

## France

### I. Current National Security Situation

France has had to rethink its basic national security strategy in the aftermath of the Cold War. The current security environment still mandates the maintenance of a nuclear deterrent. However there are also expanding roles for conventional high-tech weaponry. Military-technical and conceptual changes in war fighting, which hold revolutionary potential for future combatants, are additional factors in French security planning for the coming century.

In 1994, France issued a new White Paper defining French post-Cold War defense policy objectives.<sup>1</sup> These focus on the preservation of peace in Europe and its bordering zones and in other areas essential to French economic activity and free trade. French security planning now focuses on six different classes of future conflict scenarios that could require a French military response. These are: regional conflicts not touching French vital interests; regional conflict touching French vital interests; attack on French overseas territories/departments; fulfillment of bilateral defense agreements; peace and international law enforcement operations; and resurgence of a major threat against West Europe. These scenarios collectively require French armed forces to conduct: (1) high-intensity regional conflict within a coalition; (2) interventions to assist overseas territories or in application of defense agreements; and (3) limited peace or international law enforcement operations.

French defense policy is still evolving. In 1996, the Chirac government developed another White Paper on defense. Building on the directions established earlier, the paper reinforced the priority of conventional over nuclear forces and specified four primary policy objectives: ending conscription and the development of a professional French military force; strengthening and developing a European-based military structure and defense industrial base; continuing to modernize major military equipment; and reducing cost by 30 percent to defense production (over a six year period).<sup>2</sup>

#### *Current defense policy*

Currently, French defense policy is focused on three specific objectives: (a) the defense of French vital and strategic interests, alone if necessary, against any threat from any source, where French strategic interests focus on peacekeeping within Europe and adjacent areas (the Mediterranean and the Middle East) and in areas essential to economic activity and free trade; (b) the development of Europe and the assurance of international stability, including the establishment of a European defense identity; and (c) the implementation of a comprehensive defense policy not limited to the military and strategic spheres but more broadly encompassing all national activities.<sup>3</sup>

The new defense policy objectives, emerging military applications derived from Gulf War observations, and the differential in capabilities between French and American forces have led French strategists to rethink their force development priorities.<sup>4</sup>

### *Military Requirements*

The French Ground Forces must continue to provide defense against threats to the homeland. The French Army is more likely, however, to be needed for rapid deployment missions in smaller conflicts around Europe's periphery and French overseas territories. At the same time, the capabilities of stealthy aircraft and long-distance air-launched precision munitions raise the profile of the Air Force in many scenarios. Deep strikes are also justifiable if an aggressor state is attempting to acquire nuclear means and has a declaratory policy inimical to French vital interests.<sup>5</sup> The Air Force must also carry out independent nuclear strike missions should deterrence fail and must provide strategic airlift of rapid deployment forces. The French Navy must help project force in the Mediterranean region and protect sea lines of communication in the Mediterranean and the Atlantic. These require combined surface, underwater and naval air means. SSBNs contribute to France's nuclear dyad, as do nuclear capable naval aircraft.

The new French strategic vision elevates the role of several aspects of combat capabilities. These include: precision and deep strike weaponry; space capabilities to support terrestrial operations; all-weather, 24-hour aviation actions to seize and maintain air supremacy for independent actions and ground support; information warfare on the traditional battlefield and among the civilian population; smaller forces capable of responding with greater strategic mobility; and improved combat maneuverability for regional and global contingencies.

### *Armament requirements*

To support its new military requirements, France is focused on upgrading major defense equipment, including submarines, aircraft carriers, helicopters, tanks, and aircraft. Priority areas include intelligence and command and control systems, force protection capabilities, force mobility and military transportation. France also has identified several strategically important defense technology areas including composites, microelectronics, propulsion systems, navigation equipment, detection systems, stealth technology, and command and control systems.<sup>6</sup>

French requirements are also designed to create a mobile force with sophisticated weaponry and supporting mobility, command and control, and intelligence assets. This will not only allow French forces to achieve battlefield superiority, but will also reduce the risk of casualties and close the technology gap with the United States.<sup>7</sup>

In the aftermath of Kosovo operations, the French Ministry of Defense issued a special assessment that would be used to establish priorities for the five year procurement plan starting in 2003. That report recommended that European armed forces concentrate on

the development of command and control systems, all-weather information systems, an autonomous satellite navigational system so as to remove sole dependency on the U.S. Global Positioning System, improved targeting and damage assessment capabilities, cruise missiles, all-weather strike capabilities, the suppression of enemy air defense systems, and logistic systems. The overall intent is to improve the interoperability of NATO coalition forces.<sup>8</sup>

### *Defense budget*

In 1997, France's military expenditures were \$41.5B (1997\$US), compared to \$45.5B (1997\$US) in 1991.<sup>9</sup> This level placed France 4<sup>th</sup> globally. At the same time, French procurement expenditures projections show a downward trend.

The planned total procurement expenditures over the 1999-2002 time-frame reflect a reduction of over \$3.3 billion from the long term Military Programme Law for the 1999-2002 period. These are in addition to reductions of some \$2.4 billion in the 1997 and 1998 budgets. This has, in turn, led to the suspension/termination of three missile programs, the decision to delay the start of all new space programs until 2002 and uncertainties in the quantities of fixed wing high performance aircraft which will be ordered for multi-year high buys.<sup>10</sup>

## **II. National Defense Industrial Base**

During the Cold War France took special pride in its national defense industry.<sup>11</sup> Independent of NATO, France equipped its armed forces largely from indigenous capabilities, to include its prestigious nuclear force. In the process, the French defense industrial base developed several leaders in global defense technology. French aircraft, space systems, tactical guided missiles, electro-optics and naval systems are recognized everywhere as among the most technologically advanced in the global market.

Leading traditional French defense industries include: Aerospatiale (missiles), Alcatel (space), Dassault Aviation (combat aircraft), Direction des Constructions Navales (DCN) (naval vessels), Eurocopter Group (helicopters), Hurel-Dubois (aircraft design, production, and maintenance), Lagardere (space, armored vehicles), SAGEM (control systems and optronics), Sextant Avionique (air and space avionics), Starsem (space), SNECMA (propulsion systems), and Thomson-CSF (defense electronics).<sup>12</sup>

The Direction Generale de l'Armement (DGA) is responsible for all French armament programs. It controls all research, development, and production. It also does its own research and development for all military services and monitors the activities of both nationalized and private firms involved in the armament process.<sup>13</sup>

### *French Global Top 100 Defense Industries*

In 1991 France had eight companies in the global top 100 defense industries as measured by annual defense revenue. Those eight companies had a combined defense revenue of about \$13.8B (1991\$US).<sup>14</sup> By 1999 that number had dropped to seven but the combined revenue had increased to \$14.5B (1999\$US).<sup>15</sup> Those seven companies are EADS, Thomson-CSF, DCN, Dassault Aviation, GIAT Industries, SNECMA, and SAGEM. Annual defense revenues for the largest French defense company in 1999 are \$6B, compared with \$4.8B in 1991. The largest French company (in terms of annual defense revenue) ranked 6<sup>th</sup> globally in 1999, compared with 11<sup>th</sup> globally in 1991. In 1999 France had two companies (the very newly formed transnational EADS and Thomson CSF) in the top 10 globally.

### **III. National Armament Strategy**

French armament strategy is an important case study in the current global transformation of defense industries and defense markets.<sup>16</sup> During the Cold War, the French defense industry ranked among the global leaders in production capability and capacity. Similar to the United States and the USSR, France's armament strategy was established to research, develop and produce indigenously virtually the entire range of armament systems needed to equip its armed forces. But now, changes to France's armament strategy are adjusting this indigenous acquisition strategy to the new market-oriented conditions of the post-Cold War economy and to new military requirements in a multi-polar world. This new strategy reflects French efforts to transform its defense industrial posture without completely undoing its existing foundation.

The formulation of a new overall armament strategy and defense procurement process for France involves a number of strategic goals. These goals include: developing multinational cooperation and improving its efficiency; restructuring the defense industry at the European level; increasing the accountability of the defense industry and systematically implementing competitive procurement procedures; and applying industrial methods to program management.<sup>17</sup> French acquisition policy is also now being geared increasingly toward off-the-shelf procurement.<sup>18</sup>

#### *The 1996 modernization initiative*

In 1995, confronted with both financial problems in the defense industrial base and the need to modernize the Armed Forces to meet the new French security concept, France appointed a Strategic Committee to review French defense and defense procurement policy. The committee investigated several French sacred cows, including the development of recommendations as to which sectors should be supported or not, what the size and organizational structures should be, and the right balance between purely indigenous vs. cooperative armaments development. The committee also developed recommendations on which defense procurements should be delayed, which should continue as programmed, and what the relative priorities for procurement should be. Military space programs were identified as top priority, the LECLERC Main Battle Tank and the TRANSALL transport aircraft program were kept on schedule, and the MICA, APACHE, FAMS, and TRIGAT

programs would be delayed. The TIGRE helicopter would be completed, but series production would be delayed in a way that would still allow export sales to continue.

The general directions of the recommendations were to move France away from a near total indigenous armament strategy, and much more toward a mix of indigenous and external acquisition, in spite of the potential impact on domestic high technology employment. Continued French arms exports were viewed to be indispensable to the future health of the defense industrial base.<sup>19</sup> The final goal of this comprehensive reform effort is to significantly reduce the costs of developing and procuring weaponry and other defense equipment, including the reduction of the costs and time schedules of major armament programs by 30 percent within six years.

In February 1996, French President Chirac announced the principal elements of the new defense policy. All existing major acquisition programs were to be continued, although perhaps with delayed schedules. Aerospatiale and Dassault were to merge within two years in order to create a strong French position in the European fixed-wing and helicopter market. Thompson-CSF is to begin the process of privatization as a catalyst to the complete restructuring of the defense electronics sector and the conversion of that sector to a form more attractive to private capital investors.<sup>20</sup>

In spite of the 1996 decisions, in 1998, as a part of budget-driven program review, France cancelled several armaments programs. These included the HORUS radar surveillance satellite, the Space Surveillance System, the TRIGAT LR anti-tank missile, the MACPED anti-tank mine, the MILAS ASW weapon, the APACHE-IZ cruise missile, and the future heavyweight torpedo. A decision was also made to procure the FTA transport aircraft off-the-shelf, with the contenders being the Airbus FLA, the Russian Antonov AN-70, and the US C-130J/C-17 package. A new advanced missile system would also be procured in the future on the international market.<sup>21</sup>

### *European armaments cooperation*

France strongly supports the development of a European-wide defense industrial base, preferably with France as the leader. France views Germany and the UK as the best collaborative partners and has several cooperative programs underway with these countries. These include the VBCI light armored vehicle, the COBRA radar system, the Horizon frigate, the MU90 torpedo, the Tiger Helicopter, the NH 90 helicopter, and the ANF, Apache/Scalp, and MILAS missile programs.<sup>22</sup> France also has been working with the UK on a new British requirement to acquire two new aircraft carriers in 2010-2015 and, along with Germany, on the future European combat aircraft planned for 2018.<sup>23</sup> France views the main objective of cooperative programs to be the sharing of non-recurrent costs and larger production runs. These objectives lead to the need to create transnational integrated European defense industries that decide on work share based on profitability.<sup>24</sup>

In 1997 European cooperative programs accounted for 15 percent of the total French defense procurement expenditures, but this percentage is expected to double by the end of the current Military Program Law (1997-2002) with Germany, Italy and the UK as the main partners.<sup>25</sup> Franco-British cooperation is considered essential, wide-ranging and continually moving forward despite occasional differences within the relationship.<sup>26</sup>

#### *French-US cooperation*

France also has several important Data Exchange Agreements (DEAS) with the United States. Currently over 350 DEAS cover such diverse areas of defense technology development as ceramic armor; advanced switching technology; electric guns; testing of robotic vehicles; chemical agent detectors; and missile seekers. Although France has its own advanced aviation industry, French purchases from the US aircraft industry represent additional avenues for technology acquisition. For example, France operates a fleet of Boeing AWACS, Lockheed C-130s, and also Northrop-Grumman E2C Hawkeyes. France is reportedly also interested in KC 135 tankers.

#### *Pan-European armaments strategy*

France supports the development of a European armaments policy focused on synchronizing requirements, integrating the defense industrial bases, and creating an institutional mechanism for cooperation that at the same time respects the strategic interests of the European states.<sup>27</sup> New European dependence on export markets is one of the main factors encouraging consolidation in order to improve European competitiveness against the “omnipresent Americans.”<sup>28</sup> Within a new consolidated and restructured common European industrial base, France is trying maintain a leadership position in those sectors that feature their technological strengths.<sup>29</sup>

The current major framework for European armaments cooperation is the Western European Armaments Group (WEAG), established in 1993 as a part of the Western European Union. The WEAG is focused generally on synchronizing requirements and programs, opening of defense markets to international competition, and the strengthening of the European defense industrial base.<sup>30</sup> It has moved at a relatively slow pace.

To precipitate more decisive action, in November 1996 France, along with Germany, Italy, and the UK, became a signatory to the establishment of the Organization Conjointe de Cooperation en matiere d'Armement (OCCAR). The intent of OCCAR is to improve the management, speed, and cost-effectiveness of cooperative programs. The four countries agreed to rationalize procurement procedures and program management, improve industrial competitiveness by lowering costs, and replacing the principle of *juste retour* for determining work share for specific programs by a more flexible time phased multi-program approach to balance costs and benefits.<sup>31</sup>

OCCAR's guiding principles also focus on the development of competition among its members, the establishment of integrated product teams, and preferential awards in

procurement decisions to OCCAR member states within the context of the OCCAR management framework.<sup>32</sup> OCCAR will start by assuming the management of five specific existing programs: the HOT, MILAN and ROLAND missiles, the BREVEL drone, and the TIGER helicopter.<sup>33</sup> The second phase of the program will assume the management of a much larger set of multilateral programs.<sup>34</sup> France views OCCAR and the Western European Armaments Organization to be building blocks leading to an eventual European Armament Agency.<sup>35</sup> Of the founding countries, France has handed over the largest share of its programs to OCCAR management.<sup>36</sup>

In July 1998 France also became a signatory with four other countries (Germany, The UK, Italy and Sweden) to a Letter of Intent to pursue better conditions for defense-industrial integration, eventually leading to a common framework for defense industrial restructuring.<sup>37</sup> In the short term, the objective is to develop common procedures, and in the mid-term the development of common policies. Several major issues still need to be addressed to prepare for transnational mergers. These include provisions for security of supply, rules for transferring technical information, sharing of research funding, and industrial security.<sup>38</sup> One of the explicit objectives of the Letter of Intent is to simplify procedures and thus encourage the creation of viable, technologically advanced, and commercial strong transnational companies.<sup>39</sup>

Some French industry leaders also feel that the defense industries are moving ahead on cooperative initiatives in the absence of resolved national guidance about what capabilities should be maintained on a national basis (in terms of future-oriented reserve capacities if not actual current production). Industries in each country are focused on resolving their own issues, which may lead to inconsistent decision making when viewed from a governmental pan-European perspective.<sup>40</sup>

### *The trans-Atlantic issue*

France encourages cooperative efforts with American companies on a reciprocal basis that is not detrimental to French long-term interests. At the same time, the size and power of the US defense giants is seen as an obstacle to trans-Atlantic industrial restructuring. European consolidation will create a balancing offset, and will facilitate further consolidations, especially if they involve mutual access to domestic markets and do not threaten national interests such as security of supply and the freedom to export.<sup>41</sup>

French industry views the potentials for cooperation with US companies to be difficult due to the stringent US export control regime and also the potentials for direct competition in global export markets.<sup>42</sup> Both French government officials and industrial leaders have complained about the length and unpredictability of the US export control process, citing it as a major obstacle to effective trans-Atlantic cooperation.<sup>43</sup> In the mid-1990's, as the French defense industry was suffering from domestic budget cuts, industry leaders encouraged the French government to pressure the Western European Union to adopt a policy of European preference in defense procurement unless the United States also provided open access for European companies to the US domestic defense market.<sup>44</sup>

In order to improve the prospects for trans-Atlantic cooperation, in November 1998 France signed, along with Germany, the UK, and the US, a new charter specifying 12 principles to strengthen cooperation. In the French view, this creates a new platform for trans-Atlantic cooperation and facilitates the restructuring of the European defense industry.<sup>45</sup>

### *Offsets*

France has no official offset policy. Nevertheless offset requirements are often included in large contracts.<sup>46</sup>

### *French acquisition reform*

The main organizational and decision making structure in the French acquisition process is the DGA (the Direction Generale de l'Armement), the national defense development and procurement agency, which was founded in 1961. This entity, which oversees all French armament programs and employs several tens of thousands of employees among its main technical directorates, is the link between French defense producers and the government and is a foundation for the French strategy to transform its defense industry. Reform of the DGA, moreover, is crucial to the most recent phase of the overall national defense modernization effort formally announced in early 1996.

In 1997, in response to the Chirac defense modernization plan, the DGA underwent significant restructuring to achieve better operational efficiency. This included the adoption of industrial program management methods and the widespread adoption of commercial rather than MILSPEC standards.<sup>47</sup> The reform of the DGA was the result of the work carried out by the head of the organization (Delegue General M. Jean-Yves Helmer), and a team of some 4,000 DGA employees.<sup>48</sup> A new structure of directorates was instituted to improve operating efficiency, including two directorates responsible for industrial policy actions and international cooperation and export issues. The DGA also developed a 30 year strategic plan to help guide further efforts. The plan is organized around eight system categories: nuclear deterrence; command, control, communications and information; strategic and tactical mobility; deep attack; land control; sea control; air control; and operations and maintenance.<sup>49</sup>

Some DGA changes focus on the development of improved capabilities to manage the French defense industrial base. Changes are being made to program management techniques in order to help contain overall costs, reduce the likelihood that requests for system modification will be introduced, and avoid premature obsolescence due to technical choices made too early in a program. New industrial methods are also intended to improve the ability of DGA directorates to negotiate global arms contracts with industry covering development, industrialization, and the first series production of a system.<sup>50</sup>

### *Arms Imports*

In 1997 France imported \$260M (1997\$US) compared with \$595M (1997\$US) in 1991.<sup>51</sup> This level placed France 36<sup>th</sup> globally.

## **IV. Perspectives on the International Arms Export Market**

Although France produces about 90 percent of its own armament requirements, the defense industry also exports to more than 25 countries.<sup>52</sup> Arms exports have traditionally played a broad role in French foreign policy. They are one method that France has traditionally used to assert its defense and diplomatic independence. During the Cold War, French arms exports also were viewed as contributing to the reduction of the dependence of the recipients on armaments from either the United States or the Soviet Union. Finally, arms exports are viewed as means of sustaining the French defense industrial base so that it can provide an indigenous capability to meet the needs of the French armed forces. Within France, there traditionally has been a broad multi-party consensus favoring arms exports.<sup>53</sup>

Because of this philosophy, in 1990 arms exports accounted for about one-third of France's total armament transactions. This figure steadily declined for the next five years. Moreover, the rate of decline for arms exports exceeded the rate of decline in domestic arms sales during this same period of time. By 1995 arms exports represented about one quarter of France's total arms transactions. In 1996, however, arms exports experienced a dramatic turnaround and rose by almost 50 percent, while domestic arms sales remained essentially the same. This trend continued in 1997 when arms exports increased approximately 30 percent and represented some 40 percent of France's total arms transactions.

At the same time, differences in the military-technical requirements of the French Armed Forces compared to those of France's export customers have raised doubts about the degree to which arms exports actually contribute to French independence. If long production runs are made of weaponry designed to meet French needs, then its appeal to potential customers is limited. On the other hand, if the technical production specifications are reduced to meet the needs of export customers, then the capabilities of the French Armed Forces suffer.<sup>54</sup>

### *Competitive advantage*

French industrial leadership believes that the fact that France has been slow to privatize its defense industry provides a market advantage with customers in the Middle East and Asia. These customers procure systems requiring delivery and support over perhaps a 30 year period. A nationalized company is more likely to be in existence over that duration than a private one.<sup>55</sup>

The DGA also believes that French competitiveness is better in the market for advanced systems than on lower-technology systems that can also be produced in countries that have a cheaper labor cost.<sup>56</sup> As a result, France continues to emphasize the high technology qualitatively advanced major weapons systems that are accompanied by relatively high price tags as the basis for its export strategy. For example, recently France began negotiations with Greece to deliver the French SCALP advanced long-range stand-off cruise missile.<sup>57</sup>

### *New markets*

In 1997 France developed a new strategic plan for arms exports. That plan contained four main guidelines: focused effort on areas where real possibilities exist as well on emerging markets; the primacy of the DGA as the main organization for government support to export activities; optimization of financial support; and streamlining of export control procedures. France also initiated a concerted effort to establish a position in the market for second-hand armaments, which is viewed to be a market entry strategy leading to new products.

France is focused on diversifying its export market by creating stronger political ties with friendly nations and through more concentrated efforts by French industry to expand to new markets. In 1998, one country, the UAE, accounted for 60 percent of French export revenue. Still, the temptation to focus on the most lucrative country or region provides a strong lure to the cash strapped defense sector to continue to mine regions with the highest short term potential for success.

France is especially focused on the Middle East and North African markets, viewing these to be a window of opportunity over the next five years as countries in those strategically important regions are moving to replenish their first line equipment. They may see France as an attractive alternative to sole dependence on the United States with its export control policies and potentials for supply interruption to support US foreign policy.<sup>58</sup> In the Dubai 2000 international aerospace exhibition, Aerospatiale, Matra-BAe Dynamics, Dassault Aviation, SNECMA, and Thomson CSF were all major exhibitors. French industry generally views the Middle East to be an especially lucrative defense market because of its unstable political environment and its oil and gas reserves.<sup>59</sup>

France is also courting India. In April 2000 the French Defense Minister visited India to help promote French arms exports. Systems being offered include 10 Dassault Mirage 2000H fighters, 25 Dassault Alfa Jets and the Thomson-CSF Cobra weapon locating radar, as well as French technical and management assistance on India's planned acquisitions of German HDW Type 75 submarines and on India's Air Defence Ship program.<sup>60</sup>

### *Support to externally imposed offset agreements*

French companies, supported by the French government, have demonstrated a willingness and capability to meet the demands of its arms customers for a wide range of offsets. For example:<sup>61</sup>

- In 1994 Pakistan purchased 3 Agosta-90B submarines from DCN Shipyards, at a cost of \$950 million over a multi-year period. There was technology transfer as the second submarine is being built with in the Karachi naval dockyard using material packages shipped from DCN Cherbourg. The third submarine will be built mainly in Pakistan.
- In 1994 a \$3.6 billion deal was signed between Saudi Arabia and Thomson-CSF for stealth frigates with training, spares, technical assistance and the construction of a naval base. Offsets included a 50/50 cost-sharing of new Saudi facility construction such as a gold treatment plant and a catalytic purification plant.
- In 1997 UAE bought 30 Mirage 2000-9 fighters and upgraded its existing 2000 fighters. The offsets involved the investment by Dassault Aviation in a variety of commercial non-defense related UAE companies.
- In 1998 Egypt bought VHF tactical communications systems worth several hundred million French francs from Thomson-CSF. Thomson in turn will transfer technology to allow manufacture of the radios in Egypt.

### *Export controls*

Although the French government heavily endorses the export market, France also maintains a series of export controls that require industry to receive approval at the time of initiating formal contact with potential customers, at the opening of negotiations, at the signing of a contract, and before equipment can be physically exported. Approvals are valid for a three year period. Export controls procedures are executed by the Ministry of Defense, although the Minister of Economics authorizes the physical shipment in conjunction with the Ministers of Defense and Foreign Relations.<sup>62</sup>

France has also not hesitated to use export controls to head off situations she views to be dangerous. For example, in 1999 France stopped delivery to Pakistan of an Agosta class submarine with Exocet missiles. The reason was the possibility of a military takeover of the Pakistani government.<sup>63</sup> Recently France has also concentrated on working with US officials to increase US confidence in the adequacy of French export control policies in order to promote greater collaborative efforts between France and the United States.<sup>64</sup>

### *Arms exports*

In 1997 France's arms export level was \$5.9B (1997\$US), compared with \$2.4B (1997\$US) in 1991.<sup>65</sup> This placed France 3<sup>rd</sup> globally.

#### **IV. Transformations in the Defense Industrial Base**

French defense industry, like most of its counterparts throughout Europe, has experienced profound change since the end of the Cold War.<sup>66</sup> Chief among the causes of these changes has been the reduction in government defense expenditures. These changes have led to delays and cancellations of many French armament program, demanding that the DGA develop and implement new strategies to revitalize, if not to prevent the further erosion of, France's defense industry.

France's cash strapped naval shipbuilding industry—recognized globally for its overall excellence in producing high-quality naval vessels—is representative of the problems that are currently facing the defense industry. As described by Defense Minister Alain Richard, "France's shipyards are faced with responding to a limited number of new vessels ordered by the French Navy and a long time span between each new order. Thus, the industry can neither maintain its competence nor the diversity of its industrial site."<sup>67</sup>

In the early 1990's the French aerospace industry was especially affected by the shrinking domestic and foreign defense markets. Nevertheless R&D expenditures remained high, although the proportion funded by industry increased as government funding declined. Some companies adapted diversification strategies, while others tried to dominate niche markets. Mergers were also initiated to both preserve national capabilities and also to enhance new market penetration. The export market was viewed to be crucial to continued defense industrial viability.<sup>68</sup> The export market for optronics was viewed to be especially important in light of the shrinking domestic market.

French defense industry in the 1980's was principally state owned. In 1986 France owned 50 percent of Matra and 46 percent of Dassault-Breguet, and had full ownership of Aerospatiale, SNECMA, and Thomson.<sup>69</sup> The French defense reforms of 1996 initiated a major effort to reform the size and ownership of national defense industries. The reforms called for the privatization of state-owned electronics giant Thomson, and the merger of Aerospatiale and Dassault.<sup>70</sup> Major restructuring occurred in 1998 when defense electronic activities of Alcatel and Dassault Electronique were integrated into the Thomson-CSF Group and a joint-venture satellite company was established by Alcatel, Aerospatiale, and Thomson-CSF. These mergers are the initial steps of a 30 year plan developed to assist the French Defense Ministry in selecting equipment, guiding upstream research and engineering work and defining policy in the various technical domains of the arms industry.

##### *Aerospatiale and Dassault*

In 1999, the merger of Matra Haute Technologies and the then-state-owned Aerospatiale created the Aerospatiale Matra group. This new company has combined annual sales of \$14.85 billion, making it the world's fifth largest aerospace and defense company. The company's principal interests are in helicopters, satellites and rocket launchers.<sup>71</sup> At the

time of this merger, the privatization plan would have 48 percent stock ownership by France, 33 percent by the Lagardere Group, 16 percent publicly traded, and 3 percent employee-owned. Prior to this merger, Matra was owned entirely by the Lagardere Group and Aerospatiale had reorganized most of its activities into four wholly-owned subsidiaries: Aerospatiale Airbus, Aerospatiale ATR, Aerospatiale Missiles, and Aerospatiale Strategic and Space Launchers.

In 1999, seeking expanded partnership relationships in the defense sector, Dassault Aviation also announced that it is considering splitting into separate military and commercial entities, both 100 percent owned by Dassault Aviation.<sup>72</sup> In 1999 Dassault Aviation internally separated its civilian from its military activities in order to save costs and also to prepare for a formal division into two separate companies.<sup>73</sup>

### *DCN and Giat*

France also has announced the restructuring of its financially-troubled chief naval and land industries, DCN and Giat.

DCN has faced declining domestic orders coupled with legal and political constraints that have prohibited workforce reduction. In turn, these have influenced both costs and effectiveness, which have made it more difficult to compete effectively in export markets.<sup>74</sup> In 1999 the French government unveiled a new plan to restructure DCN to make it more competitive and attractive to foreign European partners. DCN will be reorganized into three main activities: combat systems and equipment, new construction, and maintenance. The aim is to strengthen DCN in areas in which it can compete successfully in international markets, with a goal of winning 30 percent market share in its class of products. At the same time, all of DCN's main facilities are in regions in which they are the main or sole employer, so the French government has a collateral requirement to maintain employment in those regions.<sup>75</sup> DCN is actively search for new alliances, partnerships, and cooperative agreements focused on international markets.<sup>76</sup> DCN also entered into a joint partnership with Thompson-CSF to create UDS International, focused on the global market for submarine combat systems.<sup>77</sup>

Giat, created in 1990 out the reorganization of state arsenals, was in near bankruptcy in 1996. One contributing factor was a large order from the UAE for Giat's LeClerc tanks. The fixed price contract was signed with US dollars as the exchange medium at a fixed exchange rate. Dollar devaluation against the franc forced Giat to absorb the loss.<sup>78</sup> Giat is involved a major reorganization to improve its financial performance. This will include closure or divestiture of five industrial sites and reducing 40 percent of the workforce.<sup>79</sup>

Traditional competitors Giat industries and Vickers plc (UK) also are creating a joint venture company to bolster their flagging armored vehicle sales.<sup>80</sup> The new company will focus on the development and production of main battle tanks and the modernization of existing products.<sup>81</sup> Vickers had been operating at a profit but was faced with the lack of further orders to produce its Challenger tank series after 2002. Given the decreasing

markets for the two rival main battle tanks, some sort of consolidation is increasingly inevitable. The new joint venture will engage in studies, marketing, and sales of future generations of main battle tanks to include the modernization of existing products. In parallel, Giat is gradually withdrawing from the small arms sector, concentrating its efforts on armored fighting vehicles and heavy/medium caliber artillery.<sup>82</sup> As a part of its restructuring plan, Giat halved its workforce and reduced its sites from fourteen to nine. Giat intends to concentrate on defense products with the exception of a few specific dual-use technologies that it intends to try and commercialize.<sup>83</sup>

### *Thomson-CSF*

Thomson-CSF initiated efforts to lead European-wide restructuring and consolidation in the defense electronics sector. In October 1998 Thomson operations were reorganized into eight business groups more closely mirroring global markets: airborne systems; avionics systems; communications systems; information systems and services; naval systems; optronics; air security and missile systems; and tubes and components.<sup>84</sup> In 1999 Thomson acquired Dassault Electronique and merged it with two Thomson companies to create a new Thomson subsidiary, Thomson-CSF Detexis. The new company will be a European leader in electronic warfare systems. Thomson-CSF also formed a joint venture with Racal (UK) focused on global military digital access networks, and subsequently acquired Racal in its entirety.<sup>85</sup> Recently Thomson-CSF also took initiatives to compete more effectively in the European missile sector and to expand its UK defense business with the acquisition of Shorts Missile Systems.<sup>86</sup> The company has also begun the process of privatization, shifting from a fully government owned company to one in which Dassault, Alcatel, and other smaller companies have the majority interest.<sup>87</sup> The Alcael relationship is focused on combining the research efforts of the two companies to support both defense and civilian markets, with special emphasis on hyper-frequency microelectronics, optronics, internet technologies, digital TV and radio networks, and electronic banking systems.<sup>88</sup>

Thomson-CSF is concentrating heavily on global markets with emphasis on local presence. The company recently purchased the South African company ADS as a part of the process of supplying the South African Navy with new corvettes. Thomson-CSF also recognizes the need for a close relationship with the US defense industry, and has seventeen joint projects with Raytheon focused on European and NATO markets.<sup>89</sup> Recently Thomson-CSF and Raytheon announced the formation of a new joint venture in ground-based radar and air defense command and control systems as a new step toward a broader strategic alliance.<sup>90</sup> In 1999 the company signed a strategic partnership agreement with the Saudi-Arabian company AEC to manufacture defense electronic (especially optronic) systems in order to help Saudi Arabia move toward greater national independence.<sup>91</sup> Furthermore Thomson-CSF Transfied team was the successful bidder for the purchase of Australia's largest defense company, ADI Ltd, thus gaining a major foothold in the Australian and adjacent defense markets.<sup>92</sup>

Thomson-CSF also signed an agreement to acquire 50 percent of Korea's Samsung Electronics, creating a new Korean company that will offer a full suite of systems and subsystems in the areas of optronics, military communications, naval combat systems, and air defense systems. Thomson-CSF rationale for the acquisition included both the long-term prospects of the South Korean defense market as well as an improved market position in all Northeast and Southeast Asian markets.<sup>93</sup> Subsequently Thomson-CSF was awarded a new contract to provide surveillance and fire control systems for a new Korean surface-to-air short-range missile system. The contract will involve the progressive transfer of technology to the new Thomson-Samsung joint venture company.<sup>94</sup> The joint venture is also expected to be the recipient of technology transfer from other Thompson-CSF divisions and, in turn, to greater exports of defense electronic equipment from South Korea to the international arms market.<sup>95</sup>

Globally Thomson-CSF has been pursuing an aggressive strategy of acquiring medium-size companies with strong domestic market position and creating from them a global network that is both diverse and close to principal customers.<sup>96</sup> This strategy to date has created the situation in which about 70 percent of Thomson-CSF business comes from abroad and only 30 percent from within France.<sup>97</sup> Although the company's historical strengths have been in specific defense electronic sectors, Thomson is also currently heavily focused on developing new systems integration and prime contract management business.<sup>98</sup> Thomson-CSF also has a strong linkage with EADS, receiving about 30 percent of its revenues via EADS contracts.<sup>99</sup>

### *European consolidation*

In the early 1990's French leadership called for major changes in the European defense industrial infrastructure to head off "suicidal worldwide competition."<sup>100</sup> Industrial consolidations had already started, especially in the missile sector, but government rationalization had fallen behind. The issue of preserving the French industrial and technology base was considered to be a separate one from that of European defense integration. There was also the separate issue of finding practical ways to stay abreast of rapidly changing technology without losing capabilities to design and produce in the interim. To meet the current realities, interdependence between European nations was viewed to be essential since the small size of national production runs did not warrant major investments.

Within France, many believed that national level rationalization of the French defense industry would be ineffective without accompanying, and consistent, European-wide rationalization. At the same time, the possibility that French companies may have to merge with, or even become acquired by, a foreign company was not viewed favorably. One approach being promoted to resolve this dilemma is that of European-wide defense industry specialization within countries with guaranteed access of the other countries to the products. For example France would no longer produce naval vessels, but would

procure those from the UK or Germany, and those countries would procure their combat aircraft from France.<sup>101</sup>

French officials support the creation of common European defense industry capable of better operating head to head with the Americans in the international arms market. France supports the emerging European model of a defense industrial base based on a group of transnational companies that are world leaders in their specific niche areas, available to support global system manufacturers. France sees this to be different from the American model that has resulted in large defense giants that span many systems areas.<sup>102</sup> The model being pursued with Europe for restructuring is focused on specific business sectors, in contrast to the American model that has created a few large companies operating in many sectors. European restructuring efforts have focused on missiles, helicopters, satellites, and anti-submarine warfare, with fighter aircraft, land vehicles and ammunition, and shipbuilding remaining to be restructured.<sup>103</sup>

### *Other activities*

In 1994 France signed a memorandum of agreement between the DGA and the Russian Minister of Defense to focus on cooperative development of armaments. Although recognizing the operational difficulties of working with Russia, the DGA viewed this to be profitable line to pursue, as well as the joint development of commercially viable products. France especially focused on her capabilities in science and technology, and especially advanced mathematical analysis, software development, and the design of complex systems.

The French government is also the main shareholder of a private consulting company, Defense Conseil International, whose purpose is to provide operational and program management consulting to foreign governments in the early states of cooperative advanced-technology armaments programs.<sup>104</sup>

In 1999 four French aerospace companies—Dassault Aviation, Aerospatiale Matra, Thomson-CSF, and Snecma—jointly purchased 20 percent of the Brazilian aircraft manufacturer Embraer. The intent was to be able to work cooperatively to develop and produce new technologies and products for new markets. An expected Brazilian program to replace its aging fighter aircraft provided impetus for the move, coupled with the potentials for providing similar products and services to replace the aging fighters of other Latin American countries.<sup>105</sup> Embraer expects to gain access to technologies and commercial networks and the French companies will gain a stronger position in the Latin American defense market. Embraer is also shifting to focus more of its efforts on the global arms market and the French companies will facilitate market entry.<sup>106</sup>

### *EADS*

At the end of 1997, as a part of multi-lateral discussion about ways to improve the European armaments processes and the competitiveness of the collective European

defense industries, the governments of France, Germany, and the UK stated their intent to work together toward a restructured aerospace sector. This restructuring would lead to the gradual establishment of a single company, the European Aerospace and Defence Company (EADC).<sup>107</sup> However in 1999, with the merger of British Aerospace and GEC Marconi that created BAe Systems, French public and private leadership generally believed that progress toward the EADC had been set back.<sup>108</sup>

Nevertheless, subsequent secret negotiations between Lagardere and Daimler-Chrysler Aerospace led to the creation of the European Aeronautic, Defense, and Space Company (EADS), announced in October 1999. EADS merges Aerospatiale Matra (France), Daimler-Chrysler Aerospace (Germany), and Construcciones Aeronauticas S.A. (Spain) into Europe's biggest aerospace company with annual revenues of about \$20B. EADS also will own 46 percent of the Eurofighter consortium.<sup>109</sup> After receiving regulatory approval from appropriate bodies in France, the EU, and the United States, the company will be listed on several major stock exchanges. EADS is a fully private company. Although some governments are minority and indirect shareholders, they will not be allowed to affect operational management. EADS has been created as a structure that does not prevent further acquisitions, but for which the normal mode will instead be to have joint ventures with major partners. EADS leadership anticipates that several trans-Atlantic partnerships and joint ventures may develop over the next several years; however political constraints will preclude full trans-Atlantic defense mergers at least in the short term.<sup>110</sup>

In further developments, in early 2000 Aerospatiale Matra, BAE SYSTEMS, and Finmeccanica agreed to create a new missile company that will be the second largest in the world (behind Raytheon) with combined revenues of \$2.5B. The new company will be created by combining Alenia Marconi Systems (Finmeccanica), Aerospatiale Matra's missile business, and Matra Bae Dynamics, and will operate under the auspices of EADS.<sup>111</sup> The corporate objective of the new company is to overtake Raytheon as the world's leading missile producer.<sup>112</sup>

In addition to its established product lines, EADS intends to expand into the services and operations markets because of both the longevity of EADS platforms and also the trend toward outsourcing of services in EADS customer base. EADS also has as an objective the penetration of the US defense market, which it sees to be the "world's single most important defense market."<sup>113</sup> EADS currently has established relationships and cooperative activities with Lockheed Martin, Boeing, Raytheon, and Northrop Grumman.

EADS leadership views its challenges in the defense business to be fivefold: (a) ensure profitable growth for shareholders; (b) introduce new management skills and compensation policies; (c) introduce high technology innovations such as robotics and nanotechnologies; (d) work towards both greater European convergence in defense and security and trans-Atlantic cooperation; and (e) expand into services and operations markets.<sup>114</sup>

### *Smaller companies*

Although restructuring is well underway in the large defense industries, there probably will be another round involving the smaller defense companies. Survival strategies for those companies include: restructured operations to promote efficiency and reduce costs; acquisition of competitors to increase size or gain complementary capabilities; foreign joint ventures or acquisitions to gain international market access; and diversification into commercial markets.<sup>115</sup> Other opportunities are also becoming available to subcontract to the larger restructured French defense prime contractors as those companies focus increasingly on their specific core competencies and subcontract all other work.<sup>116</sup>

The DGA is also taking steps to try and insure the continued viability of small and medium size enterprises in the defense industrial base, who are increasingly asked by the prime contractors to absorb the costs of research, development, and capital production equipment. Financial set-asides for small and medium enterprises, as well as brokering assistance to help them stay engaged with both the government and the primes, are methods that the DGA is using.<sup>117</sup>

## **VI. Risks and Concerns**

- New French security policy has created a broad requirement to modernize her conventional military forces. At the same time, French procurement expenditures projections show a downward trend. Programs are being delayed.
- Differences in the military-technical requirements of the French Armed Forces compared to those of France's export customers have raised doubts about the degree to which arms exports actually contribute to French independence. If long production runs are made of weaponry designed to meet French needs, then its appeal to potential customers is limited. On the other hand, if the technical production specifications are reduced to meet the needs of export customers, then the capabilities of the French Armed Forces suffer.
- Within France, many believe that national level rationalization of the French defense industry will be ineffective without accompanying, and consistent, European-wide rationalization. At the same time, the possibility that French companies may have to merge with, or even be acquired by, a foreign company is not viewed favorably. French goals of a genuine consolidated European defense industry may be only partly fulfilled due to substantial disagreements among the Europeans arising from nationalistic imperatives.
- Because European-wide restructuring has been proceeding slowly, defense industries in each country are making their own restructuring decisions to resolve their own issues. French leaders are concerned that this may result in inconsistent industrial decision making when viewed from a governmental pan-European perspective

- The size and power of the US defense giants is seen as an obstacle to trans-Atlantic industrial restructuring. French industry views the potentials for cooperation with US companies to be difficult due to the stringent US export control regime and also the potentials for direct competition in global export markets.

## **VII. Some Observations**

- France is moving away from a near total indigenous armament strategy, and much more toward a mix of indigenous and external acquisition in spite of the potential impact on domestic high technology employment. French acquisition policy is also now being geared increasingly toward off-the-shelf procurement. Continued French arms exports are viewed to be indispensable to the future health of the defense industrial base.
- France supports the development of a European armaments policy focused on synchronizing requirements, integrating the defense industrial bases, and creating an institutional mechanism for cooperation that at the same time respects the strategic interests of the European states (preferably with France as the leader). New European dependence on export markets is one of the main factors encouraging consolidation in order to improve European competitiveness against US companies.
- France supports the emerging European model of a defense industrial base based on a group of transnational companies that are world leaders in their specific niche areas and are available to support global system manufacturers. France sees this to be different from the American model that has resulted in large defense giants that span many systems areas.
- Some French leaders promote European-wide defense industry specialization within countries with guaranteed access of the other countries to the products. For example France would no longer produce naval vessels, but would procure those from the UK or Germany, and those countries would procure their combat aircraft from France.
- French arms exports are especially focused on the Middle East and North African countries as states in those strategically important regions are moving to replenish their first line equipment. They may see France as an attractive alternative to sole dependence on the United States with its export control policies and potentials for supply interruption to support US foreign policy.
- In addition to its established product lines, EADS intends to expand into the services and operations markets because of both the longevity of EADS platforms and also the trend toward outsourcing of services in EADS customer base. EADS also has as an objective the penetration of the US defense market, which it views as the world's single most important defense market.

- Globally Thomson-CSF has been pursuing an aggressive strategy of acquiring medium-size companies with strong domestic market position and creating from them a global network that is both diverse and close to principal customers. This strategy to date has created the situation in which about 70 percent of Thomson-CSF business comes from abroad and only 30 percent from within France.

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## ENDNOTES

<sup>1</sup> *Defense White Paper*, Ministry of Defense, Paris, 1994

<sup>2</sup> Unattributed, "European Diversification and Defense Market Guide," U.S. Department of Commerce, 1997. [<http://www.doc-bxa.bmpcoe.org/iddma-guides-europe.html>].

<sup>3</sup> Unattributed, *La Defense Nationale*, French Ministry of Defense, [[http://www.defense.gouv.fr/def\\_natio/anglais/why.html](http://www.defense.gouv.fr/def_natio/anglais/why.html)], downloaded January 10, 2000.

<sup>4</sup> Brig. Alain Baer, editor, *Reflections on the Nature of Future Defense Systems*, Cahiers du CREST, No. 12, November 1993.

<sup>5</sup> François Géré, "Nuclear Weapons and Operations Outside One's Borders," in *Tomorrow...in the Long Shadow of the Nuclear Weapon...* CREST-École Polytechnique, Paris, 1996.

<sup>6</sup> *European Diversification and Defense Market Guide*, op. cit.

<sup>7</sup> Alain Richard, French Minister of Defence, interviewed in JAC Lewis, "Interview," *Jane's Defence Weekly*, April 26, 2000, p. 34.

<sup>8</sup> Christina MacKenzie, "France's Defense Ministry Calls for Interoperability," *Defense News*, January 12, 2000, p. 24.

<sup>9</sup> *Worldwide Military Expenditures and Arms Transfers, 1998*, Department of State Bureau of Arms Control, Washington DC, January 2000.

<sup>10</sup> Jean-Marc Tanguy, "France Programme Review-In the Middle of the Rubicon", *Military Technology MILTECH*, June 1998, p 98.

<sup>11</sup> Some information for this section is derived from *French Defense Monitor*. FDM was a monthly newsletter produced by SAIC's Foreign Systems Research Center from August 1994-December 1996 that analyzed French open source literature regarding changes in military doctrine, combat concepts and the RMA, weapons development and acquisition policy, and other important French national security topics.

<sup>12</sup> Benjamin Machmud, "French Aerospace Industry," *Asian Defence Journal*, July 1999, pp. 22-28, and Izaak Zulkarnen, "Full Speed Ahead for the French Naval Industry," *Asian Defence Journal*, May 1999, p. 22.

<sup>13</sup> *European Diversification and Defense Market Guide*, op. cit.

<sup>14</sup> Unattributed, "Worldwide Defense Companies Ranked by Estimated Defense Sales for 1991," *International Defense Review Defense'93*, 1993, pp. 33-55.

<sup>15</sup> Unattributed, "Defense News Top 100," *Defense News*, August 7, 2000, p. 14.

<sup>16</sup> J. Battilega et al, "France: Selected Aspects," in *An Introduction to Global RDA Processes*, SAIC-96/6006&FSRC/B, Science Applications International Corporation, Denver, November 1996.

<sup>17</sup> Jacques de Lestapis "High Stakes Mergers", *Armed Forces Journal International*, June 1999, p. 48.

<sup>18</sup> LT. Gen. Jean Fournet, French National Armaments Director, "European-US Balance: French Seek Interdependence on Continent," *Defense News*, February 22, 1999

<sup>19</sup> Jean-Paul Philippe, "Bracing for the Storm," *Military Technology*, March 1996, pp. 32-33.

<sup>20</sup> Philippe, op. cit., p. 37.

<sup>21</sup> Jean-Marc Tanguy, "France's Programme Review," *Military Technology*, July 1998.

<sup>22</sup> *European Diversification and Defense Marketing Guide*, op. cit.

<sup>23</sup> de Lestapis, op. cit., p. 52.

<sup>24</sup> Fournet, op.cit., p. 33.

<sup>25</sup> "The New DGA," *Military Technology- MILTECH*, March 1997, p. 37.

<sup>26</sup> *Ibid.*, p. 42.

- 
- <sup>27</sup> Unattributed, *The French Armaments Policy*, French Ministry of Defense, [[http://www.defense.gouv.fr/titre\\_ang.html](http://www.defense.gouv.fr/titre_ang.html)], downloaded January 10, 2000.
- <sup>28</sup> Jacques Loppion, Chairman and CEO of Giat, in de Lestapis, op. cit., p. 52.
- <sup>29</sup> de Lestapis, June 1999, op. cit., p. 48.
- <sup>30</sup> *The French Armaments Policy*, op. cit.
- <sup>31</sup> Giovanni de Briganti, "French Officials To Head Europe's JACO," *Defense News*, November 11, 1996, p. 32, and *The French Armaments Policy*, op. cit.
- <sup>32</sup> Fournet, op. cit., and *The French Armaments Policy*, op. cit.
- <sup>33</sup> Brig. Gen. Dipl.-Ing. Peter Kuhn, Director of Equipment and Technology for Land Forces, German Ministry of Defense, "International Cooperation for Army Equipment and Technology," *Military Technology*, February 1999, pp. 119-120.
- <sup>34</sup> Briganti, November 11, 1996, op. cit.
- <sup>35</sup> Fournet, op. cit.
- <sup>36</sup> MacKenzie, November 29, 1999, op. cit.
- <sup>37</sup> Jean-Yves Helmer, French National Armaments Director, in "Cooperating with Germany in Defence Procurement," *Military Technology*, Special Issue, February 1999, p. 126.
- <sup>38</sup> Fournet, op. cit., and *The French Armaments Policy*, op. cit.
- <sup>39</sup> *The French Armaments Policy*, op. cit.
- <sup>40</sup> Jacques Loppion, President and General Director, Giat Industries, interviewed in "Giat Industries: Consolidation and Development," *Military Technology*, July 1998, pp. 103-104.
- <sup>41</sup> Fournet, op. cit.
- <sup>42</sup> Bruno Revellin-Falcoz, Executive Vice President, Dassault Aviation, in Theresa Hitchens, "French Address U.S. Jitters/Seek To Boost Confidence in Paris' Ability to Keep Secrets," *Defense News*, March 22, 1999, p. 3.
- <sup>43</sup> Richard Smith, "U.S. Export Rule Under Fire at Symposium," *Defense News*, January 10, 2000, p. 18.
- <sup>44</sup> Giovanni de Briganti, "French Body Fears Flight of Defense Industry," *Defense News*, October 23, 1995, p. 1.
- <sup>45</sup> Jean-Yves Helmer, Delegeue General Pour L'Armement, in de Lestapis, op. cit., p. 48.
- <sup>46</sup> *European Diversification and Defense Market Guide*, op. cit.
- <sup>47</sup> Unattributed, "The New DGA," *Military Technology*, March 1997, pp. 37-42.
- <sup>48</sup> Ibid.
- <sup>49</sup> Christina MacKenzie, "OCCAR Gains in Importance for French Procurement," *Defense News*, November 29, 1999, p.26.
- <sup>50</sup> Jean-Louis Fache, Deputy Director Aerospatiale, "From Cooperation to Consolidation," *Military Technology-MILTECH*, March 1998, p.83.
- <sup>51</sup> *Worldwide Military Expenditures and Arms Transfers 1998*, op. cit.
- <sup>52</sup> *European Diversification and Defense Market Guide*, op. cit.
- <sup>53</sup> Christian Catrina, *Arms Transfer and Dependence*, United Nations Institute for Disarmament Research, Taylor and Francis, New York, 1989, p. 95.
- <sup>54</sup> Catrina, op. cit., p. 96.
- <sup>55</sup> Loppion, July 1998, op. cit., p. 105.
- <sup>56</sup> Christina MacKenzie, "Defense Ministry: France Must Diversify Arms Exports/Urges Industrial, Political Outreach to Broaden Sales," *Defense News*, March 15, 1999, p. 20.
- <sup>57</sup> Frederic Aragon, spokesman for Matra BAe, in Douglas Barrie and Christina MacKenzie, "Matra BAe Courts Greece to Buy New Cruise Missile," *Defense News*, July 24, 2000, p. 24.
- <sup>58</sup> Serge Brosselin, "French Defence Industry Achieves Export Comeback," *Military Technology*, February 1998, pp. 37-42.
- <sup>59</sup> Jean-Paul Bechat, Chairman of the French Aerospace Industry Association and CEO of SNECMA, in Unattributed, "French Companies Focus on Middle East," *Defense Systems Daily*, [<http://dubai2000.org/d2page2.htm>].
- <sup>60</sup> Unattributed, "French Defence Minister Visits for Hard Sell," *Asian Military Review*, July 2000, p. 58.

- 
- <sup>61</sup> Arms Research Project, Plymouth International Studies Center, University of Plymouth (UK) at [www.politics.plymouth.ac.uk/politics/pisc/arms].
- <sup>62</sup> Catrina, op. cit., p. 97.
- <sup>63</sup> Unattributed, "France Stops Delivery of Submarine to Pakistan," *The Hindu*, October 25, 1999.
- <sup>64</sup> Hitchens, op. cit.
- <sup>65</sup> *Worldwide Military Expenditures and Arms Transfers 1998*, op. cit.
- <sup>66</sup> Unattributed, "France: Military Turnover 1990-1997 (figures from Délégation Générale pour l'Armement)," SIPRI Arms Production, [http://www.sipri.se/projects/milhex/aprod/natdata/country/franceprod.html].
- <sup>67</sup> Ricard's views of the French Shipbuilding industry were presented by Christina Mackenzie in "France to Restructure its Cash Strapped Shipyard", *Defense News*, May 24, 1999, p.8.
- <sup>68</sup> Clifford Beal, "French Aerospace Equipment Sector Faces Tough Climbout," *International Defense Review*, July 1994, pp. 83-84.
- <sup>69</sup> Catrina, op. cit., p. 98.
- <sup>70</sup> de Lestapis, op.cit., pp. 48-52.
- <sup>71</sup> Loppion, July 1998, op. cit., p. 103.
- <sup>72</sup> Christina MacKenzie, "Dassault Aviation Studies Value of a Civil-Military Split," *Defense News*, March 15, 1999, p. 28.
- <sup>73</sup> Unattributed, "Dassault Splits Military and Civil Operations," *Defence Systems Daily*, October 21, 1999, [http://defence-data.com/current/page5578.htm].
- <sup>74</sup> Philippe, op. cit., p. 34.
- <sup>75</sup> Alain Richard, French Defense Minister, in Christina MacKenzie, "France to Restructure Its Cash-Strapped Shipyard," *Defense News*, May 24, 1999, p. 8.
- <sup>76</sup> Christina MacKenzie, October 18, 1999, op. cit.
- <sup>77</sup> Zulkarnen, op. cit.
- <sup>78</sup> Philippe, op. cit., p. 35.
- <sup>79</sup> Christina MacKenzie, October 18, 1999, op. cit.
- <sup>80</sup> Jacques Loppion, July 1998, op. cit., pp. 102-105.
- <sup>81</sup> Douglas Barrie, "Anglo-French Armor House Begins to Take Shape," *Defense News*, January 25, 1999, p. 20.
- <sup>82</sup> Loppion, July 1998, op. cit., p. 103.
- <sup>83</sup> Jacques Loppion, Chairman and CEO, Giat Industries, Interview, in "One on One," *Defense News*, June 26, 2000, p. 78.
- <sup>84</sup> Denis Ranque, Thomson-CSF Chairman and CEO, in Cameron Butterworth, "Thomson-CSF Will Bring New Defence Technology to Australia," *Asia-Pacific Defence Reporter*, December 1999, p. 62, and Douglas Barrie, "Thomson-CSF Takes on Bowman," *Defense News*, January 24, 2000, p. 1.
- <sup>85</sup> Eric Kulisch, "Merger Creates New European EW Firm," *Defense News*, January 25, 1999, p. 20.
- <sup>86</sup> Douglas Barrie, "Thomson-CSF Bolsters U.K. Presence With Buy of Shorts," *Defense News*, January 1, 2000, p. 16.
- <sup>87</sup> Unattributed, "Alcatel, Thomson-CSF Reinforce Strategic Partnership," *Defence Systems Daily*, November 8, 1999, [http://defence-data.com/current/page5725.htm].
- <sup>88</sup> Christina MacKenzie, "Thomson-CSF, Alcatel Maximize Research Synergies," *Defense News*, November 29, 1999, p. 24.
- <sup>89</sup> A.W. Grazebrook, "Thompson-CSF: The Road Ahead," *Asian-Pacific Defense Reporter*, August/September 1999, p. 39, and Unattributed, "Raytheon-Thomson-CSF Awarded FLORAKO AD Contract," *Defence Systems Daily*, November 17, 1999, [http://defence-data.com/current/page5832.htm].
- <sup>90</sup> Brooks Tigner, "Raytheon and Thomson-CSF Plan Joint Venture in Radar," *Defense News*, July 3, 2000, p. 1.
- <sup>91</sup> Unattributed, "Thomson-CSF, AEC Sign Optronics Agreement," *Defence Systems Daily*, November 17, 1999, [http://dubai2000.org/d2paged42.htm].
- <sup>92</sup> Butterworth, op. cit., pp. 62-63.

- 
- <sup>93</sup> Unattributed, "Samsung, Thomson-CSF Form Joint Venture," *Defence Systems Daily*, November 1, 1999, [<http://defence-data.com/current/page5622.htm>].
- <sup>94</sup> Unattributed, "Thomson-CSF Captures S. Korean Missile Contract," *Defense News*, January 10, 2000, p. 12.
- <sup>95</sup> Unattributed, "Samsung/Thomson-CSF Partnership Expands Defense Market," *Jane's International Defense Review*, June 2000, p. 12.
- <sup>96</sup> Denis Ranque, Chairman, Thomson-CSF, in JAC Lewis, "French Giant Takes a Slice of S. Korean Market," *Jane's Defence Weekly*, November 10, 1999, p. 3.
- <sup>97</sup> Francis Tusa, "The French Defence Industry: Changing for an Uncertain Future," *Asian Military Review*, May/June 2000, p. 38.
- <sup>98</sup> Butterworth, op. cit., p. 64.
- <sup>99</sup> Thomas Enders, Head of Defence and Civil Systems, EADS, Interview in "One on One," *Defense News*, July 31, 2000, p. 38.
- <sup>100</sup> Henri Conze, French Delegeue General Pour l'Armement, interview in "Extending the Hand of Cooperation," *International Defense Review*, February 1994, pp. 29-30.
- <sup>101</sup> Philippe, op. cit., p. 34.
- <sup>102</sup> *The French Armaments Policy*, op. cit.
- <sup>103</sup> Jean-Yves Helmer, General Director, DGA, in Christina MacKenzie, "France Uses European Model of Restructuring," *Defense News*, October 18, 1999, p. 78.
- <sup>104</sup> Yves Sillard, Chairman and Managing Director, Defense Conseil International, interviewed in John Roos, "From the Boardroom: Yves Sillard," *Armed Forces Journal International*, August, 1994, p. 46.
- <sup>105</sup> Unattributed, "French Group to Take Embraer Stake," *Defence Systems Daily*, October 25, 1999, [<http://defence-data.com/current/page5601.htm>].
- <sup>106</sup> Simon Romero, "French to Buy Brazilian Aircraft Stake," *New York Times*, October 26, 1999.
- <sup>107</sup> Jean-Yves Helmer, February, 1999, op. cit., p. 126.
- <sup>108</sup> de Lestapis, op. cit., p. 48.
- <sup>109</sup> Christina MacKenzie, "Will Dassault Shift Direction Under a New Leader?," *Defense News*, February 28, 2000, p. 58.
- <sup>110</sup> Jean-Louis Gergorin, Group Managing Director, Strategic Coordination, Aerospatiale Matra, interviewed in "One on One," *Defense News*, February 14, 2000.
- <sup>111</sup> Fabrice Bregier, CEO, Matra BAe Dynamics, interview in "One on One," *Defense News*, March 20, 2000, p. 38.
- <sup>112</sup> Giles Tremlett, "Matra BAe, Spain Discuss Missile Joint Venture," *Defense News*, July 10, 2000, p. 4.
- <sup>113</sup> Enders, op. cit.
- <sup>114</sup> Thomas Enders, Head of EADS' Defence and Civil Systems Division, in Christina MacKenzie, "EADS Looks Across Ocean in Quest for Top Rank," *Defense News*, August 7, 2000, p. 34.
- <sup>115</sup> Brooks Tigner, "Smaller French Firms Feel Consolidation Pressure," *Defense News*, April 10, 2000.
- <sup>116</sup> Christina MacKenzie, "In France, Cost-Cutting Opens Up Work for Subcontractors," *Defense News*, July 14, 2000, p. 16.
- <sup>117</sup> Christina MacKenzie, "French Move to Protect Future of Smaller Companies," *Defense News*, July 5, 1999, p. 24.