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French Military budgets and arms industry (1958-1989)

Jacques Fontanel

In French arms industry

Université des Sciences Sociales de Grenoble

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Summary : France has a powerful arms industry, highly competitive on international markets for political reasons, in spite of sometimes archaic management and a policy of systematic protectionism for defence strategy reasons. Outlays are concentrated in a few industries and enterprises. It is difficult to determine the costs and advantages of that national industry, but for the French governments the independence of arms equipment supplies is essential, whatever the economic and industrial costs. It is mainly the case for nuclear weapons. It is interesting to indicate the size and composition of the military budget, the structure of military procurement by sectors and type of firms, The listing of the largest defence contractors, and the development of the "loi de programmation militaire".

La France dispose d'une industrie de l'armement puissante, très compétitive sur les marchés internationaux pour des raisons politiques, malgré une gestion parfois archaïque et une politique de protectionnisme systématique pour des raisons de stratégie de défense. Les dépenses sont concentrées dans quelques industries et entreprises. Il est difficile de déterminer les coûts et les avantages de cette industrie nationale, mais pour les gouvernements français, l'indépendance des approvisionnements en matériel d'armement est essentielle, quels qu'en soient les coûts économiques et industriels. C'est principalement le cas pour les armes nucléaires. Il est intéressant d'indiquer la taille et la composition du budget militaire, la structure des achats militaires par secteurs et par type d'entreprises, la liste des plus grands contractants de la défense, et le contenu de la "loi de programmation militaire".

Military expenditure, arms industry, armament companies, France, France defence

Dépenses militaires, industries militaires, firmes d'armement, France, défense de la France

France has a powerful arms industry, generally considered to be highly competitive on international markets, in spite of occasionally archaic management and a policy of systematic protectionism. There are no studies on the opportunity costs (which are determined by the alternative public or private programmes which are not produced because of military demands on the State budget and on the real resources of the economy) of France's military industry. Outlays are often concentrated in a few industries and in these economic sectors they account for a very high fraction of industry output. It is thus very difficult to know exactly the costs and the advantages of that industry. In the present case, it seems that the French government considers that the independence of arms equipments supplies is essential, whatever the economic and industrial results may be. This is certainly the case for nuclear weapons, which represent more than 30 per cent of the total annual amount of military equipment in France.

1.1. The size and composition of the military budget

French military expenditures has three main characteristics : the initial military budget which is becoming gradually more labour-saving, a very strong nuclear industry connected with the deterrence option and a defense industry providing almost all the arms procurement for national military needs.

I.1.1. Initial French military budgets

France's military budget is both a cost which the nation must bear and an indicator of the country's defense effort. France's military expenditure is generally estimated using the budget of the Ministère de la Défense. There is however defence expenditure that does not come under this ministry's budget but, for example, under the Prime Minister department or "Ministère de l'Intérieur". France's total military expenditure for 1986, according to the official sources, is as shown in Table 1.

Table 2 - 1986 France's defense expenditure (including pensions) in billion francs

Expenditures	1986
1. Total operating expenditure	122.0
<i>of which</i>	
Budget of Ministère de la Défense	119.6
Defense (other budgets)	2.3
Civil defense program	0.1
2. Total investment expenditure	77.0
<i>of which</i>	
Budget of Ministère de la Défense	75.7
Defense (other budgets)	1.3
3. Total military expenditure	199.0

The traditional sources of quantitative information on military expenditure (SIPRI, USACDA, IISS, NATO) use quite different definitions of military expenditure, but for France it is not too difficult to understand the relations between the data.¹

The percentage of GDP devoted to military expenditure, which had fallen regularly from the end of the Algerian War, increased in the years 1977-1982 but the share of the military budget in the State budget has declined continuously.

¹ FONTANEL Jacques : "Defence costs and budgeting in France" in "Franco-British Defence Cooperation. A new entente cordiale" edited by Yves BOYER, Pierre LELLOUCHE and John ROPER, The Royal Institute of International Affairs and l'Institut Français des Relations Internationales, Routledge, London, 1989. p. 106.

Table 3 - French Initial Defense Budget and selected components as a percentage of Total Governmental Budget and Gross National Product

Years	Initial military budget/ Initial State budget	Initial military budget/ GDP
1958	27.0	6.0
1959	28.2	5.90
1960	28.5	5.58
1961	26.8	5.20
1962	24.7	4.79
1963	23.9	4.59
1964	23.0	4.41
1965	22.5	4.30
1966	21.8	4.21
1967	20.7	4.17
1968	20.1	4.07
1969	17.8	3.76
1970	17.6	3.47
1971	17.9	3.31
1972	17.7	3.17
1973	17.7	3.12
1974	17.4	2.99
1975	16.9	3.02
1976	17.1	2.98
1977	17.4	3.10
1978	16.9	3.16
1979	16.8	3.16
1980	16.9	3.20
1981	16.9	3.36
1982	15.6	3.46
1983	15.1	3.42
1984	15.2	3.39
1985	15.1	3.32
1986	15.4	3.24
1987	16.1	3.28
1988	16.1	3.17
1989	15.8	3.15

Table 4 - French military expenditures 1958-1989 in billion francs

Years	Initial Military Budget (IMB)	Definitive Military Budget (DMB)	IMB/GDPt	DMB/GDPt
1959	15.76	16.27	6.6	6.81
1960	16.53	16.88	6.2	6.34
1961	16.82	17.42	5.8	6.00
1962	17.30	17.84	5.35	5.62
1963	18.55	19.48	5.13	5.39
1964	19.83	19.71	4.93	4.91
1965	20.82	20.85	4.8	4.81
1966	22.03	22.03	4.69	4.69
1967	23.55	23.77	4.64	4.69
1968	24.99	25.49	4.57	4.66
1969	26.36	26.09	4.22	4.17
1970	27.19	27.52	3.90	3.94
1971	28.86	29.23	3.71	3.76
1972	31.23	31.68	3.56	3.62
1973	34.80	35.18	3.50	3.54
1974	38.22	39.53	3.37	3.49
1975	43.79	46.15	3.42	3.61
1976	50.00	52.30	3.39	3.55
1977	58.41	58.64	3.59	3.60
1978	67.65	68.31	3.67	3.71
1979	77.11	77.70	3.68	3.71
1980	88.60	90.15	3.75	3.82
1981	104.44	104.95	3.95	3.97
1982	122.86	119.68	4.01	3.91
1983	133.22		3.93	
1984	142.10		3.85	
1985	150.20		3.85	
1986	158.35		3.78	
1987	169.20		3.83	
1988	174.28		3.71	
1989	182.36		3.69	

Table 5 - French Defense budget in 1989 billion francs

Years	Military budget	Capital expenditure	Operational costs
1975	123.84	53.89	69.95
1976	129.02	54.06	74.96
1977	138.65	56.86	81.79
1978	150.26	63.25	87.01
1979	152.68	66.02	86.66
1980	152.38	68.53	83.85
1981	166.46	76.00	90.46
1982	175.05	80.23	94.82
1983	175.30	80.61	94.69
1984	172.08	80.65	91.43
1985	171.25	83.50	88.75
1986	172.00	82.21	89.79
1987	177.82	90.25	87.71
1988	178.92	93.27	85.65
1989	182.36	98.00	84.36

There were 664,000 conscripts (64 % of the military personnel) in 1966 and only 293,000 in 1970. The economic argument in favour of the cheapness of conscription is not beyond debate. For some analysts, the effective cost of conscription could be between 3 to 4 times its budgetary evaluation¹. The problem of the "professionalization" of military personnel is becoming a question for discussion in France, and former Président Valéry Giscard d'Estaing argues for the end of conscription. Here, it is possible to recall the democratic interest in conscription as a solution to an excess or potential excess of power or to insufficient relations between civilian people and military personnel on the one hand, and the low efficiency and relatively high opportunity costs (although low-paid conscripts can be a substitute for expensive civilian employees) of conscripts.²

¹ GALITZINE Georges : "Les implications économiques de la conscription et de l'armée de métier". Thèse doctorat, Université Paris IX, Dauphine., Op. Cit. by SCHMIDT Christian, PILANDON Louis, ABEN Jacques "Defence spending in France : The price of independence". Paris, 1989.

² FONTANEL Jacques : "Defence costs and budgeting in France" in "Franco-British Defence Co-operation. A new entente cordiale" edited by Yves Boyer, Pierre Lellouche, John Roper, The Royal Institute of International Affairs, London, L'Institut Français des Relations Internationales, Paris, Routledge, Biling and Sons Ltd, Worcester, London, 1988.

There has been a reduction in Defense personnel over 30 years and the possible reduction of conscription concerns mainly the Army.

Table 6 - Military and civilian personnels in 1989

Forces	Professionals	Conscripts	Civilians	Total
Joint Section	11308	11308	78954	93331
Army	109504	182976	39219	331699
Air force	58105	35938	5570	99613
Navy	46293	19241	7385	72919
Gendarmerie	77170	10092	967	88229

The allocations of the French military budget is very stable, although the definitions change often for budgetary reasons.

Table 7 - Allocations of French military budget (in %)

Forces	1970-1975	1976-1982	1983-1986	1987-1991
Joint section	32.21	30.88	27.83	28.01
Air Force	24.77	24.77	25.08	24.54
Army	21.96	23.45	24.27	23.66
Navy	19.81	19.22	21.00	21.99
Gendarmerie	1.24	2.17	1.82	1.79

After a slight decline at the beginning of 70's, Nuclear forces represented between 31 to 34 per cent of the total military equipment budget, with a significant increase recently and in the coming years.

Table 8 - Relative shares of Nuclear, Conventional and Spatial Forces in French military equipment.

Forces	1970-1975	1976-1982	1983-1986	1987-1991
Nuclear	35.57	31.64	32.59	32.00
Conventional	64.43	68.36	67.41	65.98
Spatial	-	-	2.02	

L1.2. French nuclear industry

The Commissariat à l'Energie Atomique (CEA) was created on 18 October 1945 by Général de Gaulle and it was presented at that time as an indispensable tool for French nuclear and economic development. No nuclear military programme was developed till december 1954, when Pierre Mendès France expressed his opinion in favour of a secret research project on nuclear weapons and atomic submarines. Major financial subsidies were then deducted from the Defense budget and transferred anonymously to the CEA without specifying their use. In the French case, civil nuclear R&D was very useful for nuclear weapons, not the opposite.

In 1986, the resources devoted to military and civilian nuclear were almost equal, although it is difficult to quantify them very precisely, because of the inseparability of some civilian and military uses. There is an osmosis between military and civilian research. The plutonium requirements for new French nuclear weapons programmes will not be met by the output of military reactors alone. Superphénix is therefore important, indeed essential, to support the technical base for France's "force de frappe". Thus civil nuclear energy is still important for the military nuclear sector. Since 1962, military nuclear has probably exerted some positive action on civilian nuclear, in the fields of both fundamental and applied research (uranium supplies and fuel fabrication, enrichment, reprocessing, reactors, optimization of the PWR channel). From 1980 to 1988, greater importance was given to nuclear forces, with special support for tactical nuclear forces. In 1989, nuclear and space will absorb 34.2 per cent of payment allocations for defense equipment.

Table 9 - The cost of the "Force de frappe" (billion current francs)¹

Years	"Force de frappe" Costs(FPC) (billion current francs)	FPC/Military budget %	FPC/GDPt %
de Gaulle			
1960	0.54	3.25	0.21
1961	0.91	5.22	0.31
1962	1.25	6.98	0.38
1963	2.43	12.48	0.67
1964	3.70	18.77	0.92
1965	5.04	24.16	1.17
1966	5.57	25.31	1.19
1967	6.28	26.41	1.23
1968	6.27	24.59	1.15
1969	5.37	20.57	0.86
Pompidou			
1970	5.09	18.48	0.73
1971	5.08	17.37	0.65
1972	5.09	16.05	0.58
1973	5.52	15.70	0.55
1974	6.22	15.74	0.55
Giscard d'Estaing			
1975	6.41	13.88	0.50
1976	7.02	13.42	0.48
1977	7.96	13.58	0.48
1978	9.27	13.58	0.50
1979	10.86	14.08	0.51
1980	12.42	14.02	0.52
1981	14.86	14.20	0.54
Mitterrand			
1982	17.75	14.38	0.58
1983	19.30	14.54	0.56
1984	21.74	15.30	0.59
1985	23.39	15.57	0.60
1986	25.27	15.95	0.60
1987	27.80	16.43	0.63
1988	30.55	17.52	0.65
1989	31.53	17.29	0.64

¹ This table is partly developed in : Jacques PERCEBOIS : "Economie de l'effort d'armement" in "L'aventure de la bombe. De Gaulle et la dissuasion nucléaire 1958-1969". Université de Franche-Comté. Institut Charles de Gaulle, Collection Espoir, Plon, Paris, 1985.

Table 10 - Capital expenditure devoted to French nuclear forces in billion of current francs

Years	Strategic nuclear forces	Tactical nuclear forces	Total
1980	11850	730	12580
1981	13730	870	14600
1982	16190	740	16830
1983	17830	1470	19300
1984	19300	2440	21740
1985	20214	3172	23386
1986	20967	4301	25268
1987	21759	6039	27798
1988	23651	6895	30546
1989	24785	6743	31528

Table 11 - Capital expenditure devoted to French nuclear forces in millions of constant francs (1981)

Years	Nuclear Forces	Total equipment	% nuclear forces
1981	14.3	47.7	29.97
1982	13.9	50.2	27.69
1983	15.7	49.7	31.59
1984	16.6	50.7	32.74
1985	16.9	51.7	32.68
1986	17.6	52.6	33.46
1987	18.7	57.9	32.30
1988 (e)	20.0	59.5	33.58

Table 12 - Part of the French national budget devoted to CEA (in percentage)

Subventions	1980	1982	1984	1986
Civilian subvention/ civilian budget	0.83	0.74	0.76	0.8
Military subvention/ military budget	5.64	5.37	5.02	4.94
Total subvention/ Total budget	1.58	1.41	1.4	1.38

Table 13 - French nuclear expenditures in 1986 (Rapport annuel CEA 1986).

Expenditures	per cent of total
Protection and nuclear safety	6.0
Nuclear programmes	20.9
Common interest programmes	3.1
Innovation and industrial valorization	7.2
Basic research	13.9
Military applications	48.9

The French civilian nuclear industry is in crisis, as is the world civil nuclear industry. No orders for exports (except a contract signed in 1987 with China concerning the construction of the Daya-Bay power station), excess capacity, social and political opposition are drastically reducing the potential of this industry, which was particularly representative of high technology in modern French growth. The crisis is perhaps a direct consequence of new developments of military nuclear. If civilian nuclear is, temporarily or not, condemned because of proliferation and prohibition of material and technology exports, military nuclear is clearly accepted

by public opinion, although without any possibility of verifying what is exactly the right sum to spend on developing a deterrence strategy. Although the French nuclear industry is very competitive and is able to satisfy national demand, the military nature of nuclear reduces the opportunity of important spin-offs from nuclear R&D. Thus the civil value of nuclear R&D is decreased, and perhaps, the new French effort on nuclear weapons is an industrial policy in response to the recession of the civil nuclear sector. The nuclear lobby is trying to obtain an increase in military nuclear public allocations in order to compensate the decline in civil nuclear orders. At the Commissariat à l'Energie Atomique, there is a Direction des Applications Militaires, which in 1989, will use about 50 % of the total credits and employ 7,000 people (8,200 in 1968) including 2000 engineers.

Nuclear weapons are not very expensive. If you compare nuclear expenditures with the strategic importance of this weapon system in contemporary defense thinking, this conclusion seems to be undeniable.

Table 14 - World Nuclear Military Outlays Forecasts ¹(billion dollars) in 1984

States	Data sources basis	
	Sources	
	SIPRI	USACDA
France	4.8	4.7
United Kingdom	0.5	0.8
United States	39.0	38.2
USSR	28.0	51.6
China	5.7	5.2
Others	2.0	2.0
Total	80.0	102.5

¹Fontanel & Smith : "Le nucléaire, une arme à moindre coût". Le Monde Diplomatique, Août 1987.

Table 15 - French strategic, tactic, spatial and transmission forces 1988 and 1989 (million current francs)

Programmes		Programme autorizations		Payments Credits		Total Costs
	Years	1988	1989	1988	1989	
Strategic forces						
M4		3120	4609	3355	3860	59000
M5		271	65	33	69	53100
SNLE (M4)		1610	720	2363	1638	14900
SNLE MG		4817	8150	3386	4921	79800
S4		2150	100	558	415	26000
Tactical forces						
ASMP Missiles		242	227	1101	794	6800
Mirage 2000 N		1645	2165	2997	2960	32000
Spatial programmes						
Syracuse I		96	92	250	92	2173
Syracuse II		1752	2183	604	1105	8585
Helios		624	998	324	499	6820
Transmissions programme						
Hermes		199	247	222	198	5339

Missiles M4 on nuclear submarines Inflexible and Tonnant (Submarine-launched ballistic missile)

Missile M5 for new nuclear submarines (SLBM)

SNLE (M4) rebuilding of nuclear submarines equipped with M4 (Nuclear-powered ballistic submarine)

SNLE NG with the new generation nuclear submarines Le Triomphant which will be in active service on 1994 (SSBN)

S4 System is a ground nuclear missiles system with hazardous deployment.

Missile ASMP for Mirage 2000 N and Super Etendard

Hades system with the equipment and the system of launch (ballistic missile defense)

Syracuse I and II for transmission of information

Hélios, in cooperation with Italy, and Spain is an optical observation military satellite.

Table 16 - Force océanique stratégique (Strategic sea forces)

Name	Beginning of construction	Active service	Present Service
Le Redoutable	1963	December 1971	Yes (M20)
Le Terrible	1966	January 1973	1990 (M20)
Le Foudroyant	1968	June 1974	Yes (M20) Rebuilding 1990-1993
L'Indomptable	1970	December 1976	1989 (M4)
Le Tonnant	1972	April 1980	Yes (M4)
L'Inflexible	1978	Beginning 1985	Yes (M4)
Le Triomphant	1987	1994-2007	M5

The main programmes for nuclear deterrence are :

- the re-building of submarine-launched ballistic missiles (SNLE in French) at a cost of 37 billion francs for the missiles and 14.5 billion francs for the modernization of the submarines themselves,
- the SNLE-NG programme with a new technological challenge of six nuclear submarines of 80 billion francs till 2007,
- the future M5 missiles launched in 1989 and to be operational in 1999 for 73 billion francs,
- The Hadès programme, which will replace the Pluton systems in 1992, at a cost of 14 billion francs including 7.7 billion francs between 1987 and 1991,
- The Hélios and Syracuse programmes, with respectively 2.6 and 3.9 billion francs of expenditure.

Under the Fifth Republic, France single-mindedly pursued a policy of national independence by developing nuclear forces, which became the main symbol of national unity. Its defense is based on the notion of proportional deterrence, i.e, the French nuclear forces are expected to inflict greater damage on an adversary than the expected gain from attacking French vital interests. French governments have jealously guarded French independence and refuse to identify if, when and how French forces will be available to the alliance in response to a Soviet aggression. During the disarmament process, France has pursued a distinct line of action, modernizing its tactical nuclear forces and creating a Rapid Action Force in order to strengthen France's deterrent manoeuvrability. It rejects any limitations of its forces which would weaken its unilateral capacity to preserve the

effectiveness of its deterrence policy. For François Mitterrand, "France cannot accept that a part of our nuclear armament is negotiable, because if that were so we would fall into a level at which our deterrent capacity would be destroyed... France's international position refuses prohibitions. We refuse to accept the prohibition of others"¹. France could accept substantial decreases in Soviet and United States offensive striking power, if no separate Eurostrategic balance is defined apart from the global balance, if conventional balances in Europe favouring the Soviet Union are rectified and if the superpowers do not agree to a reduction in the development of defensive capabilities. At the present time, all major parties in France are opposed to drastic cuts in the French military effort and are suspicious of being drawn into talks which would limit French strike forces and modernization plans. With the new "Programmation Militaire", the nuclear warheads of France will be multiplied four or five times, with the objective for the 21st century of having the capacity to destroy nearly half the human beings in the world.

1.2.3. The main armament sectors and regions

Arms products are made by an immense and diversified industrial structure, with enterprises from various economic sectors. Armament is not at all an activity branch as identified and conceptualized by macroeconomic analysis and thus the national Accounting concept "Naval Shipyards, aeronautics and armament" (Constructions navales et aéronautiques, Armement), which includes civil and military materials and armament, seems to involve only small weapons from the Arsenals.

¹ Ministère de la Défense : "La politique de défense de la France", Mai 1982, page 8.

Table 17 - French arms industrial sectors in 1986.

PARTNERS	Percentage sectors/ Armament Turnover	Percentage armament/ Sector Turnover
DGA (armament)	18	100
CEA (Nuclear)	6	50
Aerospatial Industry	34	69
Professionnal Electronic industry	23	55
Other Electronic Industry	4	6
Naval shipyards	10	50
Others	5	-
Total	100	6

Table 18 - French arms industrial sectors in 1988.

PARTNERS	Percentage sectors/ Armament Turnover	Percentage armament/ Sector Turnover
DGA (armament)	17.5	100
CEA (Nuclear)	5.9	50
Aerospatial Industry	33.8	69
Professionnal Electronic industry	23.2	57
Other Electronic Industry	4.1	6
Naval shipyards	9.9	50
Others	5	-

Table 19 - Importance of armaments by industrial sectors in 1986 (SIRPA, Service d'information des armées).

	% total arms spending	% armament of turnover
Délégation Générale Armement	16	100
Commissariat Energie Atomique	15	50
Aircraft industry	35	69
Electronic	25	18
Mechanic and metallurgy	8	5

Table 20 - Distribution of armament orders in 1987 (in percentage)

Sectors	DGA	Private and public enterprises	CEA
Total	13	74	13
Electronics	14	37	
Aerospatial	2	31	
Land Armament	39	18	
Shipyards	37	6	
Miscellaneous	8	8	

The industry of armament is very important for the industrialization and employment in some regions.

Table 21 - Regional distribution of French armements productions in 1986.

Regions	Percentage
Aquitaine	14.9
Provence- Côte d'Azur	14.2
Bretagne	12.5
Paris- Ile de France	11.5
Région de Tours	9.9
Midi-Pyrénées	9.5
Limousin	9.1
Normandie	7.8
Poitou-Charentes	7.5
Auvergne	6.1
Pays de Loire	5.4
Rhône-Alpes	3.3
Bourgogne	3.2
Région de Rouen	3.1
Picardie	1.6
Languedoc	1.6
Alsace	1.5
Champagne	1.2
Corse	1.0
Franche-Comté	0.7
Nord	0.6
Lorraine	0.5

The direct economic impact of arms production is very important for the French economy.

1.2. Size and structure of military procurement, by sectors and type of firms

It is interesting to examine the economic importance of French armament industries and the main enterprises involved in these industries. The French arms industry represents 6 % of industrial employments, within more than 4000 enterprises.

1.2.1. Economic importance of the French armament industries

Military equipment is a very large economic aggregate in France, in comparison with other developed countries. Since 1980, there have been deep changes in the structures of French military spending. Perhaps France has become the first major State to spend more money on its military equipment than on its operating costs.

Table 22 - Initial French military budgets 1980-1989 (in current billion francs)

Year	Capital	Operating costs	Military budget
1980	39.84	48.76	88.60
1981	47.68	56.76	104.44
1982	56.30	66.55	122.85
1983	60.98	72.29	133.27
1984	66.60	75.50	142.10
1985	71.70	78.50	150.20
1986	75.68	82.67	158.35
1987	85.81	83.39	169.20
1988	90.85	83.43	174.28
1989	98.00	84.36	182.36

After the Algerian war, France gave priority to capital expenditure, mainly in order to develop its nuclear deterrent. From 1978 onwards, the modernization of the army's equipment became a strong priority in spite of the no substantial delays that were being experienced in terms of the objectives of military planning.

Table 23 - French military equipment (1960-1986) in 1985 billion francs

Years	Initial structure	1985 Structure
1960	32.4	36.4
1961	30.7	34.7
1962	28.8	32.8
1963	38.1	41.8
1964	42.8	46.4
1965	47.4	51.0
1966	50.2	53.7
1967	52.8	56.4
1969	50.3	51.9
1970	48.8	50.4
1971	47.8	49.4
1972	48.4	50.0
1973	51.3	52.7
1974	50.0	50.7
1975	47.4	48.1
1976	47.4	48.1
1977	50.0	50.8
1978	54.2	55.2
1979	57.5	58.6
1980	61.6	62.8
1981	66.3	66.3
1982	66.6	66.6
1983	69.0	69.0
1984	70.5	70.5
1985	71.7	71.7
1986	73.0	73.0
1987	80.4	80.4
1988(e)	82.6	82.6
1989(e)	86.1	86.1

The influence of the military budget on French industries is very important. The largest part of military R&D allocations, which roughly represent 30 per cent of national public R&D, are used by industrial companies. According to the National Accounting System, about 67 % of the military purchases from French economy are located in the industrial sector. An increase in expenditure may reflect only an increase in the State's financial effort and not a substantial improvement in the country's nuclear capability.

Conversely, one can easily imagine that priorities may be met while holding steady or reducing military expenditure, if the productivity of the arms industries improves and results in lower costs. The pattern of resource allocation is quite stable. This stability has sustained the group of defense contractors, commonly identified as members of the "military-industrial complex". The same group of firms are maintained in leading positions in the defense market, because of their ability to respond to new technology and military requirements. For ten years, capital expenditures have been growing faster than military personnel costs. The French army is becoming more and more capital-intensive and a wider range of objectives have to be set for conscription traditionally devoted to the collective feeling for national defense and the reduction of soldier costs, by reducing the costs of electronic, high technology, scientific or management personnel needed for the effectiveness of an organization with high level equipment and relatively unskilled soldiers. Arms enterprises are really in favour of conscription which reduces personnel costs, permits the increase of military equipment orders and facilitates the introduction and use of complex technologies.

Table 24 - Capital expenditure by major French military expenditure categories in billion constant francs (1981 value)

Expenditures	1981	1983	1985	1986
Nuclear forces	14,3	15,7	16,9	17,6
Major programmes	11,8	9,1	9,9	11,1
Basic Research	1,8	1,8	2,4	2,4
Development	3,5	3,1	3,8	3,9
Other production	5,9	9,6	8,1	7,2
Munitions	3,1	2,9	2,7	2,6
Maintenance Equipment	2,8	3,2	3,4	3,5
Personnel Maintenance	1,3	1,2	1,2	1,1
Infrastructure	3,2	3,1	3,3	3,2

Table 25 - French capital expenditure by major categories in current billion francs

Forces	1987	1988	1989
Nuclear forces	27.9	30.5	31.5
Space	0.8	1.4	2.1
Conventional Equipment	26.5	26.5	28.2
Conventional Studies and Developments	11.0	12.9	14.0
Munitions	6.5	6.6	7.4
Maintenance Equipments	5.6	5.7	6.7
Personnel Maintenance	1.9	2.0	2.1
Infrastructure	5.8	5.2	6.2

Table 26 - French capital expenditure by major categories in percentage

Forces	1988	1989
Nuclear forces	33.6	32.2
Space	1.5	2.0
Conventional Equipment	29.2	28.8
Conventional Studies and Developments	14.3	14.3
Munitions	7.3	7.5
Maintenance Equipments	6.2	6.8
Personnel Maintenance	2.2	2.1
Infrastructure	5.7	6.3

Table 27 - French capital expenditure by major forces categories in percentage

Forces	1988	1989
Common section	26.01	26.75
Air	22.14	24.14
Land	20.96	22.69
Navy	20.05	22.07
Gendarmerie	1.69	1.85

From 1980 to 1989, greater importance has been consistently given to nuclear forces, especially by favouring the tactical nuclear forces. The army has taken a large and constant share of total military expenditure, which is surprising given the major new technological challenges that France will have to face. On the other hand, the navy regularly has increased its share. A general form of agreement has been established to provide 26.5 per cent of expenditure to the army, a little over 21 per cent to the air force, between 18 and 19 per cent to the navy and a little over 9 per cent for the gendarmerie, the rest being devoted to the joint section.

The defense sector is characterized by the fact that launching the development of a new type of equipment often constitutes a very important decision which has serious consequences from an economic, financial and industrial standpoint. The institutions involved are the Délégation Générale pour l'Armement and the other public and private enterprises.

Table 28 - Some conventional programmes (in million francs) for 1989

Programmes	Payment allocations	Programme Authorizations
Small frigates	139	546
ASM frigates	236	40
Anti-Air warfare frigates	546	270
Nuclear submarines	880	792
Nuclear Aircraft Carrier	1072	1790
Oceanic anti-Mine Vessels	234	306
Atlantic 2	1915	2218
Murène Torpedo	434	289
SAAM	360	434
Mirage 2000DA	3671	3029
Mirage 2000 N'	250	2872
AWACS	930	
Leclerc tank	1118	1659
V.A.B.	1020	849
Tactical Vehicles	1174	1342
Motorized floating bridge	303	310
3th Generation anti-tanks	360	790
Multiple rockets-launcher	263	545
Anti-battery radar	35	78
155 Cannon	318	318
French-german helicopter	795	990
Orchidée	130	56

1.2.2. Délégation Générale pour l'Armement

At the top of the French arms industry is the DGA (General Direction for Armament), created in 1961, which is a technical service within the Ministry of Defense with the mission of coordinating the manufacturing, research and development centers concerned with arms design, testing and production. The General Staffs indicate the main military characteristics of the equipment, the number of units to produce, the time scales required. DGA defines technical characteristics, implementation procedures, negotiation of prices with enterprises and control of production factories. The operational responsibility of General Staffs is of a different nature to the responsibility of DGA, which is technical and industrial. The

functions of direction and supervision occupy to 25,000 people. Since 1988, there has been a "Conseil général de l'armement" which advises the Ministry of Defense on the question of scientific progress, scientific and engineers trainings and other armaments issues. The Délégué général pour l'armement, with the support of Service central des affaires industrielles which both makes proposals to him and controls the execution of decisions, is responsible for armaments industrial policy.

a) Organization

DGA has a two fields of action :

- First, it is an interface between the armed forces and the arms industry. It oversees the arms industry. The relations between managers of the arms industry, DGA personnel and military staff are very close, because they are largely composed of military engineers, with the same training and education, and the same opportunity of working for one of the three organizations.

- Second, it is heavily engaged in arms production, with the direction of the arsenal and shipbuilding complex, responsibility for the direction of the military part of output in cooperation with firms producing civilian and military goods and the control of enterprises which were nationalized in 1981.

The Délégation Générale pour l'Armement (DGA) constitutes one of the main budgetary items of the Section Commune (Common Section), but the allocations are stable, from 25.3 billion francs (with 22.25 billion francs for capital expenditures) in 1988 to 25.9 billion francs (with 22.78 billion francs of capital expenditures) in 1989.

La Délégation Générale de l'Armement (DGA) has the responsibility for "Maîtrise d'ouvrage" which involves determining the main specifications of weapons. It is mainly a partner of the complex organization used to manage the various units of arms systems and it becomes, by contract with Ministry of Defense, leader of the product (Maître d'oeuvre) for the industrial management of the system. The "Service Industriel de l'Armement" (Armament Industrial Service) from the DGA works with 3,000 enterprises and more than 10,000 enterprises are concerned directly in weapons products.

Table 29 - Délégation Générale pour l'Armement (Administrative organization)

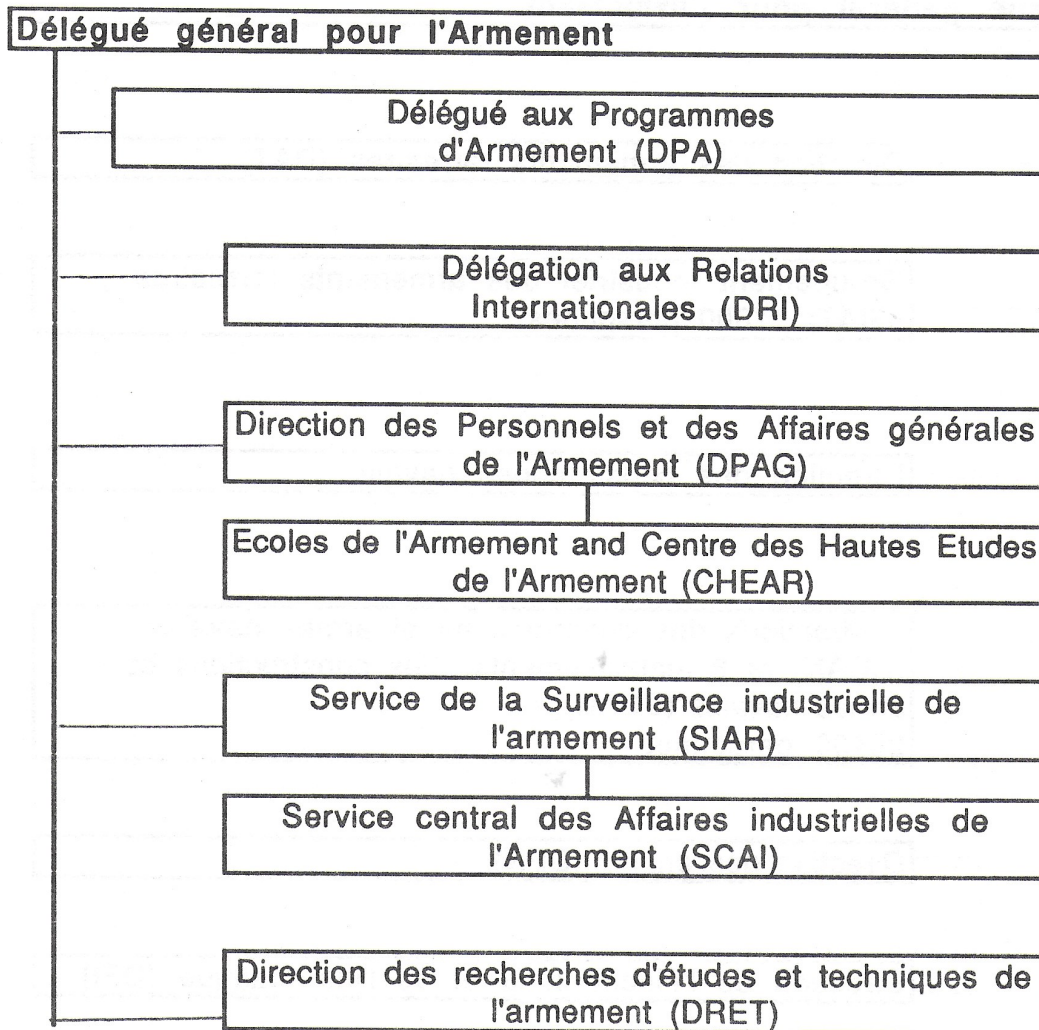
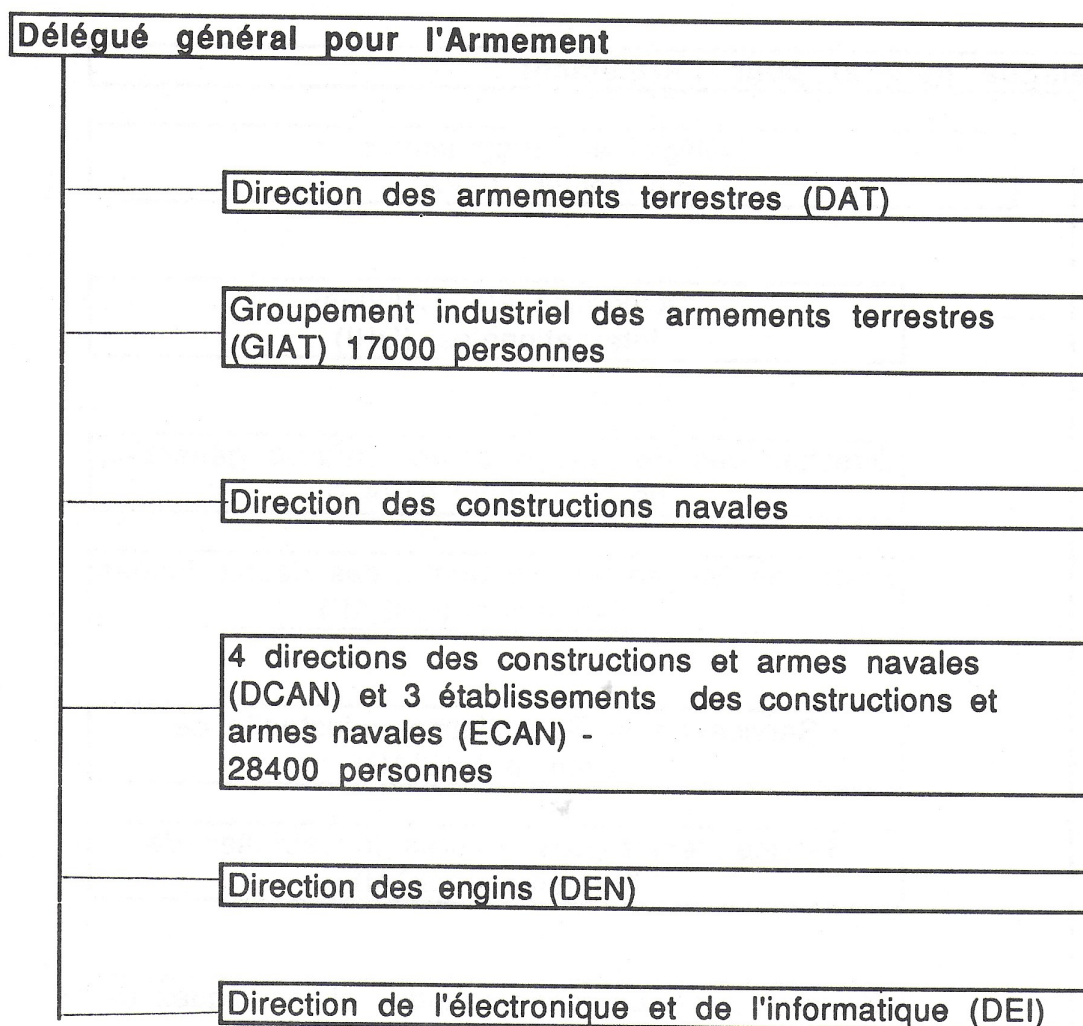


Table - Délégation Générale pour l'Armement (Industrial tasks)¹



¹SIRPA, Ministère de la Défense, Janvier 1988.

The industrial directorates (directions) have wide management autonomy and they have their own objectives. DGA has the responsibility for general coherence.

Table 30 - Types of employments at the DGA in 1988 and 1989

Type	Budgetary jobs in 1988	Budgetary jobs in 1989
Civilian holders	13241	12908
Civilian non holders	5689	5689
Military personnel on budget	4389	3161
Military budget on commerce account	2047	2038
Workmen	46292	44173
Total	72282	69501

The role of DGA is different according to the industrial sector. For the aeronautic and space sectors its main role is to be an intermediary between Air General Staff and the enterprises. For the land and naval sectors, it has a larger responsibility for production itself. The implementation of an armament contract is a very long process, which begins with the product concept and continues to mass production. The programme notion takes the place of the market. DGA, by the attribution of research contracts and "maîtrise d'oeuvre", is able to improve technological specialization and, hopefully, restructuring. It can control and support exports, giving the enterprises useful orders in order to ensure financial equilibrium. It is a main actor in the arms production system. DGA is responsible for the Arsenal and shipbuilding complex. It has centres throughout France, which are not placed in the northeast and northwest, because of repeated invasions during one century.

b) The Groupement Industriel des Armements

Terrestres

GIAT is the largest supplier of the Army. It conceives, studies and produces about 200 arms or arms systems and the branches at Bourges and Versailles/Satory are specialized in R&D. For the

G.I.A.T., with 16000 persons employed and ten industrial plants (Bourges, Le Mans, Roanne, Rennes, Saint-Etienne, Satory, Salbris, Tarbes, Toulouse and Tulle), its economic capability is threatened. It has no autonomy, no financial and legal personality. Its manpower is decided by the "Loi de Finance" and wages are not included in the normal management of the enterprises, but are decided by the rules governing the civil service.

Table 31 - Main branches of GIAT and their activities

Establishments	Productions
AMX-APX Satory	R&D, tanks, armoured vehicles
EFAB Bourges	R&D pyrotechnics and major calibre weapons
ATS Tarbes	Pyrotechnics, shells, armoured equipments
ARE Roanne	Armoured frames, assembling and re-building.
MAS Saint-Etienne	Light weapons, detection and protection equipments, NBC-rockets and ammunitions
MAT Tulle	Automatic weapons medium calibre
ATE Toulouse	Small and medium calibre, electronic equipments, mines.
ALM Le Mans	Small calibre ammunitions
ASS Salbris	Medium and major calibre loading
ARS Rennes	Small and medium calibre ammunitions, artillery elements, shelter assembling and armoured equipments.

There are rather good relations between the sites of GIAT. The construction of tanks is made by Roanne for the frame, Bourges for the main armament, Tulle for the secondary armament, with a lot of private and public suppliers of components.

The position of GIAT is deteriorating. From 1983 to 1987, the orders

respectively decreased 40 % and 60 % for the French share and for exports. GIAT had a deficit of 400 millions francs in 1987 and the overall productivity decreased. It is very difficult to bring about alliances and financial or industrial participations. GIAT is unable to take financial participations, to have cooperation agreements with French or foreign companies or to negotiate industrial property. It is condemned to buy from national tradors, although their economic performances are not very good in comparison with foreign competitors.

Table 32 - GIAT and its hours working plan per year (in thousands)

Charge	1987	1988 (estimations)
AMX-APX Sartory	992	899
EFAB Bourges	1152	1083
ATS Tarbes	1610	1511
ARE Roanne	1845	1797
MAS Saint-Etienne	1029	1029
MAT Tulle	781	710
ATE Toulouse	712	795
ALM Le Mans	292	285
ASS Salbris	493	410
ARS Rennes	287	264
Total GIAT	9193	8783

There were 14887 jobs in 1988 and only 14425 at the end of 1989. The Cour des Comptes estimates that a fundamental revision is required, with a re-structuring of the Group and a reduction to 10 or 12 thousands jobs and the development of an industrial strategy. The Cour recommends "la scission du GIAT en branches d'activités destinées à devenir des entreprises performantes, capables de participer à la constitution d'une industrie européenne dans leur domaine, voire d'être intégrées à des groupes existants". Thus a

desaggregation of the Group, the constitution of new enterprises with or without agreements with other Groups and possibly privatization would be the recommended solution in the short run.

c) The Direction des Constructions Navales

DCN is the most important French shipbuilding firm. The civilian shipyards have suffered a severe crisis, going from 28883 jobs in 1983 to only 10875 in 1989. The production of nuclear-fuelled ballistic missiles submarines is very expensive, but there is no mass production. It is construction unit by unit, with some costs reductions, through learning from experience and common investments. Eight submarines was ordered, of which five were delivered (Rubis, Saphir, Casabianca, Emeraude and Améthyste). The aircraft carriers (Charles de Gaulle and Richelieu) will be produced before 2000.

Table 33 - DCN and its components

Branches	Productions
DCAN Brest	Maintenance of Strategic Oceanic Forces Maintenance of Surface Combatants Construction of major vessels
DCAN Cherbourg	Construction of nuclear strategic submarines (Strategic Oceanic Forces)
DCAN Lorient	Construction of medium vessels Maintenance of submarines and surface combatants
DCAN Toulon	Maintenance of aeronefs and fleet
ECAN Ruelle	Weapons system Naval cybernetics Shiped handling
ECAN Indret	Classical and nuclear propelling apparatus
ECAN Saint-Tropez	Research and manufacture of torpedoes.
ECAN Papeete	Pacific Fleet Support

Table 34 - Direction des Constructions Navales and its hours working plans in 1987 and 1988 (in thousand)

Charges	1987	1988 (estimations)
Cherbourg	4942	5957
Brest	7511	7657
Lorient	4623	4473
Toulon	7243	7102
Indret	2016	2152
Ruelle	1584	1505
Saint-Tropez	868	822
Paris et Papeete	811	820
Total	29598	30448

The results are rather good for four or five establishments. At present, the other ones are in crisis

DCN has structural handicaps :

- Administrative constraints (more than a third of the employees work on tasks which are not useful in a private enterprise)
- The Finance Law indicates every year the number of jobs, with their qualifications. As a result, the enterprises are not very flexible in international markets.
- Personnel are usually civil servants and their status is related to that of the civil service.
- The Allarde law forbids the Arsenal to compete with private enterprises.
- The absence of initiative to improve the management of the firms. It has a main client, with prices calculated on a cost basis, and thus DCN has no incentive to obtain financial equilibrium of its public establishments.
- The number of engineers and high skilled personnel is less than 50 % of what it should be.

d) Direction des Constructions Aéronautiques

DCAé undertake very little industrial activity and it does not produce Air Forces equipment. It ensures the main maintenance of the principal part of the Air Force in the Ateliers Industriels de l'Aéronautique de Bordeaux et de Clermont-Ferrand. DCAé commands some research and prototypes.

The economic results are not very good and the hours working plans do not promise much improvement.

Table 35 - Direction des Constructions Aéronautiques and its hours working plans in 1987 and 1988 (in thousand)

Charges	1987	1988 (estimations)
AIA Bordeaux	1323	1318
AIA Clermont-Ferrand	1729	1703
Total DCAé	3052	3021

For the Arsenal, there is a deep economic crisis and relations between the Government and the Unions are not very good. There were a lot of strikes in 1987, with a loss of 344 thousand working hours and 44 thousand working days, mainly for the protection of the present status of employees, the future of the industrial plants and the fear of privatization. Even at Cherbourg arsenal which is not threatened by unemployment (with the construction, until 2010, of six nuclear-fuelled ballistic-missile submarines "Triomphant" and the new fight nuclear sub-marines l'Améthyste), the problems of status and wages are of a very conflictual nature.

1.2.3 Private and public enterprises

The armament enterprises have experienced a concentration process. For example, before 1936, the French aeronautic industry had 13 enterprises (Lioré et Olivier, Dewoitine, Blériot, Loire-Nieuport, De Perdussin, Bloch, Bréguet, AFN, CAMS, Potez, SECM, Farman and Hanriot). With the nationalization of 1936, there were three enterprises (SNCASE-SNCASO, SNCAM-SNCAO and SNCAN; SNCAC) and after 1958, three other groups was created (Sud-

Aviation, Nord-Aviation, SEREB). In 1970, these enterprises was concentrated in one firm : l'Aérospatiale.

The private sector of the French arms industry was significantly reduced by the nationalization programme of the Socialist government in 1981. Nine industrial groups were mainly concerned, with Thomson-Brandt, Dassault-Breguet and Matra, which are major arms producers. Aérospatiale and Dassault-Breguet shares the French airframe industry, the second one being more involved in military goods. Matra and Aérospatiale control the missile market and SNECMA is the principal engine manufacturer in France. The armament sector of electronics industry is controlled by Thomson-Brandt and Dassault Electronique which have come under Government control. The French private military industry is weak, because of the nationalization process and the international market crisis which was very intense until the beginning of 1980.

The armament enterprises have various judicial statutes :

- The "Régies d'Etat" (State stewardship) are industrial establishments of the GIAT and DAT (Direction des Armements Terrestres), DCN, AIA and DCAé, depending on the DGA.
- Industrial and commercial Public Establishment (Etablissements Publics Industriels et Commerciaux ou EPIC) have the same activities as private enterprises, but they are not governed by private law. ONERA (Office National d'Etudes et de Recherches Aérospatiales) has its own resources and its administrative and financial control is undertaken by Government Commissioners.
- Nationalized Companies are the wholly owned by the State. L'Aérospatiale (or the Société Nationale Industrielle Aérospatiale or SNIAS) is the best example of this judicial form of armament enterprise, as well as some branches of CGE (Compagnie Générale d'Electricité), such as SINTRA or CIT-Alcatel nationalized in 1981.
- The "sociétés d'économie mixte" (Mixed Joint-Stock Companies) associate State and private capital. For SNPE (Société Nationale des Poudres et Explosifs) and SNECMA, the State holds respectively 99.81 % and 90 % of total shares. For Matra, it had 51 % of the company's shares and for AMD/BA it has a majority on the decision-making general board, without having a majority of the capital. For Crouzet (34 %), the State is a common shareholder. The branches of a mixed Joint-Stock company such as Hispano-Suiza for SNECMA, remain private societies.

- The private sector firms are subject to private law. The government is able to control them, because the armament sector is a monopsonic market.

In 1987, 75 % and 90 % of total French armament turnover was accounted for by the ten and by the twenty-five top enterprises, respectively.

Table 36 - The main production of the major French armament enterprises

Enterprises	Products
Aérospatiale	Transall, Epsilon, Gazelle, Dauphin, Puma, Super-Puma Hot Milan, Roland, AS 15, AS 30, Exocet Pluton, Hadès, ASMP Surface-to-Surface missiles Sea-to-Surface missiles
AMD.BA	Mirage III, Mirage 5, Mirage 50 F1, Alphajet Super Etendard Atlantic 2 Rafale
CEA	Tactical and strategic nuclear loading Nuclear propelling
Crouzet	Aeronautic and naval navigation systems Army armaments
ESD	Aeronautic electronic equipments
Luçhaire	Shells, grenades, rockets, missiles rockets
Matra-Manurhin-Défense	Ammunition, light weapons, military engineering

Matra	Super 530 and Magic (Air-to-Air missiles) Mistral (Surface-Sea missiles) Otomat (Sea-to-Sea missiles) SATCP (Surface-to-Air missiles) Durandal (bombs) ASM Missiles Rubis system (communication Gendarmerie)
Panhard & Levassor (branch of Peugeot)	Small armoured vehicles, land vehicles
Renault Vehicules Industriels	Tanks engines, armoured vehicles
SAGEM	Aeronautic and naval navigation, guidance and pilotage systems
SNECMA	Aircraft engines
SEP	Ballistic missiles and tactical engines liquid powder propelling
SNPE	Explosives, munitions, propelling
Thomson-Csf	Electronic equipments Detections, arms systems Communications
Thomson-Brandt-Armements	Surface armaments Aeronautic armaments Ammunitions
T.R.T. (Télécommunications Radio-électriques et Téléphoniques)	Aeronautic equipments Optronic
Turboméca	Aeronautic turbine engines (helicopters)

Competition is usually restricted to two or three companies : Aérospatiale and Matra for some tactical engines, RVI and Panhard for wheeled armoured vehicles. There are monopolies : AMD/BA for fighter aircraft, Aérospatiale for helicopters and ballistic missiles, DCN for warships, GIAT for caterpillar armoured vehicles, SNECMA for aircraft engines, SNPE for powder and explosives, Thomson-Csf for radar detection systems, Thomson-Brandt Armement for mortars.

1.3. Listing of the largest defense contractors

The main contractors are Aérospatiale, AMD/BA, Thomson-Csf and SNECMA.

Table 37 - The 26 main French arms enterprises (DGA excluded) in 1986 (billion francs)¹

Enterprises	Total turnover	Armament turnover
Aérospatiale (without branches)	25.41	15.82
- SOGERMA	0.76	0.37
- SOCATA	0.4	0.2
- SOCEA	0.26	0.15
- SECA	0.43	0.2
- EAS	0.19	0.15
- SFENA	1.4	0.58
AMD.BA	15.6	13.38
ESD (Electronique Serge Dassault)	3.17	2.4
Luchoire	1.2	0.5
Matra-Manurhin-Défense	0.97	0.97
Matra	5.84	3.04
Panhard & Levassor	0.66	0.66
Renault Vehicules Industriels (RVI)	13.72	0.6
SAGEM (Société d'Applications Générales d'Electricité et de Mécanique)	4.47	1.59
SNECMA (branches excluded)	10.25	4.62
- Hispano-Suiza	1.58	0.94
- Sochata.SNECMA	0.71	0.38
- Messier-Hispano-Bugatti	1.34	0.61
SEP (Société Européenne de Propulsion)	2.63	0.98
SNPE	2.90	1.84
Thomson-Csf	21.75	16.71
Thomson-Brandt-Armements	0.88	0.88
Turboméca	2.03	1.24

¹Assemblée Nationale, Première Session ordinaire de 1987-1988, Tome X, Défense. Recherche et industrie d'armement par Jean-Pierre BECHTER, Séance du 8 Octobre 1987, page 45.

Table 38 - Main French arms enterprises in 1987 (billion francs)¹

Enterprises	Total turnover	Armament turnover
Aérospatiale (without branches)	24.8	16.1
- SOGERMA	0.8	0.2
- SOCATA	0.4	0.2
- SOCEA	0.3	0.2
- SECA	0.4	0.2
- EAS	0.2	0.2
- SFENA	1.3	1.6
AMD.BA	15.5	10.3
Crouzet	0.6	0.2
ESD	3.7	2.8
Luchaire	1.2	0.5
Matra-Manurhin-Défense	1.0	1.0
Matra	6.6	4.9
Panhard & Levassor	-	-
Renault Vehicules Industriels	14.7	1.4
SAGEM	4.6	1.4
SNECMA (branches excluded)	9.4	3.6
- Hispano-Suiza	1.3	0.6
- Sochata.SNECMA	0.8	0.5
- Messier-Hispano-Bugatti	1.4	0.6
SEP (Société nationale des Poudres et Explosifs)	3.0	0.9
SNPE	2.8	1.7
Thomson-Csf	27.2	21.0
Thomson-Brandt-Armements	0.9	0.9
T.R.T. (Télécommunications Radio-électriques et Téléphoniques)	0.6	0.2
Turboméca	2.2	1.4

There are other companies which are concerned with arms production:

¹Assemblée Nationale, Première Session ordinaire de 1987-1988, Tome X, Défense. Recherche et industrie d'armement par Jean-Pierre BECHTER, Séance du 8 Octobre 1987, page 45.

- Creusot-Loire Industrie, a branch (100 %) of Usinor-Sacilor produces armoured equipments and specialized mechanisms (mainly for the Army) at Le Creusot, Châteauneuf and Saint-Chamond.

- Les Chantiers Constructions Mécaniques de Normandie (former Chantiers Amiot), located at Cherbourg, which produce fast patrols craft, material transports, mines warfare). They are two other shipyards involved in arms industry : Les Chantiers et Ateliers La Perrière from Lorient and the Société Française de Constructions Navales from Villeneuve-la-Garenne.

These figures are interesting, but it is difficult to know precisely the real weight of the relations between these enterprises and Military Defense. For instance, Panhard Levassor is responsible for the production of armoured personnel carrier VAB, which is the most important programme with 4000 vehicles for France and 800 for exports. It is produced by Panhard Levassor, in collaboration with Renault Véhicules Industriels. Luchaire is a private enterprises specialized in shells. By an old ministerial directive, it was discussed to give 40 % of orders to this enterprise and 60 % to GIAT. This directive is no longer applied to the disadvantage of Luchaire.

For 1988 and 1989, it is easy to confirm that the armament sector is growing for Aérospatiale, E.S.D, Matra, Renault Véhicules Industriels, SOCHATA-SNECMA, Turboméca and above all Thomson-CSF, it is decreasing drastically for AMD.BA (Dassault), SAGEM, SNPE and SNECMA. With the process of nationalization, France is making important changes in the leadership structure of arms production.

Table 39 - French arms sector's control of work (Maîtrise d'oeuvre) in 1986 (in per cent)

DGA	22
CEA	6
Parapublic sector	58
Private industry	14

Marcel Dassault Aircrafts undertakes the coordination of more than 500 enterprises for their construction (exclusive of engines,

equipment and weapons).The collaboration between the armaments enterprises is rather good. For the nuclear fuelled submarines, Aérospatiale, ESD, Thomson, Air Liquide, Technicatome, Framatome, Jeumont-Schneider, Merlin-Gérin, Ecan d'Indret, Ecan de Saint Tropez, Ecan de Ruelle, SOPELEM, USINOR, DCAN de Lorient, DCAN de Cherbourg and de Toulon, SAGEM et SOPELEM are the main contractors, under the responsibility of DCN.

1.5. Brief analysis of the major procurement projects, national and international coproduction

The major procurement projects are described in Tables 40 and 41.

Table 40 - Main programmes in French "Loi de Programmation Militaire"

Programs	Imputation	% equipment effort
Mirage 2000 DA	Conventional, Air	4.7
SNLE N.G	Nuclear Navy	4.3
Mirage 2000 N	Nuclear Air	3.0
M.4.	Nuclear , Common section	2.9
Atlantic N.G.	Conventional Navy	2.3
Tactic vehicle	Conventional Land	1.7
SNLE improvement	Nuclear Navy	1.7
Cannon 155	Conventional, Land	1.7
Hadès	Nuclear , Common section	1.6
S4	Nuclear , Common section	1.4
AMX 30 B2	Conventional Land	1.3
S.D.A.	Conventional Air	1.2
Aircraft carrier	Conventional, Navy	1.1
ACT	Conventional, Air	1.1
SNA	Conventional Navy	1.0
LRM	Conventional, Land	0.9
Syracuse	Space, Common section	0.8
HAC/HAP	Conventional, Land	0.8
AMX Leclerc	Conventional, Land	0.8
ASMP	Nuclear, Common section	0.7
Hélios	Space, Conventional	0.6

Table 41 - Main long term French equipment military programmes (in billion francs)

PROGRAMMES	Long term programmes			1989	
	Total costs	Number	Delivery date	Delivery	Orders
Nuclear					
- Missile M4	37	80	1987-93	16	16
- Nuclear submarines rebuilding	14.5	5	1987-93	1	1
- Missile M5	73	96	1999		
- SNLE-Ng	68	6	1994-2007		
- S4 Albion	30	36	1996		
- ASMP	6.7	90	1988-91		20
- Mirage 2000 N	37	60	1988-91	17	6
- Hadès	13.6	90	1992		
- Astarté-Ramsès	?		1988-96	2	
Espace					
- Hélios	6.6	2	1993-95		
- Syracuse II	4.0	2	1992-95		
Terre					
- AMX 30B2	12	680	1987-91	67	46
- Char Leclerc	45	1100	1991-92		16
- HAC-HAP		215	1997		
- Canon 155	19	500	1992-94	59	17
- LRM	16.4	45	1989-94		17
- Orchidée	6		1996		
- SATCP Mistral			1988	40	55
- VBL et VAB				280	539
- V.Tact and Log.	17500		1987-91	3418	4030
- Super-Puma AS 332					8
- Mirage 2000 DA and N'	63	225	1988-92	16	27
- Light Cargos	1.97	25		4	
- AWACS	7.75	4	1991-96		
- ACT Rafale	142	250	1998		
- Missiles AA 530D & Magic					330
Sea					
- Nuclear PA	23.9	2	1996-2001		
- SNA	14	8	1982-97		1
- Light Frégate	6	6	1994-2000		
- Supervision Frigate	2.4	6			2
- BAMO (anti-mines)		10	1992-2000		3
- Crusader modernisation	1.15	20	1993-96		
- ACM Rafale	12	70	2004		
- Atlantique 2	26.3	42	1990	1	5
- Hélico NH 90		60	1998-2008		
- Torpille Murène					30
- Missile SM 39					7
Gendarmerie					
- Terminaux Saphir		15300	1987-90	1100	
- Réseau Rubis	2	22000	1993-97		
- Véhicules				11 VAB 335 VTT 2264 others	

Table 42 - Main military equipment programmes in 1989

16 AMX Leclerc
46 AMX 30 B2
17 multiple rockets-lancers
57 155mm cannons
284 small armoured vehicles
255 major armoured vehicles
400 short range anti-tank launchers
55 surface-to-air short range Mistral
8 Super Puma
3230 tactical vehicles
800 logistic transport vehicles
Fight nuclear submarines n° 8
Le Triomphant orders,
5 Atlantique 2
Modernization of 10 Super Etendard
Delivery of re-building M4 L'Indomptable
Mines hunter Le Sagittaire
Hydrographic ship Laplace (N° 3)
Construction of aircraft carrier "Charles de Gaulle",
Construction of l'Améthyste (nuclear submarines)
Construction of Frigate Jean Bart
Construction of Frigates Latouche-Tréville, Narvik, Autun, Bir Hakeim,
Construction transport ship "Foudre"
Construction hydrographic ship "Arago"
Orders 27 Mirage 2000DA and N'
Orders 6 Mirage 2000 N ASMP
Orders 6 Ecureuil helicopters
Orders 310 Air-to-Air missiles
Orders 518 modern air-to-surface ammunitions
Orders 110 short range surface-to-air missiles
Delivery of 17 Mirage 2000 N,
Delivery of 16 Mirage 2000 DA,
Delivery of 4 C130
Delivery of 13 Ecureuil
Delivery of SATCP missiles
Development of ACT for 1996
Development of Hadès programme
Development Astarté
Development Ramsès
Development of second escadron Mirage 2000 N ASMP.

The "Loi de programmation militaire" foresaw 474 billion francs (80 billion dollars) for military equipment from 1987 to 1991, with 27,9 per cent for the common section (the Hades, ASMP, M4, M5, S4, Hélios missiles, Syracuse network), 24,6 per cent for Air (mainly Mirage 2000N), 23.8 % Land (Conventional armament), 21.9 % Navy (mainly SNLE) and 1.8 per cent for "Gendarmerie". The "Loi de programmation militaire" hoped to develop the industrial infrastructure of domestic arms production. Some civil enterprises not directly concerned in arms production will be involved in military project, such as Creusot-Loire for the construction of machine parts and Société Alsacienne de Constructions Mécaniques for the Leclerc tank programme managed by GIAT (Groupement Industriel des Armements Terrestres). This objective is ambiguous, because on the positive side, it can be seen as a public will to reduce monopoly and the power of some arms firms, but on the negative side, as an attempt to expand the military-industrial complex which is already very powerful in France.

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