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Martin Lundmark

To be or not to be

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The integration and the non-integration of the French defence industry

The FIND Programme

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To be or not to be - the integration and the non-integration of the French defence industry

Abstract (not more than 200 words)

The dynamics of the French defence industry and its developments since 1995 are analysed based on the variables, integration, power, autonomy and cooperation. France is in Europe the nation that rhetorically most clearly underlines its national interests for defence autonomy but also the most active in cooperation. Corporate integration (national and European) has been orchestrated by the state. Considerable European cooperation has led to gradually increased equity integration over joint ventures to autonomous, trans-national companies. Transatlantic cooperation and integration is avoided by the French government. France is pursuing strong national autonomy in some areas as well as a shared, European autonomy in other areas. The government powers have decreased but are still considerable.

The report also contains detailed appendices over company strategy, company structure and tables covering defence industry integration and cooperation.

Keywords

France, defence industry, national interest, integration, non-integration, cooperation, power, autonomy

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Att vara eller inte vara - integration och icke-integration inom den franska försvarsindustrin

Sammanfattning (högst 200 ord)

Den franska försvarsindustridynamiken och dess utveckling sedan 1995 analyseras baserad på variablerna integration, makt, autonomi och samarbete. Frankrike är i Europa det land som retoriskt tydligast understryker sitt nationella intresse av nationell autonomi i vissa försvarshänseenden, men samtidigt också det mest aktiva landet inom försvarsmaterielsamarbete. Företagsintegration (nationell och europeisk) har styrts av staten. Betydande europeiskt samarbete har lett till gradvist djupare integration via joint ventures till självständiga, transnationella företag. Transatlantisk integration och samarbete undviks däremot nästan helt av den franska staten. Frankrike eftersträvar stark nationell autonomi samt samtidigt en inom vissa områden delad, europeisk autonomi. Statens makt har minskat men är alltjämt betydande.

Rapporten innehåller också detaljerade appendix rörande företagens strategier och strukturer samt tabeller rörande försvarsindustrins integration och samarbeten.

Nyckelord

Frankrike, försvarsindustri, nationellt intresse, integration, icke-integration, samarbete, makt, autonomi

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Content

Preface

The FOI Defence Industry Programme, FIND, has since 1990 studied defence industry transformation processes and corporate strategies in Western Europe and the US for the Swedish Ministry of Defence. Information about our previous and present research is presented at www.foi.se/find.

France is a nation with a proud and ambitious defence posture. Being one of the foremost defence players in the world, it is sometimes misunderstood regarding the aims of its defence industry policy. Outside observers tend to see a friction or mismatch between the French strivings for French autonomy, its rhetoric for Europeanisation and its relation to the US. This report is an attempt to clarify the processes of integration and non-integration – nationally as well as internationally – of the French defence industry.

During six months in January- June 2003, this author served as a *chercheur associé* at the *Fondation pour la Recherche Stratégique* (FRS) in Paris.

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Executive summary

France has Europe's second largest defence industry in Europe after the UK. France is the nation that most strongly underlines the national interest of a strong national defence industry. At the same time, it is the European nation that most strongly has incorporated strategic parts of its national defence industry into a shared, European structure. This duality is to some non-French analysts seen as a paradox. This report analyses the context for this dynamic.

The French defence-industrial system is analysed based on four main variables: *integration* (to create a new entity from separate entities), *power* (an actor's capability to master the resistance of other actors in order to reach a desired goal), *autonomy* (the capacity of a state to transform its political objectives into concrete actions) and *cooperation* (two or more actors engage in aiming to reach a shared or mutual goal). These four variables are at the core of the French defence industrial dynamics.

The French defence industry was until the mid 90s a central and important component of the French defence posture. It could be described as a stable and institutionalised meso-system. The DGA was a central actor that had all the central instruments in its control: program specifications, research planning, industry policy and international cooperation. At the core of the DGA was and is, the corps of armaments engineers – *les ingenieurs de l'armement*. France had many large companies but no national champions. The growth, breadth and strength of the French defence industry was supported by an active, liberal and successful defence export policy.

The central role of the state in shaping the defence industry has never been questioned.

The analysis focuses on changes in the French defence industry from 1995-2004. The fundamental changes are that DGA has decreased powers; it has moved from considerable direct control to less direct control and more partnerships with industry. France is slowly but irreversibly increasing its privatisation of the defence industry. French defence industry has become considerably more trans-nationalised into a European, shared autonomy structure. The national autonomy has also become more targeted.

Regarding integration, French domestic integration has always been orchestrated by the government; the market is not trusted with that responsibility. The shared autonomy has been achieved through integration with a chosen few peer nations, primarily Germany, Italy and the UK. Transatlantic integration and cooperation is avoided by the government, but relished by especially EADS and Thales. France has also chosen non-integration; the active choice to preserve French autonomy. This concerns the nuclear technologies for its nuclear defence components (force de frappe/dissuasion), i.e. nuclear propulsion and charges (CEA and Technicatome). The technologies and abilities needed in order to be able to deliver the strategic nuclear missiles are also preserved: military aircraft (Dassault) and submarines (DCN). Finally, there has been very limited foreign acquisition of French defence companies. The government opposes it and foreign investors are also rejected by the strong government influence and ownership.

Several European nations have since the 60s in rhetoric strongly supported European cooperation. In practice, France is the nation that has clearly been the most active in trans-national cooperation. After a period of cooperations with primarily Germany and Italy in the 60s and 70s, these cooperations paved the way for trans-national joint ventures, which in their turn led to the creation of trans-national defence companies as e.g. Airbus, Eurocopter, Euromissile, EADS, MBDA, and Eurenco. The French cooperations have gradually concerned more and more strategic defence components.

The variable power in sum describes a shift from direct control – *tutelle administrative* – to decreased control and more influence – *partenariat stratégique*. DGA has been the actor that has lost most direct powers, and the companies have, accordingly, achieved more and more independence. The state's ownership has been and is still considerable. The state has shifted its ownership from arsenals to national societies, transferred its ownership in EADS, Thales and MBDA into holding structures, and its influence is also regulated through contracts (EADS) and golden shares (EADS and Thales). The government defines itself as a shareholder that centres on strategic dividends, not economic dividends.

The French autonomy is still substantial by European standards. It has however clearly decreased by accepting a shared, European autonomy and also a more specialised nuclear autonomy.

The primary challenges for the government can today be described as how to preserve a French autonomy, how to incorporate the French defence industry into a European structure and still serve French interests and finally how to counteract the US dominance (technologically as well as in terms of doctrine).

The relationship to the US is often misunderstood. France does not accept dependence in strategic defence technologies. The only nation France could be dependent upon is the US and a cooperation is understood as becoming based on US conditions, so therefore this is the obvious example concerning why not to engage in uneven cooperation and integration.

The French defence industry today shows a complex symbiosis between state and corporate interests. Several components add up to this context. The state is a central owner with DGA as an important instrument, there are companies with an industrially shaped context (Thales and Sagem), there are influential families (Lagardère and Dassault) with considerable power over the defence industry, there are transnational companies (EADS, MBDA, Thales and Eurenco) and there are also companies with complete or nearly complete state ownership (SNPE, Giat and DCN).

Several French defence companies are presently important actors on a European or a global level. There is also considerable competition within France, especially concerning C3I and UAV:s. French companies are actively pursuing primarily deepened European consolidation or stronger European positioning, and some also transatlantic consolidation.

France has many similar traits with the US, and France is in the report described as "the Americans of Europe" due to e.g. their unrivalled European ambition for national autonomy, their low acceptance for dependency, and their marked national interest. Sweden can be labelled the USA (the France?) of Scandinavia with their similar, somewhat singular position in Scandinavia.

France and the UK are the two dominant defence actors in Western Europe. The French government, however, clearly retains more control over its industry. Regarding overarching policy for the defence industry, defence research and how that contributes to national defence capability needs; France protects its autonomy in certain, well-defined areas, whereas the UK obtains its defence technology priorities by being the "preferred partner" of the US. France also copies or is inspired by some UK trends: primarily concerning private-state financing solutions, and a shift from direct control over industry to control of technology through firewalls and intellectual property rights (IPR). The French defence structure is substantially more trans-national than the British, but at the same time the state maintains a national autonomy in chosen strategic areas.

To conclude, since 1995, France is in Europe the most nationalistic but also the most active in cooperation. Corporate integration (national and European) has been orchestrated by the

government. Considerable European cooperation has led to gradually increased equity integration over joint ventures to autonomous, trans-national companies. Transatlantic cooperation and integration is avoided by the government. France is pursuing strong national autonomy as well as a shared, European autonomy. The state powers have decreased but are still considerable.

The report also contains detailed appendices over company strategy, company structure and tables covering defence industry integration and cooperation.

1. Introduction

The French defence industry is the third biggest national defence industrial producer after the US and UK. The defence industry is an industry that generally has strong national characteristics, and France is a strong case of that.

France is a nation with a proud and ambitious defence posture. Being one of the foremost defence players in the world, it is sometimes misunderstood regarding the aims of its defence industry policy. Outside observers tend to see a friction or mismatch between the French strivings for French autonomy, its rhetoric for Europeanisation and its relation to the US. This report is an attempt to clarify the processes of integration and non-integration – nationally as well as internationally – of the French defence industry.

The text contains several expressions or phenomena written in French. If these are believed to still be understood by an English-speaking reader or if the French name is seen as important, they have been kept in French (and sometimes translated).

1.1. Research problem

The French defence industry is the second biggest in Europe and has for the last three to four decades been an important international actor in defence technology, defence collaboration and arms export. The French defence industrial system has some unique characteristics – as has all national defence-industrial systems – but the analysis in the Anglo-Saxon literature is often shallow and the general debate about the French defence industry context is often imprecise and overly generalising. Therefore, a description of the French defence industry and the context it acts within is seen as necessary for this report.

The French defence industry is being integrated within an Europeanised structure with chosen nations with similar defence industrial ambitions and sophistication, at the same time as the French government actively has safeguarded a French autonomy and non-dependency in certain technology areas that have been seen as central for the vital French strategic interests. These different but interrelated processes create confusion or misunderstanding among non-French related interest groups. The duality and interplay between these parallel processes of integration and non-integration is what this report is about.

1.2. Aim

The report presents an overview of the French defence industry in 2003 and the characteristics of the present system. In order to set this description in perspective, a historical background is given, focusing mainly on the last ten years. The report focuses on how companies integrate or do not integrate. This requires a substantial description and analysis of the government's defence industry policy and its relation to the companies.

The level of analysis is focused on the industrial level and the corporate map, and how these corporate entities cooperate and integrate with French and foreign corporate entities. In order to describe this level of analysis, the main influencing aspects of its environment and of the corporate strategy and conditions must be described. The main influencing parts of its environment in France are the concerned ministries, DGA, the President, the Senate and the National Assembly. The overall government defence industry policy is an important shaping factor. Each company's strategy, programs, cooperations, history (briefly) and financial behaviour is described. The overall dynamics of the French defence industry is also described.

The aim is to present an analysis based on the variables integration, cooperation, autonomy and power on the process of the French defence industry being actively integrated with non-French defence industry and actively not being integrated with non-French defence industry. This analysis covers company strategies as well as government policy and action.

1.3. Delimitations

The analysis discusses the larger or nationally strategic companies in the French defence industry. Small and Medium Enterprises (SME:s) are barely mentioned, and no overview of SME:s is presented. Concerning the companies that provide the nuclear military technology (CEA and Technicatome), these are less thoroughly described; due to limited access to information about these companies and that their strategies are closely synonymous to government policy.

One aspect of integration in the framework for analysis is the global integration; this will be mentioned only very briefly in the overview.

France is fundamentally affected by processes of Europeanisation emanating from the EU Commission and supranational developments within procurement, defence research and defence industry policy. This integration of government defence-related agencies is however only mentioned in the report, since an analysis of that process would have required a considerably more extensive report.[1] Several other analysts have described these processes, which are far from being stabilised. The globalisation of corporations is not analysed in any detail. Europeanisation, trans-nationalisation and globalisation are important external processes that fundamentally affect the possibilities for independence and autonomy for a nation. These processes will for simplicity be treated as relevant to the overall picture, but not as being central to the aim of the report.[2]

When using the term "France" in the report, it refers to the French state as a whole. This is a simplification that implies the joint actions of the president, ministers, the military, DGA and other central actors; seen as being united by certain common policy traits. When the discussion refers to the actions or responsibilities of one single group or actor, this is specified. The French "state" refers to the state as a legal entity, and the French "government" to the government acting on behalf of the state.

1.4. Data collection

The information in this report was collected through literature searches, personal interviews, discussions with experts - academic and industrial - in France, articles and internet-based information. The report has been commented upon by French experts, as well as by a reviewer.

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[1] The French public legislation and procedures for procurement (general rules, not just defence materiel) is under scrutiny of the EU Commission, and France is urged to harmonise with EU norms. Defence procurement is in Europe, however, not a part of such multilateral commitments due to the Article 296 in the Treaty establishing the European Community, which makes an exception for defence equipment. It stipulates in paragraph *(b)* that "any Member State may take such measures as it considers necessary for the protection of the essential interests of its security which are connected with the production of or trade in arms, munitions and war material; such measures shall not adversely affect the conditions of competition in the Common Market regarding products which are not intended for specifically military purposes". (http://www.assemblee-ueo.org/en/documents/sessions_ordinaires/rpt/2002/1800.html#P131_26682. May 28, 2004)

[2] Europeanisation is the consolidation process within Europe, which can concern the corporate landscape as well as government policy. Trans-nationalisation is seen as when companies have activities or subsidiaries in several countries. Globalisation is when companies become less dependent on national borders, and increasingly acts in all geographic regions.

The interviews[3] were made with representatives of industry, MoD, DGA, NATO, WEU, industrial interest organisations as well as with academic and independent analysts. Discussions were also held with representatives of the Swedish Embassy in Paris. Expected interviews were unfortunately not possible to organise with the following companies: Lagardère, Sagem and Astrium.[4]

The interviewees were suggested at first by the Swedish Defence Attaché office in Paris and by colleagues at FRS. Some interviews also resulted in further recommendations.

The interviews were of a semi-structured character, with questions sent beforehand to all respondents. There was no common question sheet or questionnaire that was used for all respondents, the questions were personalised for each respondent, based on the theme of this report. The interviews were made both in French and in English, roughly 60 % in French.

Close to half of the interviewees demanded that no quotes would be made, so therefore all interview results are kept anonymous.

1.5. Report outline

Chapter 1 describes the outline of the report and the research approach. Chapter 2 presents a background and a discussion on French characteristics in relation to the defence industry, it constitutes an attempt to define the specific context.[5] Chapter 3 is a discussion concerning the central theoretical aspects used in the report. Chapter 4 presents an overview of academic analyses of the French defence industry, and of the environment and context it acts within. Chapter 5 presents the major French defence companies' strategies for integration and cooperation and the relation to the state. Chapter 6 is an assessment of the French history and tradition of multilateral armaments cooperation. Chapter 7 is a discussion on challenges presently facing the French defence-industrial system. Chapter 8 presents the conclusions of the report. Chapter 9 offers policy recommendations for Swedish government and public actors.

At the end of the report there are appendices with interview information, company descriptions and statistics, tables and illustrations. The appendices are:

1. Interview list
2. The present French defence-industrial structure
3. Company strategies
4. French defence industry size
5. Charts and statistics concerning central companies
6. The consolidation of French solid propulsion and energetic materials
7. Table over French industry integration
8. Table over French armament cooperation

For a French reader, some of the background presentation and information in the report might be viewed as overly detailed. For a non-French reader, however, such a background is seen as essential for understanding the French defence-industrial system.

[3] See appendix for full list.
[4] Lagardère and Astrium referred to EADS for interview.
[5] This discussion extends beyond the theoretic scope as well as beyond the aim of the report. It is however seen as needed to put the French defence industry in the right context.

2. French characteristics

This chapter describes several aspects of France in general and the defence industry context in particular. In short, the chapter consists of the following parts. First, there is a discussion on how industries can be seen to contribute to a state's economic security. Thereafter comes a discussion on how the French government states their interest for a defence industry, followed by discussions concerning: state ownership of the defence industry, defence export, defence spending, French government actors, the government and its control over the defence industry, French corporate structure and legal traditions, French restructuring trends and finally the possibility for foreign companies to acquire French defence companies. These parts are believed to offer a broad and adequate background that is needed in order to more profoundly understand the French system.

2.1. A strategic industry

A concept that closely relates to power and autonomy is *economic security*. Economic security and military security are not separable in the security policy debate. Military security gives a state certain capabilities and creates others' perceptions of it. The economic security concerns access to the resources, finance and markets necessary to sustain acceptable levels of welfare and state power. Three schools can be identified as how they connect economics and security: economic nationalism, liberalism and Marxism[6]. Economic nationalism sees economic activities as clearly subordinate to national interests. State intervention in the national economy is a cornerstone in economic nationalism. Liberalism, on the other hand, sees the market as the best way to create economic wealth and create security through interdependency and globalisation. In EU, there is a constant friction between national interests and the interests of an inner market. A fundamental element of "modern economic security" is the capability of the state to act autonomously vis-à-vis the international economy. Globalisation and multinational corporations decrease the importance of the state. The role of the state is not threatened, but it is changing.[7]

France sees a large share of its industry as being part of its "strategic" capacity, a larger share of the overall industry than in comparable European countries. The defence industry is seen as an important component of the French self-image as a great power. The 1994 White Book of Defence stated that France had three types of interests: vital interests (to secure the state, guaranteed by France's nuclear force), great power interests (global responsibilities, mainly UN in order to maintain its role as a great power) and strategic interests (to engage in conflict solving that could otherwise jeopardise French vital interests and certain raw material (esp. oil)).[8] France has compared to Germany and UK the strongest nationalistic traits and, accordingly, the most elaborate economic security policy.[9] The French economic security policy and nationalistic traits have weakened somewhat since 1997, but are still significant characteristics of the French defence industry policy.

[6] Marxism is seen as irrelevant for the context of this report and disregarded from the analysis. Marxism in relation to economic security rather belongs to certain sociological analyses. It should rather be seen as an ideology and not as an economic policy.
[7] Malminen, 2000, pp. 12-32. Contrasting academic meanings exist of the phrases economic security and nationalism. Malminen's use of the concept nationalism rests on the definition by Gilpin (1987), p. 31-32. This belongs to the academic field "international political economy".
[8] Sjöstedt, 1997, pp. 18-21.
[9] Ibid, p. 32.

The French defence and security policy was to a large extent formulated by Charles de Gaulle in the 1950s and 60s[10]. Since then, under different presidents and prime ministers, the French defence and security policy has overall been very stable. No other western democracy has experienced such stability.[11] French strategic interests were shaped in the 50s and 60s, with visions and statements about the French state and "its" view upon the world, which briefly were stated as: 1. France is a great power, 2. France is an important leader for other states, 3. France can be strengthened through cooperation, 4. France is unique, 5. France needs its independence, 6. France is an inspirator, 7. the international system needs balance and multipolarity, and finally 8. the national states are the most important components of the international system.[12] These statements about the French state have been less explicitly stated since, but can be traced in the current French political discourse, although they are not always explicitly stated. Especially the first, third, fifth and seventh statements have clearly shaped the present defence-industrial system in France.

France clearly states and promotes French defence interests, and prefers French autonomy as much as possible. France is, however, perhaps the strongest advocate for EU as a security policy actor. EU is regarded by France as a needed counterbalance to the US global dominance. In this sense, France sees EU as a way of better being able to safeguard French interests, and "shared autonomy means increased autonomy"[13].

2.2. The national interest of a defence industry

The national interest concerning the defence industry is stated primarily in three ways:

- Strategic importance
- High technology as an engine for industry
- It creates employment and contributes to the national trade balance, it is a part of the social and regional policies, and it attracts support from the EU regional development programmes

The future of the French defence industry is primarily defined by French government actors as having to react to three challenges: how to maintain a certain French autonomy, how to fit the French defence industry into a europeanised consolidation and how to counteract the US dominance in the global defence industry. Furthermore, the national interest has been restated when the French autonomy has become weakened. It is in the French interest to create a European strong defence industrial technology base, and France must have a strong and competitive industry in order to be able to have an important role in the consolidation.

The consolidation of the French defence industry has to a large part been orchestrated by the French government in order to serve French interests. Companies have also pulled the government into further consolidation, driven by generic corporate drivers. This has meant that France has chosen to share competencies and production with others when this has assured benefits from economies of scale and specialisation. France has also aimed to consolidate French companies in order to make them stronger before entering a trans-national consolidation process. France thereby strives to ascertain a stronger French influence in the transnational consolidation. France wants to be strong in a European setting, and when a

[10] He became president in 1958.
[11] Gregory, 2000, and Sundberg, 2003a, p. 4-5.
[12] Sundberg, 2003b, p. 7 and 106-8.
[13] Sundberg, 2003a, p. 8-9.

European consolidation has matured, France is thereafter with its European partners prepared to engage in transatlantic cooperation.[14]

Certain industrial actors have had (and still have) a significant impact on government policy concerning industry restructuring. The best examples in France are the family-based companies Lagardère and Dassault which have had close links to high ranking politicians, and presently close links to Chirac. [15]

The government has had a strong influence and considerable power; it is an indicative tradition that can be seen as a part of the French culture. In the armaments sector, the traditions go as far back as 700 years, when all powder and saltpetre production was put under state surveillance. This powder monopoly has prevailed ever since, up to the present-day SNPE[16]. In the 17th century, Louis XIV's advisor Colbert organised strong government control over society and commerce. Napoleon continued a tradition of seeing France as a superior country, with a special mission in the world. De Gaulle formulated the need for French autonomy and greatness in the 1950s and 60s. The presidents after de Gaulle have overall maintained a similar defence posture. In the last ten years a gradual shift is however apparent towards a more indirect state power over the defence industry.[17]

2.3. French culture

In the Anglo-Saxon world as well as in Sweden, generalisations are common about how France and French actors act and that it is difficult to co-operate with the French. It is true that the French actions are different to Anglo-Saxon traditions, but too often the scepticism rests on misunderstandings, superficial generalisations or simply lack of knowledge. On the other hand, no nation finds it easy to cooperate with the US either, the Western nation that together with France places the highest emphasis on the national interest of the defence industry.

When discussing the French defence industry, the aspect of "culture" must be related to. Cross cultural studies have been conducted by researchers from many disciplines e.g. anthropology, sociology, political science, history, and organisation theory. Most researchers agree that culture is a learned behaviour, not an inherited one[18]. Hofstede looks upon culture as "the collective programming of the mind which distinguishes the members of one group or category of people from another". The experience from previous interviews in Sweden, the US and UK show that many interviewees expressed strong, and rather generalising conceptions of French culture and what it is like to co-operate with French actors – quite often rather negative conceptions. I suggest that it is unwise to strongly generalise and state that the French "culture" is so and so, but it is apparent that cultural differences do cause misunderstandings, friction and cooperation difficulties.

Government influence

The defence market – in France, and all other comparable nations – will always have a strong degree of government control and it will always to some extent work under a somewhat distorted economic logic compared to other industries. The government influence and control do, however, have their specific characteristics in each nation.

We can notice a slowly progressing government disengagement that appears to be irreversible. The influence is decreasing in two manners. In a direct manner, the government

[14] According to interviews, Paris, May-June, 2003.
[15] For example, Jacques Chirac used to visit the Dassault summer residence as a boy thanks to family links. Chirac is also a personal friend of the Lagardère family. According to interviews.
[16] Société national des poudres et explosifs.
[17] See Giovachini (2000) for a more thorough description of the evolution of the French defence industry.
[18] Mead, 1951; Hofstede, 1991; Trompenaars, 1993; Berthon, 1993. References from Asplund, 1999.

is decreasing its equity in the companies. Indirectly, the government is decreasing its engagement by steering to a lesser extent company strategy (where the state has ownership), decreasing R&D funds and demanding that companies take higher risk.[19] The French defence companies can be seen as being partially on the stock market. The privatisation of the French defence industry is far from being achieved, and it can still be seen as a clearly protected industrial sector in France, albeit less than before. Apart from the direct disengagement concerning ownership, the government also since decades decreases its control and autonomy, gradually over transnational programs, transnational joint ventures and now independent transnational companies. This pattern of gradual disengagement and decreasing control is similar to, most of all, the situation in Germany and UK (partly self-evident since the transnationalisation has occurred with companies from those nations), but also similar to Sweden, Italy and Spain.

The nature of the government ownership or government influence in French defence companies and in defence programs is a factor that fundamentally impedes the US corporate interests and also the interests of the US government actors. In a round of interviews in the US, several corporate respondents clearly expressed that they would not engage in cooperation where the prospective partner was fully or partly state owned.[20]

2.4. State ownership of the defence industry

One main source of friction between the French defence industry and other defence industries is the strong influence of the French government on the French defence industry. To some part, this rests on a difference in legal systems and legal traditions. French state-corporate constructions are difficult to relate to for countries with an Anglo-Saxon legal tradition, but can be seen as similar to domestic commercial traditions for Italian or Spanish actors. Some French components worth mentioning in this regard are *le code de marché publique*, *l'objet social* and the appointment of corporate boards. *Le code de marché publique* concerns French customary procedures for how public acquisition should be carried out and *l'objet social* the role of a specific enterprise in the society. These are practices that are inherent in French commercial behaviour, self-evident for the French, but not apparent for a foreigner.[21] The procedures for defence procurement in e.g. Sweden, the UK and US also have traits of government intervention and regulation, this just describes some French features of its defence procurement.

Holding of shares	Status	Influence
<1/3	*Minorité*	Has no special influence.
1/3 - ½	*Minorité de blockage*	Must approve of *assemblé general (a.g.) extraordinaire*, if other party in majority
Two parties ½ (50/50)	50/50	Have to agree on strategy and the *a.g:s.*
½ -2/3	*Majorité*	Appoints *a.g. ordinaire and suggests a.g. extraordinaire*, unless no owner with >1/3, then appoints both
>2/3	*Majorité, Contrôle de a.g. extraordinaire*	Appoints *a.g. extraordinaire and a.g. ordinaire*

[19] Schmidt, 2002, p. 46
[20] Acccording to interviews made in the US in 2001, se Lundmark, 2003a..
[21] *Le code de marché publique* was reformed on January 8, 2004 (http://www.ixarm.com/cgi-bin/dgap/ixarm/jsp/view/HtmItemView.do?xapNavID=CChan.Ixarm.com%2fChan.Ixarm.com.ActuPortail&xapContentOID=1610769694. Implications of this change have not been analysed.

Table 1. *French legislation for ownership influence in companies through board representation.*

In the French legislation, shareholders achieve differing levels of influence according to their level of ownership. With *minorité de blockage*, they can control but not be in charge. The state has *minorité de blockage* in Thales and EADS, as well as golden shares. The corporate boards are appointed by the majority owners, but minority shareholders get an influence on the appointments if they have more than 1/3 of the shares.[22] Other nations also have their specific distribution of power and influence between different types of shareholders, but no extensive research has been made to conduct a comparison.[23] The above table simply displays the French system.

An aspect that creates a substantial inertia in the state-owned companies (not just defence) is the aspect of *fonctionnaires*, a status among the civil servants with a special, high assurance of life-long employment within the state. This has made it difficult to make the needed rationalisations especially in DCN and Giat Industries, since local politicians and the trade unions have been able to restrict the rationalisations and these companies have for many years had very high losses, partly because of too many employees compared to production.

The recent constructions for EADS, Airbus, MBDA and other companies show French consolidation solutions, with government influence maintained through state-owned holding companies. The constructions for DCN, Giat Industries, Snecma and SNPE[24] where these companies have been transformed to stock companies, but with the state as the sole shareholder, is also a commercial practice (and an internal organisation) that is different to especially its US and UK counterparts.

In the state-owned enterprises, the French government wants to define itself as a shareholder. This shareholder wants the company to perform well in a certain area, as any shareholder would. The government expects in return from the company a protection of strategic competencies, no social unrest, no recapitalisations[25] and accepts moderate losses[26]. The government can presently be described as expecting strategic dividends in return, and it is therefore willing to accept the costs of maintaining French competencies and protecting French technology. The French government does not see itself as the creator of corporate strategies. The state-owned companies are described as being responsible for the strategies, with the government not directly influencing its strategies. This autonomy is however restricted since the government appoints the CEO:s and can also fire them. The CEO must share the strategic vision of the government, the company objectives for growth, profitability, market and product portfolio etc must be compatible with the strategic objectives of the government.[27]

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[22] According to interviews at DGA and MoD/DAS.
[23] From the information received, however, it is clear that in the UK a majority shareholder has clearly more influence than the minority shareholders compared to the situation in France. In Sweden, there are in several large corporations a smaller number of A-shares (with many votes per share) and a much larger number of B-shares (with one vote per share). Investors can thereby maintain its influence despite an decrease in actual total share value. The U.S. does not have a similar right, as in France, for a minority shareholder to influence the boards.
[24] The state ownership is 100 % in DCN and Giat Industries, 99,86% in SNPE and 97,2 % in Snecma.
[25] As has repeatedly been the case in DCN and Giat.
[26] According to interviews in France, May-June, 2003.
[27] Ibid.

2.5. Defence export

The French defence industry had its golden era during the 70s and 80s, sustained by strong government support combined with extraordinary export successes. The armaments export was 19 % of all armaments production in 1970, and it rose to a level around 40 % by 1977, and stayed at that level until 1986. At the end of the 80s, costs rose dramatically and with the end of the Cold War, the French defence industry experienced harsh economic conditions. But compared to other Western defence industry, the French decrease of armaments production was not as dramatic.[28]

A substantial defence materiel export is seen by the French government as an engine for enforcing the defence industry, and is therefore an important part of the defence industry and security policy. The French defence companies will by increasing the numbers produced of defence products and services become stronger and thereby strengthen the French security posture. The French government largely finances the R&D costs for these products and services, so the government controls what will be produced.

2.6. Defence spending[29]

The French defence spending and the nature of the spending is shaped by the previously described French view of itself and the world, and what serves the French interests best.[30] The defence spending is shaped primarily by four documents, presented in order of importance: White Books (*Livre Blanc*), the reform program *Une Défense Nouvelle 1997-2015*, the six-year *Projet de Loi relative à la programmation militaire* (LPM) and the annual defence budget. The white book has only been published twice – 1972 and 1994 – and marks more marked changes in the defence policy[31]. The 1997-2015 Reform document is described as Chirac's reform program, and is the most important change since the 1966 French withdrawal from the NATO military defence. Briefly, the reforms have in the first third of the LPM (1997-2002) been to transform the military to a professional army without conscription, rationalisations in the military and downsizing of the defence industry. It also included an important accord with the defence industry stating that the industry agreed to decrease the existing orders with 30 % and that they should decrease costs with 30 %. In return they received guarantees that the existing orders would not be changed The defence industry had suffered numerous downsizings of orders due to fix short-term budget problems for the government. The government made clearer commitment and a longer engagement. In the second and third parts (2003-08 and 2009-14) new defence materiel will be delivered and the competitiveness of the defence industry is expected to increase.[32]

The LPM every sixth year shapes in the medium term the detailed guidelines for the three services and the *gendarmerie*. This document is however not so respected by the politicians, and is repeatedly adjusted during the period. Finally, there are the yearly defence budgets.[33]

Apart from these four main documents, France also has a forward looking 30-year plan (*PP30, Plan prospectif à 30 ans)* which shapes the military R&D for the next 30 years. PP30 is prepared by the military headquarters together with DGA.[34] Furthermore, DGA is together

[28] Dussauge et Cornu, 1998, p.10.
[29] For more information on the described documents, see www.ixarm.com, DGA:s site for defence materiel, in French and in English.
[30] As is the case in most nations but perhaps clearer pronounced in France.
[31] The effects of the 1994 White Book for the defence industry will be discussed later in the report.
[32] Sundberg, (2003b), pp. 26-27.
[33] Ibid.
[34] Ibid.

with the CIDEF[35] responsible for creating a visionary document for basic research that is interesting for the defence, the PEA (*Programme d'études d'amont*, two triannual documents during the LPM) and also a document for industrial sector policy, PTS (*Politique technique et sectorielle*). The PTS describes needed government investments for maintaining the proper level of competitiveness for this sector, and also to what extent France can be dependent on other nations regarding this industrial sector.[36]

The French defence budgets have been decreasing since the early 90s, just like in the rest of the Western world. From its highest years in the 90s, the budgets have fallen 20 %, the R&D budget by 50 %. The defence industry has thereby been obliged to search for other means of financing. This has mainly been by aiming to attract private investors, export and multilateral programs.

2.7. French government actors

It is not formally correct to say that power has moved from e.g. DGA to the MoD, since the DGA is a part of the MoD. However, the DGA has been described as a highly autonomous part of the MoD, and several respondents stressed the power alterations of the DGA, mostly as a result of centralisations within the MoD or of decreased DGA control over industry. DGA Therefore The MoD and the DGA are discussed under different headings.

Ministry of Defence

The powers of the MoD have on paper been unchanged for a long time, but a large part of its means of influence have however been delegated to DGA. Presently, the MoD is responsible for the defence budget, the defence materiel export (this responsibility centralised from DGA to the MoD from DGA in 2000) and overarching decisions on defence industrial policies, e.g. type of ownership of the companies.

DGA

The *Délégation générale pour l'armement,* DGA, is a part of the MoD, but is a rather autonomous part of the MoD. DGA is the government's primary instrument for regulating armaments and the defence industry. Its role is to prepare, develop and implement armaments programmes. DGA is an intermediary between the supply side – the companies – and the demand side – the Armed Forces. It also has the responsibility to initiate and implement cooperation with other nations, and their institutions and companies. It has an unusually (compared to other nations) strong role in both supply and demand. It is also in charge of shaping the defence-related research.[37]

DGA manages the defence industrial policy for the Ministry of Defence. DGA organises general and sectorial seminars with companies (*carrefours generaux* and *carrefours sectoriels*)[38]. In doing this, France has in recent years clearly been influenced by the UK strategies and its relation to its domestic defence industry. DGA communicates its strategies through its 30 year forward-looking plan, PP30 (*Plan prospectif à 30 ans*) and the PEA (*Programme d'études amont*, translated as "upstream studies" by DGA).

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[35] *Conseil des industries de défense françaises*. An organisation jointly representing – vis-à-vis the government – the four defence industry organisations (Gitep EDS, Gican, Gicat and Gifas).
[36] Masson, 2003, p. 34 and www.ixarm.com.
[37] Dussauge/Cornu, 1998, p. 26 and 41.
[38] See http://www.ixarm.com/cgi-bin/dgap/ixarm/jsp/browse/Browse.do/CarrefoursDGA .

The armaments engineers (*ingénieurs de l'armement*) have for roughly two hundred years had an exceptional position within the French armaments producing system. Since the end of the late 18th century, they have exclusively been recruited from *l'École Polytecnique* in Paris. This was even made mandatory by a law in the early 20th century.[39] These engineers have been a strength for the French armaments production, in having a well-educated, specially trained type of elite engineers. It has also been a weakness, since the very high degree of consensus and conformity among these engineers (overall united within a Gaullist defence policy) made the French system inherently conservative and thus slow to respond and change to the new realities after the end of the Cold War and also to a globalised economy.[40]

Since Dussauge and Cornu's description from 1998 of the responsibilities of DGA, its powers have been gradually but clearly decreased. The export responsibility has been centralised to the MoD in 2000. The industry has also become more independent. This is a subtle shift, nonetheless significant.[41]

There is clearly a friction or even outright rivalry between the MoD and the DGA at present. DGA is a huge organisation that is decreasing in power, and the MoD/DAS[42] wants to reform and perhaps radically reorganise it. One suggestion for reorganisation is to separate research and procurement.[43]

Armed Forces

The Armed Forces have had a tradition of strong autonomy for each Service and they are at present responsible for their own structure. The Services are, as in all Western countries, increasingly having to operate jointly. This is reflected by that the French procurement from 2003 is steered by the goal of providing eight force systems (*systèmes de force*): deterrence (DIS); command control, communications and reconnaissance (C3R); strategic and tactical mobility (PROJ); strike at depth (PROF); dominance of "*milieu aéroterrestre"* (TER); dominance of "*milieu aero-maritime"* (MAR); dominance of "*milieu aérospatial"* (AIR) and finally preparation and maintenance of operational capacity (PREP).[44] The capability goals and procurement is thereby not strictly corresponding to the traditional services.

Ministère d'Economie, Finances et Industrie

The French ministry for Economy, Finance and Industry (also named MEFI or nicknamed Bercy) has to approve of the finances and the budgets. It has to consent to state-owned companies' acquisitions of other companies, as it has approved of Snecma's acquisition of several French companies in the past years, e.g. Labinal, Turbomeca, Hispano-Suiza and as it disapproved of Snecma's plans to acquire Italian FiatAvio in the spring of 2003. MEFI also has to approve of the large subsidies that have been awarded to French state-owned companies (DCN and Giat Industries) and also of the series of recapitalisations of these two companies.[45] It also has a strong influence in shaping and approving of the complicated

[39] Giovachini (2000).
[40] Serfati (1997), Mampaey (2001) and also according to interviews.
[41] There is a planned reform of the DGA in 2004 which will make its procurement practices more commercial, and maybe also transform it towards something similar to DPA in the UK.
[42] DAS: *Délégation aux affaires stratégiques* is an office within the MoD that has achieved considerable influence over defence and strategic matters in recent years.
[43] According to interviews.
[44] Authors' translation. E-mail from GICAT, May 3, 2003. In the original text, reconnaissance is translated from the word *renseignement*, strike at depth from *frappe dans la profondeur*, dominance from *maîtrise*. See also LPM, 2003, pp. 33-36.
[45] Giat Industries has since the early 90s received subsidies of altogether 13 billion euros.

ownership structures of the state's ownership in the French defence industry, primarily through holding companies. (See appendix 5)

President

French presidents engage in the more fundamental developments of defence restructuring, as the nationalisations in 1981, the merger of Aérospatiale and Matra in 1998 and the creation of EADS in 1999. Otherwise, the defence industrial policy has been the responsibility of most of all MoD, but also MEFI, but largely delegated to the DGA. Foreign and military affairs are also held as presidential responsibilities under the French constitution.

Le Senat and l'Assemblée nationale

The Senate and the National assembly primarily promote similar interests as the politicians in the Senate and the House of Representatives in the US; to safeguard the jobs in their home constituencies. They differ in that they are clearly less powerful than their US counterparts, and that they do not stress "the national interest" as strongly. According to interviews, an important reason why GIAT and DCN have been able to receive such enormous subsidies from the government is that the politicians in *le Sénat* and *l'Assemblée Nationale* so heavily protect their home constituencies.[46]

2.8. The government and its control over the defence industry

The French government used to closely control and steer the domestic defence industry, with substantial nationalisations as late as 1981. Some of the companies were already state owned before 1981 (and had always been): DCN, Giat, SNPE and Snecma, but also the abroad less known CEA and Technicatome[47]. DCN and Giat were state arsenals (SNPE until early 70s), and were thereby not seen as companies but as parts of the state administration. With that status came that the commercial and industrial practices were different to those of their international competitors, which was clearly not to the advantage of these arsenals.

In the French 1994 White Book of Defence (*Livre Blanc de Défence*) it was clearly stated that the only French industrial competencies that had to be kept under strict French control, were the ones strictly associated with the *force de frappe*[48]. This has been the policy since. As in all Western states with a high defence industrial ambition, the shift from the bipolar, stable cold war context was slow and difficult.

There have been substantial changes in the French government's relation to the domestic defence industry. Until the 90s, DGA had a top-down, control-oriented approach towards the defence industry. DGA orchestrated the defence research, defined the threats, the needed capacities, "managed armaments programmes", designed the weaponry to some extent and also decided on the acquisitions. A gradual shift during the last ten years has weakened this relation as well as the powers of DGA. In the last few years, DGA has formulated this as a shift from *tutelle administrative* (="administrative guardianship") towards *partenariat stratégique* (strategic partnership). The *partenariat stratégique* describes a dialogue-oriented relation with the industry where government actors and industry representatives discuss in ongoing

[46] According to interviews in Paris, May-June, 2003.
[47] These nuclear industrial capacities had other names in 1981, but the French capacity has been unbroken.
[48] *La force de frappe* or *la dissuasion* concerns the French independent, strategic nuclear capacity that it maintains in order to maintain its sovereignty and vital interests. It has two main components (*composants*), the submarine-carried force and the air-carried (*aéroportée*) force. See e.g. the DGA thematic issue "La dissuasion", l'Armement, Octobre 2001 or http://www.defense.gouv.fr/dga/fr/les_metiers/programmes_armement/programmes_en_cours/dissuasion/index.html.

seminars and discussions the future as regards e.g. threats, technology, research and partnerships. The government therefore must find someone in industry who shares its visions (and also be influenced by the companies' assessments) and in a more mutual way agree on decisions regarding research and procurement. The government also controls previously national industrial structures through golden shares (EADS, Thales) and contracts (EADS). As in other nations, the government also strongly affects the companies' strategic possibilities by controlling research funds, procurement and the export rights for defence materiel.[49]

The French government has in the last 5-10 years become less interventionist and less rigid vis-à-vis the defence industry. The industrial logic has come to play a more important role. DGA's influence and power – which has been immense - has also been weakened by the MoD. This shift and decreased control of the government resembles the shifts that have been made in e.g. Sweden, UK and – to a lesser extent – Spain.

The French companies have a strong experience of cooperation with the government and within a highly government-influenced context. Many of the top officials in the companies also have a background from DGA and are *ingenieurs de l'armement*. There is therefore an accord and a mutual understanding of the French *ésprit* and dynamics concerning the defence industry.

State ownership

It is very clear that France believes that ownership matters in the defence industry. There is consensus among DGA, the Ministry of Defence and other central actors that France in certain technology areas must be autonomous, or at least not dependent on any other nation. Thereby, it is not possible for a foreign company to acquire any of the larger French companies, or parts of them that are seen as strategic. This was very clearly expressed in DGA and MoD interviews. This is different to UK (where Thales was able to acquire Racal) and to Germany (where HDW was acquired by One Equity Partners). The French government has to approve of all foreign company acquisitions with any kind of defence content. These approvals demand the consent of the MoD, MEFI and DGA, and in extraordinary cases the prime minister and the president. There is some limited foreign ownership, mainly American, among defence-related SME:s (see table in appendix 8).

The French government has a strong presence in all industrial sectors, and is more active in protecting national industries than most comparable countries. The state has considerable ownership in the French defence industry: 33,4 % of Thales, 15% of EADS, 97 % of SNECMA, 99,86 % of SNPE and 100 % of DCN and GIAT. The government also has indirect influence in Dassault since their Dassault shares (that the state acquired in the 1981 nationalisations) were transferred into EADS. The state majority ownership represents about half of France's defence production. The French government also has a right of veto in EADS and Thales concerning selling of stocks that can have strategic effects on the national defence. In 2003, the Ministry of Defence had plans to recapitalise GIAT Industries, it transformed DCN into a *societé national* with all shares held by the state, to further privatisations of SNECMA and of SNPE. SNECMA was planned to be privatised in 2001, but this privatisation was stalled after the September 11, 2001 events.[50]

[49] Giovachini (2000) and interviews.
[50] Masson, (2003), p. 33 and "Calepin International". Snecma is now (2004) planned to be privatised by one third.

Compared with other nations, some elements are similar, but overall, comparable countries (as regards defence industrial ambitions) show less government-governed industrial structures. In the US and UK, the industrial logic is very strong. In Germany, the industrial logic is strong, but with a special ownership structure through family *stiftungs* (foundations) and with interests and ownerships from regional authorities.[51] Sweden has more rapidly than other comparable countries let industry become internationalised, and the industrial logic is now strong. In Italy and Spain, the government influence continues to be strong, especially in Spain. In all these countries, there are strong bonds between domestic industry and the national military, procurement agencies, defence research bodies etc. It is apparently a natural outcome of domestic defence production. Each country has its own more or less unique logic of a "military-industrialised complex" (MIC), each MIC is strongly institutionalised[52], but each in its own, unique way. In Europe, these different logics have led to complicated trans-national structures of cross-ownership, guided and restricted by demands for political influence and resulting in political compromises.

France has been later in starting its process of decreasing the state ownership compared to the countries it primarily compares itself with (US, UK, Germany and Sweden (although Sweden is clearly a less influential country)), but it resembles Spain and Italy concerning state ownership. Perhaps it has to do with common cultural and judicial traits shared by these three countries. By keeping a substantial state ownership, it also resembles European countries outside the LOI 6[53] with a lesser defence industry (e.g. Finland, Norway, Greece and Portugal). On the other hand, France is the European country with the highest and most outspoken demands for armaments autonomy, so this is not surprising.

2.9. French corporate structure and legal traditions

Defence companies can be either private (the state holding no share or less than 50 % of the company) or of one of the three following types of the *secteur public*:

- *les établissements d'État*: (arsenals): not a judicial entity, under public law (*droit public*), an integrated part of the state, usually with certain administrative freedoms,
- *les établissements publics*: companies owned by the state but forming an independent judicial entity, under private law and with financial and administrative freedom and
- *les sociétés nationales*: companies where the state – directly or indirectly – holds a majority of the shares, under private law, and usually in the form of a *societé anonyme (*stock company*)*.[54]

The first category is run directly by the MoD, but in practice delegated to DGA. The second category enjoys more freedom, but the leaders are chosen by the government. The government also holds considerable (but not majority) shares of private companies (acquired by nationalisations), now mainly through holding companies (EADS and Thales, and Dassault through EADS).

This division of types of public defence companies is still valid (December, 2003)[55] and within each category the representation is as follows:

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[51] "Regional authorities" refers to the central authorities in the German *länder*, i.e. the fact that the Hamburg Land owns shares in EADS.

[52] Institutionalisation can be described as a "process by which a given set of units and a pattern of activities come to be normatively and cognitively held in place, and practically taken for granted as lawful." Meyer, Boli & Thomas (1987), p. 13.

[53] The LOI 6 (LOI: Letter of intent) refers to the six-nation defence materiel cooperation between the six largest defence-industrial nations in Europe : UK, France, Germany, Italy, Sweden and Spain.

[54] Dussauge and Cornu, 1998, p. 11-12.

Arsenals: only some special workshops within the Forces themselves (e.g. *Ateliers de Réparation de l'Armée de l'Air*); some in DGA itself (SMA (*Service de la Maintenance Aéronautique*, employing 3300 people, and DCE (*Direction des Centres d'Expertise et d'Essais*, employing 8500 people).

Établissements publics: Onera (*Office National d'Etudes et de Recherches Aérospatiales*) and CNES (*Centre National d'Etudes Spatiales*). These are in the public sector, but of private law stature with a CEO and a board of directors.

Societés nationales: Snecma (the creation from the nationalisation of a number of private companies after WWII), SNPE (previously an arsenal, was made a *societé nationale* in the early 70s); Giat Industries (arsenal until 1990); and finally DCN (arsenal until 1999), an MoD arsenal (i.e. not reporting to DGA) from 2000 to 2003 and now a *societé nationale* since June 1, 2003.[56]

2.10. Restructuring trends

The French defence industry is undergoing three parallel developments: 1. a reorganisation of its activities; 2. the interaction between civil and military sectors (mainly a Europeanisation of its structures creating a complex architecture of holdings); and finally 3. the increasing divergence between the best-performing industries (i.e. aeronautics and electronics) and the continuously from an economic point of view under-performing naval and ground-based sectors.[57]

There is a clear difference – not just in France – between the aeronautics, space and electronics sectors in that the defence industry consolidation has been stimulated and triggered by their close interaction and cross-fertilization with the commercial sector. The commercial restructuring and consolidation (à la Airbus, followed by EADS and BAE Systems) has also created similar patterns of consolidation in the military, connected sectors. The naval and ground-based sectors, however, have not to the same extent been engaged in multilateral collaboration and national industries have created indigenous capacities and solutions. The naval and ground-based sectors have seen much less restructuring.[58] The lack of common commercial programs or activities is missing, and thereby the incentives for transnational consolidation appear to be insufficient.

A recurring strategy is that of "dual use". This notion has repeatedly been used, revived and brought back by different governments and the EU. This strategy, however, has not proved to have been very successful. Strategies for harvesting synergies from technological development, both for commercial use and for military use, has been a recurring vision of the decision-makers of research funding for decades. It has, however, been very hard to implement dual use strategies; the uncertainties are too large. The synergies that do arise are instead a consequence of unforeseen effects, when businessmen and innovators create new technological solutions and business opportunities. Such processes cannot be planned. The role models for dual use and the examples of successful dual use strategies are usually the lucky exemptions or cases where the strategy has been formulated *a posteriori*. Nonetheless, the dual use vision is still vivid in French defence planning and is also a favourite subject within the EU Commission. A more productive, refined dual-use approach appears to be to

[55] E-mail information December 2003 from Jean Tisnés, DGA and Jean-Paul Hébert, Ehess/Cirpes.
[56] Information from DGA.
[57] Hébert, 2002, p. 44.
[58] Schmitt, 2001.

pool civil and military R&D[59] and see what kind of cross-fertilization that will occur, thereby not saying that such an effect automatically will occur.

2.11. Foreign companies integrating with French companies?

Foreign companies can not acquire a larger French defence company. All acquisitions of minor companies (with a defence content) must also meet the consent of the French government. It is clear which companies that are clearly out of reach for foreign acquisition (DCN, Thales, Dassault Aviation, CEA, Technicatome). Certain technologies within EADS are also protected. Companies like Sagem, Giat and *parts* of Thales and EADS could probably be acquired by European companies if the French government does not see them as highly strategic and/or if they see shared autonomy (within Europe) as an alternative that benefits the French strategic interests. The only possibility for US companies would be minor companies with a strong dual-use character working on already globalised markets. Any larger merger or consolidating construction - as the creation of e.g. Eurocopter, MBDA, EADS, Eurenco - requires a four-part agreement with the concerned companies and the governments as concerned actors (more than four-part if more governments and companies are involved). This number of actors will increase by one when the program has started, since the program itself also will become an actor[60].

The clearest case of transatlantic integration is Thales Raytheon Systems. This is a case of a 50/50 strategic venture, seen as a "test case" of how France and the US are able to cooperate. There are French, or French-based companies (especially Thales and EADS), that eagerly strive for transatlantic cooperation and integration. These companies' strivings are severely pushed back by the US general lack of faith in the French defence system[61] in combination with the French government's unwillingness to engage in cooperation with the US. A corresponding difficulty can be assumed if a US company strives for US-French cooperation.[62] Thales Raytheon Systems has had a slow development. They have received a small number of orders. According to Thales representatives, it is progressing in the planned manner. According to its competitors, not much progress can be seen.[63]

[59] As in EADS (Schmidt, 2002, p. 46).
[60] Wilén, 1992, p. 1.
[61] A commonly spread generalisation, which was largely confirmed in Lundmark, 2003.
[62] Admittedly, a streak of cultural rivalry can also be said to exist between the U.S. and France, as well as between France and the U.K. This aspect is however outside the focus of this report.
[63] According to inteviews in Paris, May-June 2003.

3. Framework for analysis

The French defence industry is in this report analysed on how it is being integrated and not being integrated with other countries' defence industries. The analysis is based on the following theoretic concepts:

- integration
- cooperation
- autonomy
- power

As stated in the introductory chapter, theory is separated between this chapter that introduces and defines central theoretic concepts and the next chapter "Analyses of the French defence industry" that presents analyses of the French defence-industrial system.

The analysis is focused on the industrial level and the corporate map, and how these corporate entities cooperate and integrate with French and foreign corporate entities. In order to describe this corporate level of analysis, the main influencing aspects of its environment and of the corporate strategy and conditions must be described. The main influencing parts of its environment in France are the concerned ministries, DGA, the President, the Senate and the National Assembly. The overall government defence industry policy is an important shaping factor. Each company's strategy, programs, cooperations, history (briefly) and financial behaviour are described. The overall dynamics of the French defence industry is also described.

The four main theoretic concepts are chosen because they are seen as central aspects in shaping the industrial dynamics as well as the government's policy and actions towards the defence industry. *Integration* or not integration is perhaps the most fundamental decision of all in French defence industry. *Cooperation* has been the European enabler for deepened institution integration, and France has been the most active nation. *Power* is chosen since there is a shift of control that decreases government control and increases corporate independence. *Autonomy* correlates directly with the French security posture, the choice of transnational integration or not and also the French policy of maintaining a elaborated and wide domestic defence industrial capacity. All four concepts – especially integration – are often used in an imprecise way in different analyses, articles and the general rhetoric, and therefore a discussion on these central theoretic concepts is essential.

Apart from these four central concepts, there are also a few more – independence and dependence, commitment and competitiveness – that will be used, and that demand a short definition.

Independence and *dependence* are theoretic aspects that are used, but not problematised. For simplicity, they are treated as rather unambiguous states on a continuum from being dependent to being independent. The independence of a company is increased by 1. its control over strategic resources, 2. its options for alternative sources of services and resources, 3. its ability to influence or coerce others to dispense needed services and 4. a non-dependence on external resources.[64]

Commitment to a relationship can be defined as a mutual process where satisfaction, rewards and investment will increase the mutual commitment. The greater the number, diversity and strength of the bonds between the interacting parties, the greater the commitment of these

[64] Blau, 1964, p. 119-25.

organisations to their relationship and the greater the stability of their relationship.[65] Such a relationship can also be analysed as the commitment of one party. Commitment is in the context of this report used in relation to cooperation and concerns a government's behaviour when rhetoric corresponds well with action, and that action in this case is resulting in major decisions, e.g. that France politically states that it supports European cooperation and that it also actually does engage in cooperation, not just talks about it.

Competitiveness is also referred to in chapter 4 in relation to company policy for integration and cooperation. This concept is not problematised at any length, it can for the purpose of this thesis be defined in the words of Porter that companies should strive to perfect and develop a series of activities in the "Value Chain" in order to achieve long-term sustainable competitive advantages.[66]

3.1. Integration

Integration can be defined as "forming a new whole" out of separate components. The whole can consist of several autonomous sub-parts or sub-systems, but these are said to be under the supervision of the larger integrated whole. Integration can thereby be described as a process of change rather than as arriving at a new position.[67]

Integration needs to be discussed and defined in order to increase stringency in the general debate. Integration can be defined as to increase effectiveness through reduced redundancy and duplication in the resources in order to fulfil a certain activity chain, to prevent duplication of activities as well as to achieve mobilisation of resources. If these purposes are fulfilled, the system is said to be more effective. The organisation's behaviour and performance must be judged in relation to its social environment, it is interdependent of the conditions around it. They are dependent on their environments, the context of an organisation is critical for understanding its activities. Internal action in order to create internal efficiency is better understood when judged in relation to the interaction with the outer context. The outer context offers resources that are critical to the organisation. To acquire resources, organisations must inevitably interact with their environments.[68] In a context as institutionalised as the defence industry[69], the resource allocation becomes institutionalised.

The driving force for integration is to improve efficiency, create synergies, get access to resources or markets – or a combination of these. There is interaction between differentiation – to shape the individual organisation for each specific task in order to solve it efficiently – and integration – to tie together the entire organisation so that the overarching objectives can be reached. An internationalised company acts in several, diverse contexts or environments. Each such environment has its demands in order to allow the organisation to take part of its resources and be able to integrate its activities with the environment's activities in some way. [70] Integration can be described as the answer to a conflict of different goals or objectives; the resources must blend in some way in order to be able to achieve mutual goals. Effective functioning can be seen as the appropriateness of the three-way relationships (between the

[65] Wilson and Mummalaneni, (1990). p. 415.
[66] Porter, M. (1985).
[67] Hertz (1992), p. 107-9 in Axelsson and Easton.
[68] Pfeffer and Salancik (1978). Page 1-20.
[69] Not just in France, every state with a substantial defence industry has created its own "military-industrialised complex", all with their respective, internal logic and institutionalisation.
[70] Lawrence and Lorsch, 1967.

uncertainty and diversity of the environment, the degree of organisational differentiation and the state of integration and conflict resolution achieved).[71]

Integration is often treated in the literature as an intra-organisational process, seldom as a phenomenon between two separate firms – e.g. integration of activities within the setting of a strategic alliance, joint venture, consortia or other joint set-up. A common assumption is that the basic reason for actors to integrate is to enhance effectiveness.[72] Perhaps the most common reason for integration is to pursue shared or merged goals. Other reasons for integration can also be to become a part of other networks, to improve the corporate portfolio and to improve the future potential.[73] Companies' international integration can also be described as that national networks (that an individual company is a part of) become a part of other, national networks, thereby creating new, higher-order interconnected networks of networks.[74] This report focuses on integration between separate corporate entities, not within companies.

In this report, integration is analysed in two main aspects: *geographic integration* and *integration of activities*. Geographic integration is in this report integration within France, within Europe, transatlantically and globally[75]. Integration of activities is analysed on three levels: decision integration, institutional integration and execution integration.[76]

The *decision integration* – that many decisions of several actors are replaced by fewer decisions by a smaller, merged group of actors, and the outcome concerning who controls it thereafter[77] - will be analysed in lesser detail. It can be seen as an outcome of the process when actors become fewer by consolidation. As an actor's influence changes from direct control to indirect influence, the decision focus shifts and changes its nature.

Institutional integration concerns the amount of formal-legal-power that one organisation has which allows it to influence the behaviour of another.[78] Institutional integration is important regarding the defence industry in a European perspective, when the international integration[79] – the process by which supranational institutions come to replace national ones – decreases the autonomy of the national system. This report, however, will not analyse the Europeanisation or globalisation processes of government institutions or other trans-national, similar processes of integration of government actors. Vis-à-vis the French system, they will be seen as external pulls that strive to decrease state autonomy, company independence and also the importance of borders.

Execution integration concerns the way activities are executed and the characteristics of flows. This flow can be tangible – physical resources and capital – as well as intangible – knowledge at different levels of abstraction.[80] In order to analyse the execution integration for the defence industry, it should for added clarity and stringency be separated between R&T

[71] Pugh and Hickson, 1993, pp. 50-51.
[72] Hertz, 1992, p. 107, and Mattsson, 1969.
[73] Integration is seen as different from consolidation. Consolidation is more of a general development in an industry; the aggregate result of many actors many acts of integration.
[74] Johanson and Mattsson, 1988, p. 474.
[75] The global integration will be mentioned only briefly.
[76] Hertz, 1992, p. 107.
[77] Ibid, p. 108.
[78] Ibid, pp.107-8.
[79] Goldstein, 2001, p. 440.
[80] Hertz, 1992, p. 111.

integration and production integration. Defence R&T[81] planning and spending is to a very large extent being kept within tight, national control. These processes take many years, perhaps five to ten, before the results may encounter the results of other national R&T processes in multilateral defence armaments programmes. It is not until the results of R&T processes meet, that production integration can occur; therefore the division between R&D integration and production integration. By that time, the technological choices and investments are made and institutionalised into each national process, and the possibilities for cross-border synergies are thus largely limited. There are also several European processes of defence R&T cooperation and harmonisation, e.g. Within WEAG (Western European Armaments Agency), LOI (Letter of Intent) and the presently ongoing creation of defence research cooperation within the EU[82].

Non-integration is seen as the active choice of not engaging in integration. In the context of this report, it refers to that companies within an industry not are being integrated or not are integrating with the companies from some other system than the French, e.g. with the European defence industry. Non-integration can (as in the French case) be an active and deliberate political choice of controlling, limiting and shaping the process of international industry consolidation. Non-integration does not refer to disintegration – to reverse the process of integration – nor is this occurring to any apparent extent.

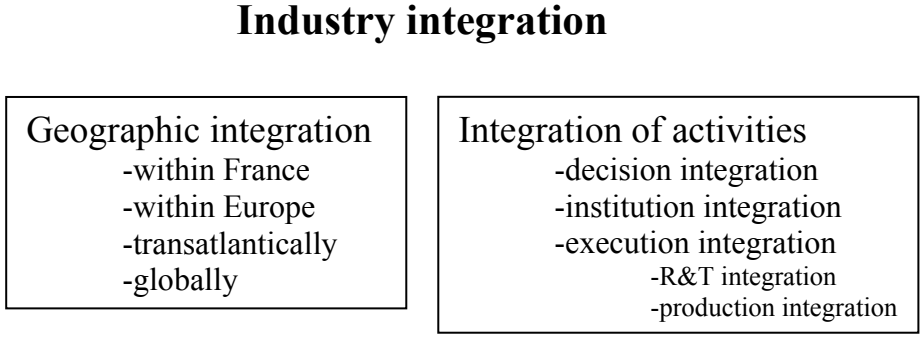

Figure 1. *Aspects of industrial integration.*[83]

3.2. Cooperation

Cooperation[84] must be separated from integration; it is often wrongly seen or assumed as being the same thing as integration. Cooperation can be defined as two actors that choose to jointly pursue an activity in order to reach a common goal. No industrial or government actor would

[81] In defence materiel development and production, there is a sepration between R&T (Research & Technology) and R&D (Research & Development). R&T is linked to defined products, R&D is more general. The EU has started to use the term defence RTD (Research Tecnology & Development), in order to cover all aspects.
[82] Presently the Preparatory Action Security Research is planned to become the European Security Research Program. Furthermore, the EU plans to create a European Defence Agency.
[83] Integration of activities adapted from Mattsson (1969) and Hertz (1992). The division between R&T integration and production integration is this author's addition to the scheme.
[84] Cooperation will in this report be used as a synonym to collaboration.

co-operate simply out of cooperation being a good thing, it requires that their respective self-interests must overlap and that they both see cooperation as an attractive option. The two key requisites for cooperation to thrive are that the cooperation must be based on reciprocity and that the shadow of the future is important enough to make this reciprocity stable.[85]

Cooperation does require some kind of integration, but the concepts must be held apart. In this regard, a continuum of integration can be described where closer cooperation can be assumed to lead to increasing integration.[86]

Cooperation will not in this report be analysed as a theoretical concept, but rather be used as exemplifications, as manifestations of integration. France has a long and strong track record of European armaments cooperation. Important projects will be mentioned as examples. An extensive assessment of cooperations is offered in appendix 9.

3.3. Autonomy

An aspect related to autonomy is sovereignty; that a government (at least in principle) has the right to do whatever it wants in its own territory.[87] With a globalised world with trans-national companies and overlapping alliances between nations, sovereignty is no more a valid concept, the interdependencies and interconnectedness between nations and companies are too developed. Autonomy is also closely related to aspects as autarky, or self-reliance. Autarky relates to a state's trade strategy and having reached autarky can be defined as not to trade with other states and try to produce for all domestic needs within the country, and thereby avoid dependence on other countries.[88] Autarky in this rigid sense is clearly un-realistic.[89] The problem area should instead be discussed as degrees of autonomy and dependence. *Autonomy* can be defined as the ability of the state to transform its policy preferences into authoritative actions, including domestic policy as well as policy affected by external forces.[90] Autonomy is seen in this report as a certain degree of independence – or perhaps more appropriately – as a lack of dependence upon other nations. Autonomy is seen as the ability of being able to pursue individual goals without being dependent on others. France has a tradition of maintaining a certain degree of autonomy as regards the armaments production, in the present discourse the French government actors often refer to the importance of a certain autonomy.

3.4. Power

Power is described in many ways. A common trait is that power describes a social relationship among actors or organisations, where one actor has the capability to overcome resistance to achieving a desired objective or result. This power is clearly relationship specific; an actor has more power in one relationship than in another. Power is also context specific; an actor acts in different environments and its powers are differing.[91]

In the French defence industry context, a shift is occurring from direct control (direct state ownership) to indirect control (different levers of influencing the strategy and performance). Direct control is based on ownership. Indirect control is based on relationships between actors, where the actors in some way are interdependent, and often asymmetrically

[85] Axelrod (1984), p. 6 and 173.
[86] Lundmark, 2003a, pp. 23-29.
[87] Goldstein, 2001, p. 82.
[88] Goldstein, 2001, p. 364-365.
[89] In theory on international relations, security policy, political economy and other related fields – mostly within political science – the definitions of autonomy, autarky and self-reliance have produced several different academic schools. This report will not discuss these differences in depth, and instead find the above definition satisfactory for the purpose of this report.
[90] Kassim and Menon 1996, p. 2-4.
[91] Pfeffer, 1981, pp. 2-3.

dependent.[92] The indirect control will in this report be described as influence, but the lines are fine between direct and indirect control.

There are different bases for control: possession, access to a resource, the use of a resource, who controls its use and finally the ability to make rules and otherwise regulate possession, allocation and use of resources and to enforce the regulations. All these constitute sources of power based on some kind of resource-dependence. Another source of power is concentration of resource control. Furthermore, a source of power is one organisation's dependence on another, which must be based on some exclusive resource being concentrated to another party. Such dependence can be described as being asymmetric, which relates to that the parties are dependent on each other, but some more so, due to uneven distribution of power.[93]

Power can be seen as having four dimensions: 1. sources or bases of power, 2. means or instruments used to exert power, 3. amount of power and finally 4. the scope or range of power.[94] The defence industry is an industry where these powers are very strong with the government in France, it has the right to define and alter the state's role in relation to these dimensions.

Power is a subtle variable, which in this context aims to describe how much, how direct or indirect the defence industry is controlled by the government. Reversely, it also reflects to what extent the actions and strategies of the company are decided upon by the company. This concerns the degree of power of the government and implicitly sees decreasing power for the government as more autonomy for the company. Power relates to how the French government has strived and strives to have power over the domestic defence industry in order to best serve the French national interests. Power can be seen as ranging from direct control to more subtle, indirect forms of influence. Important variables in this regard are "*tutelle administrative*", shareholder interest, strategic partnership, R&D and defence orders.

A factor that can be underlined in relation to the defence industry is the government's exclusive right to place orders within a country; no other party can. Reversely, a defence company usually has few domestic competitors, since the government has not built up several, resembling industrial structures with government military and R&D funding. Thereby, the defence company is in a favoured position since the government has few (if any) domestic competitors to choose from if the government sees domestic production as important.

Power is in this report concentrating on the interorganisational field; the interface between on one side the defence companies and on the other side the regulating, influencing and controlling facets of the government. Power within the companies or among managers is not analysed. The power relationships between companies are touched upon, as well as the power balance between the government organisations (e.g. MoD, DGA, the president).

3.5. Corporate or government goals?

The aspects of power and autonomy are fundamentally different between corporate actions and government policy. Companies are in this context seen as pursuing maximum competitiveness and efficiency from the conditions that the industrial situation offers. Companies strive to control resources and to make independent decisions that will benefit the company and/or its owners. In an industry as politicised as the defence industry, companies will have to closely interact with government policy and actions.

[92] Håkansson and Johanson, 1992, p. 28-29.
[93] Pfeffer and Salancik, 1978, pp. 48-52.
[94] Kallinikos, 1984, p. 63, referring to Dahl, 1957.

A study from FMV (the Swedish Defence Materiel Administration) discusses state ownership of defence companies and its implications on corporate conditions for competition and cooperation. State ownership does not prove advantageous or disadvantageous for companies per se, it all depends on the nature of government control and influence and how that fits with the conditions of the counterpart, and that company's type of government influence. Government support might preserve inefficient companies, as well as force out competitive companies that lack a necessary government support. The study compares Finland, Norway, France, U.K., Italy, Spain, Belgium and Germany, with a focus on the first three. France is claimed to have the strongest concentration of state ownership of these nations. French direct control and indirect influence is seen to be comparatively strong. The indirect influence hampers the domestic possibilities for cooperation while the direct control both hampers and supports the possibilities for cooperation. Internationally, the indirect influence creates both advantages and disadvantages for the companies, whereas the direct control overall is negative for the companies' possibilities for cooperation and competitiveness.[95]

3.6. Conclusions

This theoretical framework suggests an interplay between *power* – the ability to reach a certain result – and *autonomy* - the ability of being able to pursue individual goals without being dependent on others. This evolving interplay creates *integration* – "forming a new whole" out of separate components between companies – which is manifested in the form of *cooperation* – two actors that choose to jointly pursue an activity in order to reach a common goal – and *consolidation* - the general development in an industry; the result of many actors many acts of integration. This framework is used in order to focus on the integration and non-integration of the French defence industry.

The theories behind the four concepts integration, cooperation, autonomy and power have somewhat differing theoretical backgrounds and underlying assumptions. Integration is based on a business administration/organisation theory standpoint. Cooperation is based on a theoretical standpoint (Axelrod) that appears to have become prevailing in all social sciences. Autonomy is, however, clearly based on political science and confronts important distinctions between "political economy" and "international relations", two different schools in political science. These differences are not profoundly discussed in this report. Power, finally, is based on a business administration/organisation theory standpoint, mainly based on the same assumptions as integration and is in the discussion on power labelled the resource-dependence perspective. Other standpoints on power exist in political science (and were mentioned above), but the resource-dependence perspective is chosen. The business administration assumptions have in common that they assume organisational efficiency, whereas the autonomy assumptions are based on the supremacy and non-dependence of the state, which strives less for efficiency but rather for independence. These underlying assumptions need not be conflicting, but the performance of some parts of the autonomous French defence industry capacity may be pointing to that they are not fully compatible.

[95] Hagberg and Vestergren, 2002.

4. Analyses of the French defence industry system

For this chapter, a number of analyses of the French defence industry system have been studied. They are presented primarily in chronological order. These analyses by academics have not focused on the theoretic concepts chosen in this report. This is not seen as a disadvantage, the analyses constitute suitable assessments to relate the research behind this report to. The non-French analyses that have been identified are unfortunately rather old, but the ones seen as most influential are referred to.

4.1. Analyses

Kolodziej (1987) described in detail the set-up of the French defence-industrial system. He described it as both easy and difficult to describe why France makes and markets arm and military technology: easy, because it fits well with the French national policy concerning national independence and security, economic and technological development, diplomatic influence, and prestige. Difficult, since the systemic imperatives and the systemic dynamics are not evident. He also described the core of the French defence elite as consisting of

> *"a loose coalition of high bureaucratic functionaries, located primarily within DGA, military engineers, industrialists and armed services chiefs. This oligarchy is largely insulated from daily governmental direction and control and shielded from close public scrutiny".*
>
> *"The leadership of the arms complex, primarily military technocrats occupying posts in the DGA, possesses the requisite powers and mechanisms to order its own affairs and to resolve internal conflicts that might prompt external intervention, It controls the recruitment, training and incentive structure … it commands impressive resources to advance its own interests … and to project a favourable public image"*
>
> *" … the DGA enjoys access to some of the most powerful emotive symbols of national pride and unity …"* [96]

These persons moved between different platforms on the higher levels of influence. At the same time, the French *Sénat* and *Assemblée Nationale* had much less influence on defence spending and policy than the Congress in the US. Thereby, the French system did not have a credible system of checks and balances; the defence bureaucracy elite ruled itself. Furthermore, Kolodziej underlined the French response to (at that time) falling Third World exports: to move defence spending from existing orders to R&D and to promote further European cooperation. In shifting the rationale for armaments production, the size of the defence industrial system and the influence of its bureaucracy could largely be kept intact.[97]

Serfati has described the French defence industry as a "*méso-systeme*". In economics, analysis is often made either on a micro-level (one actor, usually a company) or macro-level (a state). The meso-level is something distinct in between, in this case it applies to the defence industry. The notion of the French defence industry as a meso-system is based on its deliberate and elaborated place and role in the French economy. The meso-system is defined by its specific type of products or services. The meso-system is characterised by: a general consensus among successive government and political parties, its relative autonomy from the impact of economic recessions, a definition of it as being a central part of France's scientific

[96] All three quotations from Kolodziej, 1987, p. xv.
[97] Kolodziej, 1987.

and technological development, and a strong social and economic cohesion within DGA and particularly among the *ingénieurs de l'armement*.[98]

A peculiarity according to Serfati (1992:b) in the French defence-industrial system is that "their might (has) relied heavily on their close relationship with the state". When companies in other nations have chosen to leave the cumbersome defence market, very few industrial groups have done so in France, some even sought to enter it in the early nineties. Alcatel and Framatome re-entered the defence market after having left it in the 1980s. The reason for this attractiveness was, according to Serfati, generous defence contracts, export subsidies and a general attitude of accepting deviations from agreed costs and delivery dates.[99] Serfati also describes how the French government had allowed and encouraged small and medium-sized firms to develop niche technologies, thereby creating a patchwork of smaller high technology SME:s, rather than creating a few, larger, internationally competitive groupings. This was a result of the DGA's previous policy to plan production according to the state's needs, rather than to the generic economic needs of industry.[100]

The reduction of national defence budgets, the increase of R&D expenditure and the competition of the American giants have forced France – and other European states – to adapt. The restructuring has been made mainly by the companies, with the gradual deregulation and decoupling from national governments. The industrial logic for consolidation cannot wait for the visions of a security-united Europe, it has had to adapt. According to Mampaey, the extensive powers given to DGA during the 60s to 70s were a major restrainer in the necessary industrial adjustments that had to be made after the Cold War. The restructuring in France has been more government-driven than in any other western state.[101]

In 1992, in a US Congress report, it is stated that the French government engages in long-term planning and various forms of administrative guidance to ensure the financial and technological health of the defence industry. In contrast, the US, Department of Defense relies primarily on market mechanisms rather than government intervention. The report also notes that the French *Sénat* and *Assemblée Nationale* have considerably less power over defence decisions than does the US Congress.[102]

France chose to increase its share of international cooperation with the 1994 *Livre Blanc*, and the 1996 paper *Une nouvelle défense*. In 1992, however, there was still institutionalised resistance. Fontanel and Pilandon, (1992), describe French arguments against armaments cooperation: "(a) French weapons are superior and are tailored exactly to the needs of the French armed forces; (b) a domestic arms industrial base is essential to maintain strategic independence; and (c) "unfair" trade practices motivate protective measures." Furthermore, arguments against the commonly articulated arguments for economic benefits through armaments cooperation were: " (d) domestic procurement creates employment, boosts tax revenue, improves the balance of payments and produces technological spin-offs for civil production; (e) if cooperating countries do not want exactly the same systems, (cooperation will create unreasonably high costs); (f) compromise designs may be more expensive to produce; and (g) coordination and transport needs increase costs".[103]

The role of the state vis-à-vis the defence industry rests on four objectives:

[98] See Serfati, e.g. 1992a, p. 51-79; 1996, p. 17-21.
[99] Serfati, 1992b, p. 105.
[100] Ibid, p. 106. Wulf, 1993, reiterated Serfati's findings (p. 144).
[101] Mampaey, 2001.
[102] US Congress, 1992.
[103] Fontanel and Pilandon, 1992, p. 114.

- a political purpose, not to become dependent on any other country;
- a technological purpose, aimed at preserving a military technological advance while ensuring maximum confidentiality;
- a military purpose, to be able to react quickly to any sudden threat and
- an industrial policy purpose, that the concentration of authority within the state for arms production is seen as a gauge of effectiveness.[104]

The French arms production system is seen as adapting its levers of control and regulation – constructed for the Cold War – rather than allowing an erosion of them.[105] Four processes can be described as modifying the conditions for the government: the continuing importance of the civil sector (through diversification and importance of civil technology development), European integration, the reorganisations of DGA and the ongoing privatisation.[106] Clearly, the government is instrumental in the last two processes. The very principle of state control has not, yet, at all been called in to question.

The French government's legislative and regulatory instruments can be described as: the regulatory constraint (how rules, regulations and legislation shape the behaviour of the companies); and controlling arms exports. Furthermore, the French government has financial and budgetary instruments: the overall defence budget; R&D funds; multi-year orders; and the holding of capital (through ownership).[107]

Despite the fundamental changes in security affairs and the globalisation of the economy, arms production in France is one of the rare industries that has retained its national nature and its systemic features inherited from earlier times. The French government has a strong presence in all social and economic relations in France, and this influence is rarely questioned by the general public or within the meso-system itself.[108] If, however, also the French defence industry will have to transform more fully, which will be the means of governmental action and control concerning the defence industry?

Five decades of strong support in France for the defence industry have awarded the defence innovation networks a central place in the national system of innovation. The French defence expenditure had also been concentrated to a small number of sectors, regions and companies, thereby making a smaller group of companies (esp. Matra, Aérospatiale, Dassault, Snecma, Thomson, DCN and Giat) the nexus of R&D funding networks. The military objectives were given top priority in the early 60s, which, according to Serfati, has made the process "path-dependent" since the French institutions, structures and organisations have been largely unchallenged.[109]

The French meso-system for arms production has been preserved despite fundamental changes in geopolitical, economic and technological factors, according to Serfati, due to a strong triple agreement, a "quasi-consensus":

- an agreement of political order, consecutive presidents and governments maintain the relation to the defence industry,
- an agreement of the "rank" of France in the world, that France has a top position to maintain and defend and

[104] Hébert, 1998.
[105] Mampaey, p. 134-141.
[106] Hébert, 1998.
[107] Mampaey, 2001, pp. 136-141.
[108] Ibid, p. 123-144.
[109] Serfati, 2000, p. 71. Note that this description apparently does not include the consolidation in 1998-2000.

- an agreement on the economic and technological level, the groups with a military specialisation have a central position in the national R&D and innovation system, which is only scarcely contested.[110]

These agreements were "codified" in the institutions of the Vth republic and has made it possible for the French meso-system to transform, adapt and (most importantly) defend its size and importance, despite the dramatic changes in the global security conditions over the last decades.[111]

Lovering (1999) described the French defence-industrial development since the sixties as being "reflected in a distinctive social consensus". The French commitment to a strong national defence (and a corresponding national defence industry) "remained exceptionally ambitious by European standards". Chirac announced fundamental changes in the French defence policy, but some of the objectives for defence industry reform (i.e. towards a less distinctly French solution) were abandoned due to the socialist governments reactions to street riots in 1996 in response to the threat of job losses. Lovering foresaw a further adaptation towards the British adaptations of its defence industry during the nineties. He also foresaw that France would play an important role in a European consolidation.[112] He also pointed out that French companies had disadvantages with regard to deepened cooperation due to its employment structures and non-resolved over-capacities and under-competitiveness in some companies; foreign partners were therefore reluctant to engage in cooperation with French companies since they could risk having to share the costs of further rationalisations.[113]

Britz and Eriksson (2000), describe a pattern during the nineties to try to steer the national development in acceptable directions, despite difficulties in making policy changes. The security interests were seen as being driven by a logic of anarchy (= the French striving for national autonomy) and the economic interests by a logic of interdependence; the system thus possessing an inherent source of conflict. The logic of interdependence gradually gained importance during the nineties, as France lowered its ambitions for autonomy, which was made explicit in the 1994 *Livre Blanc*. This adaptation was related to an outright shortage of the financial means needed to uphold a largely national military innovation system.[114]

The French government had substantial problems with adapting some of state-run companies, i.e. DCN and Giat Industries. Incentives to achieve efficiency and competitiveness were largely held back by interests to satisfy goals for preserving capacity and employment. Furthermore, these companies did not, it is claimed, produce the kind of weapon systems that the Armed Forces demanded. These companies were also repeatedly recapitalised by the government.[115] The industrial level (apart from mainly DCN and Giat) were seen as overall having an logic of interdependence, whereas the political level has been dominated by a logic of anarchy. This difference is seen as being a possible explanation for why cooperation has run more smoothly on the industrial level.[116] Regarding its armaments production, France has had two arenas to negotiate on: a domestic (the main actors being DGA, MoD, *le Sénat* , *l'Assemblée Nationale*, the Armed Forces and the unions) and an international arena (with a wide array of supranational bodies, and national interests of states and industries). For a company, the domestic discussion might focus on the protection of employment, whereas in

[110] Serfati, 1995.
[111] Op. cit., and seen as still valid by Mampaey, 2001.
[112] Note that Lovering wrote this before the creation of EADS and MBDA.
[113] Lovering, 1999, pp. 346-9.
[114] Britz and Eriksson, p. 178.
[115] Ibid, p. 176-7.
[116] Ibid, p. 190.

the international arena the discussion regarding that company would focus on how to create competitive European companies; two quite different discussions.[117]

The French restructuring has had to interact with an international situation that has not stabilised. The international restructuring can be described as containing four problems:

- the European restructuring has not stabilised, and different sectors are unevenly consolidated;
- the transatlantic situation is not stabilised. There is a substantial gap in technology, funds, doctrine, industrial policy, trust and speed of change between the east and west side of the Atlantic Ocean;
- new forms of production systems create new problems; Network centric warfare, revolution in military affairs (RMA), new types of supply chains, increasing monopoly, increasing importance of the financial sector. To this could also be added the increasing importance of non-military technologies and technology development;
- the political-strategic dimension; that the Europeanisation of the industry also demands a Europeanisation of institutions and politics. [118]

4.2. Conclusion

These analyses show that the French defence industry system/meso-system has a very strong position within the French government and society, and that it has been quite stable. The analyses are mainly French (Serfati, Hébert, Dussauge and Cornu, Mampaey, Fontanel and Pilandon). Some other, non-French analyses have been identified: three American (Kolodziej, US Congress and Lovering), where Kolodziej's analysis stands out and has also shaped or inspired the other two; one Swedish (Britz and Eriksson) and one German (Wulf, which however is based on Serfati's assessment). As stated previously, no non-French analysis more recent than 2000 has been identified, so the later assessments rely solely on French analysts.[119]

Compared to Serfati´s descriptions of the meso-system, it has started to change considerably since the late 1990s. First of all, considerable transnationalisation has occurred, creating EADS and MBDA (apart from Thomson CSF/Thales, which was already transnational). This sets considerable parts of the French defence industry in a trans-national setting and thereby weakens the control and influence of the French government. Secondly, the DGA has seen its powers decrease with the shift from *tutelle* to *partenariat* and also with the centralisation of export authority to MoD/DAS. Thirdly, the French government is in a slow but apparently unstoppable process of shifting from direct ownership to either privatisation or ownership through holding companies. A fourth, but still upcoming aspect is how the Europeanisation of defence R&D and defence capabilities will be coordinated within the presently emerging structures.[120] To some extent, these will lead to a further shift of power from France to a europeanised structure. The components described by Serfati and others are still present, but

[117] Ibid, p. 226-227.
[118] Hébert, 2002, pp. 55-57.
[119] The fact that there are only French, more recent analyses is a disadvantage for making a comparative study on the analyses of the French defence industry since, as stated in this report, there have been clear shifts in integration, power and autonomy in the last five or six years. This perceived lack of non-french analysis is however a situation outside of my control.
[120] Concerning new European structures and organisations, these are not discussed since it is to a large extent unclear what the end results will be regarding scope and innovation. It is also seen as being outside the scope of this report.

there is a continuing shuffle of power and control, which in sum decreases the powers of the French government, and even more so the powers of DGA.

5. Company policy for integration and cooperation

This chapter presents the most important findings concerning the corporate strategies. There are individual presentations of each company in appendix 2. A table with an overview of the companies' strategies for cooperation and integration is also presented as Appendix 3.

The analysis focuses on eleven companies, which are seen as being most central to the French defence industrial landscape.[121] CEA and Technicatome are also vital to the French strategic interests concerning defence capabilities, but their strategy is not expanded upon, since their strategies are so synonymous to the government's priorities.

Compared to other Western nations with a considerable defence industry, the French defence industry contains many different elements. Firstly, there is the strong state ownership presence. Secondly, there are also companies with a very strong industrial logic[122] e.g. (Thales and Sagem). Thirdly, there are families with a very strong position and influence on defence matters that concern their companies (Lagardère and Dassault[123]). Fourthly, there are companies (DCN and Giat) with strong arsenal-type traditions that stand in stark contrast to the industrial logic of companies like Thales, EADS, Sagem and Dassault Aviation – but all of them remain as important actors in the French defence-industrial landscape. The trans-national logic of EADS and Thales is clearly different to the (largely) national logics of the former arsenals, and also contrasts with the technological isolationism of Dassault Aviation. All these elements mix and overlap in a complex symbiosis between government and corporate interests.

French companies cannot be described in unison as having strong common traits; there is a continuum over all variables. The common feature of the French defence industry on a meso-level is the continuous strong presence and influence of the government. The most important traits or patterns concerning the major companies are the following:

- *Cooperation*: The majority of companies are extensively engaged in cooperation, primarily with Germany, Italy and UK. Thales has created an extensive portfolio of international joint ventures in relation to its numerous cooperations. Dassault Aviation has no cooperation concerning fighters, but has a new (since 2003) strategically significant UCAV[124] cooperation with Sweden and Greece. Also Giat Industries does not have much international cooperation, which primarily is due to Giat's lack of attractiveness. The French defence industry has practically no transatlantic cooperation.
- *Competitiveness*: French companies show low profitability, as European defence companies in general. The state-led companies Giat Industries (especially) and DCN, show economic performances that would have driven them out of business a long time ago, were it not for government support. Thales, EADS, MBDA, Sagem, Astrium, Alcatel, Snecma are in certain technologies or segments globally competitive, by technological expertise and/or sheer size. There is considerable competition among French companies, e.g. EADS, Sagem, Dassault and Thales regarding UAV:s; Thales,

[121] These short descriptions on company strategy are based on interviews with the companies, home pages, annual reports and other respondents' assessments. Thus, the assessments in this chapter and in Appendix 7 cannot be attributed to single sources, therefore the scarcity of footnotes.
[122] Industrial logic in this sense refers to that the companies' goals and objectives shape the industrial development, instead of a development highly governed by state actions and regulations.
[123] Lagardère is a conglomerate where its very large French media interests and its defence activities are separate activities. Dassault has recently entered the media business, when it in 2004 acquired Le Figaro and L'Express.
[124] UCAV: Unmanned Combat Aerial Vehicle.

Giat Industries and Sagem concerning army "transformation"; and between EADS, Thales and Sagem concerning C3I.

- *Integration:* Most companies are the creations of government-led Franco-French consolidation (Snecma, Giat, Thales (partly)), or of government-controlled European consolidation (EADS, MBDA, Eurenco). Several important European trans-national companies are in part owned by EADS (Eurocopter, Airbus, Euromissile, Astrium). Thales has overall grown organically by extensive acquisitions over several decades, its "multidomestic" strategy. Sagem has remained untouched by the government-led consolidations. Dassault has maintained its isolation vis-à-vis other companies, apart from that Dassault Electronique was merged into Thales in the late nineties. French companies have only acquired a very small amount of smaller US companies. French companies with a defence content cannot be acquired by foreign companies, apart from the handful of dual use aerospace companies that have been acquired.
- *Government relation:* The French defence companies show a continuum of government dependence, from very high, Giat, to low, Sagem. Some have a close relation to the government, due to the government's choice to keep these companies under close control (DCN, Giat, Snecma, SNPE). DCN and Giat are fully owned by the state, SNPE at 99,86 % and Snecma[125] at 97 %. Dassault and Sagem have largely independent relations to the government. EADS and MBDA are firmly established internationally, but clearly dependent on the government. The government has golden shares in Thales and EADS, and contracts concerning certain strategic technologies with EADS.

Autonomy: This variable relates to the state's degree of independence in defence technology and defence production, so it is not expanded upon in this chapter.

Power: As used as a theoretical variable in this report, power is not applicable to company strategy. Power is analysed as shifts of control and influence between the actors in the industrial dynamic, i.e. between the government and the corporate entities.

[125] The MoD has declared that it will privatise one third of Snecma's shares in 2004.

6. Integration through cooperation[126]

6.1. Cooperation leading to consolidation

Structural consolidation often requires a major collaborative program in order to create enough political will for allowing the creation of such new entities. The industrial incentives cannot progress without government approval or consent.

There is a long French tradition of European armaments collaboration after WWII, especially with Germany, United Kingdom and Italy, in roughly that order. The French defence industry has gradually since the 60s integrated itself with parts of the European defence landscape. At the end of the 50s a small number of cooperations were started (Breguet Atlantique, Transall). In the 60s, Franco-German missile cooperation (Milan, Hot, Roland), airplanes (Alphajet); Franco-British in helicopters (Puma, Gazelle, Lynx), airplanes (Jaguar) and missiles (Exocet). Gradually, these early cooperations have evolved from research accords to non-structured programs and over joint ventures led to the rise of companies as EADS, MBDA, Eurocopter and Airbus. This direction of structural development has been made possible by political will, and could not have been implemented solely by the companies. The Franco-German cooperations of the 60s and 70s were a platform for deepened integration, gradually attracting more countries and companies. France has by European standards been very active in multilateral cooperation, opposing the commonly held view that France strictly sees to its own interests and is hard to cooperate with.[127] In 2002, 30 % of the French armaments programmes were made in bi- or multilateral cooperation.[128]

The rhetoric for Europeanisation has consistently been strong for the last decades. France wants a European interdependence in certain areas, but autonomy in certain defined areas that relate to the *force de frappe*.

France has to a very limited extent participated in transatlantic collaboration. This is deliberate, since it does not wish to be dominated by another country and collaboration with the US is seen as an imbalanced venture. It is worth stressing once again that they are not against the US, but against being dependent. France declares that it strives for a transatlantic collaborative culture, *after* Europe has united its strengths and objectives in a way that makes the two sides more equal. It should be stressed that this is the government's position, whereas Thales and EADS eagerly promote transatlantic cooperation. There is no industrial friction in this, but clearly political, i.e. there are corporate interests on both sides of the Atlantic Ocean for integration and cooperation, but the fact that the French government is important for shaping these companies' strategic scope, and clearly and openly avoids transatlantic cooperation – that creates a political dilemma as it hampers the companies' strategic possibilities.

In rhetoric, France has for a long time been very pro-European. In practice, they have let parts of industry organise itself in pan-European industrial collaborative patterns, all with nations seen as being of similar defence sophistication (primarily Germany, UK and Italy). They have also withheld some strategically vital interests under French control, directly in France or indirectly in trans-national companies through holding companies. There is actually little imbalance between rhetoric and practice, it's just that the logic behind the safeguarding of French interests is less publicly stated.

[126] An extensive list of French participation in international cooperation is presented in appendix 9.
[127] Dussauge and Cornu, 1998.
[128] Hébert, 2002, p. 45-46.

The table of cooperation (see appendix 7) is not claimed to be exhaustive, but should cover most cooperations.

6.2. A pattern of deepening commitment

The bilateral cooperation between France and other European nations, and to some extent between the US and European nations, has had a similar pattern of deepening commitment. The initial interest starts with either that one or both parties master a technology that is of interest to the other and/or that the development costs are seen as too heavy to bear for one nation, and that a shared development therefore would be beneficial. Another embryo for cooperation has also been when a nation has shown interest to acquire an existing defence product from another nation and has through testing and national adjustments created reciprocal discussions for further innovation (such discussions on innovation have also arisen when a nation has produced an existing product under license). Less often, it seems, nations have started out from a common/similar/mutual military threat to counter or a capability to create.

Cooperation commences by some kind of informal discussion concerning possible cooperation, commencing either between militaries in some form, between industries or between ministries – the latter usually entering the process later. If these discussions are fruitful or promising (or politically pushed) the discussions start to take more institutionalised form. This is in the shape of committees, bureaus, program offices etc. or meetings (that gradually become increasingly frequent and regular). If the cooperation continues to deepen, at some time a Memorandum of Understanding (MoU) or more official committee is created between nations, ministries or military bodies; thereby making the cooperation more official. Cooperation may also commence leap-wise, due to MoU:s or declarations between governments. However, government MoU:s in themselves do not automatically create Parallel with this, the industrial cooperation becomes more organised, where the loosest forms might be financially non-binding agreements for mutual development, and deeper commitments might be mutual program offices or organisations. These mutual industrial organisations have since the 1960s become more and more corporate, from joint economic organisations, to joint ventures, to companies merged into joint ventures, and finally to transnational companies as e.g. Eurocopter, MBDA and EADS.

The militaries also test prototypes and solutions together, usually, but not necessarily[129] together with industry in some form. This military interaction could also be in the form of presentations of materiel for allies, or reciprocal ongoing information concerning the development in certain technology areas – and cooperations sometimes emanated from discussions at such interactions. Militaries have also created arrangements where they within specified military areas or domains have started committees for different technology areas or capabilities and through discussions and comparisons try to identify prospects for cooperation.

Thus, the gradual deepening of cooperations consists of parallel industrial, political, military and technological processes – each consisting of many sub-processes. Each program has to win approval in all of these processes; there are enormously many path-deciding decisions that have to be taken underway.

This overall process of gradually deepening commitment towards an actual defence product or solution is however far from harmonious. The examples are many of ideas for cooperation

[129] Sometimes products, technologies or prototypes were developed within the military or within e.g. DGA and its numerous *Ateliers* (“studios” or workrooms) and arsenals for military innovation.

that never resulted in anything; cooperations where nations discussed for years but could never agree on specifications; where different national technological choices or traditions killed the possibilities for cooperation; where military strategy or tradition was seen to be too far apart or not negotiable; where national prestige took over; where industrial competition and rivalry never made the industrial parties willing to share sufficient degrees of information; where the political process was more deeply committed than the military commitment – just to mention a few of the possible reasons for failure.

6.3. France – the central player in European cooperation

An overview of the major European collaborations from 1958 to 1998 consisted of 52 collaborations. France participated in 43 of these, Germany 31 and the UK in 23, followed by Italy 17, Spain 6, Netherlands 4, Belgium 3, Sweden 2 and Norway 1. In the 70s, UK tilted towards more US-UK cooperation. The programs were distributed over the decades with in the 60s 13 programmes, in the 70s 4 programmes, in the 80s 12 programmes and finally in the 90s (until 1998) 21 programmes. The Franco-German cooperation was throughout this 40-year period the core of the collaborative structure in Europe. France initially (1958-75) preferred bilateral agreements whereas UK and Italy preferred trilateral cooperations. Germany had a 50-50 share between bi- and trilateral cooperations. The entire 40-year period had 32 bilateral arrangements, and France participated in 29 of those. 14 of those were Franco-German (out of 17 German bilateral arrangements), eight were Franco-British (out of ten British bilateral arrangements), and four were Franco-Italian (out of five Italian bilateral arrangements). [130]

Nature of programme	Number of programmes
Aircraft	6
Engines	6
Helicopters	6
Missiles	16
Vessels	3
Artillery	6
Tanks, armoured fighting vehicles	3
Engineering equipment	3
Communications	1
Space	2

Table 2. *Nature of European armaments cooperation programmes 1958-1998.*[131]

In 2002, 20 % of the French procurement was in collaboration, measured as % of funding.[132]

[130] Hébert, 2003, École Militaire.
[131] Hébert, 2003, p.3. École Militaire.
[132] Hébert (1999)

The assessment of the geographic integration in Appendix 7 is believed to cover the most important events. There is no differentiation in the table whether these cooperations and programs were initiated between companies or between states.

For some programs, they might have been listed varyingly by the sources behind the table as being consortia, JV:s, production arrangements or related setups. No further research has been done to find the most appropriate label.

In some cases, different sources state different starting years for programs, usually differing one year. No further research has been done to pinpoint the most correct year.

The integration of activities is extensively covered in the table, but does not claim to be exhaustive. Decision and institution integration has not been researched in such detail that it can be separated in the table. The production integration was in all likelihood preceded by some sort of R&D cooperation, but these first phases of cooperation appear not to have been openly documented.

The general purpose of European cooperation projects is by Sandström (1997) seen to be to achieve similar systems. Sandström stated that the degree of similarity was often exaggerated since in a great number of European cooperation projects each project member had been given the right to choose specific specifications both on the system as a whole and on subsystems and/or systems such as missiles, etc. Cooperations also were seen to tend to be constructed in order to preserve existing overcapacity, and in some cases even to create new overcapacity when participating nations widened their technology scope. Furthermore, participating nations tended repeatedly not to learn from mistakes; mistakes made in previous cooperations were repeated in new and related cooperative projects.[133]

[133] Sandström, 1997, p. 116-7.

7. Challenges for the French defence-industrial system

In the spring of 2003, there were certain aspects or processes that received considerable attention in the sense of being challenges for the French defence industrial system, the policy of the French government and the strategies of the companies. In order to qualify as challenges in this discussion, they must be seen as influencing fundamental directions in strategy, policy or in industry structure or dynamics. The following challenges were either on a short term or on a long term. The first two have been resolved or important decisions have been taken since the spring of 2003, these challenges are however still commented upon.

7.1. Short term

A400M

The A400M was a first decisive test concerning the cohesion between European defence cooperation in relation to the upcoming EU Rapid Reaction Force and related processes. As could be expected, the concerned states could not accept it being powered by a US engine. The A400M was a lithmus test of the political will to protect the European defence industrial base. Airbus announced on April 29, 2003 that it was prepared to accept the Pratt & Whitney tender for the engine for A400M, since it was 20 % cheaper than the alternative TP400-D6 proposed by the Europrop International (EPI) consortium, made up of SNECMA, Germany's MTU Aero Engines, Spain's IPT and the UK's Rolls Royce. May 6, 2003, Airbus announced that it had chosen TP400-D6 after the price had been lowered. The contract is worth around EUR 2 billion for more than 750 engines. SNECMA's chairman, Jean-Paul Bechat, underlined that politics had a strong influence on how the deal turned out.[134]

Carriers

France will probably acquire a second aircraft carrier after the *Charles de Gaulle*, first operational in the late 90s. The UK has chosen Thales as the prime integrator for its aircraft carrier. France has apparently made some kind of concession to UK in return for them choosing a French company[135]. Blair and Chirac have an accord, a strong mutual vision of France and UK pooling their aircraft carriers in a mutual, European strategic power projection force.[136] The next French aircraft carrier brings with it many important choices. Will it be a second Charles de Gaulle? Will it be partly or mainly a British design? Will it be nuclear or diesel powered? France and UK cannot make a A400M for aircraft carriers, since UK will have JSF:s[137] and France will have Rafales, which among other things, brings with it technological choices such as catapult start for Rafale and sky-jumps for JSF. The procurement outcome is to a very high degree a political decision. It has important implications for the future of French technologies, UK-French cohesion as well as for European cohesion. It should however be noted that the participation of Thales for the British carrier rests entirely with its British subsidiary, Thales UK, which is the former Racal. The British technologies within Thales UK are strongly kept apart from the activities of the mother company. The British government thereby protects its domestic industrial capacity by technological firewalls and intellectual property rights.

[134] Lewis, 2003; Jakubyszyn, 2003; Migault, 2003. This "political outcome" is by no means unique to this case or to France, it is rather the norm in defence programmes.
[135] According to interviews in Paris, May-June, 2003.
[136] According to interviews in Paris, May-June, 2003.
[137] Joint Strike Fighter, an upcoming U.S. fighter.

France chose in the spring of 2004 conventional propulsion. The consequences of this decision are still to be clarified.

7.2. Long term

Whither the United Kingdom?

The choices of the United Kingdom are clearly important to the strategic possibilities of the French government. If UK chooses to drift even more towards doctrinary unison with the US and further away from France and a Europeanisation, this could create serious divergence between the US-prone parts of Europe and the parts of Europe that prioritise a European capacity. If the UK in the end chooses not to keep Thales as the prime integrator for its aircraft carrier (such turns have been taken before in defence procurement) and also otherwise seek more UK-US procurement solutions, a decisive rift would be created, in line with the already taken JSF decision.

Fort Dassault

Dassault Aviation is a company that to a very limited extent co-operates with others and it is not a supplier to any other fighter aircraft. When other states more and more are pooling their fighter projects (Eurofighter, JSF), this French policy is becoming increasingly costly. France wants to maintain a domestic fighter capacity, although it has not been as clearly defined as being strategically vital as the *force de frappe*. Dassault Aviation is by its isolationism and its extraordinary influence on government decisions holding the French government hostage, making Dassault Aviation in its entirety a *de facto* nationally protected strategic asset. For an upcoming manned fighter in Europe, France could choose to make yet another Franco-French solution, but it would be costly. In order to maintain a French fighter competence, France presented a UCAV programme at le Bourget in June 2003, a program that will be led by France, with Dassault Aviation earmarked as the prime integrator (and Thales as a main supplier) but that welcomed European collaborative partners that are seen as being at an adequate technological level.[138] This limits the possible collaborative partners to essentially Germany, Sweden, Italy and Netherlands. Netherlands has however bound its research funds to JSF. France has explicitly welcomed Sweden and the Netherlands.[139] Regarding its UCAV programme, Dassault has been much more open for cooperation, probably because the whole set-up is made for multilateral collaboration. All in all, the French UCAV programme has a strong resemblance with JSF, where the US leads the program and Lockheed Martin is the assigned prime integrator. The UCAV program was formally joined by Sweden and Saab in December 2003 and in January 2004 by Greece and Hellenic Aerospace. The programme share was in February 2004 50 % Dassault Aviation and 25 % Saab Aerospace. Spain, Italy and Russia are also in negotiations.[140]

[138] See e.g. Le Figaro, June 20, 2003, Defense News June 23 (two articles),, 2003, Ixarm, December 12, 2003 and Ministère de la Défense, January 22, 2004. Russia has in 2004 also been asked to participate.
[139] According to interviews in Paris, May-June, 2003.
[140] www.ixarm.com and information from Saab Aerospace.

Further national consolidation?

There are discussions on further consolidation within France. One question has been whether the satellite capacities of Alcatel Space and Astrium can be united[141]. Another is if Thales should join forces with another company, where the strongest propositions are EADS or Dassault Aviation. The French Prime Minister Jean-Pierre Raffarin said at the closing ceremony of Le Bourget 2003 that the French state might not in the long run be best suited as a shareholder in the defence industry. This would primarily relate to the minority shareholdings in EADS and Thales, but also to privatisations of DCN, Giat, Snecma and SNPE, where Snecma is closest to such a privatisation. Snecma would already have been privatised if were it not for the events of September 11, 2003 in the US.[142]

An overall question is how to choose to safeguard French national interests by affecting the industrial restructuring. Will the strictly French capacity be further set into a European, trans-national setting, as in the case of the contract from 2000 between the French state and EADS regarding the launchers for the ballistic missiles? There are signs of the French government moving towards a more British solution where French interests would be protected in an industrial logic by IPR and technology control, rather than direct ownership. The UK has very strict "firewalls" in British companies for protecting British technology and know-how.This expected shift will be of fundamental importance to the government's relation to the defence industry, and would also make DGA clearly less influential and needed since the government will then leave a responsibility (under supervision) to the companies, rather than administrate them. [143]

In several aspects, France seems to want to go the same way as the UK. There are plans for breaking up DGA into two parts: research and procurement – somewhat like the British divestiture of Qinetiq. Several French respondents saw role models in *public private partnerships*, *value-for money* and other British reforms.

Europeanisation, not transatlanticism

France strives to minimise the US dominance by pushing for Europeanisation (with partners at the same level of sophistication), and Europeanisation is seen as serving the French interests better than a transatlantic integration. France wants to create a "European preference"; that European states to a higher degree should buy European, and thereby promote a European defence technological and industrial base (DTIB), which would strengthen Europe vis-à-vis the US. The Ministry of Foreign Affairs stresses this stronger than DGA and MoD, as wanting to create a "European reflex".[144]

How much is the Europeanisation, and France's role in it, affected by the elements of divergence between the US hegemony and the Franco-German reluctance to accept US dominance in Iraq? Will the friction within Europe have long-lasting impact on European cohesion, NATO cohesion and transatlantic relations? How big are the differences between the US-led military doctrines (especially in relation to the Iraqi campaign) and France's military identity? Will UK drift even more towards a one-sided harmonisation with the US?[145]

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[141] Dismissed for the time being by the concerned companies. Jane's Defence Weekly, 30 July, 2003.
[142] According to interviews.
[143] The policy of technology control through IPR is not unique for the UK, e.g. Sweden and Germany have controlled industrial internationalisation by its ownership of defence technology, e.g. when One Equity Partner acquired HDW and Sweden and Germany demonstrated the limits of technology transfer in Kockums and HDW.
[144] According to interviews this inter-ministerial friction exists.
[145] See Lundmark 2003b

These questions are somewhat speculative, but apparent concern was obvious among French actors during my stay in France.

Transformation[146]

It is not appropriate to talk about a French transformation, since that means applying an American vocabulary and logic for an American problem in a French context. GICAT[147] is addressing "Transformation"[148], since it is an argument for further spending and new R&D. Is there a French transformation? France is experiencing similar transitions, but an important difference compared to the US is that France clearly states that its modernisation is based on its legacy forces, and has a clearly less ambitious vision than the US. Some important French projects are BOA (*Bulle Operationelle Aéroterrestre*), Félin and *fédérateur engin de cohérence de combat (EC3)*. These three projects represent the shift towards network centricity (*combat infocentré*) and armed forces reform. These RMA-related French projects are almost entirely French held. An aspect that could be impeding the possibility for drastic modernisations is the fact that the French armed forces were much less affected by the "peace dividend" after the end of the Cold War, and therefore it has not (to the same extent as other European countries) had to accept drastic changes or cuts in its military structure.

The French network centric approach resembles the British approach[149] in that France does not want to transform its Forces as radically as the US, France rather wants to upgrade her legacy forces.

Families

Dassault has a special relation to the government, a special link to the highest places, in a way that EADS apparently does not have, when it comes to fighters and UAV:s. This is not popular with EADS. Chirac's father and Marcel Dassault were friends, so Jacques Chirac spent summer holidays during his youth with the Dassaults. The Lagardère family also has achieved a very strong position as owners of first Matra, then as part owner of Aérospatiale-Matra, and now EADS. The interesting question is what would happen if these families would lose their influence, how that would affect the defence industrial dynamics. This challenge is minor to e.g. the transatlantic gap, the name of the family itself is not important. If the link to these owner groups would weaken considerably, this could, however, produce important follow-on effects.

[146] Transformation does in this context refer directly to the U.S. process of "Transformation", a modernisation process of its Armed Forces. This modernisation can be encompassed within what is labelled « Revolution in Military Affairs (RMA) ». For RMA, see Owens (2000), for Transformation see (Lundmark, 2003b) and for Network-centric warfare see Axelson and Eriksson (2002)
[147] GICAT is the defence industry interest organisation for army materiel.
[148] « Transformation » as it is being defined in the US as the process of Army reform.
[149] See James, 2004, upcoming report.

8. Conclusions - the French navigation between integration and non-integration

Overall, the French defence industrial policy rests on the conviction that concerning certain, strategically vital technologies and competencies, France does not accept being dependent on any other nation, most notably the *dissuasion* or *force de frappe*, i.e. their nuclear deterrence force. In some technology areas, France has chosen to share important technologies with other European countries. France has very limited armaments cooperation with the US. This is mainly because the US is the only country that France could truly be dependent on, so therefore the US is the example of the country whose influence on European defence issues must be limited (according to the French government). It is not a question of being against the US; it is a question of being against and actively avoiding dependence.

The French state and its different governments can be seen as acting fairly predictably in defence and armaments issues, but if decomposed into separate actors, these represent their respective interests. This resembles the aggregate vs. separate actions within the US "military-industrialised complex"[150]. The French state is not a monolith, but its actors act rather coherently. It appears as if there is a high degree of consensus among the principal actors in the defence-industrial context concerning that the French defence industry is a vital component of the national strategic interest and that the government has an important role to play in shaping and directing the defence industry. What differs is primarily the view upon the distribution of power and influence among the government actors over the defence industry and the defence programs. DGA wants to maintain its extensive powers, the president and the MinDef want to decrease the influence of DGA and increase the internationalisation and autonomy of the enterprises. The Armed Forces want to have more control over the development and specifications of the defence programs. There is also, according to some respondents, a rivalry of interpretation between the MinDef and the Ministry of Foreign Affairs concerning the emphasis on what is most important for the national interest: export, export to whom, cooperation with which nations, military readiness, what military capabilities are most strategic etc.

Compared to other nations with a considerable defence industry, the French defence industry contains several different elements. Firstly, there is the strong state ownership presence. Secondly, there are also companies with a very strong industrial logic[151] e.g. (Thales and Sagem). Thirdly, there are families with a very strong position and influence on defence matters that concern their companies (Lagardère and Dassault). Fourthly, there are companies (especially Giat) whose arsenal-type traditions stand in stark contrast to the industrial logic of companies like Thales, EADS, Sagem and Dassault Aviation – but all of them remain as important actors in the French defence-industrial landscape. The trans-national logic of EADS and Thales is clearly different to (the largely) national logics as those of the former arsenals, and also contrasts with the technological isolationism of Dassault Aviation. All these elements mix and overlap in a complex symbiosis between government and corporate interests.

[150] As described in Lundmark, 2003a.
[151] Industrial logic in this sense refers to that the companies' goals and objectives shape the industrial developments, instead of development highly governed by state actions and regulations.

If the government acts in a rather predictable manner, what about the private companies?[152] They do have common traits, since they have been created and have a background within the French system. They have developed strategies and behavioural patterns that fit with the demands of the government-run system. There are at the same time clear exceptions to that. Thales' strategy is perhaps not an exception, but rather a specific, somewhat unique strategy. EADS, Thomson-CSF/Thales, MBDA, Eurocopter, Euromissile all have decade-long traditions of European cooperation, which have become institutionalised into the organisational structures (albeit less so in Thales). Sagem and Dassault have successfully maintained a high degree of autonomy.

DGA has had an extremely powerful position within the French defence industry system, but has in the last decade gradually lost considerable power. There is a discussion on the interministerial level to separate research from acquisition and thereby split the DGA. Aspects of DGA:s gradually decreasing powers are e.g. the ongoing transition from *tutelle administrative* to *partenariat stratégique*, i.e. from management by control and rules to management by objectives, at least 5-10 years after industry made this shift. DGA is still, however, a central actor in the French defence industry context. It should be stressed that there was consensus among the respondents and the recent texts studied that DGA is experiencing – since a number of years – a shift of decreasing power and influence.

The government is to a lesser extent exerting direct influence on the defence industry, it is transforming from being in charge of strategy to a shareholder with primarily an interest in strategic[153] dividends (as compared to private shareholders, who expect economic dividends). This can be described as a shift from control to influence.

French government actors are clearly concerned with the increasing US dominance in defence matters. Many French analysts do not want to analyse global defence problems based on a US-defined logic and vocabulary, e.g. the US concept of "transformation". Apart from the US being much more influential and bigger, the US acquisitions of European defence companies and the long-term impact of JSF on the European aerospace industry are seen as primary worries for France, this since this makes the Europeanisation process more difficult, which then inflicts on French national interests. The impact of acquisitions in Europe by US companies can be labelled "transatlantic wedges"[154], since they distort the context for Europeanisation.

The French defence industrial meso system as described by Serfati has clearly been weakened in its cohesion in the last five to ten years. This report does not offer a new description with a systemic approach, nor is a systemic approach as applicable today. The French defence industrial context is less unique today and it has adapted to a more Europeanised structure and a less government-run context. Still, Serfati's description has valid points and is useful for discussion. After all, each and every developed national defence industrial system acts within a somewhat special or unique institutionalised context.

After this overall conclusion, a discussion concerning the four central theoretic aspects: integration, cooperation, autonomy and power.

[152] « Private companies » should be understood as that the companies are truly private (=no state ownership) or, in the French context, are viewed as private. Companies can be transformed from arsenals into "*societé national de droit privée*" with all shares held by the state, as well as that the state's substantial ownership is placed within holding companies. In the French context, these can be labelled as private companies.
[153] « Strategic" as in the sense of being strategic to the national interest.
[154] Lundmark, 2003a, p. 53-54.

8.1. Integration

As should be apparent, the actions and the behaviour of the French companies are – as in Pfeffer and Salancik's analysis – best related to its outer context of the French defence meso-system. The companies' actions can thus not be understood or described properly without relating to its environment.

Geographic integration

French consolidation: **Considerable**. In 1981-82, Mitterrand orchestrated a large nationalisation of the defence industry. France has thereafter supported national consolidations in electronics (the French government orchestrated a merger of Dassault Electronique and the electronics activities of Alcatel into Thomson CSF in 1998), satellites (merging the satellite activites of Thomson CSF, Alcatel and Aérospatiale, 1998), missiles (Matra-Aérospatiale 1999, now inside EADS) and Snecma has concentrated engine manufacturers and related component manufacturers.[155]

French companies acquiring foreign companies: **Limited**. The exception from that rule is Thales/ex Thomson CSF which for some fifteen years has pursued a "multi-domestic strategy" by acquiring companies in other countries and creating strong national presences, the most prominent examples being Hollandse Signaalapparaten in Netherlands (1989) and Racal in the UK (2000). Thales describes their multi-domestic strategy as that they foster the acquired company's national bonds and links with the military, research community, ministries etc. *Giat* acquired FN Herstal in 1991 but chose to divest it in 1997 due to failure in creating synergies. *Snecma* wanted to acquire FiatAvio in spring 2003, but this was blocked by The Ministry of Economy, Finance and Industry.

Trans-national integration: **Extensive**. As described earlier in the report, France has for roughly 40 years engaged in a gradual Europeanisation of certain parts of its technology and capacity into joint structures. These new entities have been addressed under the slogan of Europeanisation, but the consolidation has been focused to comparable countries (Germany, UK, Italy in roughly that order, and to a lesser extent Spain, Sweden and Finland).

Transatlantic integration: **Very limited**. French companies have acquired some SME:s in the US, and US companies have only been able to acquire some SME:s. The most significant event was the creation in 2001 of Thales Raytheon Systems, the first strategic, structural, transatlantic venture between a US company and a company from any other nation.

Foreign ownership in France: **Very limited**, mainly a small number of SME:s.

Global: There are a small number of examples of global integration in South Korea, South Africa, Singapore, Australia (Thales) and Brazil (Dassault).

Integration of activities

There has been a trans-national integration of activities under mutual umbrellas, e.g. within Thales, MBDA and EADS. The politically led restructuring processes leading to EADS and MBDA as well as the corporate led restructuring processes leading to Thales, however have mainly resulted in separation of activities and restriction of synergies in order to maintain a well defined national competency. In a way, the new corporate entities EADS and MBDA can be seen as more or less permanent juste retour arrangements. Over time, such arrangements of compartmentalisation will probably erode as ongoing cooperation creates new channels of

[155] There was also consolidation through nationalisation in 1936 and 1945.

communication and technology cross-flow, but the political restrictions impede the possible synergies that could be derived.

The evolution of the integration of activities is less openly revealed. Corporate statements on how integration is proceeding between merged entities are often exaggerated, and are more aimed at winning political points than reflecting reality. The actual industrial actions follow a logic restricted by government-led national protection of competencies and IPR.[156]

The national *decision integration* in France has occurred due to the consolidation within sectors, in different phases since the beginning of the 20th century. Presently, the most important ones are Snecma's acquisitions of other aerospace companies, the fusion of Thales' and Dassault's electronics activities and the fusion of Matra and Aérospatiale.

The trans-national decision integration has come far regarding missiles (e.g. MBDA; SCALP), transport aircraft (A400M within Airbus), geopositioning (Galileo), space (Ariane and ESA) and energetic materials (pooling of resources from France, UK, Sweden and Finland). Trans-national decision integration is held apart, from the French perspective, regarding fighters, nuclear subs, ballistic missiles and certain other technologies that are vital for the *force de frappe*. There is limited, yet important activity integration within Thales Raytheon Systems.

The *institutional integration* of companies has been extensive in the last few years. The sixties and seventies saw a phase of integration through joint programs; this was followed by a period of creation of joint ventures, which then became the foundation for the creation of companies like Eurocopter, EADS, MBDA, Astrium and Airbus. There has been more drastic institutional integration (mergers orchestrated by the government) within France, and a more step-by-step and gradual institutional integration within Europe.

There has also been an integration of the multilateral political bodies concerning defence collaboration (a process that in the past few years appears to have reached a higher momentum).

The *execution integration* can be divided into R&D integration and production integration. Defence systems are inherently technologically complex, so the production is preceded by a period of several – maybe 5-10 - years of R&D before production and testing can commence. Defence R&D is still to a high degree nationally held processes, and this is very much the case in France.[157] The production integration is rather a process of coordination and division of specialties than a true integration of production in the sense of creating synergies and technology transfer. In other industries, such synergies, technology transfers and the adjoining rationalisations are a main driver for trans-national mergers and acquisitions, but such effects are in the defence industry actively held back by political restrictions. Another influential aspect is the ambition to protect industries, jobs and regional employment. This is by no means a French characteristic or phenomenon; it is rather a characteristic of European armaments collaboration. The multilateral development and production of e.g. missiles, warships, fighters and armoured vehicles are organised as work share or juste retour arrangements where largely separately developed systems and functions are assembled into a

[156] In fact, no extensive research has been done concerning the integration of activities and this author's previous experience is that the corporate representatives are unwilling to reveal such details, or tend to exaggerate the degree the actual integration. It is also difficult to check the actual validity of such positive corporate statements. A study by Molas-Gallart (1999, regarding the European missile industry) show that the degree of integration of activities is often exaggerated, and that national entities often are actively held intact and separate from other entities in cooperations as well as in corporate integration. This lack of research does not, however, make this aspect less interesting or important.

[157] Clevström and Winnerstig, 2003.

mutual product, e.g. a missile or a fighter. The interaction is gradually increasing among collaborative partners, but progress is slow.

R&D processes are largely kept as national processes. This restricts the possibilities of stronger synergies, since after a national research process of around five years, there have been substantial national investments in technology and doctrine, fundamental choices have been made and compromises or mutual bottom-line agreements are more difficult to create. If a truly deepened European procurement and DTIB is the goal, a more interactive and shared defence R&D process would be an important step. A recent FOI study supports the conclusion that interdependence in defence technology and production is problematic; it is a compromise between the need for autonomy and the facts of what it costs to perform R&D strictly nationally. The rhetoric on European consolidation has had considerable effects on the French armaments production, but not on R&D.[158]

The integration concerning French defence companies – nationally and internationally – has been consolidated both through government-led events and company-led acquisitions. The government-led consolidation has clearly been more dramatic overall. Most of the company-led consolidation has required a government consent. Thomson CSF/Thales is the exemption; it has over 20-30 years consistently acquired foreign companies and nurtured these within their "multi-domestic" strategy.

8.2. Cooperation

It is uncontroversial to state that the French armaments production has a 40-year old history of trans-national cooperation, and that many successful programs have been accomplished. An overview of the collaborative map with a French participation is presented in appendix 9. As stated earlier, the cooperation over the last 40-50 years is characterised first by a period of cooperation steered by political logic (cooperations, joint ventures) then more and more industrial logic, leading to merged, trans-national companies. Political will and consent has always been needed in order to move to a phase of deeper, border-crossing integration.

European cooperations had an initial goal to achieve economies of scale and interoperability. These goals have often been clearly lowered due to that projects almost as a rule have been awash with delays, increased costs and not seldom projects aborted by one or several of the partners. The long-term goal of preceding corporate institutional integration by a phase of cooperation was reached after decades, despite periods of lesser interest for European cooperation.

8.3. Autonomy

Autonomy is for France a question of not being dependent on any other country, or at least not accepting dependency more than to a certain degree. France can thereby itself formulate its needs and respond to them with armaments and capabilities. It is clear, however, that the US development is what to a fundamental extent steers the overall course of the global armaments development. France wants to decrease the degree of hegemonic dominance of any other country.

[158] Ibid, p. 65-66. In fact, most countries still keep defence R&D as more or less strictly national processes. France is compared to the UK (in Clevström & Winnerstig) seen as being less set into an international system. France has – rhetorically – clearly chosen EU/Europe, whereas UK is investing in both EU and its relation with the US.

By having a broad, strong and competitive defence industry at a high level of technological sophistication, France is to a large degree able to choose its partners and also strengthen its influence and impact on European defence industry consolidation.

Presently, the four purposes for maintaining the French defence-industrial system (Hébert, 2002, described under 4.1) are unchanged regarding the political, technological and military purposes. The industrial policy purpose, however, is clearly losing in importance due to the shift from *tutelle* to partnership and the gradually decreasing control by the government due to changing ownership modes.

An important strategy for maintaining a large and competitive defence industry is by actively promoting and supporting arms export. Autonomy can also be described in aspects of production. France controls production by owning or influencing companies, it also appoints the CEO:s of the state-owned companies, if the CEO:s strategic vision does not fit with the government's (= the shareholder), the CEO might have to resign.

To pool production with other Europeans is a lesser degree of autonomy than an all-French production, but this shared autonomy is seen as a sufficient degree of control for some technologies and crucial economies of scale are also achieved. The most sensitive shared competencies might be the missile production within MBDA (especially for the six-nation air-to-air missile Meteor), the SCALP/Storm Shadow cruise missile (a UK-French program) and the Galileo program (satellite navigation, France, Germany, Spain, Italy).

In relation to the earlier described legislative and regulatory instruments (Mampaey, 2001), France differs compared to comparable countries, most clearly regarding actively using the means of holding of capital. Otherwise, controlling the budget, R&D funds and orders is similar in most countries; apart from that each country has its own dynamics and type of institutionalisation. The overall strategy of the French government has been to actively and openly use all means in order to maintain a defence industry at the highest level of technology. This defence industry is seen as a main pillar in the French security policy stature.

The French policy for autonomy can be summarised in a table. The autonomy is achieved with several means of control, relating primarily to how strategic the technology is.

In this table, Giat Industries does not clearly fall under any of these categories in that it does not seem to be regarded as possessing a strategic competency.[159] A degree of control, without owning the company, is that France has golden shares in EADS and in Thales.[160] Also, the French state has a contract with EADS concerning the ballistic missile propulsion, the launchers. This technology is closely similar to the launcher technology for the Ariane program, so the French state achieves synergies and economies of scale by supplying these similar technologies for both its own ballistic missiles and for Arianespace. Technology is also protected by different kinds of firewalls and restrictions on technology transfer.[161]

[159] French ministries and DGA would probably never admit that Giat does not possess strategic competencies, but the political decisions point to that its competencies are regarded as being of the kind that can be shared with others, or even purchased abroad, without compromising French interests.
[160] According to interviews. The golden shares mean that France has a veto right for divestiture of certain parts of these companies, and also for direct acquisition from foreign companies. The golden shares also take into account Franco-French consolidation in directions that the state does not approve of.
[161] The details of such accords would be of interest, but are naturally not publicly revealed.

Degree of French autonomy	Set-up	Companies	Comment
High	*Inside DGA*	Ateliers de Réparation de l'Armée de l'Air, SMA and DCE	R&D and requirements decided within DGA
	State-owned company, no trans-national cooperation, no export	CEA, Technicatome	Parts of nuclear submarine technology, nuclear warheads
	State-owned company, primarily for the French market	Parts of DCN, GIAT Industries	
	State-owned company, trans-national cooperation	Snecma, SNPE	
	Private company, protected autonomous status	Dassault Aviation	
	Golden shares	EADS, Thales	
	Contracts	With EADS	Launchers for strategic missiles
	Shared autonomy	Eurocopter, MBDA, Euromissile, EADS, Eurenco, Airbus, satellites. Thales Raytheon Systems in a limited, but unique set-up with an unusual partner.	Technologies, products.
	Foreign ownership	Ratier Figeac, Renault Trucks, Rockwell Collins France, TRW Systèmes Aéronautiques	Very few examples. Mostly aerospace dual-use technology or company with primarily civil production (Renault Trucks)
Low	*Globalised market*	Sagem, parts of EADS, Thales, some smaller producers of armoured vehicles (Panhard, ACMAT) and vessels (CMN (Constructions Mécaniques de Normandie) and Chantiers de l'Atlantique).	The companies are to a limited extent concerned by national bonds and acting on global, competitive markets. Military markets that technologically are close to civil markets (primarily in aerospace). The civil parts of Snecma would be such a company.

Table 3. *Degrees of French armament development autonomy*

France protects a French autonomy concerning the vital technologies regarding its *force de frappe*, whose ballistic missiles can be delivered from either airplanes (Mirage or Rafale from Dassault Aviation) or nuclear subs. The production of nuclear-powered submarines and fighters is held almost entirely French, only some aerospace dual-use systems or parts are non-French. The thermonuclear warheads are provided by CEA (Commissariat à l'Energie Atomique, state-owned), and the propulsion of the nuclear submarines is provided by Technicatome (a subsidiary of Areva[162]), in cooperation with DCN Indret. The ballistic missiles are made by MBDA (for Matra BAE Dynamics Alenia, ex-Aerospatiale Matra Missile part of EADS, which owns 37.5% of MBDA). The submarines are developed and produced by DCN. The sonars and electronics are from Thales Underwater Systems, Nice.

[162] Areva is the French state company that pools the French public nuclear activities.

The engines for the Dassault aircraft are assembled by Snecma (entirely French), the avionics, electronics and other vital systems are also French (Thales, Sagem, Dassault, EADS). Dassault Aviation as the undisputed fighter prime system integrator is an asset with a *de facto* similar status as the vital technologies for the force de frappe. Some non-vital, non-strategic components are of foreign origin, but only if they are of dual-use character, e.g. also used in civil aviation.[163]

Regarding the missiles, the launchers for the ballistic missiles are being made by EADS, the part of EADS that makes the launchers is the former Aérospatiale Matra Missile, and there are no other parts of EADS, or rather of MBDA, that have the same competence. The French government has transformed its previous golden share in Aérospatiale Matra Missile to a contract with EADS assuring that EADS cannot sell this part of EADS without the consent of the French government, which is then entitled to acquire it.

Regarding warships, France would unlikely order from other producers than DCN.

France has no conventional (diesel-powered) submarines in its navy, but supports DCN's cooperation with Spanish IZAR in the production of the conventional submarine Scorpène, which has been exported to Chile. Conventional submarines are not strategic in themselves, but the production of them brings synergies and economies of scale to the production of the nuclear-powered submarines, and is therefore a strategic complement.

The companies that to an important extent are working with technologies that are both civil and military, or where the applications are used in both markets, are less possible to influence for the government. Such companies would be Alcatel, Astrium, Sagem and parts of Snecma, Thales and EADS. Dassault Aviation, however, sees very few synergies between their civil and their military divisions, they have in fact decided to entirely separate the accounts between the civil and the military parts of Dassault Aviation.[164]

8.4. Power

As has been described, the French government has moved away from a more direct form of control by direct ownership (sharpened by the 1981 nationalisations) and far-reaching powers given to DGA. Gradually, France has let its technologies, competencies and production assets become europeanised to a substantial part, from initial programs, over JV:s to autonomous, transnational companies. A further step towards decreased control has been taken with the government putting its shareholding assets in holding companies. The next step seems to be further privatisation of the state-owned companies (Snecma probably soon[165], DCN has a contract with the state until 2008) and divestiture of the assets in Thales and EADS is openly discussed. France can be expected to move towards the British set-up of private companies, with the government protecting national assets of technology and know-how by firewalls and the protection of IPR.[166]

Control of the future strategies of the companies is held by the allocation of research, and to whom it is allocated. Other means of power are *l'objet social*, and the appointing and firing of CEO:s in state-owned companies.

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[163] Dassault has (according to interview) estimated the U.S. content to be 1 %, consisting of dual-use aerospace components, which however are crucial for the airplane. In the short run, France would not be affected by these products being blocked, but in a longer perspective, it would be a serious problem.
[164] According to interviews May-June, 2003.
[165] In the spring of 2004, it was decide to privatise one third of Snecma's shares.
[166] This is by no means unique to the UK, it is similar in Sweden and the U.S. for example

Mampaey (2001) repeated Serfati's (1995) description of the French stability in its meso-system. The last few years, however, show a shift in the system, primarily regarding the importance of DGA and of the government's decreasing ambition of controlling the companies through the holding of capital. DGA's powers are decreasing, whereas the Ministry of Defence is increasing its influence and the companies themselves are increasing their autonomy. Despite these ongoing changes, the French government's influence remains clearly more marked than in comparable countries.

8.5. Comparisons with the U.S., Sweden, and the UK[167]

The ambition and defence posture of the US regarding defence matters has no resemblance in any other nation. The so-called Military-Industrialised Complex (MIC) is a huge machine, perfected during 40 years of Cold War and operated on a budget about $ 400 billion a year. The US spends four times as much as Europe on military R&D. The actions and paths taken within the US defence policy is overall guided by what is seen as being in the "national interest". The US defence industry to the most part engages in solutions for the US, and the US actors that decide on defence procurement almost entirely "buy American". The US is in defence matters the most autonomous, the most powerful, the most influential – paired with an enormous budget.[168]

France can be described as being the "Americans of Europe". This since France is the state in Europe with the highest ambitions for autonomy; the country that most clearly promotes the French national interest of autonomy in certain defence competences and also the country that does not accept being dependent on other countries in vital defence technologies. France is often described as prioritising "French" solutions. France is sometimes described by critics as being too self-centred; of promoting its own interests too much. The French defence industry has a tradition of being intimately linked to the national strategic interest – in fact an indispensable part of it. France sometimes shows *a tendency* to award itself a priority of interpretation of what security or defence choices that would be best for other nations (as when Chirac criticised Poland's choice of US fighters). If compared to the US, the French position is really not that different. The US can afford to offer more to allies due to its dominant position, and this position also gives the US wider rhetoric scope than France in security and defence matters.[169]

Both France and the US have in their international rhetoric a tendency of referring to their national priorities and global assessments as being globally valid – thereby in a way creating a rhetoric rivalry between the two.

Sweden could in this comparison be described as the "Americans of Scandinavia" (or perhaps the French of Scandinavia?). Sweden has the highest defence ambitions, a developed defence industry with a tradition of Swedish solutions (emanating from Sweden's tradition of non-alignment). Sweden has, according to my opinion, also shown a tendency to act somewhat paternalistic towards its Scandinavian neighbours.

[167] The assessments under this heading assume that the reader has a knowledge about these nations' defence postures and policies; they cannot be described in this report. There is also – admittedly – a slightly speculative nuance in these assessments. These comparisons are however seen as relevant, for getting a wider perspective.
[168] Lundmark (2003a).
[169] One must separate rhetoric and action, or in other words, the discrepancy between "to strive for" and "be able to". The US has since before WWII had military abilities that match much more closely to its rhetoric than the match in France. The above discussion comes closer to rhetoric than the actual military ability.

An important French feature that differentiates it from the US and Sweden is its extensive tradition of armaments cooperation, whereas Sweden and the US have in general had a tradition of preferring national solutions.

France does not support transatlantic cooperation or integration, nor do the US government actors or companies look favourably on US-French cooperation. The US reluctance can be said to be based on a general reluctance for cooperation, incompatible strategies with the French and a general suspicion towards the French, that they (according to some US statements) export sensitive technologies with little restriction and that they perform "industrial espionage" in order to promote their own companies.

France, Sweden and the US are three nations with strong historic strivings for autonomy in defence industry and defence technology. Sweden has most clearly decreased the autonomy ambition since the Cold War. Sweden has chosen to let its industry be internationalised, thereby creating a largely foreign-owned domestic industrial structure. France has chosen to accept or seek shared autonomy for some strategic technologies, but avoids dependence on the US. France retains national autonomy in technologies associated with its nuclear deterrence force. France does not so far approve of foreign ownership of defence companies, other than dual use aerospace SME:s. The US accepts the fact that globalisation of the overall economy has made it impossible to be completely autonomous, some uncertainty must be accepted. The US however stays so far ahead quantitatively and qualitatively that its military power is unrivalled and unthreatened. It also has a domestic defence technology and industrial base that covers practically all technologies and niches.

If comparing France with the UK, these two nations are the ones in Europe that have the highest ability and preparedness for actual military action; they are the only two in Europe with nuclear strike forces and the two European nations with the highest defence ambitions. There is also an implicit rhetoric competition for not being seen as inferior defence-wise to the other, in a European perspective. However, France protects its defence industry more directly than the UK. Regarding how to best optimise its armaments acquisition process for strategic armaments, they have chosen two quite different strategies. France protects its national autonomy in certain strategically defined technology or capability areas, whereas the UK by being the – by far – preferred partner to the US seeks higher leverage for its acquisition of strategic defence technologies. There is, however, a difference for the UK between security policy and defence materiel procurement. They are very close to the US in security policy, but in defence materiel procurement they are closer to Europe. It is difficult also for the British to create cooperations with the US.

France also has shown a tendency to follow UK trends in procurement and government relation to the defence industry. France adopts or is inspired by British solutions of private-state financing of defence R&D and production, as well as striving to push more of the financial risks to industry. France is also moving gradually towards less direct proprietary control of industry towards the British more market-oriented relation where the government exerts close scrutiny and control of defence technology through firewalls and IPR. French defence ministers have a tendency to compare their defence spending, capabilities and priorities with the British.

Compared to the UK defence-industrial structure, the French defence-industrial structure on the one hand has larger parts of the industry trans-nationalised, but at the same time more closely protects its national autonomy for certain strategic technologies.

8.6. Result

In relation to the aim, the report has shown that France actively uses integration in order to serve French interests as a means to transform national defence capacities and in order to achieve shared autonomy with other states. The shared autonomy that is achieved by new European trans-national companies is helped by the fact that that change is strengthened by corporate, industry-generic strivings for globalisation and economies of scale. France also uses non-integration as an active tool to preserve French autonomy regarding its nuclear capacity and, implicitly, its fighter ability. Cooperation has been and is used under the motto of achieving economies of scale and interoperability[170] and also in order to gradually create a collaborative structure in order to facilitate corporate institutional integration. A substantial part of the French defence industry has by that process become a part of trans-national companies (e.g. Eurocopter, EADS, MBDA and Eurenco). France has had a well-developed system of extensive power and control over the French defence industry that has awarded the defence-industrial system a central part in French industrial and innovative structures. This government control has in the last five years clearly weakened, transforming government direct control to more indirect forms of influence and control. The interest group that has seen its role and power decrease most radically is DGA. Companies have in most cases been pushing the government to allow more international integration, unless French autonomy has served the companies better.

There is a direct conflict between several companies' (especially Thales and EADS) strivings to create stronger transatlantic links and the government's policy to avoid transatlantic cooperation in order to avoid dependency on the US. A central pillar in the French defence industrial policy is not to become dependent on any other state in defence technologies that are seen as core technologies for French strategic interests.

The Europeanisation is a central aspect of French defence industry policy, and has been so for some forty years, albeit that the political phrasing has changed. This Europeanisation must be seen as a process that has not been driven by the EU, it has from the beginning been a consolidation process among a limited group of nations – among the EU members – with similar conditions and needs. This selected Europeanisation has primarily involved France, Germany, UK, and, to a lesser extent. Italy. Other EU members have not been up to par for shared autonomy with the bigger nations. The LOI/FA was a further underlining of the actual impact of the EU. The EU has thus had very little impact (*communéatisation*) on the consolidation. The EU can be expected to increase its impact on the defence industry – in France and elsewhere – in the ECAP aftermath and the creation of a "defence bureau".

[170] The value of the results are however ambiguous and disputed.

9. Recommendations

This report is aiming to offer a deeper and better understanding of the dynamics and goals of the French defence industry and the government defence industry policy. Attached to this, recommendations are formulated for Swedish government actors and industry[171]: The overall objective is to improve Sweden's procurement processes and to get access to attractive defence materiel and technologies. An important component of this is to create mutually beneficial cooperations of some kind.

These recommendations mark a clear shift from the report's analytical aim to the objective to offer recommendations to the financing body of this report, the Swedish Ministry of Defence. The recommendations should be seen against the interest of the Ministry of Defence' goal to strengthen the Swedish ability to acquire the defence materiel it needs, and the context and analysis of the thesis as a background to the following recommendations. [172]

Cooperation

- France has an unrivalled history of multilateral armaments cooperation; this gives France a cooperation competence that is under-recognised in Sweden. France can be a gate-opener into wider European cooperation.
- Sweden has limited presence in multilateral armaments cooperations with France as one part. France and Sweden have similar traditions concerning autonomy which could facilitate common views. The UCAV and Bonus cooperations should be used as important benchmarks.
- Sweden should search for cooperation (either in R&D or actual armament programmes) in areas that have one or several of the following characteristics:
    - The envisioned armament or military capacity is seen as contributing to EU military capacity
    - Areas where the goals of France and Sweden for industry or technology autonomy match, e.g. autonomy vis-à-vis the US or to create a European alternative.
    - Where France shows interest in Swedish technologies or where Sweden is ahead.
    - Network-centric (NCW) solutions. The French pragmatic bottom-up NCW perspective should complement the Swedish more top-down NCW perspective. France lacks in overarching visions, Sweden lacks in field-testing.
    - Technologies that are battle proven and/or acquired by the UK and US.
- Avoid efforts to establish cooperations where France already is highly competent or where they appear to want to keep their national autonomy.

Industry

- For further defence industrial consolidation in Europe, French industrial partners are in focus. Sweden must proactively seek possibilities for such developments. The creation of Eurenco is an important benchmark.
- The French business context has some special characteristics that are specific to French business practice: *l'objet social*, *le code de marché publique* and the appointment of corporate boards. These aspects should be understood when engaging in a French cooperative venture or company integration of some sort.

[171] These recommendations are based on an understanding of Swedish conditions that are not described in this report.

[172] Important input for these recommendations from Commander Patrik Selling, Assistant Defence Attaché 2002-2003, Swedish Embassy, Paris.

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Monitor

- A permanent liaison office for defence industrial links and analysess should be attached to the defence attaché in Paris.
- The knowledge in Sweden is far greater concerning British and US armaments development than French, primarily as an effect of assumed language barriers. Such distances should actively be diminished. The French willingness and ability to speak English is also far greater than often assumed by Swedes.
- Swedish authorities should monitor and analyse the developments in the French procurement, e.g. regarding the trends towards U.K.-resembling private solutions, towards technology control rather than direct ownership control and the 2004 DGA reform. What can Sweden learn from this and adapt to Swedish conditions? What possibilities for Sweden arise from changes in France?

Security policy

- If Sweden wishes to stronger pursue processes of Europeanisation (in or outside EU), it has good prospects of partnering with France, where the processes of Europeanisation gain strong political support.
- A Swedish armaments programme has better prospects for success if it links to, and the justifications for it can be linked to, vital security policy goals that are shared between Sweden and France. France formulates such links more clearly than Sweden.
- Sweden should try to identify possibilities for cooperation with France (and other nations) regarding capability demand that is identified in the ongoing ESDP (and related) process(es).
- Sweden should give high priority to the ongoing creation of European networks for defence research and analysis (e.g. EDA (the European Defence Bureau).

Technology

- In some technology or capability areas Sweden is insufficiently incorporated into international corporate structures and multilateral collaboration. It should be seen as being of fundamental importance to deepen Sweden's international integration in for e.g. the missile industry, Network-centric capabilities, submarine and underwater warfare. France could offer prospects for such developments.
- Sweden must proactively seek knowledge and continuous interaction concerning French technology trends and procurement reforms and seek R&D and R&T cooperation in early phases of problem and technology definition; thereby improving the possibilities for deepened armaments cooperation.
- Sweden should strive to identify national industrial and technological niches where both France and Sweden are willing to protect these capacities, as in the case of the UCAV cooperation.

Military

- France places higher emphasis on deployment than Sweden. For Franco-Swedish cooperation, this aspect could be addressed more clearly by Sweden.
- France has a higher emphasis on mobility and power projection than Sweden. For possible cooperation, Sweden should identify niches or capacities that are shared or similar in this regard.

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Appendices

1. Interview list
2. The present French defence-industrial structure
3. Company strategies
4. French defence industry size
5. Charts and statistics concerning central companies
6. The consolidation of French solid propulsion and energetic materials
7. Table over French geographic industry integration
8. Table over French integration of acticities

Appendix 1. Interview list

The respondents had experience and knowledge of the historical background as well as the present. The table below describes their background. The following categories of respondents are listed, followed by the number of persons met: defence company (8), government agency (government officials) (4), analysis organisation (2), multilateral organisation (2), academic analysts (3), industry interest group (4), ministry (1) and embassy (2). This is all in all 26 persons.

Category	Company/organisation	Position	Main field of expertise	Number of persons
Defence company	EADS	Communications Defence and Civil Systems	Especially missiles	**1**
Defence company	GIAT Industries	Project director, "production acquisition"		**2**
Defence company	Snecma	Defence business		**1**
Defence Company	Dassault Aviation	Business development		**1**
Defence company	Armaris	Sales and marketing department		**1**
Defence company	SNPE/SME	Development of external relations		**1**
Defence company	Thales	Senior management, group executive strategy		**1**
Government agency	DGA/Direction de la coopération et des affaires industrielles	Directeur ; Sous-directeur; Sous-directeur adjoint	Defence cooperation, defence-industrial policy, international collaboration, the role of the French government	**3**
Government agency	DGA/Centre des hautes etudes de l'armement (CHEAr)/Département Rayonnement et Études Stratégiques	Researcher (chargé d'études)	Long-term technological strategies	**1**
Analysis organisation	FRS (Fondation pour la recherche stratégique)	Deputy director	French defence policy, military technology	**1**
Analysis organisation	FRS (Fondation pour la recherche stratégique)	Researcher /Chargée de recherche	Defence industry, Europeanisation, consolidation	**1**
Multilateral organisation	EU/Institute for Security Studies	Associate Director	Europeanisation, consolidation	**1**
Multilateral organisation	NATO/Political Affairs Division	Previously official at DGA, now at NATO	French defence industry policy	**1**
Academic	Université Paris 1/Laboratoire d'Économie	Researcher	The role and importance of the	**1**

analyst	publique		defence industry in France	
Academic analyst	C3ED Centre dÉconomie et d'Ethique pour l'environnement et le Développement	Researcher (Maître de Conférences)	French defence-industrial system	**1**
Academic analyst	Ecole des Hautes Etudes en Sciences Sociales (EHESS)/CIRPES	Researcher	French defence industry, international collaboration, consolidation	**1**
Industry interest grouop	GICAT (Groupement des industries concernées par les matériels de défense terrestre)	Director of international affairs and strategic actions; Economic calculations and offset	Interests of Army-oriented defence industries	**2**
Industry interest group	CIDEF /Conseil des industries de défense françaises (French defence industries council)	General secretary	Relations between the French government and the defence industry, French defence industry policy, defence industry interests	**1**
Industry interest group	GICAN/French Naval industries interest group		Naval defence industry, naval defence cooperation	**1**
Ministry	Ministry of Defence/DAS		Industrial relations	**1**
Embassy	Swedish Embassy	Defence attaché, Assistant defence attaché	Defence industrial affairs, cooperation	**2**

Table: List of respondents.

Appendix 2. The present French defence-industrial structure

In the following presentation, some companies are more extensively covered in statistics. This is simply due to the fact that it has been difficult to achieve statistics on some companies. The most complete picture is for the year 2001. The figures are from DGA's official information or from the annual overview from Cirpes[173], and also from homepages and annual reports.

The company presentations are held short, and the companies are mentioned under different headings in the report. Each company statistics is presented to the extent that information has been available.

In some cases, the figures that have been found have not been the same, e.g. for defence share of turnover, between for example Hébert, 2002 and Calepin, 2003 (issued by DGA). In these cases the DGA figures have been chosen. There must be some difference in definition of defence content.

Annual reports for 2003 were not published yet when this report was printed (June 2004). Some companies presented that information, or parts of it, on the internet.

[173] Calepin International, 11eme édition, juin 2003, DGA, Ministère de la défense and Hébert, 2002.

Alcatel Space[174]

(MEuro)	2002	2003
Turnover	3000/1300 in satellites	3600/nc
Defence turnover	nc	nc
% defence	nc	nc
Workforce	nc	nc
% export	Nc (43 % Western Europe)	Nc (43 % Western Europe)
Résultat net	135	332
Profit margin %	4,5 %	nc
Order book	nc	nc
R&D expenditure	2226	1593
% state ownership	0	0

Alcatel Space is the largest French company in the space sector, biggest in Europe and 3rd in the world. It is a construction from 1998 of the satellite parts of Aérospatiale and Alcatel as well as ground based stations for satellites from Thomson-CSF. In 2002, it acquired Thales' 48,83 % share of Alcatel Space for 795 millions Euros. The satellite business within Alcatel Space is truly dual use and the technologies are equally for civilian use in telecommunications. For defence, the main use is for military intelligence. The Thales workers' ownership in Alcatel was in 2002 33,4 % and is scheduled to decrease to 28,8% in 2006. Groupe industriel Marcel Dassault owns 5,6 % of Alcatel. Alcatel Space experienced difficulties after contractions in the civil telecommunications business, which created imbalances in 2001-2002 between its civil and military businesses.

Important militarily oriented businesses are e.g. satellites, military communications systems (e.g. Syracuse III), space-based navigation systems (Galileo) and military observation by satellite.

The French government has pushed for Alcatel Space merging with Astrium, but these plans were rejected – perhaps for the time being - by Alcatel and Astrium at the 2003 Le Bourget.[175] There are also plans for merging Alcatel Space with Italian Alenia Spazio, and a strategic alliance is in the making (Nov. 2003). Alcatel Space is larger (1,3 billion Euros to 550 million Euros) and Alenia Spazio has a clearly higher military share of its business.[176]

[174] Hébert (2002), pp-16-17, http://www.alcatel.com/space/pdf/alcatelspacetoday.pdf and http://www.alcatel.com/finance/reports/2002/pdf/full_report.pdf.
[175] Jane's Defence Weekly, 30 July, 2003.
[176] Jane's Defence Weekly, 3 December, 2003.

Astrium[177]

(MEuro)	2000	2001	2002	2003
Turnover	1034	995	797	1600
Defence turnover	227	179	nc	nc
% defence	22	18 %	nc	nc
Workforce in France	2241	2241	2642	2445 (total 6092)
% export	31	nc	nc	nc
Résultat net	42	-20	-111	nc
Profit margin %	4,1	-2,0 %	-14,0	nc
Order book	nc	1711	nc	nc
R&D expenditure	nc	995	nc	nc

Astrium is since May 2003 owned 100% by EADS.

Main businesses are ground and space observation (35%), telecommunications (34 %), spatial infrastructure (19%), ground systems (8 %), avionic and electronics equipment (3,5%).[178]

EADS Astrium has supplied all the European military satellites currently in operation: HELIOS, the optical surveillance system, SKYNET 4 and NATO IV for military communications. The Company is also prime contractor for the HELIOS user ground segment and supplies telecommunications ground stations and transportable and mobile terminals. Paradigm Secure Communications of Astrium has been selected as Preferred Bidder by the UK MOD for Skynet 5.[179]

[177] Figures from Calepin, 2003.
[178] Calepin 2003.
[179] http://www.eads.net/eads/en/index.htm

CEA – Commissariat à l'Énergie Atomique [180]

(MEuro)	1998	1999	2000	2001	2002
Turnover	2783	2836	2777	2808	2689
Defence turnover	1066	1113	1139	1077	1380
% defence	38	39	41	38	51
Workforce	16151	15945	15987	16069	15024
Résultat net	-27	-28	90	707	-168
Profit margin %	-1,0	-1,0	3,2	25,2	-6,2

CEA is 100% state owned through the holding company Areva. AREVA was created in 2001, and combines all state interests relating to nuclear activities.[181]

Military business areas: simulation, nuclear warheads and nuclear propulsion, deconstruction of nuclear enrichment facilities and surveillance of the respect for nuclear non-proliferation treaties. The thermonuclear warheads are provided by CEA. Nuclear propulsion is provided in cooperation with Technicatome. France does since 1996 not perform any military nuclear tests, so tests are done by CEA by simulation. CEA has no defence-related export. In its fields of defence expertise, it is the only supplier to the French state.[182]

Programmes: Reactors for the aircraft carrier Charles de Gaulle, the launching submarines Le Vigilant and Le Terrible; and the future attack submarines Barracuda.[183]

[180] For years 1998-2001 : Hébert, 2002 ; for 2002 : CEA annual report.
[181] http://industrie.gouv.fr/energie/nucleair/ra2001-areva.htm
[182] CEA Annual report 2002.
[183] Ibid.

Dassault Aviation (Groupe)[184]

(MEuro)	1998	1999	2000	2001	2002	2003
Turnover	3441	2889	3485	3470	3437	3300
Defence turnover	1695	929	1011	817	1211	1610
% defence	49	32	29	23	35	49
Orders taken (prises de commandes)	5027	3409	4127	3854	3520	2420
Defence orders taken	2601	1528	1540	1407	799	1030
% defence of orders taken	52	45	37	37	23	42
% of defence orders in France	15	89	27	86	85	86
Workforce	11632	11601	11419	8686	8883	11950 (?)
Workforce in France						nc
% export	90	58	88	65	79	64
Résultat net	206	175	237	273	312	295
Profit margin %	6,7	6,1	6,8	7,9	9,1	nc
Order book				3850	10043	nc
% state ownership	4,3	4,3	4,3	4,3	4,3	4,3

Dassault Aviation (DA) is owned by Groupe Industriel Marcel Dassault (GIMD) by 50,02%, EADS by 45,94% and the public stock exchange by 4,04%.

DA is a prime contractor and France sole designer of military aircraft. It is the sole provider of military manned aircraft to the French armed forces. Apart from DA, only the Eurofighter consortia and Saab produces manned military aircraft in Europe. Daughter companies, part ownership: Dassault Aero Service (100%), European Aerosystems LTD (50%), SECBAT (36 %), Eurotradia International (16%) and SOFRESA (6%). DA has a 5,7% minority in Brazilian Embraer.

Important military projects for DA: Mirage, Rafale, UCAV program, Baby Duc (UAV). Dassault Aviation is not a supplier to any non-French aircraft.

Dassault is a company that is unique in many aspects. It has managed to preserve its autonomy and integrity from the French state, yet maintain a very favourable position with the French government, through consecutive governments and presidents. It only co-operates with other companies when it has no other option, but prefers to work on its own.[185]

184 Source: 1998-2001: Hébert, 2002 ; 2002: Annual report, Dassault Aviation.

185 According to interviews in Paris, May-June, 2003.

DCN – Directions de Chantiers Navals[186]

(MEuro)	1998	1999	2000	2001	2002	2003
Turnover			1740	1180	2200	1659
Defence turnover			1740	1180	2200	
% defence			100	100	100	
Workforce	17581	16418	15095	14760	14200	
% export	10	23	26	35	28	
Résultat net	-70	15	-92	-61	117,6	41
Profit margin %	-4,1	0,9	-5,3	-5,2	5,3	
Orderbook						4751

DCN is the clearly dominating French naval supplier of mainly submarines and naval vessels. It is owned 100 % by the French state. May 30, 2003, DCN was converted into a private company status, with all shares held by the state. Thereby it can engage in cooperations and joint ventures as any private company, but with just one shareholder.

In 1991, DCN created DCN International, a private company in order to facilitate DCN:s possibilities for cooperation, since its arsenal status strongly limited its operations.

Its business areas are: New constructions (45 %), Maintenance (30%) and Combat systems and equipment (25%). Important subsidiaries: DCN International (100%), Armaris (50-50 JV with Thales, owned 100 % by DCN since 2004), UDS International (owned 100% by Armaris), GIE Eurotorp and GIE Eurostat. DCN has cooperations with primarily Thales, and also IZAR (Scorpène submarine), Fincantieri (Horizon frigate), Kongsberg (SENIT 2000) WASS (torpedoes).

DCN makes larger naval vessels, mainly aircraft carriers (type Charles de Gaulle) and frigates (types La Fayette, Horizon, Bravo, Delta, Sawari II). It produces nuclear-powered submarines, only for France, (types Le Triomphant and Barracuda) and conventional subs only for export (types Agosta and Scorpène).

Two other and considerably smaller military ship producers are CMN (Constructions Mécaniques de Noirmandie) and Chantiers de l'Atlantique. They do not really compete with DCN, for the French Navy they produce much smaller and less prestigious ships.

[186] Figures and statistics from Hébert, 2002 and Calepin, 2003.

EADS – European Aeronautic Defence and Space Company

(MEuro)	1999 (pro forma)	2000 (pro forma)	2001	2002	2003
Turnover	25553	24208	30798	29901	30133
Defence turnover		4840	6160	5980	7100
% defence		20	20	20	23,4
Orders taken (prises de commandes)/defence		49079	60208	61200/31009	31000/7100
Workforce	88631	88879	102967	103967	109175
Workforce in France				40,2 %	nc
% export		47 % outside Europe	55% outside Europe	nc	nc
Résultat net	-1046	-909	1372	-299	152
Profit margin %	-4,6	-3,8	4,5	-1,0	0,5
Order book		131874	183256	168339	179280
R&D expenditure	1324	1339	2046	2096	2189
% French state ownership	15	15	15	15	15

EADS is the result of a merger in July 2000 of French Aérospatiale-Matra, German DASA and Spanish Casa. EADS has a complicated ownership structure with several layers of holdings (depicted in appendix 5). In short, it has the following institutional owners, plus the 34,58 % that is on the stock market.

French state	Lagardère	BNP Paribas AXA	Spanish state	Daimler Chrysler	Hamburg Land	Stock market
15%	11,1%	3,9%	5,42%	28,1%	1,9%	34,58%[187]

The institutional owners had a pact stating that none of them would sell any shares before June 30, 2003. So far, no one has sold. The first three are French, thereby making the French part 30 % (equal to the German part), and these three have their shares united in a holding company: SOGEADE.[188] EADS had on its creation approximately 100 000 employees at more than 70 sites, in mainly France, Germany, Spain and UK. The holding company (EADS B.V.) that unites all institutional owners is headed by the Lagardère chairman and the Daimler-Chrysler chairman. The company has two CEOs (one French and one German) and two headquarters (in Paris and Munich). The company is legally situated in the Netherlands (due to tax reasons). EADS has roughly 20 % defence and 80 % civil content. [189] The civil parts (esp. Airbus) generate profits, and the defence part is clearly not profitable.

EADS has a very wide business portfolio. It is not represented as a main constructor in submarines and naval vessels, nor in armoured vehicles, but otherwise in all possible defence product and service segments. The overall business segments were in 2002 Airbus (63 %), Aeronautics (17%), Civil and defence systems (11%), Space (7%) and Military transport

[187] The biggest shareholders – out of the 34,58 % – were in 2002, in the following order: Deutsche Bank, the Kuwaitian state and the US billionaire Kirk Kerkorian. Hébert, 2002, p. 20.
[188] Masson, 2003, p. 79.
[189] Masson, p. 17.

aviation (2%).[190] This balance will shift after the A400M commences, increasing the last business segment, and also add a military production to Airbus.

EADS has an extensive portfolio of subsidiaries (e.g. Eurocopter and Astrium) and part ownerships (e.g. Airbus (80%), Airbus Military (56,4%), Eurofighter (46 %), Dassault Aviation (45,8%), MBDA (37,5%), Patria (26,8%[191]) and Arianespace (22,9%)). EADS in different forms or as owners has a part in many defence programs, e.g. Airbus, Eurofighter, Tornado, all sorts of other aircraft and helicopters, Ariane, ballistic missiles M4 and M51. It has cooperations with (among others) Agusta Westland, BAE Systems, Boeing, Finmeccanica, Lockheed Martin, Northrop Grumman, Israel Aircraft industries, Saab, Sikorsky, Snecma and Thales.[192]

The merger of Matra Haute Technologies and Aérospatiale in 1999 was a clash of company cultures. Matra had an elaborated Lagardère industrial culture and Aérospatiale had another government-oriented, institutionalised culture built up of many *fonctionnaires* and *ingénieurs de l'armement*. The clash of these cultures resulted in most of the Aérospatiale-Matra – and consequently within the French parts of EADS – higher managers were initially from Matra.[193]

MBDA is owned 37,5 % respectively by EADS and BAE Systems, and 25 % by Finmeccanica. MBDA France had in 2001 a turnover of 1040 and a result of 45 (4,3%), 5030 employees, 100% defence activity and 33 % export.

Figures from some EADS-related companies:[194]

2001	Turnover	Defence turnover	% defence	Work-force	% export	Résultat net	Profit margin %	Order book	R&D expenditure
Eurocopter	2243	965	43	10394	65	48	2,1	7465	nc
Aérospatiale Matra Missiles[195]	587	587	100	2714	50	nc			
MBDA[196]	1807	1789	99	9370		nc		13000	
Matra BAE Dynamics France	525	525	100	2327	30	-30	-5,7	nc[197]	nc[198]

[190] Calepin 2003, p. 8.
[191] The ownership in Patria is an indirect result of the Nordic procurement of the NH90 helicopter, from Eurocopter. Hébert, 2002, p. 23.
[192] Ibid.
[193] According to interviews in Paris, May-June 2003. Due to cross-ownerships, these turnover figures are overlapping.
[194] Hébert, 2002.
[195] 2000.
[196] 2002.
[197] The Order book was 3677 in 2000.
[198] R&D expenditure was between 176 to 193 M Euro 1997-2000.

GIAT Industries, Groupe

(MEuro)	1995[199]	1998	1999	2000	2001[200]	2002	2003
Turnover	1265	1079	884	554	762	777	729
Defence turnover	nc	1049	866	554	762	746	nc
% defence	nc	97	98	100	100	96	nc
Workforce	11228	10273	8867	7500	7450	6200	6000
% export	nc	61	57	30	51	34	nc
Résultat net	-1570	-133	-145	-283	-203	-118	nc
Profit margin %	-124,1	-12,3	-16,4	-51,1	-26,6	-15,2	nc
Order book	nc	nc	nc	2770	2792	2300	2180
R&D expenditure	nc	nc	nc	93	129	100	142
% state ownership	100	100	100	100	100	100	100

Giat is the most troubled of the French state-owned companies. Giat had 17000 employees at its height and 11 000 in 1995. In a recovery plan from the spring of 2003, Giat will decrease its present workforce of 6250 with 60% in three years, so it will be 2500 employees in 2006. The number of employees were 11 000 in 1997 and 18 000 in the 80s. Giat has at present very limited orders, and no apparent possibilities for export.

In 1990-94, Giat acquired many smaller companies in France: Luchaire Défense and Manurhin Défense (1990), SMS (1992), Cime-Bocuze, Canons Delcour (1993), Mécanique Creusot-Loire (1994)

It also acquired FN Herstal in Belgium 1991 but divested it in 1997 due to an unsuccessful integration process.

Giat produces firearms, cannons, artillery, armoured vehicles, tanks and munitions. Its business segments are Armoured systems (81 %), Arms and munitions (15 %), R&D (3 %) and "Other" (1%). Main subsidiaries: Luchaire Défense (100%), Manurhin Défense (100%), 50 % of CTAI[201], Euro Shelter, Satory MV and SPRIA, and finally CIME Bocuze (34 %). Giat is roughly 90 % *Armé* and 10 % *Armé de l'Air*.

There are three main reasons for its continuous poor performance. Firstly an ongoing mismatch between production capacity and demand, exemplified by the fact that it had French orders for 1400 Leclerc tanks in 1990, which had been reduced to 400 in 2003. Secondly, the very large order of Leclerc tanks to the UAE in 1992 which was agreed upon on disastrous terms for Giat. One main, disastruous, clause of the contract was that Giat guaranteed to that each delivered tank would be equipped to the highest possible standard at the time of delivery, with the delivery running over many years. The final deliveries are in 2003. This order of 20 billion francs has generated a 40 % loss of 8 billion francs. Thirdly, Giat has been unable to win any export orders in recent years.

Giat has cooperations with BAE Systems, Oerlikon, Otobreda, Renault Trucks (*Satory Military Vehicles*), Rheinmetall, TDA, Thales, EADS and Bofors Defence AB.

Main programs underway: *arme de petit calibre du fantassin* (FAMAS), 155 mm artillery cannon, CTAI telescopic munition, and cannons for Rafale and Tigre. Leclerc upgrade and infantry armoured vehicles (VBCI, Vextra) and the Bonus intelligent munition.

[199] The disastrous year of 1995 is included, as an example. This year, the loss was higher than the turnover!
[200] DGA figures point to a turnover of 802 and a defence turnover of 770. CIRPES states a turnover of 762, all defence. The figures in this table is however the CIRPES figures. Varför ej DGA?
[201] Cased Telescopic Ammunition International, a 50/50 JV between Giat and BAE Systems.

Sagem- Societé d'Applications Générales d'Électricité et de Mécanique[202]

(MEuro)	2000	2001	2002	2003
Turnover	4270	3037	2763	3180
Defence turnover	897	941	663	nc
% defence	21	31	24	nc
Workforce	15600	11660	12097	nc
% export	59,6	53	54	54
Résultat net	152	-14	77	nc
Profit margin %	3,6	-0,05	2,8	nc
Order book	nc	1670	nc	nc
R&D expenditure	nc	nc	nc	nc

Sagem is owned by its employees. It has wholly owned subsidiaries in the US, Spain, Australia and Switzerland and less than 100 employees in companies in Germany. Sagem is primarily a systems subcontractor.

Its business segments are Communication (64 %) and Defence and security (36%). It defines its defence activities as guidance, navigation, guided weapons, military avionics and aeronautic systems. It's a supplier of air-ground missiles, navigation systems, surveillance systems and different unmanned vehicles (e.g. Crecerelle, SPERWER, Ugglan and HORUS). It has a part in many defence programs, e.g.: Exocet, Mistral, Roland, Aster, Apache, Challenger, Leclerc, Rafale, Mirage, NH90, Tigre and Félin. Sagem has cooperations with e.g. EADS, Ericsson, Giat, MBDA, Patria, BAE Systems, Finmeccanica and Honeywell.

According to www.sagem.com, Sagem is World No 1 in helicopter flight control and space optics, European No 1 in optronic systems, tactical UAV:s and inertial navigation. Sagem was in the spring of 2003 the only European company that had exported UAV:s for military use. Sagem has a self-financed UAV program with Dassault Aviation, named Dassault Sagem Tactical UAV.

Sagem won a prestigious contract *Félin* ("$ 1 billion") in the spring of 2004 over a consortium of Thales and Giat, the SITEL battle management systems and also in June 2004 was awarded in a consortium with Giat and Thales to develop a BOA demonstrator.[203]

Sagem has been clearly more difficult to attain figures and statistics from, they also declined to be interviewed.

[202] Figures from Calepin, 2003 and homepage.
[203] www.sagem.com/en/communiques-en

Snecma[204]

(MEuro)	1998	1999	2000	2001	2002	2003
Turnover	4340	4860	5646	6893	6504	6431
Defence turnover	868	729	903	1241	1236	1480
% defence	20	15	16	18	19	23
Orders taken (prises de commandes)	nc	nc	8800	9200	10000	nc
Workforce	20262	23111	35208	38142	38986	39695 28990 in France
% export	71	71	73	70	69	68,5
Résultat net	248	258	318	358	106	nc
Profit margin %	5,7	5,3	5,6	5,2	1,6	nc
Order book	nc	nc	8800	9200	10000	nc
R&D expenditure				973	1124	1112

The state ownership is 97,2 %. The non-state ownership is parted between United Technologies Corp. (US) (1,7 %) and Fimalac (1,1 %),

Its four markets are defined as civil aviation, military aviation, helicopters, and space and defence. Main defence products: gas turbines for aircraft and missiles, aeronautical equipment.

Snecma operates in propulsion and "*equipements*", 36 % propulsion/22 000 employees and 64 % components/16 800 employees. Snecma does not want to be defined as a defence company, its company structure is not organised with a separation between defence and civil markets or products. Of its 39 000 employees, 9600 are in France.

It has through acquisitions, mainly in France, integrated both competitors as well as related activities. The main acquired companies are Turbomeca, Hispano-Suiza, Hurel-Hispano, Messier-Dowty, Messier Bugatti (50%) and Labinal. Acquisitions in 2002: Aircelle. Transnational integration: Techspace Aero (Belgium) 51 %.

Snecma has a part in a range of motors, is the supplier of motors to Rafale, Mirage, French ballistic missiles and is also one of the partners in the A400M motor consortia Europrop International. It has a part in Eurofighter and Ariane, and cooperations with e.g. Denel, FiatAvio, General Electric, ITP, MTU, Pratt & Whitney and Rolls Royce. Volvo Aero is the only main aerospace propulsion company not in this group.

Creation of *Snecma Propulsion Solide* (SPS) in 2002, for Herakles. The technology in Snecma Propulsion solide refers to propulsion of strategic, ballistic missiles and for the Ariane family, the Ariane technology is to a large extent similar with the technology for ballistic missiles[205]. 50 % of SPS' turnover is for M51, a French ballistic missile.

Snecma also has a 50/50 JV with FiatAvio, Europropulsion, propulsion for launchers.

There are plans to sell a "substantial, but minority" share of Snecma during 2004, where US General Electric is planning to acquire 10 %.[206] According to the set-up, US ownership will be avoided.

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[204] Figures from Calepin 2003, Snecma annual report 2002 and Hébert, 2002.
[205] Interview, Snecma.
[206] Tran, *Defense News*, March 1, 2004 and http://www.ixarm.com/cgi-bin/dgap/ixarm/jsp/view/AfpNewsItemView.do?xapContentOID=1610773969&xapNavID=CChan.SectArmnt/Chan.SectArmnt.ActualiteArmement&BV_SessionID=@@@@0242571034.1078747959@@@@&BV_EngineID=cccfadckkjgjkedcflgceggdfljdffk.0.

SNPE – Societé nationale des poudres et explosifs207

(MEuro)	1998	1999	2000	2001	2002
Turnover	794	844	822	853	830
Defence turnover	151	151	204	171	nc
% defence	19	18	25	20	nc
Workforce	5184	5551	5373	5586	5573
% export	49,7	51,3	50,9	52	52
Résultat net	14	26	6	-20	-78
Profit margin %	1,8	3,1	0,7	-2,3	-9,4
Order book	nc	nc	nc	nc	nc
R&D expenditure	80	87	84	85	107

SNPE is owned by 99,86 % by the French state. It can be described as a chemical engineering company. Its defence activities are not explicitly described in the annual report, but consist of powder, explosives and fuels for propulsion for grenades, rockets, ballistic missiles and regular missiles.

Two important new companies were created in 2003: Roxel (February) and Eurenco (August), as a part of a complicated new structure (see appendix 5). In short, the SNPE *Materiaux Energetiques* (SME) and the Snecma *propulsion solide* are pooling their interests 50/50 in a holding company called Hérakles. Roxel pools the French and British tactical propulsion 50/50, divided by SME and MBDA, a future link between Hérakles and Roxel is planned. Hérakles owns 60 % of Eurenco, a merger of the Swedish-Finnish explosives company Nexplo and the SNPE energetic materials capacity.[208]

SNPE is involved in e.g. Ariane 5, the ballistic missile M51, tactical missile Aster and all sorts of propulsion and powder for rockets, grenades and munitions.

2003 figures not presented at all on www.snpe.fr in June 2004.

[207] Figures from Hébert, 2002 and SNPE 2002 annual report.
[208] Interview at SNPE, June 2003 and Jane's International Defence Review, September 01, 2003.

Technicatome 209

(MEuro)	1998	1999	2000	2001	2002
Turnover	258	236	244	207	nc
Defence turnover	245	224	230	nc	nc
% defence	95	95	94	nc	nc
Workforce	1925	2085	2025	nc	nc
% export	nc	nc	nc	nc	nc
Résultat net	9	4	3	nc	nc
Profit margin %	3,6	1,7	1,2	nc	nc
Order book	nc	nc	nc	nc	nc
R&D expenditure	nc	nc	nc	nc	nc

100 % state owned through the holding company Areva.

Technicatome provides the nuclear reactors for the nuclear propulsion of submarines and vessels. No defence export.

Technicatome is essentially an engineering, high technology company and not active as a defence company. It is on this list since they constitute a vital part of the *force de frappe.*

Its defence strategy can be seen as synonymous to the choices of the government in Tecnhicatome's field of expertise.

[209] Figures are from Hébert, 2002. www.technicatome.fr did not show 2002 or 2003 results and figures.

Thales, Groupe [210]

(MEuro)	1998	1999	2000	2001	2002	2003
Turnover	6175	6890	8580	10268	11105	11569 (25 % France)
Defence turnover	3272	3833	4934	5883	5976	6950
% defence	53	56	58	57	54	60
Orders taken (prises de commandes)	7022	7942	9269	11059	10677	nc
Defence orders taken	nc	nc	nc	6100	6000	
Workforce	48850	48920	57312	62494	60600	57439
Workforce in France, %	70	69	57	54	55	56
% export	69	68	74	75	77	nc
Résultat net	-232	275	201	-366	154	nc
Profit margin %	-3,7	4,0	2,3	-3,6	1,4	nc
Order book	13403	15428	18366	19744	19000	18700
R&D expenditure	1524	1600	1800	1900	1900	nc

Thales, created in 2000 (previously named Thomson-CSF), is owned 32,6 % by the state, Alcatel (9,6%), GIM Dassault (5,7%), 47,4 on the stock market and 5,6 % by Thales. Alcatel had a 15,8 % share in 2001, but sold 6,2 % on the stock market.

The parent company Thomson SA was nationalised in 1982. The French government consolidated in 1998 the Thomson, Alcatel and Dassault professional and defence electronics activities and also the satellite activities of Thomson, Alcatel and Aérospatiale. Thales left the satellite business (Alcatel Space) in 2001.

Thales has a very wide range of activities, services and products. It is usually described as a ”defence electronics” company, and it supplies e.g. combat systems, radar, electronics for defense systems, communication systems, aerospace surveillance, air defence systems, naval defence systems, avionics and simulation.

It is renowned for its “multi-domestic approach”; that it aims to have a domestic presence in many nations. It has for a number of years made foreign acquisitions, e.g. acquired Hollandse Signaalapparaten in Netherlands (1989), Sextant Avionique, Hughes Redifusion, Thorn EMI.EMO and Racal (2000) in the UK. Thales has also made acquisitions in South Korea (Samsung), Singapore, South Africa (ADS) and Australia (Australian Defence Industries, ADI). See appendix 7 for more detail.

Thales has gradually become more and more prominent in naval affairs, from being a supplier of vital systems to also becoming more and more of a prime contractor/integrator. It has partnered with DCN in three 50/50 ventures. First, the export-oriented JV Eurotorp for torpedoes. Secondly, the JV UDS International (1994), for surface ships. These two are both only for commercial cooperation; how to find possible orders. In July 2002, Thales and DCN created the strategic 50/50 JV Armaris[211], combining naval vessels, naval combat systems, prime contractor abilities – for export and cooperation. UDS International and Eurotorp are now headed by the strategically overarching Armaris. Thales is increasingly becoming a

[210] Hébert, 2002; Calepin, 2003 and Thales 2002 annual report.
[211] Owned 100% by DCN since 2004.

prime integrator for vessels, it has through a subsidiary such a role in Australia, and also in UK for the CVF, the future UK aircraft carrier.

Thales created in 2001 a transatlantic, strategic joint venture with Raytheon – Thales Raytheon Systems – which was the first *strategic* transatlantic joint venture.[212]

Thales is also chosen as the prime integrator for the next UK aircraft carrier. Thales has also shown interest (as well as DCN) in purchasing German HDW.

[212] Discussed at more length in Lundmark, 2003a, p. 42.

Foreign owned companies

There is also a small number of foreign-owned companies with a defence content. The most notable are:

Fiscal year 2001, MEuro	Ratier-Figeac	Renault Trucks	Rockwell Collins France	TRW Systèmes Aéronautiques
Turnover	151	3666	305	81
Defence turnover	30	110	15	27
% defence	20	3	5	33
Workforce	1123	15761	521	672
Workforce in France	nc	nc	nc	nc
% export	26	50	69	39
Résultat net	12	nc	nc	nc
Profit margin %	7,9	nc	nc	nc
Owner	United Technologies (US)	Volvo (Sweden)	Rockwell Collins (US)	TRW (Northrop Grumman) (US)

Renault Trucks has received a substantial part of the VBCI, an infantry vehicle, together with Giat, which gives Volvo a not widely known presence in the defence market.

Some other companies with a defence presence in France for which figures have not been obtained: Wärtsilä (Finland) and Goodrich (TRW, US).

Appendix 3. Table on company strategies

	Overall strategy for integration and cooperation	Type of cooperation	Type of integration	Geographical scope of integration	Ownership	Relation to the French government
Alcatel Space	Further its international position, either by merging with Astrium or Alenia Spazio	Has a part of several French and European programmes. Provides satellite-based defence services.	A result of a Franco-French construction from 1998, merging the satellite parts of Aérospatiale and Alcatel, and parts of Thomson-CSF.	French	Thales workers: 33,4 % (2002), Groupe Industriel Marcel Dassault: 5,6 %.	The government pushes and supports a further consolidation of the satellite business; either Franco-French with Astrium or with Italian Alenia Spazio.
Sagem	Independent from the government Systems subcontractor	Responsible for parts of French programmes Cooperations with foreign companies	No institutional integration within the defence-related corporate map. Integration through partnerships in programmes.	Cooperations with EADS and e.g. Ericsson, Patria, Finmeccanica, BAE Systems and Honeywell.	Owned by its employees	Independent, industrial logic, not a typical defence company.

	Overall strategy for integration and cooperation	Type of cooperation	Type of integration	Geographical scope of integration	Ownership	Relation to the French government
Dassault Aviation, Groupe (military)	Be a prime fighter producer with very tight technology control. To remain most of all independent, and also small and competitive.	For fighters, only French companies. For UAV:s, cooperation the norm, with French and others. Dassault does not fit in in a consolidated European structure, nor does it want to. Dassault sees cooperation in US-led program as impossible. International cooperation preferred as work share arrangements. Engaged in limited international cooperation. Sees scientific cooperation with universities as very beneficial. Strives for open development architecture.	No acquisitions. Cannot be acquired. Very limited integration of any kind with other companies, apart from that other French companies provide systems for programs with Dassault as lead. Has joint company with Sagem for UAV:s. 5,7% in Brazilian Embraer (civil aircraft). Has had a (now non-active) JV (*European Aerosystems Limited*) with BAE Systems.	No international integration, and isolationistic in France. Does not want to acquire foreign companies, does not want U.S. presence.	50,02 % Groupe Industriel Marcel Dassault, 45,76 % owned by EADS. Groupe Industriel Marcel Dassault has a very strong financial situation. Its own capital exceeding the value of Thales.	The government does not intervene, accepts Dassault's very independent stature. No golden shares or contracts.

	Overall strategy for integration and cooperation	Type of cooperation	Type of integration	Geographical scope of integration	Ownership	Relation to the French government
Thales, Groupe	To be "multidomestic"; to have a national company presence in many countries that should have a national ("domestic") presence and acceptance. Not change the domestic company culture. Emphasises to be financially strong and to have technological know-how. Strives to become a prime naval contractor, without being the shipbuilder, but rather as the systems integrator. To create a stronger U.S. presence.	Numerous partnerships for products, as cooperations or JV:s. Important system provider in many defence programs in many sectors and nations. Several cooperations through JV:s with DCN.	JV:s seen as compromise solutions. Prefers acquisitions. Is however present in many JV:s and consortias.	The European company most renowned for acquiring foreign companies and managing them successfully. Has acquired companies in, most notably, Netherlands, US, Germany, UK, Australia and South Africa, but also in many other countries. Has a unique transatlantic *strategic* JV in Thales Raytheon Systems. It is unique in the sense that it is strategic, and thereby more visionary, compared to the most common *project* JV:s. Integration of strategies between the companies in a product area (radars).	32,6 % state, Alcatel 9,6 %, GIM Dassault 5,7 %, 5,6 % on the stock market and 5,6 % owned by Thales.	Golden share concerning foreign acquisition of Thales. Probably also golden shares or agreements concerning certain technologies crucial for e.g. submarines and warships.

	Overall strategy for integration and cooperation	Type of cooperation	Type of integration	Geographical scope of integration	Ownership	Relation to the French government
EADS	EADS European strategy is counterdependent on deepening of ESDP[213]. To create a stronger U.S. presence. "Consolidates through programs". Has an advantage because of a decades-long tradition of trans-national programs in the companies that have created EADS. Integrating its merged companies and exploiting the synergies.	Primarily government-led programs as work share and teaming arrangements, but at enormous sums. Technological cooperation outside EADS family in order to further or strengthen market presence.	Institutional integration between France, Germany and Spain. Decision integration through joint programs between these countries. Limited integration of activities, rather specialisation.	Primarily European, the company is a creation of government-led Europeanisation. Transatlantically, MoU:s with Northrop Grumman. In favour of teaming arrangements. Do not see acquisitions in the U.S. as plausible. Has a minority share in Finnish Patria.	15 % French state, 5,42 % Spanish state and 1,9 % Hamburg Land.	The French state has had a contract concerning launchers.

[213] European Security and Defence Policy.

	Overall strategy for integration and cooperation	Type of cooperation	Type of integration	Geographical scope of integration	Ownership	Relation to the French government
MBDA	To become a European missile alternative at the same level as Raytheon. Global presence.	Large government-led production arrangements, primarily work share arrangements.	The company is consolidated around programs, at present mostly a consolidated future. National structures still very separate. Some Spanish and German companies are planned to be incorporated.	European, and nationally before that.	Has minority French and Spanish state ownerships through several layers of holding companies.	Strategically very little impact, but orders are so far orchestrated through government agreements. MBDA is a government-led creation for a shared European autonomy. Orders shape the integration and consolidation, and is a part of the governments' consensus regarding MBDA.
Astrium	Further its global position and niche leaderships in certain technology areas and customer segments. To remain the preferred or dominant European company in its area.	Provides satellites for use in military services. Has provided all present satellites for military use in Europe.	Astrium is the creation of the fusion of the satellite activities within EADS. EADS acquired in 2003 the share held by BAE Systems.	A consolidation of French, German, British and Spanish satellite activities.	Government ownership through EADS.	Dependent on government-financed programs, but over-all more into civil telecommunications.

	Overall strategy for integration and cooperation	Type of cooperation	Type of integration	Geographical scope of integration	Ownership	Relation to the French government
DCN	Maintain its market share and win new export orders. Become less dependent on export orders outside Europe. Become less dependent on French orders. Strengthen its identity through ventures with Thales, creating integration and synergies in technologies and programs. "Broaden our horizons through European partnerships and alliances"[214] Refine its identity, does not just want to be seen as a platform maker. To be more independent when the contract with the state expires. Focus on core competence as systems integrator	European consortias and JV:s, that however often have failed. Two JV:s and one joint company with Thales. Both for export and for synergies that strengthen both companies' identities. Abandoned cooperation/alliance with Kockums, after Kockums was acquired by HDW. Produces Scorpène submarines with Spanish Izar, for export only.	No acquisitions, nothing to acquire in France. Has had clear limitations for international integration due to its arsenal statute.	Has plans for acquisitions in Spain and Germany, but the host countries appear reluctant.	100 % state	Transformed in 2003 into a societé nationale. A contract until 2008 with the state that guarantees a certain workload, thereafter is DCN less attached to the state. Has several times received subsidies from the government, but clearly less than Giat.

[214] DCN "press kit", September 2003, at www.ixarm.com

	Overall strategy for integration and cooperation	Type of cooperation	Type of integration	Geographical scope of integration	Ownership	Relation to the French government
GIAT Industries, Groupe	To stabilise at a lower size. When its not loss-generating at that lower size, it will be more able to consolidate and start partnerships. Strengthen through partnerships. Accumulate French and export orders.	Has cooperation with Thales Optronics for Félin. Smaller partnerships and cooperation with Oerlikon and RUAG (Switzerland), Royal Ordnance (UK)	JV with Renault Trucks (VBCI). Joint company (*CTAI*) with Royal Ordnance. JV with Bofors Defence (*Bonus*). Acquired Belgian FN Herstal in 1991 and later sold it.	Very limited. Major French consolidation several decades ago, but none the last decade.	100 % state	Very dependent upon the government. Presently the only customer. Contract with the state until 2006. Has repeatedly received large sums from the government for recapitalisations.

	Overall strategy for integration and cooperation	Type of cooperation	Type of integration	Geographical scope of integration	Ownership	Relation to the French government
SNPE	Has its identity as a chemical company, but the government's control over defence-related activities shapes SNPE's defence activities. Hérakles and Roxel are to be on the same level as the U.S. counterparts. To safeguard its strategic capabilities. SNPE sees its own strategy as quite different to the government's.	Within trans-national defence programs. Cooperations follow shared autonomies. Avoids cooperation with the U.S. in strategic technologies.	Consolidation within France concerning strategic propulsion between SNPE and Snecma in France (*Hérakles*). Consolidation in partnerships in complex trans-national structures. Solid propulsion motors for tactical use with UK (*Roxel*), Sweden and Finland concerning energetic materials (*Eurenco*).	SNPE has had a French Monopoly for around 600 years. European, no transatlantic. National autonomy in some technologies, shared autonomy within Europe with carefully chosen partners.	99,86 % state	The parts of SNPE that are seen as strategic for France are closely protected. The government appoints and fires the CEO and approves of the board. Societé national, de droit privé. The government does not intervene as long as SNPE has "not too big deficits" and does not create "social conflicts". The government transferred 50 million Euro to SNPE in 2002.

	Overall strategy for integration and cooperation	Type of cooperation	Type of integration	Geographical scope of integration	Ownership	Relation to the French government
Snecma	Wants to attain a larger international market share by acquisitions of companies. Also foresees further European consolidation.	Very elaborated international coop in civil aerospace, especially with General Electric. Also much intl coop in military, does specific systems within a motor. Strategic propulsion kept Franco-French.	Extensive vertical and horizontal integration in France, making Snecma the national leader. Tried to acquire FiatAvio, but was blocked in France by Ministère d'Economie, Finance et Industrie.	Extensive in France. Synergies among French companies now within Snecma. Foreign integration of assets only in Belgium. Sceptic towards transatlantic JV:s.	97 % state	The government definitely affects the strategy and has certain very clear restrictions: strategic propulsion and to have a French fighter capacity. The government appoints and fires the CEO and approves of the board. Societé national, de droit privé. Will probably be privatised within a few years.

CEA and Technicatome are 100 % state owned. The companies are actively held entirely French. The companies' strategies for its military activities correspond directly with the government's. The only international integration is that the capacity for nuclear testing by simulation (only testing by simulation at present) is shared with the UK. Concerning military technology, they should more be seen as arsenals than companies.

Appendix 4. French defence industry size

From 1989 to 1999, the distribution of defence industry employees was as follows.

	State - DGA	Aerospace	Electronics	"Mecanics"	Naval construction	Nuclear	Chemical and miscellaneous	**TOTAL**
1989	24000	65400	57700	47100	31600	10200	19100	**255100**
1990	23800	63300	55000	47300	31800	9800	19100	**250100**
1991	24100	61600	54700	47900	31300	9400	19300	**248300**
1992	23820	57990	50360	42090	28700	8550	18930	**230440**
1993	22180	51390	47390	36780	28860	8220	19300	**214120**
1994	21260	45500	46180	37020	28050	8130	18470	**204610**
1995	20870	42000	41680	34100	27320	7750	18870	**192590**
1996	20140	41000	41970	31000	25500	6990	17900	**184500**
1997	19780	38680	40500	29960	23400	6650	19470	**178440**
1998	18290	37415	42060	29700	21640	6825	19230	**175160**
1999	17170	39010	41685	28645	20315	6540	17705	**171070**
% change 1989-99	-28.5	-40.4	-27.8	-39.2	-35.7	-35.9	-7.3	**-32.9**

Table. Number of employees in the French defence industry (Source: DGA)

In 2001 the total turnover was 13.2 Billion Euros (B€), of which 5.1 B€ for export. The export share was 25 %. The orders taken were 13.6 B€, 4.9 B€ export. The total number of employed in France were 79 200 in 2001, 79 800 in 2000. Employed internationally by French defence companies were 166 000. The defence industry comprises roughly 4 % of the French industrial sector. The French defence industry is about a quarter of Europe's defence industry. As a comparison, the UK (biggest in Europe) had in 2001 a turnover of 20.3 B€, 35% export and 175 000 employed by British defence companies. Germany had a turnover of 6.3 B€, 11 % export and 90 000 employed. The US had in 2000 a turnover of 120 B€, an export share of 29 % and 1 276 000 employed.[215]

[215] Figures from CIDEF, (2002) and Calepin International, 2003.

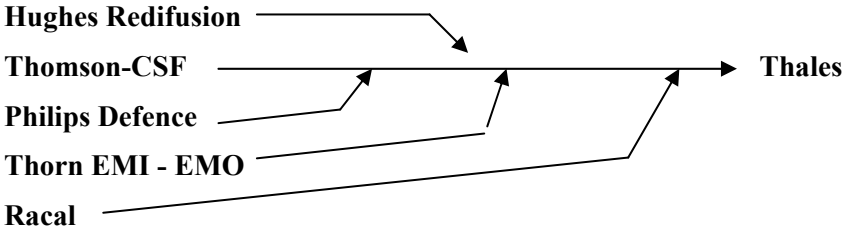
Appendix 5. Charts and statistics concerning central companies

The defence industry in Europe and the U.S. 2000

	Turnover (billion Euros)	Part export of turnover in %	Directly employed
U.S.	120	29	1 276 000
United Kingdom	20.3	35	175 000
France	12	22.9	166 000
Germany	6.3	11	90 000
Sweden	4.7	6	26 500
Italy	4.4	20-25	27 000
Spain	1.1	37	11 600

Source : Cidef, *Ministère de la Défense*
(From Masson (2003)).

Thales background



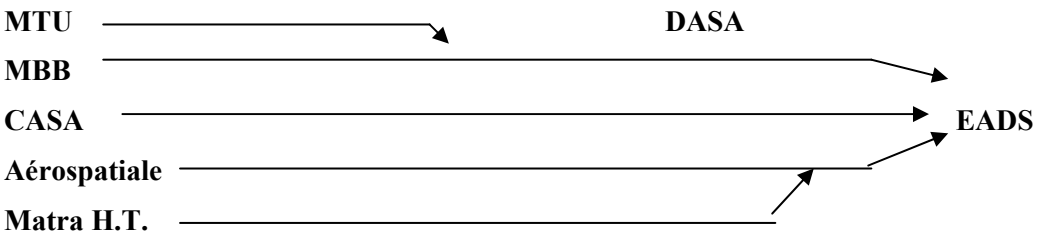
(From Masson (2003)).

The capital in Thales

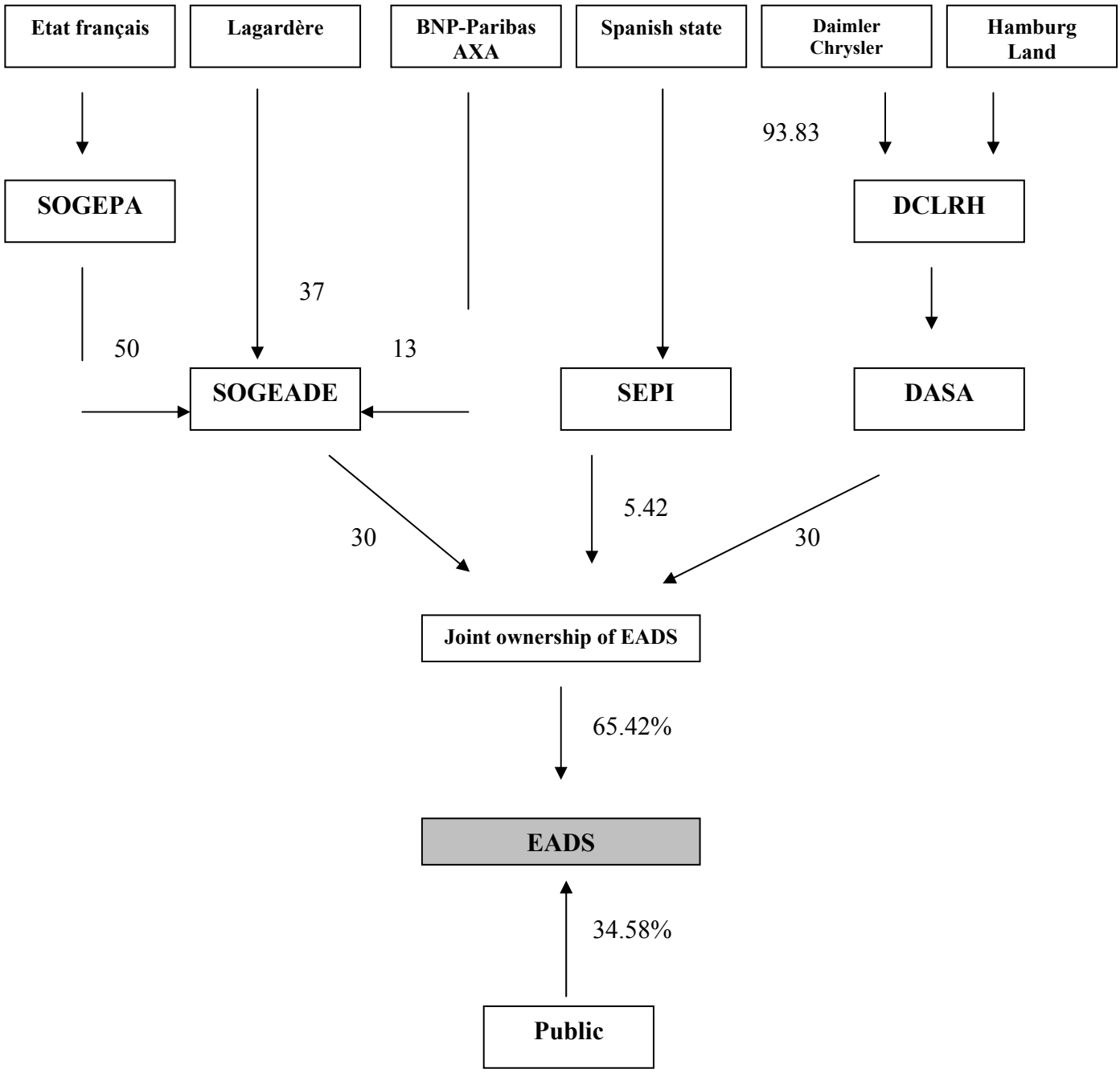
	2001	2002
Public sector		
Thomson SA	32%	32%
Sogepa (100% French state)	0.6%	0.6%
Industrial partner		
Alcatel	15.8%	**9.7%**
Groupe Industriel Marcel Dassault	5.9%	5.9%
Thales	5.8%	5.8%
Public (including employee ownership)	39.9%	**46%**

Source : Thales annual report 2001 (From Masson (2003)).

EADS background



EADS shareholder structure

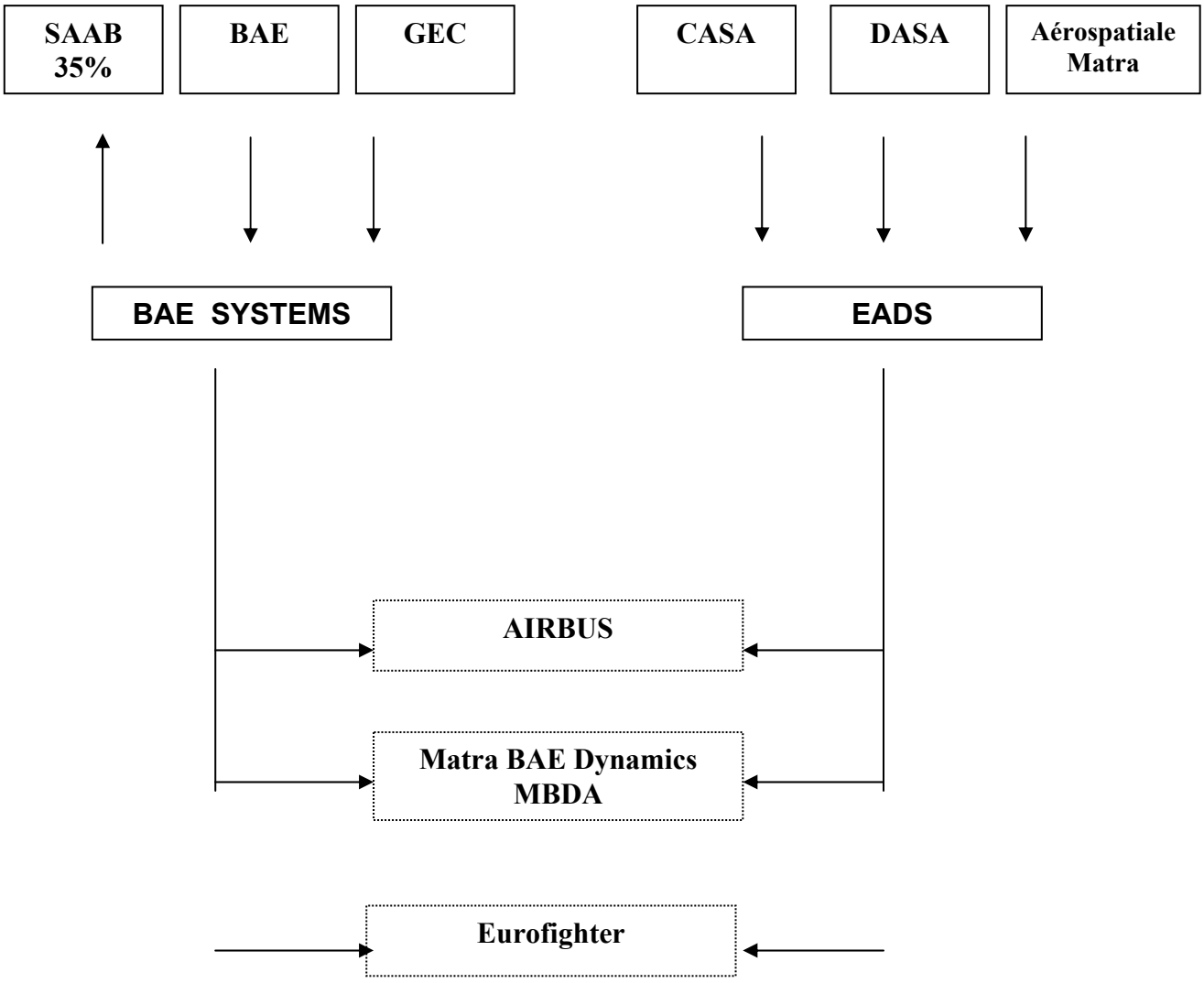


EADS activities by business area

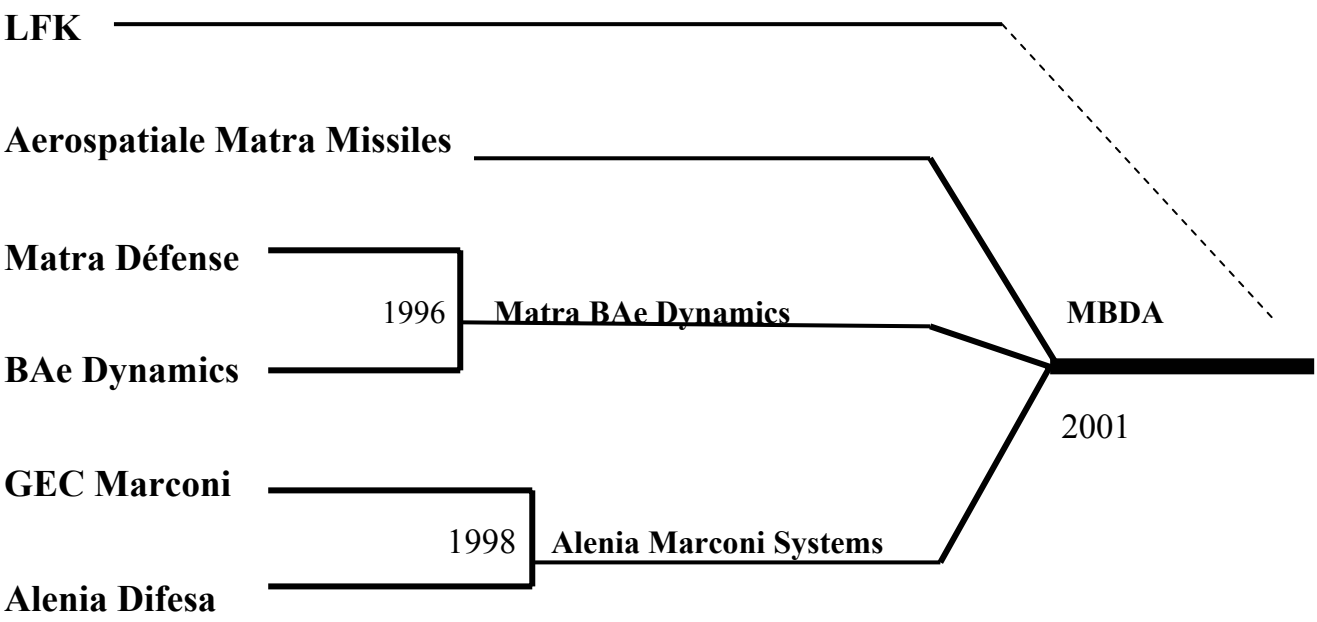
(Meuros)	2001		2000	
	CA	Investment	CA	Investment
Airbus	20 549	1 433	14 856	657
Military transport aircraft	547	63	316	55
Aeronautics	5 065	281	4 704	307
Space	2 439	99	2 535	145
Civil and defence systems	3 345	159	2 909	117
Total	31 945	2 035	25 320	1 281
"Postes éliminés et ajustements"	-1 147	161	-1 112	70
EADS	30 798	2 196	24 208	1 351

Source : Annual report EADS 2001

EADS - BAE SYSTEMS



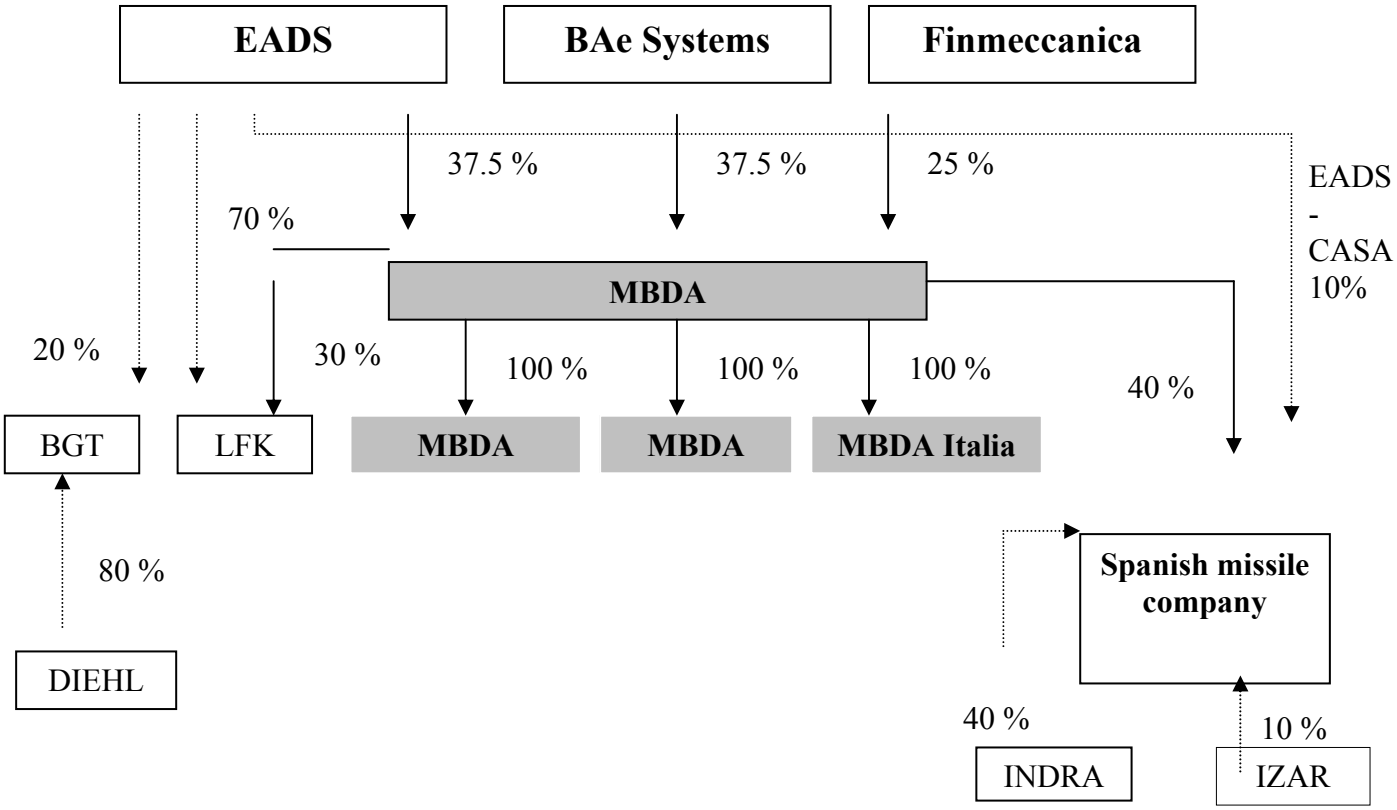
MBDA



Source: MBDA Document from 08/03/2001

From Masson (2003)

MBDA shareholder structure



Source : MBDA document from 08/03/2001 From Masson (2003)

GIAT Industries' activities by geography

Source : Giat Industries' homepage (www.giat-industries.fr)

Appendix 6. Ownership structure after SNPE:s European consolidation

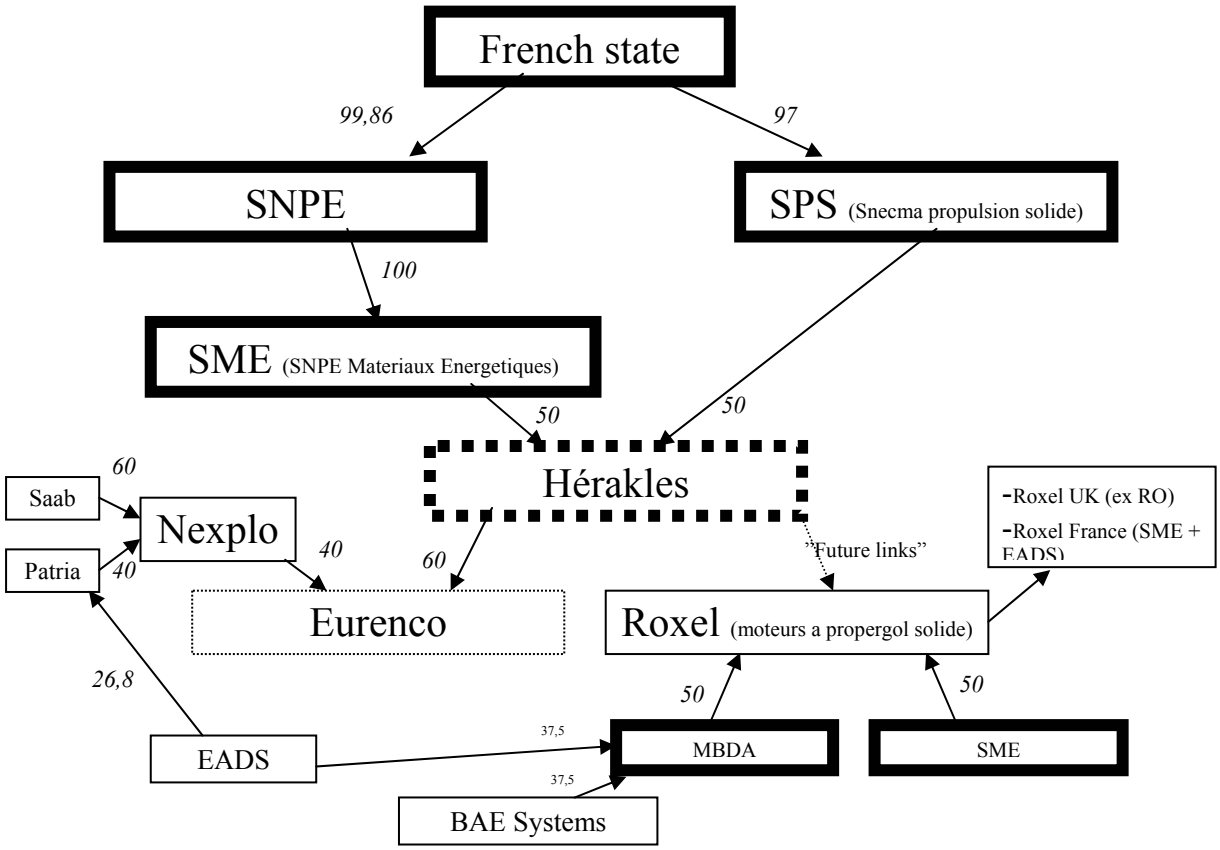


Figure: The consolidation of French solid propulsion and energetic materials (Source: Own.)

Tables over French industry integration and cooperation

Industry integration

Geographic integration	Integration of activities
-within France	-decision integration
-within Europe	-institution integration
-transatlantically	-execution integration
-globally	-R&T integration
	-production integration

The following lists are long lists of, firstly, integrative manifestations between companies and, secondly, of trans-national cooperative programmes with France as one of the parts. The list of integration within France is far from exclusive. It concerns the larger events in recent years. For the transnational events, the table aims to be almost exclusive. Concerning the table for cooperations, numerous sources have been sought and it is unlikely that any important programs have been missed out. The degree of information concerning the cooperations differs widely, and the lists presented here are limited regarding detail for each cooperation. The cooperations are presented with the amount of information that was obtained, up to the level of detail chosen.

In some overviews, export and production is seen as cooperation. In the tables, agreements concerning license production or export are not included, since these do not require more than marginal cooperation. Such programmes are included only when information has been obtained that the accords for license production or export resulted in some kind of extended bi- or multilateral cooperation. Discussions and cooperation in strictly military matters are not included as cooperations.

The author would also like to acknowledge the use of the DBP Defense Industry Globalization database, courtesy of Richard A. Bitzinger. This database presents international programs and cooperations from 1961-1995 in five-year periods (e.g. 1991-95), so therefore a starting year within that period has been assumed by this author. It is also unclear if some of the DBP-listed programs or cooperations have been terminated afterwards.

Appendix 7. The geographic integration of the French defence industry

Geographic integration		
Within France	Nationalisations and government-led consolidations	Nationalisations with consolidations in 1936, 1945/6, 1981/2. Privatisations in 1996. Government-led consolidations creating: Snecma (1945), SNIAS (1970), SNPE (1970), Thomson-CSF (nationalised, 1981), SNIAS renamed Aérospatiale (1984), Alcatel Space (1998), Aérospatiale-Matra (1999) Thomson-CSF renamed Thales (2000).
	Joint ventures	JV: Eurotorp (Thales + DCN) UDS International (Thales + DCN) Armaris (Thales + DCN) Sofradir (Thales + Sagem) "Joint company for UAV:s" (Dassault + Sagem)
	Mergers and acquisitions	Examples of mergers and acquisitions leading up to the present companies:[216] *Aerospatiale :* Nord Aviation, Sud Aviation, SEREB *Giat*: Luchaire Défense and Manurhin Défense (1990), SMS (1992), Cime-Bocuze, Canons Delcour (1993), Mécanique Creusot-Loire (1994) *Snecma* : Turbomeca, Hispano-Suiza, Hurel-Hispano, Messier-Dowty, Messier Bugatti (50%), Labinal and Aircelle *Thomson-CSF/Thales*: Thomson-Brandt merges with CSF (1968), Sextant Avionique, electronics divisions of Alcatel and Dassault (1998)
Within Europe	*MoU:s:*	Four-nation for helicopter development (1978, France, West Germany, Italy and UK), NH 90 Helicopter (1985)
	Consortia	ESA, European Space Agency (1971?, F (Aérospatiale) G (DASA)) ATR-42/-72, transport aircraft (1976, F (Aérospatiale) I (Alenia)) Dragon AA gun (1976, F (Thomson) G (Thyssen)) MTR-390 engine (1981, F (Turbomeca), G (DASA) UK (Rolls Royce)) MICA-ASRAAM AAM missile (1990, F (Matra) G (BGT)) MICASRAAM AAM missile (1990, F (Matra/Dassault) UK (GEC)) "Strategic alliance" (1990, F (Giat) G (Rheinmetall)) "Strategic alliance" (1990, F (Giat) UK (Royal Ordnance)) Eurofar transport helicopter (1990, F (Aérospatiale) I (Alenia) Sp (CASA) G (Eurocopter) UK (Westland)) ATAS Sonar (1990, F (Thomson-Sintra) UK (BAe Dynamics)) "Missile cooperation" strategic alliance (1990, F (Matra) I (Alenia)) "Electro-optical applications" (1991, F (Thomson-CSF), UK (GEC-Marconi)), "Electro-optical applications" strategic alliance (1991, F (SAGEM/SAT), I (Officine Galileo/EFIM) Tiger Helicopter, UK (1992, F/G (Eurocopter) UK (BAe)) M-138 engine (FLA) (1992?, F (Snecma) G (MTU) I (FiatAvio)) MiG-AT Trainer (1992, F (Snecma/Sextant) Ru (MiG MAPO))

[216] For more detail, see Hébert (e.g. 1991, 1995), Dussauge & Cornu (1998), Giovachini (2000), Mampaey (2001) and Serfati (1992, 1997, 2000).

		Blazer AD Turret, marketing strategic alliance (1992?, F(Thomson-CSF) US (Martin Marietta)) CV90 Foreign sales, strategic alliance (1992?, F(Giat) Sw (Bofors)) Folding Roadway System (1992, F (Lohr) G (Krauss-Maffei)) "Eurobridge" (1992, F (CNIM) G (Dornier)) T-72 upgrade, strategic alliance (1992, F(Sagem) Cz (RDP Group)) T-72 M2 MBT, strategic alliance (1992, F (SABCA) UK (GEC Marconi), Be, Slk) 155 mm artillery gun (1992, F (Giat), Sw (Bofors)) "Ammunition cooperation" strategic alliance (1992, F (Giat) Swi (Pyrotech)) "Bowman communication systems" (1992, F(Thomson) UK (GEC)) *cancelled* "Defense electronics" strategic alliance (1992, F (Thomson) G (DASA)) MCM Sonar , co-development (1992, F (Thomson-CSF) Sw (Bofors)) "Active Skyflash II" codevelopment (1994, F (Thomson) UK BAe)) Aramis ARM, missiles (1994, F (Dassault) G DASA/BGT)) MICA AAM (1994, F (Matra) Sw (Ericsson)) MSAM (UK) SAM (1994, F/GEurosam) UK (GEC)) PAAMS SAM, for Horizon (1994, F (Eurosam), UK (BAe)) *cancelled*
	Common subsidiaries:	Airbus (1970, F (Aérospatiale), G (Deutsche Airbus), UK (British Aerospace), Sp (Casa)), Euromissile (1972, Aérospatiale, MBB), Eurosam (1989, F (Aérospatiale, Thomson-CSF), I (Selenia)),
	Joint ventures	*JV:s*: Transport Allianz Group (Transall) (1959, F (Aérospatiale), G (MBB)), Milas (1987, F (Matra), UK (BAe Dynamics) I (Alenia Difesa), GEC Alsthom (1989, F (CGE/Alsthom), UK (GEC), Matra Marconi Space (1989, Matra, GEC-Marconi), Defence Electronics of Singapore (1990, F (Thomson-CSF), Sing. (Allied Ordnance)), Ferranti-Thomson Sonar Systems (1990, F (Thomson-CSF), UK (Ferranti)), Eurocopter (1990, Aérospatiale and MBB), ISI joint venture (1990, F (Sagem) I (Sepa)) GTAR (1991, F (Thomson-CSF), UK (GEC)), "AIR" regional ((1991, F (Aerospatiale) UK (BAe) I (Alenia)) Euromil /Mi-38 Helicopter (1992, F/G (Eurocopter) Ru (Mil/Kazan Helo/Klimov)) SGS-Thomson Microelectronic (1991, F (Thomson-CSF), I (IRI) UK (Thorn EMI)), "Bergerac NC", artillery (1992, F (SNPE) I (SNIA)) Eisys (1992, F (Syseca) I (Ellettronica)), Euronacelle (1992, F (Hispano Suiza) I (Alenia)) Euromissile (1992, F (F (Aérospatiale) G (DASA)) Euro-Hermespace (1992, F (Aérospatiale, Dassault) I (Alenia) G (DASA,)), CTA, Cased Telescopic Ammunition (1992, F (Giat) UK (Royal Ordnance)) Star (1992, F (Thomson-CSF) UK (Shorts Brothers)), INS, International Nacelle Systems (1992, F (Hurel Dubois) UK (Shorts Brothers)), Euro-LAV (1992, F (Panhard) G (MaK Systems)), Advanced Energetic Materials Corp. of Europe (1992, F (SNPE) US (Kaman)), Eurocorvette/BRECA, (1995,, Chantiers de l'Atlantique), G (Bremer Vulkan)), Horizon International (1992, F (DCN), I (Orizzonte), UK (GEC-Marconi) UK parted

		1999 from the program), "Explosives/propellants" (1992, F (SNPE) UK (Royal Ordnance)) "Small arms/joint development" (1992, F (Giat) UK (Royal Ordnance)) "Satellite joint venture" (1993 (F (Aerospatiale) G (DASA)) Landing gear (1992, "Messier Dowty", F (Snecma) UK (TI Group)) RTG Euromunitions (1994, F (TDA (Thomson-Dasa)), G (Diehl), Thomson Dasa Armement TDA/TDW (1994, F (Thomson-CSF), G (Ferrante)), "CELERG" missile propulsion (1994, F(Aerospatiale, SNPE) G (Bayern Chemie)) Bayern-Chemie/Protac (1994, F (Thomson-CSF), G (Dasa)), ESI European Satellite industries (1994, F (Aérospatiale), G (Dasa)), FTSS Ferranti Thomson Sonar Systems (1994, F (Thomson-CSF), UK (GEC-Marconi)), Indra Sistemas (1995, F (Thomson-CSF), Sp (Teneo), Eurotorp/MU-90 (1995 (DCN/Thomson) I (Whitehead)) (JV for development of future combat instrumentation) (1995, F (Thomson-CSF), G (Dasa), UK (GEC-Marconi)) Thomson Marconi Sonar (1996, F (Thomson-CSF), UK (GEC-Marconi)) Matra BAe Dynamics (1996, F (Matra), UK (British Aerospace)) APA Aero Propulsion Alliance (for A400M) (2000, F (Snecma (24,8%)) G (MTU (24,8%)) UK (Rolls Royce (24,8%)), Sp (ITP (13,6 %)), I (Fiat Avio (8%)), B (Techspace Aero (4%)) Diehl Avionik Systeme (2000, F (Thomson-CSF (49%) G Diehl (51 %)) ET Marinesysteme (2000) F/G (EADS (59%)) F (Thales Nederland (50%)) Eurofighter Simulation Systems (2000, F (Thales (26%) Sp (Indra (26%)) I (Finmeccanica (24%)) C (CAE Elektronik *and* G (STN Atlas Elektronik (together 24%)) Rolls Royce Snecma (2000, F (Snecma (50%)) UK (Rolls Royce (50%)) SOSTAR Stand-Off Surveillance and Target Acquisition Radar (2000, F (Thales (28%)) F/G (EADS (28%)) I (FIAR (28%)) Sp (Indra (11%)) NL (Fokker Space (5%)) Turboprop International (2001, F (Snecma (33%)) G (MTU (33%)) I (Fiat Avio (22%)) Sp (IPT (12%)) EPI Europropulsion International (2002) (MTU (28%) G, Rolls Royce (28%) UK, Snecma (28%) F and ITP (16%) Sp) EPI is the reconstruction of APA after Fiat Avio and Tecspace Aero left the arrangement Paradigm Secure Communications (2002, F/G/Sp EADS (50%) UK BAE Systems (50%)) BAE Systems left Paradigm in January 2003. INMIZE (for Meteor) (2002, MBDA (40%) F/G/I/UK, INDRA (40%) Sp, Casa (10%) Sp and Izar (10 %) Sp) Roxel (missile propulsion) (2002, MBDA (50%) F/G/I/UK and SNPE (50%) F)
	Autonomous companies	Eurocopter (1992), Airbus, EADS, Astrium (2000) MBDA (2001) Eurenco (2003).

	Company-led mergers and acquisitions:[217]	*Cancelled acquisitions*:	Giat failed to acquire Heckler (1990, G) Cancelled merger: "Eurodynamics" (ca 1990, F (Thomson) UK (BAe)) CMN failed to acquire Swan Hunter (ca 1995, UK)
		Foreign acquisitions of French companies:	Cancelled merger: "Eurodynamics" (ca 1990, F (Thomson) UK (BAe)) Dassault Belgique (1986, B (SABCA)) Bendix France (1990, UK/F (Thomson-Lucas)) Sema-Matra (1990, UK, CAP) MHS (part of Matra) (1990, G, Daimler) CSEE Defense Systèmes (49%) (1990, I, Finmeccanica) IN2 (part of Intertechnique) (1990, G (Siemens)), Matra (5%) (1990, G, DASA) Matra (5%) (1990, UK, GEC) BAe Space Systems (1992?, Matra Marconi Space) Renault Trucks (2000, Volvo) Cancelled: Matra (2%) (1990, S, Wallenberg)
		Thomson-CSF/Thales:	Forges de Zeebrugge (1988, B), Hollandse Signaalapparaten (1989, NL), NV Philips MBLE Defence (1990, NL), Philips TRT (1990, NL), Ferranti (1990, UK), Link-Miles (1990, UK), Pilkington Optronics (50%) (UK, 1991), Inisel/Bazan (49%) (1992,Sp), Indra (24,9%) (1994, Sp) Amper Programas (49%) (1994, Sp), Kyat (1994, Sp), MEL (Defence group of Thorn EMI) (1994, UK), Redifussion (1994, UK), Thorn fuses (1994, UK), Elettronica (33%) (1997, I), Siemens Forsvarssystem (1998, N), DI Electro-Optic (1999, NL), Odelft Electronic Instruments (1999, NL), Allied Signal Aerospace (electro-optical activities of) (1999, C), Shorts Missile Systems (50%) (2000, UK), Racal (2000, UK).
		Alcatel	Defence parts of ACEC (1989, B), Telettra (1990, I), parts of Telefonica (1990, Sp),
		Giat	Munitions division of PRB (1990, B),

[217] This list of mergers and acquisition is clearly not exhaustive, partly depending on whether companies are classified as defence companies.

			Tech Belcan (1990, B), FN Herstal (1991, B) but FN divested in 1997 Giat failed to acquire Heckler (1990, G)
		SNPE	Martignoni, (1990, I), Sipe Nobel (1992, I).
		Snecma	Norsk Jet ((1989, N), Fabrique National Moteurs (1990, B), Messier Dowty (50%) (1998, UK)
		Matra Marconi Space (F/UK company)	BAe (part of) (1994, UK), Ferranti International (part of) (1994, UK),
		Dassault	SABCA (1981, B)
		Aérospatiale	DASA (8%) (1986, G)
		Matra	BGT (20%) 1990, G)
		French Suez (artillery)	SGB (1990, B)
		Sextant Avionique/BGT	VDO Luft (1992, G)
		Alsthom	HSA (1992 , , NL)

Transatlantically	*MoU*:	Cooperation between EADS and Northrop Grumman
	Consortia:	CL-289 RPV (1990, F (Snecma) D (DASA) C (Canadair)) PLS armoured vehicle technology (1990, F (Lohr) US (Oshkosh)) "General cooperation" strategic alliance (1990, F (Aérospatiale) US (Lockheed)) ALFS sonar systems (1990, F (Thomson-Sintra) U.S. (Hughes)) RAN submarine combat systems (1990?, F (Thomson) U.S. (Rockwell)) "Ammunition cooperation" strategic alliance (1992, F (Giat) US (Alliant)) "Area Defense Weapon" (1992, F (Thomson) G (Dynamit Nobel) C (Bristol)) "Air Defence systems cooperation", strategic alliance (1994, F (Matra) U.S. (Lockheed)) AShM missiles, strategic alliance (1994, F (Aerospatiale) U.S. (McDonnel Douglas)) *cancelled* MBDA/Boeing for *Meteor* (2000)
	Joint ventures	"Thoray" joint venture, co-development (1990, F (Thomson) U.S. (Raytheon)) MATS, advanced energetic materials (1991, F (SNPE), US (Kaman)), Loral Space Systems (1992, F (Aerospatiale/Alcatel) I (Alenia) U.S.(Loral)) ACSS Aviation Communication & Surveillance Systems (2000, F (Thales (30%)) U.S. (L-3 Communications (70%)) Thales Raytheon Systems (2001, F (Thales (50%)) U.S. (Raytheon (50%))
	Acquisitions from France of U.S. and Canadian companies:	Fairchild (1986, U.S., Matra) Ocean Defence Corp. (1988, U.S., Thomson-CSF), Belcan Technologies (1990, C, Giat), Midway Aircraft Instruments (1990, US, Dassault) Honeywell Federal Systems (1990, US, Groupe Bull) Zenith Data Systems (1990, U.S., Groupe Bull) Wilcox Electric (1990, U.S., Thomson-CSF) Rockwell Transmission (1992, U.S., Alcatel) Mili Com Electronics Technologies (1994, U.S, Thomson-CSF.), Rediffusion Simulation (1994, U.S., Thomson-CSF), Magellan Corp and Navigation Systems (2001, U.S., Thales) *Cancelled acquisitions*: Aerospatiale failed to acquire de Havilland (1986), U.S. Thomson failed to acquire LTV Missiles Division (1992), U.S. Sextant Avionique failed to acquire Allied Signal (1992?), U.S.
	Acquisitions from U.S. of French companies:	Fairchild (1992?, from Matra) Ratier-Figéac, TRW Systèmes Aéronautiques, Rockwell Collins France.[218]
Globally	*Consortia*	"Aircraft Servicing (1990, F (Aérospatiale) Malaysia (OFEMA/AIROD)) Cheetah (Mirage III) strategic alliance (1990?F (Dassault) Israel (IAI) RSA (Atlas)) P-120 helicopter (1990?, F (Eurocopter) Singapore (SA) PRC (CATIC))
	JV:	"Helibras", helicopters (1976, F (Aérospatiale) Bra (Bueninvest, Bra state)) Defence Electronics of Singapore (1990, F (Thomson) Singapore (Allied Ordnance))
	Mergers and acquisitions:	Dassault 5,7 % minority share in Embraer (Brazil) Thomson CSF/Thales: Australia, South Korea, South Africa, Singapore

[218] Previous names of TRW Systèmes Aéronautiques, Rockwell Collins France not identified.

Appendix 8.

The integration of activities of the French defence industry

Decision integration		Decision integration consists of the preliminary or introductory phases. It is difficult to decide when these become institution integration or when they actually start. Decision integration has not been a part of the analysis.
Institution integration		See the previous table on geographic integration.
Execution integration		Divided between R&D integration and Production integration.
R&T integration		"Franco-German Programme Office" missile cooperation bureau (1972, F, G), Apache/CWS AGM (1981, F, G) Milas A ShM missile(1981, F, I) Astrid, missile seeker (1990, F (Thomson) G (BGT/DASA)) "Tank technology" strategic alliance (1990, F (Giat) UK (Vickers)) "Joint helicopter development" (1991, F, G, China, Singapore, unknown success), "Missile cooperation, pooling of R&D" (1991, F (Matra), I (Alenia)), "Missile R&D – very short range air-defence (VSHORAD)" (1991, F (Thomson-CSF, UK (Short Brothers), "Develop and market a new class of submarines" (1991, F (DCN), Sp (Bazan)), "2-year Joint development of medium-size weight and light wheeled and tracked vehicles" (1992, F (Giat), UK (GKN)), "Canon de 140" for armoured fighting vehicle (1992, F (Giat), G Rheinmetall), UK (Royal Ordnance)), "2-year Joint development of medium-weight armoured vehicle for future German and French programmes" (1992, F (Giat), G (Krauss-Maffei)), ARV (Leclerc-based) (1992?, F (Giat) Sw (Hägglunds)) *later cancelled* "Future fighter" joint R&D, (1992, F, UK), Dassault, BAe CLARA navigation pod (1992, F (Thomson) UK (GEC)) New strike aircraft (1992?, UK, F (governments)) "A/C engine" (1992?, F (Snecma) UK (Rolls Royce) "Airframe cooperation" (1992?, F (Dassault) U.S. (Boeing)) DCN/Kockums submarine technology cooperation (1998, F, S) abandoned in 1999 when HDW acquired Kockums, FOAS Future Offensive Air System (1998, F, UK) dormant or abandoned Land systems: only design development and sales, MoU (1999, F (Giat Industries) UK (Vickers)) ETAP European Technology Acquisition Programme (2001, F, G, UK, Sp, Sw, I), CVF, British Aircraft carrier (2003, F (Thales), UK (BAE Systems)) UCAV demonstrator (2003, F (Dassault Aviation), Sw (Saab Aerospace), Gr (Hellenic Aerospace)) MALE (medium-altitude, long-endurance) UAV (2003, F, NL)

Production integration	*Aircraft*	Breguet Atlantique Maritime Patrol Aircraft (1958, F, G, I, NL), Dornier Transall (1959, F, G), MBB, Aérospatiale Adour turbo jet engine (1964, UK, F), Rolls Royce Turbomeca Tyne Mk 21-22 engine (1964, UK, F, G) Rolls Royce Snecma MTU M-45 engine (1962?, UK, F) Rolls Royce Snecma Jaguar (1965, UK, F), BAe Dassault Puma (1965) Aérospatiale Westland /Gazelle (1967) Aérospatiale Westland/Lynx (1967) helicopters (UK, F), Larzac military jet engine (1968, F, G) Snecma, Turbomeca, MTU Siemens Alpha Jet Trainer (1970) (F, G), Dassault Dornier RTM 322 helicopter motor (1983 (F, UK, G, I) Turbomeca, Rolls Royce, DASA Piaggio Tigre helicopter (1987, F, G), Aerospatiale DASA MTR 390 Tigre motor (1987, F, G, UK), NH 90 helicopter (1992, F, G, I, NL) Aster surveillance (1992?, F (Thomson-CSF) UK (GEC) U.S. (Westinghouse)) Euroflag-FLA Future Large Aircraft (1992, F (Aerospatiale), I, UK, Sp, G; these joined later in 1992 by P, B, Tu), ATF/A400M (2000, F, UK, G, Sp, B, Port.,Tu, Lux),
	Missiles:	Milan, Hot, Roland (all 1963, F, G), Aérospatiale MBB Martel (1963, F, UK), OTOMAT shipping missile (1963, F, I), Matra OTO Melara Kormoran (1964, F, G), MBB Thomson Aerospatiale Exocet (1970, F, UK) HAWK Improvement programme (1973, USA, F, G, I), AC3G (1976, F, UK, G) HOT-2 ATGW (1976, F (Aerospatiale) G (MBB)) Milan-2 ATGW (1976), F (Aerospatiale, G (MBB)) Kormoran 2 AShM (1981, F (Aerospatiale, Thomson) G (DASA)) VT-1 (1985, F, USA), Milas, (1987, F, I, joined later by UK) Matra, OTO Melara CL 289 (1987, F, G, C) Trigat (1988, F, UK, G), Aerospatiale, MBB, BAe Dynamics ASTER (1988, F, I), Eryx antitank missile (F, C) Polyphème (1989, F, G, I) Aerospatiale DASA HOT-3 ATGW (1990, F (Aerospatiale) G (MBB)) Milan-3 ATGW (1990, F (Aerospatiale) G (MBB)) Apache (1992, F (Matra Aérospatiale), UK (BAe Dynamics)), Scalp EG/Storm Shadow (1997) (F, UK, I); PAAMS (1998, F, UK, I); FSAF Famille de sol-air futurs (1998, F, I), NSM (1999, F, N), METEOR (2000, F, G, UK, Sw, Sp, I),
	Battle	None successful.

	tanks/armoured fighting vehicles	
	Vessels	Eridan, Mine Clearance (1975, F, B, NL), TRIPARTITE Minehunter (1975, F, B, NL), CMN Beliard Van der Giesse Horizon frigate (1992, F, I, (UK has withdrawn)), Scorpène submarine (1996?, F (DCN), Sp (Bazan)),
	Artillery	Cobra Counter battery radar (1986, F (Thomson), G (Siemens), UK Thorn-EMI), 1990 + USA (General Electric)), Canon 45 mm (1994, F, UK)
	Munitions	Munition Flèche (1979, F, G), ACED intelligent munition (1991, F, G), Thomson-Brandt, Diehl/Rheinmetall) Bonus intelligent munition (1991, F, Sw), CTA (1992)/CTAI Cased Telescopic Ammunition International (1995, F, UK)
	Space	Helios I observation satellite (1987, F, Sp, I), Aerospatiale, Matra, Alenia CASA Helios II observation satellite (1996, F (Aerospatiale), B, Sp, I, G (DASA)), Galileo geopositioning (1999, EU); Syracuse (1999, F, G), VEGA launcher, (1999, I, F)
	Radars	RASIT (year?) and RATAC artillery radar (1962) (F, G) LMT, Lorenz AMSAR airborn multirole solid state active array radar (1999, F/UK (GTAR Consortium), G (DASA))
	Communications Systems	Masurca Marine supersonique ruelle contre avions (?, F, US) NADGE NATO Air Defense Ground Environment (1953, NATO) RITA tactical communication systems (1972, F,B) Thomson-CSF RITA also sold to the US Army, (Thomson-CSF, BTE) Navstar radionavigation (1978, EU, NATO), ACSS Air command and control system (2000, NATO) MIDS LV Multifunction Information Distribution System – Low Volume (1990?, NATO standard, U.S. (lead), Sp, I, G, UK (Plessey), Swi, NL, F (Thomson))
	Miscellaneous	PARIS Sonar (F, NL, UK), GROUND MINE-LAYER (F, B, G), CL289 Drone (F, G, C), MINEHUNTING SONAR sold to US Navy (F, USA), MLRS Multiple Launch Rocket System (1979, F, G, UK, USA, I), "MLRS-EPG", Vought MLRS-TGW Warhead (F (Thomson), US (MM) UK (Thorn EMI) G (Diehl)) CFM 56 jet engine (1972?, primarily civil, F, USA), Snecma, General Electric Brevel/Erodrone reconnaissance drone (1990, F, G), Matra, DASA DoFB modular bridge (1992, F, G), MU 90 torpedo (1992, F, G) SLAT Sytème de lutte anti-torpilles (1998?, F, I) NGIFF New generation identification friend or foe (1998?. F, G)
	Failed or abandoned programs	"Standard tank" (1957, F, G, I), AFVG Anglo-French Variable Geometry aircraft (1964, F, UK), MATS "travaux concrets" (1970-73, F, G) Atlas missile, (1970, F, B), HLM Helicopter Launched Missile (1970, F, UK),

		MIFLA missile (1974, F, UK, G), AV90 main battle tank (1978, F, G), ASSM AShM, missiles (F (Aerospatiale) UK, NL, No, G, US) AMRAAM + ASRAAM production of European robot (1980, USA, UK, G, F), Q-5K fighter (1981, F , China) MFS2000/SAM 90 SAM missile (1981, F (AEG) G (MBB, Siemens)) SPRSOM AGM missile (1981, F (Aerospatiale, Thomson) G (Dornier, Diehl)) NFR 90 NATO Replacement Frigate (1984, C, F (DCN), NL, G, I, Sp, UK, USA), MOBIDIC (1984, F, G), Aerospatiale Thomson, Dornier Diehl ANS Anti Navire Supersonique missile (1984, F, G), MSOW and LRSOM/SRSOM missiles MoU (F (Aerospatiale), I, C, Sp, UK, USA, G), Eurofighter (1984, F, UK, G, I, Sp) France withdrew 1985, MACPED antitank mine (1986, F, G, UK), ANL missile (1986, F, G), Aérospatiale DASA ASLP Air-Sol Longue Portée (nuclear) (1987, F, UK), RM5 Roland Mach 5 (1988, F,G), NIS FF system (1990?, US (Raytheon) F (Thomson) UK (GEC) G (Siemens) I (Bendix?) LAMS SAM (1990, F/I (Eurosam) UK (BAe, GEC) Sp (Ibermisil)) Novi Avion fighter, strategic alliance (1990, F (Dassault) Yug (Soko)) ANF Anti Navire Futur missile (1994, F, No), APGM Autonomous Precision Guided Munition (1990, C, F (Matra), G (Dornier), I (OTO Melara), NL, US (General Dynamics), Tu, Sp), RM-5 SAM missile (1990, F (Matra) G (Euromissile)) THAAD SAM missile (1990, F (Thomson) U.S. (LTV)) VBCI/MRAV/GTK Véhicule blindé de combat d'infanterie (1997, F, G, UK) France withdrew in 1999 Trimilsatcom communication satellite (1997, F, G, UK),

Table: *Integration of the French defence industry*.[219]

Nations: G stands for Germany, whether it was West Germany or the united Germany. C is for Canada.

[219] Sources: Kolodziej (1987), Heisbourg and Creasey (1988), Serfati (1992), U.S. Congress (1992), Matthews (1992), Wilén (1992), Brzoska and Lock (1992), Sköns (1993), Hébert (1995, in Latham/Hooper), Ministerio de Defensa (1996), Dussauge/Cornu (1998), Hébert (1999), Markusen and Costigan (1999), Hébert (2000, 2001, 2002, 2003), EADS (2003), Bée (2003), Ellner (2003), Hartley (2003), James (2003), Meunier (2003), Mounier-Kuhn (2003), Pommerin (2003), Masson (2003), www.ixarm.com (2004), Sipri yearbooks and also numerous web searches.