company continues to battle with adverse investor sentiment. Historical financial returns have been poor and management will continue to face pressure from share holders to improve performance.

**Table 16.3: Rolls-Royce – Acquisitions and divestment involving US companies**

| Year         | Transaction | US company involved      | Sector | Comment                                                                                                |
|--------------|-------------|--------------------------|--------|--------------------------------------------------------------------------------------------------------|
| March 1995   | Acquisition | Allison Engine Co.       | Eng    | Deal worth \$525m                                                                                      |
| October 1999 | Acquisition | National Airmotive Corp. | Eng.   | \$73m acquisition of engine repair & overhaul business with \$189m contract for repair of T56 engines. |

**Table 16.4: Rolls-Royce - Current US defence programmes**

| Programme   | US customer               | Programme classification | Prime contractor             | Comments                                                                                                                                                        |
|-------------|---------------------------|--------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AV-8B       | Marine Corps              | Ai/Eng                   | Boeing                       | F402-RR-408 engine supplied by Rolls-Royce Military Aero Engines Ltd. (UK)                                                                                      |
| T-45        | Navy                      | Ai/Eng                   | Boeing                       | F405-RR-401 Adour turbofan engine supplied by Rolls-Royce Turbomeca Ltd. (a joint venture of Rolls-Royce and France's Turbomeca)                                |
| V-22 Osprey | Marine Corps<br>Army      | Hel/Eng                  | Boeing-Bell                  | T406-AD-400 turboshaft engines power V-22 & derivatives (MV-22 & CV-22)                                                                                         |
| C-130J      | Air Force<br>Marine Corps | Ai/Eng                   | Lockheed Martin              | AE2100D3 turboprop engines.<br>Major suppliers are:<br>Dowty Aerospace Propellers (UK)<br>Lucas Aerospace Engine Control Systems (a UK-based subsidiary of TRW) |
| TH-67       | Army                      | Hel/Eng                  | Bell Helicopter              | AE250-C20JN                                                                                                                                                     |
| OH-58D      | Army                      | Hel/Eng                  | Bell Helicopter              | AE250-C30R/3                                                                                                                                                    |
| DDG-51      | Navy                      | Sh/Oth                   | Litton Industries<br>Ingalls | Allison Engine providing Redundant Independent Mechanical Start Systems (RIMSS)                                                                                 |
| M1A2        | Army                      | MV/Oth                   | General Dynamics             | Allison Engine provides auxiliary power units (APUs)                                                                                                            |
| C-130       | Air Force<br>Marine Corps | Ai/Eng                   | Lockheed Martin              | T56/501D engines                                                                                                                                                |
| P-3         | Navy                      | Ai/Eng                   | Lockheed Martin              | T56/501D engines                                                                                                                                                |
| P-3B        | Navy                      | Ai/Eng                   | Lockheed Martin              | T56-A-14 engines                                                                                                                                                |
| P-3C        | Navy                      | Ai/Eng                   | Lockheed Martin              | T56-A-14 engines                                                                                                                                                |

**Table 16.4: Rolls-Royce - Current US defence programmes (cont.)**

| Programme | US customer               | Programme classification | Prime contractor | Comments                                                                                                         |
|-----------|---------------------------|--------------------------|------------------|------------------------------------------------------------------------------------------------------------------|
| E-2C      | Navy                      | Ai/Eng                   | Northrop Grumman | Originally fitted with two Allison T56-A-425 turboprop engines<br>E-2C Group I variants feature T56A-427 engines |
| C-130H    | Air Force<br>Marine Corps | Ai/Eng                   | Lockheed Martin  | T56-A-15                                                                                                         |

**Table 16.5: Rolls-Royce - Potential future programmes**

| Programme            | US customer                       | Programme classification | Prime contractor                          | Comments                                                                                                                                                                  |
|----------------------|-----------------------------------|--------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Joint Strike Fighter | Air Force<br>Navy<br>Marine Corps | Ai/Eng                   | Boeing<br>Lockheed Martin                 | Rolls-Royce has a 40% share (GE 60%) in the Joint Strike Fighter Alternate Engine Program with General Electric & is providing the STOVL lift system for Pratt & Whitney. |
| WR-21                | Navy                              | Sh/Eng                   | Co-development with Northrop Grumman (US) | DCN (France) is a marketing partner                                                                                                                                       |
| Global Hawk          | Air Force                         | Ai/Eng                   | Northrop Grumman                          | AE3007H                                                                                                                                                                   |
| C-5 upgrade          | Air Force                         | Ai/Eng                   | Lockheed Martin                           | Allison Engine Co. bidding the Rolls-Royce Trent engine                                                                                                                   |

## **17. The prospects for a transatlantic defence industry**

The previous sections of this report have described the transatlantic defence industrial activities of a number of leading US and European defence contractors. We have noted that the last fifty years have seen the evolution of transatlantic defence industrial relationships from predominantly government-led arrangements driven by Cold War concerns about Western European military capabilities towards increasingly industry-led relationships driven by commercial concerns about market access. This section will consider the near and mid-term prospects for the further development of a transatlantic dimension to the defence industry.

### **17.1 Moves towards a transatlantic dimension to the defence industry will continue**

There is little doubt that the gradual move towards a transatlantic dimension to defence industry restructuring will continue and there are a number of reasons to think this will be the case.

- *Government concerns about interoperability and affordability* – we have already noted the pressures towards transatlantic defence industrial relationships emerging from government concerns about military interoperability and the need to reduce the cost of defence equipment. Such pressures are likely to grow in the foreseeable future.
- *Business pressures for closer transatlantic defence industrial relationships* – similarly, we have noted that the companies in the newly consolidated European defence industry and their US counterparts face significant business pressures to expand their international activities. Transatlantic relationships will play a growing part in their strategies.
- *Major procurement programmes are increasingly subject to transatlantic teaming* – equally, our company profiles have shown that many of the major forthcoming procurement programmes in the United States and particularly Europe have an important transatlantic dimension.
- *Recent transatlantic acquisition and joint venture activity represents a watershed for transatlantic defence industrial relationships* – three recent transactions may be argued to represent a watershed in transatlantic defence industrial relationships. First, BAE Systems' acquisitions of Lockheed Martin's Control Systems and Aerospace Electronic Systems businesses has placed a European company in a central position in the US defence industry as a leading supplier to the US Department of Defense and a participant in some of the most sensitive US technology programmes. Second, the Thales Raytheon Systems Co. joint venture has shown that non-UK European companies can also address US government security concerns and that French companies may be able to gain real access to the US. Finally, the recent acquisitions in Europe by General Dynamics and United Defense suggest that US companies may be increasingly willing to consider acquisition as a route into the European market.

### **17.2 Mega-mergers are unlikely in current circumstances**

Irrespective of these recent developments, however, there are good reasons to be cautious about the speed at which transatlantic developments will proceed. Past experience suggests that the development of a transatlantic dimension to the defence

industry is likely to be cautious and there are likely to be plenty of political, regulatory and business challenges ahead. Thus, although a number of acquisitions have been completed, full mergers between the leading US and European prime contractors seem highly unlikely in current circumstances.

Such deals would require enormous political commitment from governments on both sides and a step-change in attitudes towards national defence industrial capabilities and national security. Equally important, perhaps, the business risks and costs associated with any transatlantic mega-merger would most likely outweigh the potential commercial benefits. To make business sense any deal would need to provide real cost savings through operational synergies and much more than merely market access and political influence. Many leading Wall Street investment analysts hold a negative view on the matter and this has tended to colour the attitude of defence industry executives. Many analysts believe that acquisitions in Europe would dilute the earnings of US companies because they offer limited scope for cost savings. A survey by the Government Electronics and Information Technology Association starkly captures the dilemma faced by US companies:

“In simplified form, if a US company wishes to buy a European firm, and to make the deal work, you either have to cut back their capacity and fire foreigners, or cut back your own capacity and fire Americans. And there certainly aren’t many incentives for those kinds of business deals”.<sup>43</sup>

Equally, it seems rather unrealistic to expect major transatlantic acquisition activity while other, less risky and lower commitment forms of US-European industrial relationships remain at a relatively early stage of development for many companies.<sup>44</sup> Instead, equity relationships amongst the largest companies are more likely to emerge slowly and then only after they have overcome numerous business and political hurdles. This is not to say that transatlantic acquisitions will not continue and perhaps increase in number. Certainly, small and medium-sized transatlantic acquisitions involving leading defence companies may well occur where they make business sense. Thus, we could see more deals such as those announced by BAE Systems in the United States and United Defense in Europe, and there is likely to be further acquisition activity amongst lower-tier suppliers.

### ***17.3 But cooperation will broaden and deepen***

Given such issues, it seems likely that cooperation rather than merger will almost certainly remain the principal means by which the leading companies will seek to develop transatlantic relationships. Thus, we are likely to see more programme-specific teaming on new US, European and transatlantic programmes. At the same time, some companies may well identify opportunities in certain business areas to bring their activities together into informal alliances, more formal collaborative agreements or perhaps equity-based joint venture structures. In many respects, this scenario sees the extension of current trends and would seem to be the most practical route to building transatlantic relationships between prime contractors. In time, we may witness an evolution of these relationships and we will quite probably see those companies that have worked together on particular programmes considering the

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<sup>43</sup> ‘Industry Outlook – GEIA 2000-2009 Ten Year Forecast’, Government Electronics and Information Technology Association, Arlington, VA.

<sup>44</sup> Robert P. Grant, op. cit. in note 3.

prospects for strategic alliances, and we may see established alliances evolving towards full mergers. This step-by-step approach represents a pragmatic response to the existing political, regulatory and business challenges and will allow the confidence building between governments and the growth of business experience in managing such relationships that are necessary to build a transatlantic defence industry.

#### **17.4 Non-UK European companies will increasingly seek entry into the US market**

At the same time, we are likely to see growing efforts by non-UK European companies to enter the US market. The Thales Raytheon Systems Co. joint venture has shown that closer cooperation between US and French companies are feasible in political and regulatory terms as well as desirable from a business perspective. Further developments are highly likely in the near to mid-term not least because entry into the US market is seen as a core element of the strategies of both EADS and Thales.

- *The European Aeronautic, Defence and Space Co. (EADS)* has expressed its intention to develop a transatlantic dimension to its strategy. The company entered the competition to acquire Lockheed Martin's aerospace electronics business teamed with the US defence electronics company L-3 Communications. EADS has signed an MoU with Northrop Grumman under which the two companies are exploring opportunities in ground surveillance and a number of other areas of defence electronics, such as aerial targets and decoys, airborne electronic attack and fire control radar. The first product of this relationship was an agreement to offer a 'European version' of a weather and navigation radar, developed by Northrop Grumman, for the Airbus A400M military transport aircraft.
- *Thales* – the French company (formerly Thomson-CSF) is also seeking to expand its US presence. The company is pursuing what it calls a "multi-domestic" strategy and – through acquisitions and minority equity stakes – it has established positions in the UK, Australia and Brazil. Despite its long-standing ties with Raytheon, Thomson-CSF had always been rebuffed in its efforts to penetrate the US market due to what are perceived as the Pentagon's long-standing suspicion of French intentions. The company's acquisition in 2000 of the UK defence electronics company Racal may alter Thales' position in the United States. One of Racal's most attractive features to the French company was its established position in the US defence market, where it ranked as a leading supplier of radio systems and data recorders to the US armed forces. The acquisition allows Thales to absorb Racal's proxy structure in the United States and – combined with the fact that Thomson was granted a Secret level Special Security Agreement in 1999 for its Texas-based Training and Simulation business – the French company now has a security structure under which it can build a larger US presence. Indeed, Thales has already shown its intent to establish closer ties with US companies by winning two major contracts from Lockheed Martin. The first is to supply electronic warfare equipment for Turkish F-16 fighter aircraft and the second is to supply radio and communications systems for F-16s being sold to the United Arab Emirates. Thales hopes that such contracts will open the door for participation

in the JSF programme, most probably through its Dutch or UK subsidiaries Signaal and Racal.<sup>45</sup>

## 18. Conclusions

This report has had two objectives. First, the report has sought to describe and analyse the participation of ten leading US defence contractors in the European defence market. Second, it has sought to describe and analyse the organisation and corporate strategy of two European companies (BAE Systems and Rolls-Royce) and to consider their participation in the US defence market. In support of these objectives, the report has also charted the evolution of transatlantic defence industrial relationships over the last fifty years and has considered the near and mid-term prospects for further transatlantic defence industrial developments.

### **Key findings**

A number of key points have emerged from our study and it is worth re-iterating them here:

- The US defence companies that we have examined have differing exposure to the European market as a consequence of the types of systems they produce, their corporate strategies and the extent of European capabilities in those fields. The ten companies can be categorised into four types according to the extent of their participation in European programmes and the extent of their European “footprint” of strategic alliances, joint ventures and wholly-owned subsidiaries.
- There is a growing recognition amongst US companies that they need to do more than offer offsets if they are to secure European contracts in the future. US companies that are seeking to expand their position on European companies are increasingly pursuing strategies that extend beyond FMS to teaming arrangements and consortia with European companies and is supported by a sizeable footprint of European strategic alliances, joint ventures and wholly-owned subsidiaries. In this way, they are seeking to meet increasing European demands for greater technology transfer and industrial participation in major programmes.
- An analysis of the strategies of the US companies suggests an emerging pattern of alliances between leading US and European companies. *Boeing-BAE Systems* have a number of formal and informal alliances across a range of activities. The creation of the *Thales Raytheon Systems Co* joint venture represents the further extension of established relationships between the two companies. *Northrop Grumman* and *EADS* have entered into alliances in a number of business areas. Equally, *Lockheed Martin* and *EADS* have long discussed collaborative relationships on mission aircraft.
- What is clear is that the companies in the newly consolidated European defence industry and their US counterparts face significant business pressures

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<sup>45</sup> Jean-Pierre Neu, ‘Thomson-CSF monte en puissance sur le F16’, *Les Echos*, 29/30 Septembre 2000.

to expand their international activities, and transatlantic relationships are likely to be an important dimension of their strategies.

- Non-UK European companies are actively seeking to enter the US defence market through acquisition and joint venture. Historically, European participation in the US defence industry has been dominated by the activities of UK companies. BAE Systems and Rolls-Royce have significant positions as contractors to the US Department of Defense and other companies – such as Smiths Aerospace, Meggitt and Ultra – have established themselves as lower tier suppliers to US prime contractors. However, non-UK European companies are seeking opportunities to enter the US market and amongst these Thales and EADS are likely to be particularly active in the future.