

The French Nuclear Policy In The New Century

CSC 2000

SUBJECT AREA Foreign Policy

Executive Summary Format

EXECUTIVE SUMMARY

Title: **The French Nuclear Policy in the New Century**

Author: **Major Eric, G, BUCQUET**
 French Marine Corps

Thesis: For the foreseeable future, France must maintain its independent
nuclear capability and not implement the Eurobomb concept.

Discussion:

Three invasions in less than one century, the defeat of 1940, and the Suez crisis constitute the main historical elements, explaining the fourth republic's will to develop a nuclear program. Nuclear weapons offered France freedom of action and influence and gave France the ability to play a key role in international community as a global power. France gained the image of a strong modern nation independent from the bipolarity of the cold war. With the end of the cold war, France joined the other nuclear powers to negotiate arms control and disarmament.

For the foreseeable future, France must maintain its independent nuclear capability and not implement the Eurobomb concept. To maintain a credible arsenal, France will henceforth use simulation in conjunction with GB and US cooperation. Domestically, France's nuclear arsenal is supported by a large consensus. This consensus must be a permanent concern for the government in order to let France preserve its freedom of choice between a Europeanization of its capability and an independent arsenal. Indeed an independent arsenal needs to be supported by French public opinion to strengthen the government in the face of international opposition.

Conclusion(s) or Recommendation(s):

Maintaining an independent nuclear arsenal provides the following benefits:

- Continuation of French freedom of action;
- Protection against all-azimuths threats by ensuring immediate reprisals in case of attack;
- Reinforcement of the US nuclear "umbrella" with France as an independent center of decision-making, linked to NATO;

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 2000		2. REPORT TYPE		3. DATES COVERED 00-00-2000 to 00-00-2000	
4. TITLE AND SUBTITLE The French Nuclear Policy In The New Century				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) United States Marine Corps, Command and Staff College, Marine Corps University, 2076 South Street, Marine Corps Combat Dev Command, Quantico, VA, 22134-5068				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 83	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

- Ability to offer Europe a common nuclear capability in case of a withdrawal of US nuclear weapons from Europe;
- Continued coherence of French deterrence as the cornerstone of French defense strategy.

In conclusion, for France the benefits of maintaining an independent nuclear arsenal outweigh the costs. French independent deterrence is required as long as the world remains nuclear. As a result, France needs to keep its nuclear capability in order to maintain its security and protect its vital interests.

CONTENTS

CHAPTER 1

WHY DID FRANCE BECOME A NUCLEAR POWER? 5

CHAPTER 2

THE EVOLUTION OF FRANCE'S NUCLEAR POLICY SINCE DE GAULLE 12

Continuity and Political Rallying	12
The absence of debate.....	14
A success story?.....	15
A fragile consensus.....	16

CHAPTER 3

FRANCE'S CURRENT NUCLEAR STRATEGY 19

Deterrence.....	20
The definition of the vital interests.....	21
A strategy of no-use.....	25
The aborted debate.....	23
The reality of the threat	27
A strategy of means	27
An independent arsenal	31
The current layout.....	29
The factors supporting the 1995 evolution of the French nuclear arsenal	29
The current lay out: a dyad.....	34

CHAPTER 4

THE FUTURE OF THE FRENCH NUCLEAR STRATEGY 37

The evolution of nuclear weapons through simulation	37
The evolution of the nuclear weapon through the cooperation	37
The Eurobomb	42
Is the Eurobomb a new idea?	41
Concerted deterrence.....	43
The difficulties faced by this concept	43
The implementation of a concerted deterrence	45
The objective to be reached.....	47
A Strategic Partnership with Germany.....	48
The evolution of the nuclear weapon through arms control	50

CHAPTER 5

AN ASSESSMENT OF THE FUTURE OF FRANCE'S NUCLEAR STRATEGY

52

CONCLUSION 56

ANNEX 1: CHRONOLOGY60

ANNEX 2: The 1994 White Paper threat assessment: six scenarios 62

ANNEX 3: Nuclear Weapons Database 63

Bibliography 78

FRANCE'S NUCLEAR POLICY

In matter of strategy, the most important is to neutralize, not to kill (comte de Guibert)

Introduction

In 1995, M. Jacques Chirac, the newly-elected French President, said that "France's nuclear deterrence (dissuasion) remains the fundamental element of France's defense strategy. It is the ultimate guarantee against every threat to our vital interests, whatever the source or kind."¹ This study analyzes France's current nuclear posture and argues to the contrary that, given the current challenges facing France's foreign policy, its nuclear option has become obsolete and outdated.

France's nuclear posture was established during the Cold War and was designed to deal with the Soviet threat, but this now presents a problem. Though

nuclear weapons were not invented originally to manage the relationship between East and West, they nevertheless had a defining role during the Cold War in the confrontation between NATO and the Warsaw Pact. Must we, therefore, consider that today's nuclear weapon is useless without the Soviet threat? Is France's original "anti-city" (i.e., population-focused) nuclear targeting strategy still viable? Today, with the demise of the Soviet Union, the threat has changed radically. Nevertheless, President Chirac's view quoted above indicates that nuclear weapons remain the cornerstone of France's defense strategy. The nuclear capability plays an important role in international relationships, and therefore, France has refused to do without it. Moreover, President Chirac's decision is supported by a broad consensus, which includes four main aspects:

- the maintenance of a policy of deterrence,
- the rejection of a posture of nuclear war-fighting,
- the establishment of some tangible connection between France's nuclear arsenal and European defense,
- the creation of a linkage between deterrence and nuclear disarmament.

These various aspects will be examined throughout the study.

Key questions, however, are whether France's nuclear arsenal today and in the future protects its vital interests and whether France's current and future nuclear program promotes its important objectives and vital national interests in Europe and beyond. Does the current French nuclear strategy crystallize France's will to remain a medium-sized power, and maintaining a role within the international community? In that case, the nuclear arsenal could be considered a proper tool to support foreign policy, and the French proposal to share its deterrent capability with European allies a

¹ Speech by Jacques Chirac on 31 August 1995.

means to remain a key player in Europe, in light of a stronger reunified Germany. The only modifications to the French nuclear deterrence doctrine so far have been the consequence of budgetary constraints. President Chirac's recent decisions concerning French nuclear deterrence provided some changes in the nuclear forces' infrastructure and, for some observers, these modifications opened a new era in French deterrence. However, physical changes do not always amount to a strategic change. In fact, some critics, such as Lucien Poirier (one of France's most eminent nuclear strategists), believe the end of the Cold War should have led to a thorough doctrinal reappraisal, which did not occur². On the one hand, most French strategists have refused to debate significant adjustments, holding that the deterrence strategy, which was successful against the Soviet Union, is still applicable to today's threats. On the other hand, some strategists have tried to shift from a "strong-to-the-weak" posture to a "strong-to-the-crazy" warfighting strategy. Therefore, it would be difficult to take the President's recent decisions in this area as a starting point for "a new chapter in the history of the French nuclear arsenal."

This study will assess whether France's current deterrence doctrine can be adapted to the new security environment or whether France must move further along and develop a new and more mature nuclear posture. The following issues will be examined: 1) the history of French nuclear policy after World War II through the presidency of Charles de Gaulle; 2) the evolution of the French nuclear policy since de Gaulle and the consequences of subsequent debate about France's nuclear program; 3) France's current nuclear strategy; 4) France's future nuclear strategy; and 5) assessment of France's nuclear deterrence in the 21st Century.

² Lucien Poirier, La crise des fondements, (Paris: Economica, 1994), 58-65.

CHAPTER 1

WHY DID FRANCE BECOME A NUCLEAR POWER?

Following WWII, France was protected by the U.S. nuclear umbrella. Fifteen years later, however, France exploded its first nuclear weapon. This chapter will explain why France decided to become a nuclear power and which reasons led President de Gaulle to announce his *force de frappe* policy. Before addressing this issue, it is important to note that General de Gaulle came back into power in 1958 and that the first explosion occurred on 13 February 1960.³ However, less than two years had passed between these two events, and this interval would not have been sufficient to launch a program and to carry it out. Therefore, the starting point of the French nuclear program was not the result of General de Gaulle's decision, but it dates back to the preceding IVth Republic. It was the IVth Republic which developed nuclear weapons, while General de Gaulle merely gave them a justification as a means of external policy.

The decision to launch a nuclear program initially was the result of major events faced by the various governments of the IVth Republic. The Indochina War, in particular, may have triggered the question of a need for a French nuclear arsenal. Significantly, René Pleven, Minister of Defense under Laniel government, argued for a French nuclear arsenal, at the time that the battle of Dien Bien Phu and the question of U.S. nuclear support to the surrounded garrison made this proposition especially relevant. In December 1954, General Louis-Marie Chassin, after a

³President de Gaulle's message to Pierre Guillaumat was revealing: "Hurrah for France! As of this morning, she is stronger and prouder," André Passeron, *De Gaulle parle*, (Paris: Plon, 1962), 365.

strategic assessment of the Indochina war, took a stand in favor of France 's acquisition of weapons of mass destruction.⁴

The rejection of the European Defense Community's (EDC) treaty⁵ by the French Parliament (30 August 1954) which would have committed France to a unified European army, kept the way free for a French nuclear arsenal. In case of an integrated European defense, tightly linked to the U.S. nuclear umbrella, the EDC would have denied France the possession of nuclear weapons. Following this decision, Germany was authorized to begin its rearmament but renounced seeking its own nuclear arsenal. This decision gave an advantage to France, and during a meeting on 26 December 1954, Pierre Mendès France declared that he was conscious that nuclear states had an advantage on the international stage. He therefore promulgated a decree which initiated nuclear research in France as an answer to the question posed by Germany's rearmament and admission to NATO and how France should ensure its security against a potential resumption of German militarism. The answer for Mendès France was the possession of nuclear weapons.

The Suez Crisis of 1956, perhaps, proved to be the decisive element in the development of France's nuclear weapons program. Following the Franco-British intervention, the Soviet Union threatened France and Great Britain with the employment of its nuclear weapons unless they withdrew from Egypt. London and Paris, in turn, asked for diplomatic and military support – including nuclear

⁴ General Chassin, "Réflexions stratégiques sur la guerre d'Indochine", Revue de la défense nationale, December 1954, 507-522.

⁵ On 27 May 1952, the EDC treaty was signed in Paris and had been initiated by Pleven on 24 October 1950. In order to prevent the rearmament of Germany, Pleven had proposed to create a European army made up of European contingents, including German units. On 30 August 1954, however, the French Parliament voted against the EDC Treaty. Therefore, France's Prime Minister Pierre Mendes France dropped the treaty.

guarantees – from Washington, which, however turned down their request. France and Great Britain, who were compelled to withdraw, realized that they had no power and were dependent on the US. As a result, France came to conclude that the U.S.'s nuclear guarantee to NATO members was deficient, and this crisis fueled France's decision to create its own nuclear force. Accordingly, on 30 November 1956, an interagency agreement was signed by the Atomic Energy Committee, the Defense Ministry, and the Finance Ministry in order to accelerate the French nuclear program. On 11 April 1958, the Félix Gaillard government decided that the first nuclear explosion would be carried out during the first part of 1960. Therefore, the nuclear program had really been in place even before General de Gaulle's return to power.

However, with the return of General de Gaulle, the nuclear weapons program took on a new dimension. Under the IVth Republic, the idea had not been to establish an independent nuclear force within a narrow national framework, but rather to acquire a specific asset to put on the table before European or NATO councils. For General de Gaulle, on the contrary, France's nuclear capability was a necessary tool for general policy. Not surprisingly, a nuclear military force was to become the expression of an entirely new foreign policy – the policy of national independence.

At heart, General de Gaulle wanted France to reemerge as a great nation, and only De Gaulle, the historic figure of WW II, who had been able to lead France to final victory, could try to do that. To achieve that goal, as he said in a press conference on 7 April 1951, "France must have its own policy and its own defense, based on atomic power." In a memorandum dated 17 September 1958 (only a few months after his return to power), he proposed to the United States and to Great Britain the establishment of a three-member directorate within NATO. In General de Gaulle's

vision, NATO's structure at that time was unsuited to ensuring the security of the Free World. Moreover, France also had specific responsibilities outside the geographic area covered by NATO. The ensuing refusal of the U.S. to respond favorably to the proposal and to share leadership within NATO only confirmed to General de Gaulle the need to reinforce the French nuclear program.

At stake was de Gaulle's deep-rooted suspicion that the United States would not risk a nuclear holocaust for the sake of Europe, and de Gaulle called into question America's nuclear credibility and guarantees. This question had become increasingly relevant after the humiliation resulting from the Suez Crisis. For Paris, the Suez intervention had been connected with the war taking place in Algeria, then a French territory.⁶ The ineffectiveness of the US nuclear shield was also confirmed for Paris by the US's decision to substitute a strategy of "flexible response" for that of "massive retaliation." In case of Soviet aggression, de Gaulle was convinced that the only strategy able to defend Western Europe was an immediate riposte with powerful means against the potential of the enemy. With the reliance on flexible response, however, American help would come too late. President de Gaulle was convinced that, in any case, the United States would not risk its own survival in order to defend Europe. As he concluded: "Why would you want them to accept to be erased from the map, because a European country threatened by Russia calls for help?"⁷ This idea was based on the fact that a balance of terror existed, since Russia was able to reach America with ICBMs. The uncertainty about the use of nuclear weapons by the United States in order to protect European territory was the main concern of the General. He was also convinced that in case of war the two superpowers would try to

⁶ Marc Ferro, *Suez, La Mémoire du siècle*, (Bruxelles: Editions Complexe, 1995), 90.

⁷ Alain Peyrefitte, *C'était de Gaulle, Vol 1, La France redevient la France* (Paris: de Fallois-Fayard, 1994), 418.

preserve their sanctuary by keeping the fight inside Europe. Therefore, France needed its own arsenal. “Why do you want to give up your fate to your protector?”⁸ he asked. During a press conference on 5 September 1960, he developed his ideas publicly: “Taking into account the nature of these weapons and the consequences of their use, France cannot leave its fate and even its own life to the discretion of others.” This sentence could in itself provide a rough definition of France’s vital interests.

Determined, President de Gaulle did all he could to give France its nuclear capability, designating Pierre Guillaumat, the former administrator of the Atomic Energy Center as the new Defense Secretary (1958-1960). De Gaulle, predictably, waited with impatience for the first explosion. As a senior military officer remembered, “General de Gaulle was in a hurry to get the nuclear capability, because it was a diplomatic instrument which would give France the right to sit at the table of the major states.”⁹

Various events helped General de Gaulle to reach his goal. In 1962, General de Gaulle ended the Algerian War, which gave him the possibility of reapportioning the defense budget between Title III (operating expenditures) and Title IV (procurement expenditures) to finance the nuclear program. Moreover, General de Gaulle took advantage of the backing down of the Soviet Union during the Cuban crisis to play a more independent policy vis-à-vis the United States. Therefore, he refused the US’s proposal of a multilateral force, which he took as a US attempt to try to monitor France’s new-born nuclear force.¹⁰ “Since when is it true that a people

⁸ Charles de Gaulle, *Mémoire d’espoir*, (Paris: Plon, 1970) 213.

⁹ General Buchalet, *L’aventure de la bombe*, (Paris: Plon, 1985), 199.

¹⁰ President Kennedy proposed creating a US-led multilateral force. He offered the European states Polaris missiles which would be integrated within NATO’s arsenal and could be fired only with the US President’s approval.

must prevent itself from getting more efficient weapons for the reason that its main enemy and friend have more superior means than it has?”¹¹

Nuclear weapons offered France freedom of action and influence. During the Cold War, NATO considered the French nuclear arsenal a significant factor of uncertainty for the Soviets.¹² Concurrently, that same arsenal could also become a factor of uncertainty for its allies, providing France greater freedom of action at the diplomatic level, and France used it to offer the Third World and the western alliance an alternative to the United States. For example, President de Gaulle rejected bilateralism and wanted specifically that France offer a third way to the world. For Scott Sagan on the other hand, France was motivated by its will to maintain its great power status as its colonial empire was vanishing.¹³ However, such a conclusion is acceptable only if we take the definition of Camille Grand of great power status: “France, as in past centuries, had to acquire the most modern weapons in order to remain an independent and sovereign nation...In that respect, one could argue as Scott Sagan did that France followed the ‘norms model,’ which, at the time, identified nuclear weapons with ‘great power’ status.”¹⁴ Therefore, it is important to emphasize that the origin of France’s greatness comes from this liberty of action; it does not stem from its nuclear arsenal. Indeed, it is important to concede that a country’s nuclear capability is not synonymous with being a great power. Nuclear capability alone is not a measure of a country’s greatness. However, nuclear capability coupled with the other great power attributes, enables a country to join the table of decision making on

¹¹ General de Gaulle, Press conference of 14 January 1963.

¹² The 1974 Ottawa declaration recognized a real role for the French and British forces in the Western general deterrence.

¹³ Scott Sagan, “Why Do States Build Nuclear Weapons?”, International Security 21, N°3, Winter 1996-97, 54 – 86.

¹⁴ Camille Grand, “A French Nuclear Exception,” Occasional Paper N°38, (Washington, D.C.: The Henry L. Stimson Center, January 1998), 6

world matters. After WWII, France was able to take advantage of the Allied victory. With its occupation area in Germany and its seat on the Security Council of the United Nations, combined with its diplomacy, its military, its culture, and its economy, France was able to play a key role in the International community even without possessing nuclear weapons.

The results of de Gaulle's nuclear policy were not far behind the stated intentions. By 1964, French deterrence had become a reality with the first nuclear bomber squadron of Mirage IVs entering operational service. Nevertheless, the Presidential decisions were contested for two main reasons: the "force de frappe" was expensive,¹⁵ and the nuclear arsenal was limited in comparison with that of the U.S. and the Soviet Union. Therefore, public opinion and some political quarters were opposed to de Gaulle's policy. Nevertheless, the stability of power facilitated the early implementation of the French nuclear policy, and de Gaulle's era saw the harmonious adaptation of defense to French external policy. The aims and the principles of de Gaulle's external policy determined the means granted to the military policy and its goals. The "force de frappe" became embedded as the cornerstone of French military policy.

¹⁵ "In that period, France probably invested at least 10 billion FF," Ruelh Lothar, La politique militaire française sous la V^e République, (Presses de la FNSP, 1977), 268.

Nevertheless, the defense budget decreased between 1960 (6.34% of GDP) and 1969 (4.17% of GDP), as a consequence of the end of the Algerian war and of prosperity. These figures are taken from Jean Doisse and Maurice Vaïsse, Politique étrangère de la France, Diplomatie et outil militaire, (Paris: Points Histoire, Editions du Seuil, 1992), 620.

CHAPTER 2

THE EVOLUTION OF FRANCE'S NUCLEAR POLICY SINCE DE GAULLE

Continuity and Political Rallying

After 1969, the question was whether the nuclear program would survive President de Gaulle's resignation. Moreover, would the program survive the political shift from Right to Left and, later, the "cohabitation"? In fact, the French nuclear program continued as before and was able to generate a consensus around it.

This continuity was mainly achieved by the work of the two presidents following de Gaulle, as they shared the same point of view as their predecessor.¹⁶ This continuity was only possible, however, thanks to the institutions which made the president the key man on the issue of deterrence. Therefore, with the power to pass laws, which was the consequence of the new Constitution of 1958, initiated by General de Gaulle, the President was able to manage the establishment and the reinforcement of the nuclear program despite the opposition from other political quarters. Most of the procurement laws were adopted by the Parliament under Article 49.3, which is the strongest means of pressure the government has vis-à-vis the Parliament. Moreover, the structural weakness of the opposition inside the institutions of the Vth Republic was another important reason for the lack of debate on this subject.

In addition, the maintenance and the reinforcement of nuclear deterrence were progressively supported by French public opinion. The so-called French consensus on deterrence however, did not arise during the de Gaulle era. For example, the 1972

¹⁶ President Georges Pompidou (1969-1974) was General de Gaulle's Prime Minister. President Valéry Giscard d'Estaing (1974-1981) was General de Gaulle's Finance Secretary.

Common Program, which sealed the alliance between Socialists and Communists for the next presidential election, condemned nuclear weapons and called for the dismantlement of the nuclear arsenal as part of their electoral platform. It was only in 1977 that the Socialist Party did a complete turnabout on deterrence. Since 1978, splits on the nuclear debate along party lines have vanished, and the leftist parties' agreement to deterrence led to a consensus on matters of defense. In 1981, the political shift of power to the Left had no consequence on French nuclear deterrence. On 16 November 1983, President François Mitterrand, who had for a long time opposed de Gaulle's nuclear military policy, announced: "The cornerstone of deterrence in France is the head of state, that means me".

This consensus is total, and extends not only to political circles, but also to public opinion, thereby characterizing France versus other European countries, which are mainly against the nuclear option. This agreement on the defense system underscores the French strategic culture, influenced by the memory of three invasions in the span of one century. The French nuclear capability had grown out of France's need for an undefeatable security. Compared to Germany, the aggressor each time, France suffered the majority of the destruction. The burden remained a strong consideration for the decision-makers of the Fourth and Fifth Republics. Anxious to avoid the possibility of a new invasion, which could have been fatal to the nation, France decided to favor nuclear weapons over other inefficient defense systems (such as the Maginot Line) or an unreliable alliance (as in WWII). The nuclear arsenal demonstrated the will of the nation to deter any aggressor from invading France. The dissuasion has worked in respect to the historically correct view that France remains vulnerable to European power plays. The defense of the "sanctuary" with a nuclear weapon has the advantage of reconciling the patriots, whose minds are at ease with a

military tool that is technically reliable, with the pacifists who see in nuclear weapons as an unchallenged war-prevention asset. This consensus has two consequences: defense has never been a subject of debate in France; the budgetary framework with the “lois de programme” (military procurement laws) still exists.

The absence of debate

The absence of public debate is understandable. Since its origin, the French nuclear adventure has been controlled by the governments and especially by General de Gaulle. He resourced the project fully, and when France attained a nuclear capability he commissioned official strategists with the requirement to develop strategy.¹⁷ Their strategy – strategy of the means (see later) – did not elicit any substantial criticism for various reasons.

First, as we already saw, a preponderance of France’s population finally shared a common concern over the threat. With a nuclear capability, France was able to deter the Soviet threat with its “weak to the strong posture” (see chapter 3) and, at the same time, recover its freedom of action in the world. These two elements joined to propel national support for an independent nuclear capability and it became difficult for any opposition to reorient public opinion against France’s decision. Debating nuclear weapons was, for many, equivalent to debating independence. Any concession was seen to mean a return to dependence, or interdependence at the very least. Second, because of its withdrawal from NATO, France did not take part in Western strategy related to NATO or American leadership. Third, the lack of civilian

¹⁷ French nuclear strategists included General Charles Ailleret, General André Beaufre, General Pierre Gallois, General Lucien Poirier, who fostered debate from 1950 to 1960. The only civilian strategist at that time on nuclear deterrence was the scholar Raymond Aron.

expertise was also an explanation for the lack of an eloquent, objective debate about nuclear policy.

A success story?

The nuclear arsenal helped the French to become confident again after the ordeal endured during WWII. It gave them the feeling of security and reinforced national cohesion and nationalism. It also gave France the image of a strong nation independent from the bipolarity of the Cold War (i.e., the US-USSR confrontation). And, it enhanced France's image as a modern country, with advanced technology. Engineers and industry were compelled to innovate, and the industrial repercussions were important. Moreover, the French nuclear arsenal gave France a specific place on the international scene. It gave France the capacity to play as a superpower in comparison to Germany. This element was probably another reason for the rallying of the major political parties to de Gaulle's nuclear policy. This nuclear capability gave France a mission inside the NATO alliance, as the French armed forces, thanks to the deterrence, found an important mission which gave them confidence.

But is this success story completely true? Some would argue that, for example, France's conventional forces suffered from the focus on nuclear policy. The Gulf War, for example, illustrated the limits of the French conventional forces. Moreover, France's nuclear-focused defense was regularly threatened by arms control negotiations and by the Soviet and American improvements to their own arsenal (see later).

A fragile consensus

The consensus in public opinion is linked to the idea shared by the majority of the population that France would not be able to maintain its security without deterrence.¹⁸ Nevertheless, the evolution of this opinion is an important concern to monitor and to strengthen by French decision makers for many reasons.

First, for it to be credible, deterrence needs to meet two necessary conditions: the arsenal needs to reach a certain level of credibility in order to achieve a second-strike capability and, political decision-makers should be ready to use the nuclear weapons. The problem of “rare will”¹⁹ meets the problem of the support of the public opinion. A permanent effort must be fueled to maintain the invisible and psychological links between the Nation and the strategy of use.

Second, this feeling constitutes a paradox in Europe. European public opinion is mainly in favor of disarmament and against proliferation. The general opposition to nuclear weapons stems mainly from the fundamental confusion between deterrence and the use of nuclear weapons. France in that domain is very clear, and its “dissuasion” is driven by the idea of a no-use weapon. Nuclear war in the French concept is possible only if “dissuasion” fails. Many people have started to support the dismantling of nuclear weapons, arguing from the disappearance of the Soviet threat. As Pascal Boniface writes, “it is much easier to mobilize public opinion against the vice of a possible use of nuclear weapons than it is to convince anyone of the ironic virtues of the concept of deterrence.”²⁰

¹⁸ A June 1996 poll gave a 61% positive response to the statement that “France could not ensure its defense without the deterrent force” and a total of 73% for a reinforced, modernized or untouched deterrence (data taken from SOFRES/SIRPA poll).

¹⁹ Gérard Chalian, Arnaud Blin, *Dictionnaire de la Stratégie Militaire*, (Saint-Armand-Montrond: Perrin, 1998), 585.

²⁰ Pascal Boniface, *The Future of the French Nuclear Posture*, source: www.idsa-india.org/an-nov9-6.html, 1.

Third, antinuclear ideology today represents an international political force. This strength will be supported by the ecological political movement, which has become more antinuclear after the events of Chernobyl. It is important to note that future diplomacy on military nuclear capability will be more and more linked to civilian nuclear applications. Today, Prime Minister Lionel Jospin has to face this opposition inside his own government, which includes some members of the Green Party. Nevertheless, with some concessions, the Greens have rallied to the political program of the government.

Fourth, the fight against nuclear weapons has taken on a new legal dimension. In 1994, an international organization of lawyers succeeded, for the first time, to get the United Nations General Assembly to ask the International Court of Justice to give an advisory opinion on the conformity of the threat and use of nuclear weapons to Public International Law. The International Court of Justice, by seven votes to seven, found in July 1995 that the threat or use of nuclear weapons “would generally be contrary to the rules of the International law,” but “was not able to declare illegal its use by a State in case of self-defense, when the survival of this State is threatened.” This decision shows that the judges are now able to give a judgement about problems concerning nuclear weapons. The medium-size nuclear and democratic powers, such as France, will have to be vigilant in the future to defend their nuclear policy against these various pressures.

This international opposition has already interfered with French nuclear strategy. French nuclear strategy has already undergone several evolutions since 1995, such as the closing of the testing facilities, and the suppression of the Hades Missiles. Many opponents of the French nuclear strategy appreciated the two previous examples of evolution. New Zealand and other Pacific countries have indeed been

asking France to close the test areas of Mururoa and Fangataufa for a long time.

Germany was happy to hear President Chirac announce the elimination of the surface-to-surface ballistic missiles. The pressures of foreign countries did not justify this evolution. Nevertheless, it is impossible to know exactly what role this international opposition played in influencing the current French nuclear strategy.

CHAPTER 3

FRANCE'S CURRENT NUCLEAR STRATEGY

Having described the history of the roots of French nuclear deterrence, which is necessary in order to understand its specificity, this chapter will examine France's current nuclear strategy. First it is important to understand that the end of the Cold War did not mean the end of nuclear weapons. Therefore, France remains a nuclear power. Though frequently criticized for doing so, some Anglo-Saxon analysts argue that, "French nuclear policy [is] unrealistic and pretentious or, at best, [is] an interesting but superfluous strategy of a country obsessed by its grandeur and great power status. On the other hand, the French tend to think that France has developed the perfect nuclear posture for a medium power, both reasonable and efficient, or in a word, Cartesian, allowing no criticism."²¹ While summarizing France's current nuclear strategy in 2000, this chapter will also try to underscore its weaknesses.

Before starting to describe this strategy, it is important to understand what strategy covers. Grand Strategy is the decisions taken by the political power, which in France belongs to the President, in all the domains available (diplomacy, economy, culture, armed forces...) to reach the objectives defined by policy. In nuclear matters, even during cohabitation, this decision was never shared with the Prime Minister. Grand Strategy is directly linked to Policy defined as by the head of state. The only aim of Grand Strategy is to realize the objectives defined inside the policy, objectives which are mainly pacific. Therefore, war is included in Grand Strategy, but is only a small part of the general concept. As described above, nuclear weapons cover these

two elements of the grand Strategy: the nuclear arsenal is the ultimate weapon in case of conflict and, at the same time, has given France a freedom of action, which supports France's international status.

Deterrence

French nuclear strategy has always been based on a policy of deterrence. Deterrence can be defined as the threatened use of force to prevent an enemy from embarking on a move that is hostile to France's interests. The French word for deterrence, "dissuasion", describes a result which is the restraint in the enemy's behavior induced by a threat, while "deterrence" (coming from the word terror) focuses on the reasons for the restraint. For Camille Grand, "these linguistic differences illuminate differing French and U.S. views on atomic bombs: a moral judgement was never implied in France's nuclear posture, whereas 'massive retaliations' also known as deterrence by punishment is a US phrase that carries a distinctive moral echo."²² Therefore, the failure of deterrence, in the French conception, would result in the destruction of the sovereign nation after a lost war.

This definition is linked with political will to ensure the credibility of a medium power's deterrence when facing a superpower. This deterrence implies that France puts its own existence at stake in the process. Many observers, to include Camille Grand, describe this "dissuasion" as a "brinkmanship posture."²³ Such an all-or-

²¹ Camille Grand, "A French Nuclear Exception," *Occasional Paper* N°38, (Washington D.C.: The Henry L. Stimson Center, January 1998), 1.

²² Camille Grand, "A French Nuclear Exception," *Occasional Paper* N°38, (Washington D.C.: The Henry L. Stimson Center, January 1998), 10.

²³ Camille Grand, "A French Nuclear Exception," *Occasional Paper* N°38, (Washington D.C.: The Henry L. Stimson Center, January 1998), 10.

This idea is developed by Alain Joxe in *Le cycle de la dissuasion* (Paris: La découverte, 1990) in which he drew a historical parallel with Xenophon. Xenophon laid out his hoplites with a ravine at their back in front of the Persian army so as to show Greek resolve by the brink.

nothing posture is possible due to the resolve of the completely independent French President of the Republic.

The French concept continues to be defined “as the will and the capability to make any adversary, whoever he may be and whatever facilities he may possess, fear unacceptable damages that are out of proportion with the stakes of the conflict if he tries to attack our vital interests.”²⁴ This official assessment, written in 1994 by the French Ministry of Defense, shows that French deterrence has not really changed since its origins. The principles have remained consistent and it is important to review them.

The definition of the vital interests

As discussed previously, French doctrine remains firm on the idea to inflict unacceptable damage to any adversary at any time in order to deter him from aggression against France’s vital interests.²⁵ Though it is important to define France’s vital interests, they are not precisely defined in order to maintain the efficiency of dissuasion. “Nuclear deterrence can cover more ground if the adversary does not know exactly where vital interests begin. This avoids his being able to calculate the risks inherent in an act of aggression against French interests.”²⁶ In fact, it is the President, the key man on matters of dissuasion, who will decide if vital interests are at stake. The definition of vital interests is a matter of political judgment as expressed in the 1994 white paper. “There is no reason to give an accurate definition of these interests which are part of the freedom of decision of the higher authorities of the

²⁴ Ministère de la défense, Livre blanc sur la défense 1994, (Paris: Collection 10/18, 1994), 100.

²⁵ Ministère de la défense, Livre blanc sur la défense 1994, (Paris: Collection 10/18, 1994), 95.

²⁶ Bruno Tertrais, The French Nuclear Deterrent after the Cold War, P 8012 (Santa Monica: Rand, 1998), 10. Since 1997, Bruno Tertrais has been Special Assistant to the director of Strategic Affairs, French Ministry of Defense.

state.”²⁷ Nevertheless, after reading the Defense White Paper of 1994, we can consider that the free exercise of our sovereignty, the integrity of the mainland and of its overseas territories and departments, and of its air and maritime avenues of approach belong to the vital interests. The fuzziness inherent in the French definition of vital interests shows us that they vary also over time depending on the modification of economical, political, and military factors.

The definition of vital interests was broadened in October 1995 after a two-day summit between the British Prime Minister and the French President: “We did not see situations arising in which the vital interests of either France or the United Kingdom could be threatened without the vital interests of the other also being threatened.” It is true that in Europe such an economic and political integration exists that it is difficult to know where the Union’s vital interests end and where those of each state begin. Nevertheless, in the European context deterrence can only cover a limited number of domains. What are the vital interests common to all Europeans capable of justifying the use of nuclear weapons? The predominance of national feelings shows the limits of the European construction outside the economical, financial, and regulation aspects.

While discussing the eventuality of a sharing of its arsenal, France reserves defining vital interests in order to keep its freedom of action and to avoid potential threats. Would France risk a nuclear holocaust in order to defend Germany’s vital interests? This question dominates any consideration by France to share its nuclear capability (see later).

²⁷ Ministère de la défense, Livre blanc sur la défense 1994, (Paris: Collection 10/18, 1994), 100.

A strategy of no-use

France's nuclear strategy is a strategy of deterrence, which means a **strategy of no-use**.²⁸ The magnitude of the destruction realized by nuclear weapons has given the classical military notion of "dissuasion" a real strategic context, which was completely unknown before. Today, officials consider that nuclear weapons, with their unstoppable power of destruction, have this capacity. "The use of total war as an efficient means of policy" prevents general war.²⁹ The whole point of nuclear weapons is to prevent wars, not to win them.³⁰ In France, nuclear deterrence has never been associated with warfighting but only with war prevention and peace. This official definition, which was proven during the Cold War could be debated in the case of a rogue state's threat. However, nuclear weapons designed to deal with the Soviet Union's threat are too powerful to be used against such a threat.

The aborted debate

Shortly after the fall of the Soviet Union and the Gulf War, a debate broke out about a potential shift in strategy. The idea was to build miniaturized nuclear arms for surgical strikes. Such a strike would conceptually limit destruction to the chosen target, with very limited damage to the environment. The concept was to deter rogue states in the Third World. In this case, it was considered that the high payload anti-city weapons were essentially irrelevant, but the use of limited weapons could be envisioned. The debate enabled advocates of the old strategy to defend nuclear postures that deterred actual use. However, sophisticated conventional weapons could

²⁸ Ministère de la défense, *Livre blanc sur la défense 1994*, (Paris: Collection 10/18, 1994), 96.

²⁹ *Livre blanc 1972*, quoted in Ministère de la défense, *Livre blanc sur la défense 1994*, (Paris: Collection 10/18, 1994), 100.

³⁰ See the speech on French "dissuasion" policy by François Mitterrand, 5 May 1994: "Deterrence (dissuasion) is designed to avoid war, not to win it".

now deliver surgical strikes. Deterrence, as a consequence, could only be a facet of strategic-level strikes. This debate was quickly canceled because President François Mitterrand was a defender of the strategy established by General de Gaulle. His 1990 decision not to send and not to use nuclear weapons during the Gulf War could be considered a clue about the outcome of an eventual shift in strategy. There were no vital interests in the Gulf War; therefore the deployment of nuclear weapons was not adopted. In the 1994 White Paper, officials rejected any evolution from a strict deterrent posture to a war-fighting strategy³¹.

This basic French concept is considered the best way to defend the future of France's nuclear arsenal. As Pascal Boniface said³², "it deprives the enemies of their principal source of leverage. In adhering to a posture that contemplates the use of nuclear weapons, France would be playing into the hands of its nuclear foes by associating itself with the idea that such weapons can be used to fight, and not to preserve the peace. In so doing, France would have squandered any further prospect of maintaining the political legitimacy it has fought so hard to gain for its arsenal."

This decision to maintain the traditional strategy was the only one accepted by the Communist and Ecological parties which reside in the governing coalition. Moreover, the other option would have increased the European anti-nuclear sentiment, especially in Germany.

Beyond the political bargain inside the coalition, a problem still remains. Is France's arsenal unfit to face today's potential threats? Are elaborate small-yield weapons needed? The problem is not a technical one but is more a problem of freedom of action. A post-nuclear era, initiated by the demise of the Soviet Union, is not the right time to develop these weapons. Moreover, France's agreement to the

³¹ Ministère de la défense, Livre blanc sur la défense 1994, (Paris: Collection 10/18, 1994), 99.

³² Pascal Boniface, The future of the French Posture, <http://www.idsa-india.org/an-nov9-6.html>, 4.

Comprehensive Test Ban Treaty and the closing of its testing facilities denies this option.

The reality of the threat

An attempt to define the nuclear threats facing France and Europe is very important. Western public opinion and political decision-makers generally believe that there are no more strategic threats against Europe.³³ The end of the bipolar world and the disappearance of the Soviet enemy appeared to orphan the French deterrent. With the demise of the Soviet Union, “for the first time in its history France does not face a military threat near its border.”³⁴ The disappearance of this regional threat is frequently advocated in order to propose budgetary cuts in relation to military nuclear equipment. Therefore, does France require a nuclear arsenal?

In a 1994 White Paper, France completed the first serious review of the threats and risks it faces. The nuclear threats are summarized below and remain the predominant strategic issues of their kind today.

- Today, Russia maintains significant nuclear capacity. The fact that the Soviet Union disappeared does not mean the end of the nuclear threat. With 25,000 nuclear weapons, Russia still remains a potential threat. Nobody can predict the future, and nobody can say who will be in charge of this country after Yeltsin.
- As we enter the new Millennium, the military capabilities of a number of regional powers are on the rise not only in the field of conventional weapons but also, given proliferation, in the field of weapons of mass destruction, including nuclear weapons.

³³ “our country...has no declared enemy and no aggressive requirements” speech of the Prime Minister in front of the Institute of Higher Studies of the National Defense (08/09/1998).

³⁴ Ministère de la défense, Livre Blanc sur la Défense 1994, (Paris: Collection 10/18, 1994), 21

- Another threat is the potential use of weapons of mass destruction on our troops overseas. For instance, Saddam Hussein, instead of launching his Scuds against Israel, could have launched his missiles (with chemical warheads) against the Allied forces during the Gulf War.³⁵ What would be the reaction of the U.S. President?

The 1994 White Paper is too restrictive. Other weapons of mass destruction (WMD) threats have appeared globally. Of great concern is the use of WMD's by terrorist groups. Proliferation, which will occur naturally, is mainly a non-state threat. This threat seems to be relevant after the Aum's chemical attack in Tokyo on March 20, 1995 and illustrated that asymmetrical mass destruction is a reality.

Some people would try to find a new enemy in the South along the "proliferating" nations, especially Libya and Algeria. Is this threat real? The instability of the Mediterranean countries is a great concern for France. However, the threat of French nuclear reprisals, once intended to deter the Soviets, is not easily reoriented against the South. Using the threat of nuclear attack against a non-nuclear armed country of the South would be contrary to France's vision of its place in the world (see later).

Following this assessment, the same French white paper crafted six scenarios³⁶. Two of them (scenarios number 2 and 6) involve the use of nuclear weapons and in a third one (scenario number 3) the use of nuclear deterrence seems possible even if it is not clearly evoked. While admitting the need for a new strategic reassessment, the White Paper did not provide one. Nuclear forces must be capable of

³⁵ "The proliferation of nuclear, biologic, and chemical weapons of mass destruction, typically combined with ballistic missiles, will create a new threat for our defense system, neither for the protection of the territory than for the French troops committed outside". Ministère de la défense, Livre Blanc sur la Défense 1994, (Paris: Collection 10/18, 1994), 106.

³⁶ See annex N°2: The 1994 White Paper threat assessment: Six Scenarios (From Camille Grand, "A French Nuclear Exception," Occasional Paper N°38, (Washington, D.C.: The Henry L. Stimson Center, January 1998), 14.

permanently fulfilling two functions: to inflict unacceptable and possibly repeated damage; and to proceed to a limited strike on military targets, delivering ultimate warning before a massive response.

As described before, the definition of vital interests is so vague that it is possible to assess that nuclear deterrence could be used against various sorts of threats. Therefore, could French deterrence be used against conventional, nuclear, chemical, and biological threats? This question requires a differentiation between the threat, the level and the nature of the aggression, to determine whether this would trigger retaliation. Nevertheless, the use of nuclear weapons against terrorist threats or rogue state threats is a difficult adjustment for the strategists to make. A strategy on how to use nuclear deterrence throughout the continuum of conflict is a broader question to resolve. For instance, the British nuclear arsenal did not deter the Argentines from invading the Falklands. Moreover, nuclear weapons were not rational retaliation even if the Falklands were part of Britain's vital interests. Could France use nuclear weapons to defend a part of its territory? The answer is not easy to predict, but the President would have to take in consideration many constraints. He will have to take into consideration civilian casualties, French force protection, public support, international opinion, environmental problems,... Such a decision is difficult to make as it concerns the vital interests of one's country. Would this problem be manageable by a European coalition (see later) ?

A strategy of means

France built its own weapons while facing budgetary constraints. This imposed limits on the number of nuclear weapons, which in turn led French strategists to craft a strategy adapted to their means. This **strategy of means** resulted in **deterrence by**

the weak against the strong. “The idea was that even though France did not have the means to build a huge nuclear arsenal like the United States possessed, it would be able to deter the Soviet Union from attacking its vital interests by threatening to inflict an unacceptable level of damage on the Soviet Union, a risk that certainly would not warrant aggression.”³⁷

As a consequence, France postured its nuclear deterrence on the **principle of sufficiency**, which has since been adopted by Russia and the U.S. For General Gallois, a nuclear strategist, France has to “take the best part of the atom: its capacity to implement the non-use of war within the unbalance in the capacity of destruction.”³⁸ France needs to possess a nuclear capability only to the level required to deter its strongest adversary at any one time. France by this means was able to stay away from the bilateral arms control talks during the Cold War. It argued that its own arsenal had nothing to do with the enormous and overkill capability of U.S. and Soviet arsenals.

Consequently, the enemy’s cities represent the targets for French nuclear weapons. The limited number of weapons was balanced by the threat of reprisals against what is called by General Gallois the “very substance” of the enemy. If the official language frequently referred to the enemy’s cities as targets in the 1960s and 1970s, by the end of the Cold War these references had disappeared. Today, officials use the words “unacceptable damage.” For Bruno Tertrais, these words “are fairly recent as a standard policy expression, but they correspond to an idea present since the origins of the French deterrent.”³⁹ However, what would be the objective in case of a terrorist aggression? Does the anti-city strike strategy fit the potential

³⁷ Bruno Tertrais, *The French Nuclear deterrent after the cold war*, P 8012 (Santa Monica: Rand, 1998), 9.

³⁸ Gérard Chalian, Arnaud Blin, *Dictionnaire de Stratégie Militaire*, (Saint-Amand-Montrond: Perrin, 1998), 586.

³⁹ Bruno Tertrais, *The French Nuclear deterrent after the Cold War*, P 8012 (Santa Monica: Rand, 1998), 12.

threats? The French strategy to deal with these threats is called an anti-proliferation and counter-proliferation strategy (see later).

An independent arsenal

A fundamental idea behind French deterrence is to remain completely **independent**, a decision which gave birth to a French-made arsenal. This provides to the President the complete right to decision-making on using these weapons unilaterally and independently in the case of a threat. This liberty includes the all-azimuths doctrinal concept, although during the Cold War the enemy was obviously the Soviet Union. Today, possession of a nuclear arsenal is still a key element in France's independence at the political level.⁴⁰ Therefore, France's offer to share its nuclear capability is contradictory with this concept. What could be designed as an eventual model for a European common nuclear capability is the U.S. nuclear umbrella. Similarly, the use of nuclear weapons is always in the U.S. President's hands. Who would be in charge of a Eurobomb? Could France's President accept to give up one of the most powerful attributes of his office? These questions suggest that the idea of the Eurobomb is not yet a reality.

The current layout

The factors supporting the 1995 evolution of the French nuclear arsenal

The current French nuclear layout is the consequence of key decisions made by President Jacques Chirac in 1996. He decided to modify the French triad into a dyad by eliminating its ground component, the 18 Albion ground-to-ground missiles

⁴⁰ Ministère de la défense, Livre blanc sur la défense 1994, (Paris: Collection 10/18, 1994), 99.

(Intermediate Range Ballistic Missiles) and the Hadès short-range missiles. “We are going to close the Albion plateau. Our two submarine and airborne components are now sufficient to guarantee our security.”⁴¹ In September 1996, the S-3D inter-continental ballistic missiles of the Albion Plateau were taken out of service, and the destruction and the dismantlement of the warheads completed in 1998. It is important to underscore that this issue was not debated publicly. The decision was made by the President alone with the advice of the administration.

Three main reasons officially explained the decision. First, the elimination of ground ballistic missiles (short and intermediate range ballistic missiles was made possible by the collapse of the Soviet Union, the main threat. Second, with the end of the Cold War, the defense budgetary expenditures were diminishing in France and throughout Europe. In France, budgetary constraints combined with the will to reinforce the conventional component drove the various governments to decrease the share devoted to nuclear weapons. Therefore, France suppressed its nuclear ground component consistent with its “means” strategy. Third, this component was an old component and its credibility was questionable. During the last years of the Cold War, the fear of the vulnerability of these surface-to-surface missiles to a first strike by Soviet SS18s forced us to reconsider the utility of this component. The new political conditions in Moscow, especially the START agreements, changed the threat, and a strike from Russia seemed politically and technically less probable. Indeed, the decreasing number of warheads from ten to one (demirvation) carried by each ICBM reduced to a large extent the ability of the Soviet missiles to destroy Albion Plateau. Therefore, in the future, we did not see who would be able to destroy the ground component.

⁴¹ President Chirac announced the disbanding of both systems in a TV interview (22 February 1996).

Besides, the dismantling of the pre-strategic Hades missile with its range of 300 kilometers responded to German public opinion fearing a nuclear strike on Germany. The dismantling of the Hadès component presents a problem – France has no preemptive strike capability to deliver an “ultimate warning.” This role is henceforth devoted to the air-to-ground capability.

But, France’s decision rested on maintaining the delivery means it considered more survivable and, therefore, more capable of remaining viable over time. The initial greater expense of retaining mobile delivery means is expected to ensure a cost savings over time.

Budgetary constraints combined with a set of new priorities⁴² will continue to reduce the role of nuclear weapons in French strategy and their share of military spending. Between 1990 and 1997,⁴³ spending on nuclear weapons fell from 38.8 billion francs to 16 billion.⁴⁴ The new Procurement Law (1997-2002) devotes 105.8 billion francs for the six-year period to nuclear deterrence, thus about 17.5 billion francs a year. With less than 21%, the share of nuclear forces within the “Title V” (procurement) of the defense budget has reached its lowest level since the beginning of the French nuclear arsenal. To complete this picture, it is useful to remind the reader that in one of its most recent reports, the “Cour des Comptes” (court in charge of controlling the finances of the government) criticized the use of the defense budget to balance the budget of the nation, delaying and increasing the costs of the military program.

⁴² In the 1994 White Paper, one of the new priorities is the will to improve the equipment of the conventional forces.

⁴³ In 1997, the total nuclear force budget was 20,3 billion francs (10,6% of the defense budget). This sum included 16,5 billion francs for equipment and 3,7 billion francs for operations.

⁴⁴ In 1998, the nuclear share was reduced down to 16,3 billion, that means 15% less than in 1997. For more information see Camille Grand, “A French Nuclear Exception,” Occasional Paper N°38, (Washington, D.C.: The Henry L. Stimson Center, January 1998), 17.

Since the 1995 decisions, the principle of sufficiency is more than ever true because France has drastically reduced its arsenal, cutting its warheads by 15 per cent.

The current lay out: a dyad.

Today, French deterrence relies on sea-based and air-based components.

The sea-based component will be composed of four new generation nuclear submarines (SNLE-NG), two of which will be permanently at sea with a new missile under development. This new submarine generation belongs to the Triomphant-class and is gradually replacing the Redoutable-class submarines. Each submarine is able to carry 16 missiles. This new series of submarines is stealthier and more difficult to detect. They can carry the M 45 missile.⁴⁵ It is believed that the submarines carry fewer nuclear warheads than their maximum potential load, and instead may carry counter-electronic packages and dummy warheads.⁴⁶ The first two Triomphant-class submarines were commissioned in 1996 (the Triomphant) and 1999 (The Téméraire). The third one (the Vigilant) is planned for 2003 and the last one for 2007.⁴⁷ This fourth submarine will be the first one equipped with the M51 missiles⁴⁸ armed with the new nuclear warhead, the TNO (Tête Nucléaire Océanique). The deployment of this new warhead will be vital to France's ability to maintain a nuclear force over the long-term. Today, two of France's older Le Redoutable-class submarines armed with

⁴⁵ The M 45 missile could have a range of 6,000 km or more and could carry up to six TN75 hardened and stealthy warheads, with a reported yield of about 100 kt, as well as penetration aids. For more information, see Admiral Marcel Duval, "Perspective d'avenir de la dissuasion française", Revue de la Défense Nationale, November 1996, 20.

⁴⁶ See Nuclear futures: Western European Options for Nuclear Risk Reduction, www.basicint.org/nufu3-0.htm, (Chapter 3), 5.

⁴⁷ For more details, see Maurice Blin, "Projet de Loi de Finances pour 1998 adopté par l'Assemblée Nationale, Défense," Sénat, Rapport général N°85, Tome 3, Annexe n°43, 1997.

⁴⁸ The M51 will probably have an increased range (8,000 km) and a new nuclear warhead called Maritime Nuclear Warhead (TNO) or also referred as New Nuclear warhead (TNN). For more information, see Admiral Marcel Duval, "Perspective d'avenir de la dissuasion française", Revue de la Défense Nationale, November 1996, 21.

16 M4 missiles remain in service. For the first time since the launching of the first French submarine, an official agency called the CPRA (Committee in charge of determining the cost of arms) has determined the cost of the nuclear submarines. The cost price will consist of 45,114 billion FF (\$7.16 billion) for procurement and 100 billion FF (\$15.91 billion) for the force's 35-year-long service life.⁴⁹

The air-based component consists of a renewed air-to-ground capability (with both a strategic and a pre-strategic component) carried by the Mirage 2000N and the follow-on Rafale fighter-bomber aircraft. The Mirage 2000N carries the ASMP (air-to-surface medium range missile). Growing from one squadron, France now has three squadrons equipped with the Mirage 2000N with ASMP. Each squadron has 15 aircraft. The ASMP has a TN 80 warhead, which has a yield of 300 kilotons and a range of between 80 and 300 km, depending on launch altitude. Around 2008, the ASMP will be replaced by an enhanced ASMP/A missile, which could have a range of 100 to 600 km depending on launch altitude. This air-based component increases the flexibility of our deterrence and is considered by several strategists as a tool for a future Europeanization of the French deterrent.

Two flotillas of Super-Etendard aircraft (24) of the Navy can already use the ASMP, and the aircraft carrier Charles de Gaulle is designed to maintain this capability with the Navy's Rafale. France maintains two aircraft carriers to ensure one is ready to sortie if not deployed already. But, there is still some doubt as to whether France will deploy one or two aircraft carriers in the future.⁵⁰ Therefore, the number of nuclear-armed Navy Rafales that will be deployed remains a question.

⁴⁹ For more information see Jacques Isnard, "Les quatre sous-marins nucléaires français coûteront 150 milliards de francs", *Le Monde*, 30 September 1999.

⁵⁰ In a recent article, Jacques Isnard confirmed that the decision on a second nuclear aircraft carrier will occur in 2002. See "Défense: la France s'essouffle," *Le Monde*, 10 November 1999.

After forty years of existence, France's current nuclear strategy faces numerous challenges. First, survivability runs a gamut of technical, economical, and political conditions. However, a European coalition seems to be at least a pragmatic answer. Technically, survival may center on European assimilation and cooperation. Economically, France may eventually share its nuclear capacity at the European level due to costs. Politically, France must maintain its capability with the support and to support French public opinion.

CHAPTER 4

THE FUTURE OF THE FRENCH NUCLEAR STRATEGY

The evolution of nuclear weapons through simulation

With the Comprehensive Test Ban Treaty (CTBT) and the closing of its test site,⁵¹ computer simulation becomes the essential means to maintain France's capability and credibility of its nuclear arsenal. France developed the PALEN (Preparation to the limitation on nuclear testing) program in order to decrease the number of real nuclear tests. Today, PALEN has been renamed PASEN (Nuclear Testing Simulation Program), to take into account the signing of the CTBT.

For a long time already, the use of computer simulation in laboratories played a key role in understanding how a nuclear explosion works. France considers the use of simulation as a means to maintain its capability at a sufficient level and to keep up the necessary skills to face any threat.⁵² To keep its capability means having the ability to ensure the future reliability and safety of the weapons. Nuclear weapons have a limited life expectancy, which is fixed in France to about twenty years. To fulfill the objective of maintaining this twenty-year-life expectancy, France plans to renew nuclear weapons with the previous concepts already physically tested. Simulation verifies that the inevitable adaptations of these concepts in operational warheads would not decrease the safety and the reliability of the weapons. The role of the

⁵¹ In 1996, France closed its testing facilities in the Pacific Ocean and signed the CTBT. Before signing, France wanted to be sure of the safety and reliability of its deterrence in the mid-term and long-term. Therefore President Chirac decided on a new campaign. The aim of this last campaign was to qualify the TN75 warhead, to learn how to design a more "robust" warhead (since no testing would be possible in the future), and to improve the French database.

⁵² More details about this subject can be found in Jacques Bouchard's article: "La simulation et le renouvellement de l'armement nucléaire," *Défense nationale* n°5, May 1996, 39.

simulation is not to replace real testing carried out for the tuning of a new concept of nuclear weapon, because in any case it will offer the necessary guarantees. Its role is only to complete the results of the testing to enable these inevitable adaptations. Therefore, the development of new types of nuclear warheads is impossible. For instance, studies on the development of the new TN100, designed to equip the future M5 SLBM, were cancelled. After 2010-2015, France will only use the Oceanic Nuclear Warhead (TNO: Tête Nucléaire Océanique) in its SLBM version. This warhead will be a less sophisticated warhead in design and will be developed entirely without the aid of a testing program.⁵³ The aim of the simulation is also to ensure the production of new specialists to replace those who designed the current weapons by real testing. Simulation will be the only way of developing a new generation of nuclear weapon specialists, who will have to maintain the current arsenal without the possibility of organizing new explosions. This will ensure the credibility of France's deterrence, but this will be possible only by using simulation combined with the possibility of comparing the real data obtained through the different rounds of testing.

France is entering the next century with an ambitious nuclear program. It has planned to develop two nuclear warheads and to build new facilities, including a Megajoule laser and the AIRIX radiographic machine at Moronvilliers, to facilitate its simulation program.⁵⁴ In order to decrease the cost, France is in favor of wider cooperation with GB and the US.

⁵³ The yield of the TNO depends on the source. For journalist Jacques Isnard (Le Figaro) the projected yield is 300kt. See Bruno Tertrais, The French Nuclear Deterrent after the Cold War, P-8012 (Santa Monica: Rand, 1998), 38.

⁵⁴ For more information about these facilities, see "Nuclear Futures: Western European Options for Nuclear Risk Reduction", www.basicint.org/nufu3-0.htm, (Chapter 4), 7.

The evolution of the nuclear weapon through cooperation

As we saw previously, France's arsenal is the result of a national effort. If the British took advantage of their initial participation in the American Manhattan project, which explains the lead of Great Britain in carrying out its first explosion, France received little help from the Americans on the scientific and technical plane. Today, cooperation among the three Western nuclear countries has increased steadily. This cooperation is necessary for many reasons. France and the Great Britain, because of budgetary constraints, have shared some results of their research. This subject remains classified, however, and there are few details available. Nevertheless, it is possible thanks to studies of the number of scientific visits between France and Great Britain to guess the size of the cooperation.⁵⁵ Since 1995, the figures show an increase in this cooperation. In 1997, for example, there were reciprocal visits on an average of once every two weeks. These visits focus on nuclear weapons research and development in a post-nuclear testing environment, and especially on the problems linked to stockpile stewardship, i.e., the maintenance of nuclear arsenals without testing.

At the beginning, cooperation between France and Great Britain was not possible because Britain was forbidden from sharing data with other nations without the expressed permission of the US.⁵⁶ Since the 1996 signing of a nuclear cooperation agreement between the United States and France, Britain can now supply France with US-supplied information regarding nuclear weapons design and manufacture.

Nevertheless, as on every team, there are still some difficulties.

⁵⁵ The studies can be found in "Nuclear futures: Western European Options for Nuclear Risk Reduction", www.basicint.org/nufu3-0.htm, (Chapter 4), 5.

⁵⁶ The 1958 US-UK Mutual Defense Agreement requires US consent before the UK can communicate any information acquired under the Agreement to a third party and vice versa.

- The ASLP (Air-to-surface long-range) was designed to replace the ASMP, but the refusal of the United Kingdom to share the cost of this missile has resulted in the project's cancellation.

- The British nuclear deterrence is technologically too dependent on the US to risk America's displeasure.

- The aim of this cooperation is likely not the same for France and Great Britain.

Indeed, in 1993 the British Defense Secretary Malcolm Rifkind, spoke of the need to improve UK-French cooperation, but he placed its prospect as a means to firmly strengthen NATO, "the specific European contribution which underpins the collective security of the whole alliance."⁵⁷ This cooperation will mainly concern deterrence, nuclear doctrine, anti-missile defenses, arms control, and non-proliferation. Prime Minister John Major confirmed this conclusion by saying that there was no room in Europe for a new deterrence agency outside NATO. France and Great Britain have improved their cooperation on nuclear matters for two reasons, as expressed in the 1994 White Paper: "This European choice is necessary for strategic and economic reasons."⁵⁸ However, It will probably reach a deadlock in the near future if the objective of this cooperation is not the same. Budgetary constraints cannot be a strong enough glue to consolidate such a construction. As the White Paper stated, "this progressive construction is leading to the affirmation of a political identity, which would be incomplete if it is not expressed also in the Defense domain."⁵⁹

⁵⁷ Malcolm Rifkind, "UK Defense Strategy: a continuing role for nuclear weapons?" Ministry of Defense, London, 16 November 1993.

⁵⁸ Ministère de la défense, Livre blanc sur la défense 1994, (Paris: Collection 10/18, 1994), 52.

⁵⁹ Ministère de la défense, Livre blanc sur la défense 1994, (Paris: Collection 10/18, 1994), 52

U.S.-French cooperation started in 1961.⁶⁰ Unlike the case with Great Britain, the extent of this cooperation was limited. In 1996, the cooperation took a new start after the signing of a Memorandum of Agreement (MOA) on cooperation concerning nuclear safety and security. This MOA authorizes cooperation on stockpile stewardship and on the exchange of information about nuclear weapons design. The MOA also defines the use of facilities and visits and assignments of technical personnel to take part to join projects. Overall, this MOA greatly improved nuclear cooperation among the three Western nuclear powers. This cooperation is a two-way process. First, it shows that these powers want to share their data to enhance resources for weapons designers in order to retain their nuclear weapons programs in the future. Second, it also indicated that in that matter, the interests of the powers belonging to the nuclear club are similar.

But, cooperation inside the nuclear club is fragile. The refusal of the US Congress to ratify the CTBT, combined with the experimentation of Ballistic missile defenses, threatens the credibility of the French deterrent. In their zeal to develop an anti-missile system, which goes against the 1972 Anti-Ballistic Missiles (ABM) treaty signed with the Soviet Union, the United States could restart a nuclear-weapon race.⁶¹ “Opponents argue that deploying this system would undermine not just the anti-ballistic missile treaty but the entire system of arms reduction and non-proliferation treaties that have limited the spread of nuclear weapons.”⁶² Other countries will try to improve their nuclear arsenals in order to defeat the US’s defenses. Therefore,

⁶⁰ Agreement between the Government of the United States of America and the Government of the French Republic for Cooperation in the Operation of Atomic Weapons Systems for Mutual Defense Purposes, Paris, 27 July 1961.

⁶¹ “The National Missile Defense (NMD) Act states that it is U.S. policy to deploy as soon as technologically possible a system of interceptors, radar, and communications gear that can shoot down an incoming long-range missile.” Bill Gertz, “Clinton signs Bill for Missile Defense,” *Washington Times*, 26 July 1999, 4.

⁶² Elizabeth Becker, “Missile is unable to hit target in Pentagon test”, *Washington Times*, 19 January 2000, 1.

should not France also enhance its capability? For example, will France wait until 2008 to launch its fourth submarine of the Triomphant-class, the first equipped with the M.51 missile, which would be able to defeat anti-missile shields? The decision⁶³ that President Clinton will make in June 2000 could threaten the fragile balance of world deterrence, and the community of interest of the Western nuclear powers. The United Kingdom already has asked the United States to widen its new defense system.⁶⁴

French Prime Minister Lionel Jospin recently denounced this resumption of the arms race in the world. "The global strategic balance would be threatened if we were not able to curb the resumption of arms race...and if the temptation of the main power [the United States, defined in the same speech as the power which is in a relative situation of the dominating power] is to be free from international discipline in the matter of strategic weapons; the same disciplines it defined."⁶⁵

France, with its proposition of a Eurobomb, considers that nuclear cooperation in Europe can go further.

The Eurobomb

This section will deal with the possibility of a **concerted deterrence** and an evolution of the French strategy to establish a Eurobomb. This Eurobomb could be defined as a force that would be independent of NATO.

⁶³ "Mr Clinton said in his statement that a decision on whether to deploy a limited national missile defense will be made next June based on flight tests and other developmental efforts, costs estimates and an evaluation of the threat." (Bill Gertz, "Clinton signs Bill for Missile Defense," Washington Times, 26 July 1999,4).

⁶⁴ Michael Evans, "Britain asks to widen Defense system", London Times, 31 January 2000.

⁶⁵ Speech of M. Lionel Jospin at the Institute for the higher studies of National Defense, Le Monde, 23 October 1999.

Is the Eurobomb a new idea?

The Europeanization of “dissuasion” is probably one of the most important shifts in the French position. Though General de Gaulle already promoted this long-term vision,⁶⁶ this idea was made possible only after an evolution of military affairs in Europe. In fact, before the end of the Cold War, this concept was opposed to deterrence. The White Paper of 1972 explained that “nuclear deterrence is exclusively national.” French will to get a nuclear arsenal was the direct consequence of realizing the unreliability of the American nuclear umbrella after the Suez crisis. Therefore, it became absurd to try to extend France’s deterrence to Europe. How credible could such an offer be, when Paris denied that even the mighty American nuclear deterrence would be extended to anyone?

Concerted deterrence.

President François Mitterrand, in mid-January 1992, changed French deterrent thinking.⁶⁷ He proposed to study the extension of the French nuclear “dissuasion” to Europe if a common security policy was implemented. It was the second time that President Mitterrand had proposed this idea. In 1986, he had suggested that France was ready to consult with the Chancellor of Germany on the use of tactical nuclear weapons by France on German soil, and even to cover Germany officially with the nuclear umbrella. This idea was rejected by Germany.

Three years later, in January 1995, Prime Minister Alain Juppé made a new overture in favor of sharing the French deterrence, which introduced the concept of

⁶⁶ Frédéric Bozo showed that General de Gaulle had envisioned a “European future” for the French deterrent. See Frédéric Bozo, “Dissuasion concertée: le sens de la formule”, Relations Internationales et stratégiques, n°21, Spring 1996, 93.

concerted deterrence. “After the development of a common doctrine on the part of France and the United Kingdom, should our generation shrink from envisioning, not a shared deterrent, but at least a deterrent coordinated with our principal partners? I ask the question: with the adoption of a monetary union and the forging of a new Franco-German understanding, can it really be imagined that France’s perception of its own ‘vital interests’ will remain unchanged?”⁶⁸

The problem of the Europeanization of deterrence is to avoid a violation of the Non-proliferation Treaty, especially when cooperation in matters of nuclear deterrence can be considered a proliferation throughout Europe. This concept evolved from the notion that the vital interests of France, the United Kingdom and the other partners are now so entangled that the broadening of deterrence by the two nuclear powers to their neighbors could be undertaken without any need of a declaration or participation of the other states. “French vital interests have been defined more politically than geographically for several years. This is one of the principal results of fifty years of reconciliation and mutual dialogue. It is also the result of European construction... Future European defense will not be built without, in one way or another, French – and British – deterrence playing a role.”⁶⁹ The concept foresaw national control of the nuclear arsenals with a European doctrine for their use.

⁶⁷ “Only two of the twelve have nuclear forces. For their national policies they have a clear doctrine. Is it possible to conceive a European one”? President François Mitterrand, “Speech to the Seminar, Rencontres Nationales pour l’Europe”, 11 January 1992.

⁶⁸ Prime Minister Alain Juppé, “Speech at the 20th Anniversary of the Analysis and Forecasting Center,” 30 January 1995.

⁶⁹ Prime Minister Alain Juppé, “Speech to the Institute of the Higher Studies for National Defense”, 7 September 1995.

The difficulties faced by this concept

These proposals were not really appreciated by the other European partners. Though a shared vision of the vital interests with some members of the E.U. had appeared, France received no request from these members about a European role with their weapons. If France's European partners agreed with the 1974 Ottawa declaration,⁷⁰ they did not express a real interest to the French proposal. Responding to M. Alain Juppé (7/09/1996), M. Klaus Kinkel added that Germany was not interested in a "supplementary security," which would be added to the one already provided by NATO. The Amsterdam Treaty places the future of European defense very firmly in a NATO context. France, being outside the integrated military structure of the alliance, and outside the Nuclear Planning Group, will face many difficulties in developing its concerted deterrence. Moreover, the mainly negative reaction of the European governments after the French decision to resume its testing indicated that the Eurobomb is not yet a political desire of these countries. Indeed, ten to fifteen of France's partners in the European Union voted in favor of a projected resolution by the United Nations Organization (UNO) Commission for disarmament. Many reasons can explain this negative reaction to the French proposal.

First, it was seen as a French attempt to link common security policy to France's nuclear arsenal. Second, a significant misunderstanding was also reinforced by the fact that France decided to resume its testing the same year that Alain Juppé had put forward his proposal. Therefore, this initiative was taken as a clumsily disguised attempt to endorse testing by Europe. Third, if France considered "dissuasion" as the only real means to preserve its independence and security, the

⁷⁰ The 1974 Ottawa declaration recognized a real role of the French and British forces in the Western general deterrence.

other partners saw it as a threat. Fourth, public opinion is not ready to hear of any form of European common nuclear policy and, as a result, the governments refused to take any risks on the issue, which is perceived as neither urgent nor vital. Lastly, the reliability of the comfortable umbrella provided by the United States enables some countries to discount future concerns. However, the resumption of ABM defense system research, combined with the possible restriction of US protection due to domestic pressure (isolationism) and to the enlargement of NATO, might lead these countries to reevaluate the threat. Such a process could result in the establishment of a concerted deterrent complement of the US nuclear umbrella. Moreover, the Franco-British joint commission identified four prerequisites for a European deterrent in 1993: a common concept, common vital interests, a sharing of roles and responsibilities, and close cooperation with the US. These concerns are always relevant.

Though France was considering major concessions to its partners, the latter were either indifferent or hostile, fearing to become “nuclear countries” against their will. Consequently, no parliament has supported the French concept, even if some influential figures, such as former Belgian Prime Minister Leo Tindenmans, have strongly supported it.

However, France launched a debate which has not yet ended. As soon as Europe resumes its political construction, the concerted deterrence will be at the center of this debate. For Bruno Tertrais, “concerted deterrence is thus first a recognition of the necessity of taking into account the European dimension in policy decisions about nuclear military issues, and second, an openness in principle to consider options for greater cooperation among European countries in the nuclear field.”⁷¹

⁷¹ Bruno Tertrais, The French Nuclear deterrent after the Cold War, P-8012 (Santa Monica: Rand, 1998), 45.

France has not given up. In a nuclearized world, an efficient and powerful European defense needs a nuclear pillar. In order to get a stronger Europe, France wants to implement the Common Foreign Security Policy (CFSP). As M. de Decker wrote in his report, it would be “totally illogical to start implementation of the CFSP without examining the role of the French and British nuclear forces in the definition of a common defense policy of the EU.”⁷² Therefore, from a French official point of view, France’s concept of concerted deterrence is sound, and the result of the inevitable discussions on that matter will determine the future of the CFSP. The 1994 French White Paper, the first official government document to breach the option of a Europeanized deterrent, underlined this idea: “National independence, and the independence of the future Europe, are without any doubt linked to the possession of such [nuclear] weapons.”⁷³ The question of a European nuclear doctrine will become one of the major questions with the erection of a Common Security Defense...”Indeed, with the nuclear option, Europe can become autonomous in defense matters. Without it, this is impossible.”⁷⁴

The implementation of a concerted deterrence

What could be the intent of a concerted deterrence? Is it to associate sovereign states with the use of the nuclear deterrence as it is already done inside the NATO Nuclear Planning Group? This cooperation will require the existence of a leading nation. Such an unequal relation does not fit within the European Union working

⁷² Report of M. de Decker of the Defense Committee of the assembly of the Western European Union (nominated in the treaty to implement decisions of the European Council with defense implications) on the role and future of Nuclear Weapons quoted in “Nuclear Futures: Western European Options for Nuclear Risk Reduction”, www.basicint.org/nufu3-0.htm, (Chapter 3), 7.

⁷³ Ministère de la défense, Livre blanc sur la défense 1994, (Paris: Collection 10/18, 1994), 93.

⁷⁴ Ministère de la défense, Livre blanc sur la défense 1994, (Paris: Collection 10/18, 1994), 98.

rules. The leadership, which will belong to France or Great Britain, will affect the sensitivity of many other members. This is a concern.

Is it a sharing of the nuclear capability? This is not easy and M. Alain Juppé expressed this idea when he was Foreign Minister: “Deterrence cannot be split in terms of decisions.” Is it a co-management of the means on which deterrence is based, with Paris and London retaining the entire decision on use? In that case, with the demise of the Soviet threat, the surface-to-surface missile component could be used as a tool to develop a European deterrence. It was possible to keep ICBMs operational by associating some of our partners to its daily management within a concerted deterrence. Such an association is more problematic with sea-based component. An accident under the sea or an attack during a patrol or in a harbor by an enemy using only conventional means are always possible, whatever the quality of the team and the stealthiness level of the Triomphant-type submarine. For Yves Boyer, “during the inter-war period a destruction of the French fleet by the British Home fleet was an absurd hypothesis. Everybody knows what happened in 1940 when Admiral Sommerville, carrying out the orders issued by London, launched with his squadron an attack against the French fleet partially anchored in Mers-el-Kebir. ”The same thing is always possible with a nuclear arsenal. A high-intensity crisis could drive France to threaten its neighbors by using its nuclear arsenal against the interest of another significant power. This country could then attack our submarines, and therefore leave France without any other solution. Is it just as the French Defense Minister, M. Charles Millon proposed, “a meeting to elaborate the doctrine of employment?” As for the possibility that Europe takes over France and the United Kingdom in order to build a nuclear submarine or a nuclear aircraft carrier, it will be necessary first to convince the Europeans of the necessity of such programs. It is

perhaps possible to consider some partnership project by project, country by country. Prior to such decisions, however, it will be important that the European countries agree on the necessity to stop the decline in their defense budget.

A concerted deterrence can take many forms, but prior to making a choice, it is important to determine the objective to be reached.

The objective to be reached

Whatever the means, the proposal for concerted deterrence is on the way, launched by the French authorities. This proposal conveys the problem of the utility of nuclear deterrence. The fact that many are opposed to the nuclear option throughout the world suggests that nuclear deterrence is an idea to reconsider.

Dealing with the nuclear issue is in fact to start from the existing realities and not from obsolete doctrines. Among these realities, there is the existence of the weapon. Nuclear weapons exist and it is impossible to go back and forget their existence. Moreover, nuclear weapons, as we saw previously, are a good means of avoiding a long and difficult war with many casualties. Another advantage is the idea of the independent centers of decision-making inside NATO. This idea, adopted during the Ottawa Convention and reassessed in the strategic concept of NATO adopted in Rome in 1991, could take a new dimension in case of the reinforcement of the European Union. The uncertainty that always exists in the mid-term about the position of the United States towards Europe must push the Europeans to consider options other than putting their existence only into the US alliance's hands. This idea, evoked by Alain Juppé, will have to persuade the Europeans to deal with the potential existence of autonomous means of strategic-political decisions.

Today, nuclear deterrence is aimed at a virtual enemy, about we do not have data. Therefore, the doctrine for a European deterrence must remain vague. Thinking

must be oriented to define a deterrence concept aiming to maintain some simple goals such as avoiding a destabilization of the international order and to reduce the possibility of major war.

Moreover, concerted deterrence may not necessarily involve all the European countries.⁷⁵ It may only concern some of the European countries and, among them, the United Kingdom and Germany.

A Strategic Partnership with Germany

France must also convince Germany to consider the establishment of a **strategic partnership**. An agreement about the concerted deterrence with Germany will lead other allies to support this option. This idea to implement cooperation between France and Germany is not new. In the 1950s, France and Germany agreed on a draft about a “Common Research and Utilization of Nuclear Energy for Military Purposes.” President de Gaulle and Chancellor Adenauer, however, blocked this project in 1958.

Germany’s readiness to participate in a “dialogue on the role of nuclear deterrence in European Defense policy” was officially announced through the “Franco-German Concept on Security and Defense” issued after the Nuremberg Franco-German summit in December 1996.⁷⁶ However, the German government, in 1998,⁷⁷ stated that this dialogue should be viewed in the NATO context to allow participation of the UK. France is well aware of the reluctance of Germany to give up the U.S. umbrella. “What could France possibly contribute that Germany, a

⁷⁵ “it is equally true however, that it would be contrary to the spirit of European construction for some of them to take ‘a free ride on a collective good’. The Swedish renunciation of the nuclear option seems to have been partly caused by a belief that Sweden was de facto covered by the U.S. nuclear umbrella. See Cole (1994)” quoted by Bruno Tertrais, The French Nuclear Deterrent after the Cold War P-8012 (Santa Monica, Rand, 1998), 46.

⁷⁶ “Franco-German Common Security and Defense Concept”, 9 December 1996, para.3.1.

⁷⁷ Deutscher Bundestag, “Answer of the Federal government to questions”, 28 April 1998.

beneficiary of the U.S. deterrent, does not have already?”, said Prime Minister Alain Juppé in 1995. It is a mistake to believe that France wants to take the place of the United States instead of understanding that it wants only to complement the U.S. protection for the reasons we discussed previously. In that respect, the concept of the “second center of decision making,” used to explain the existence of an independent UK deterrent, is valuable. Concerted deterrence will increase the difficulty of planning for a potential adversary.

In Germany, opinion about a "concerted deterrence" is split between pros and cons. On the one hand, with a more united Europe, Germany should volunteer for a "Europeanization" of the French and British weapons. On the other hand, the opposition has mobilized people against this idea along with people who argue that France would be better off joining the nuclear planning group, instead of seeking a Eurobomb.

By means of concerted deterrence, the French government ensures that Germany is still anchored in a European Union with a European Defense identity as a rational component. France wants to prevent any reemergence of a nationalistic Germany's security and defense policy, and this idea of sharing the “force de frappe” avoids Germany’s development of its own nuclear deterrent. Besides, it would offer France the opportunity of sharing the heavy financial burdens of research and maintenance.

Moreover, for Germany to share the responsibility of nuclear power is a means to put an end to the separate status of France. German officials have recognized that France with its own deterrence and as a member of the Security Council plays a more influential diplomatic role than Germany. Therefore, Germany could try to minimize this role in order to erase the difference in status between the two countries.

How will Germany, which has renounced nuclear weapons and refuses to have “its finger on the button” participate in a European deterrent? Part of the answer is in the right to change its mind as Germany did when it decided to send military forces outside Germany as part of a military operation. In the case of a Eurobomb, what would be the Russian reaction to a Franco-German nuclear coalition? Would it resume the Cold War? An answer to this geostrategic question is fundamental before going further to the Europeanization of the French arsenal.

The evolution of the nuclear weapon through arms control

From the French point of view, nuclear disarmament and nuclear deterrence are not mutually exclusive. Disarmament can be achieved by reducing the arsenal’s overall number of warheads, thereby defining a more reasonable posture. At the beginning, France refused to be subjected to arms control conventions because perceived instruments of superpower control over France were unwelcome to the national character. Now, on the other hand, France is a key promoter of arms control and non-proliferation measures, even though it maintains a nuclear arsenal.

France’s nuclear arsenal reached its highest point in 1991, with a deployment of 540 warheads. Since then, France has unilaterally reduced its nuclear arsenal by over 30%, and ultimately disarmament will result in the complete elimination of nuclear weapons.

President Chirac, while announcing the end of the nuclear tests in 1996, declared that a new chapter was beginning, one in which France would work actively in favor of disarmament. On September 8, 1998, Prime Minister Lionel Jospin explained this idea: “France’s nuclear deterrence has today entered a new era. The evolution of the strategic context permits a reduction in the number of weapons, as

well as in the state of alert of the forces, but nuclear deterrence remains at the center of our defense.”

France was the first country to accept the zero option in the comprehensive test ban treaty⁷⁸. It also closed its testing facilities on Mururoa, signed the Treaty of Rarotonga for the denuclearization of the South Pacific, and the treaty of Pelindaba, offering Africa the same status. Finally, it took part in an effort to the cut off negotiations on the production of fissile materials. Can France go any further?

France, the United Kingdom, and China have indicated their willingness to take part in multilateral reductions only if the United States and Russia will implement substantial cuts in their respective arsenals. Currently, the French arsenal is less than 5% of either the American or the Russian arsenals. Therefore, the focus of future nuclear disarmament should be on transparency and de-alerting measures. France is likely to wait for the implementation of the START II and III treaties before agreeing to negotiated reductions in French forces.

⁷⁸ The idea is that CTBT should apply to all nuclear explosions.

CHAPTER 5

AN ASSESSMENT OF THE FUTURE OF FRANCE'S NUCLEAR STRATEGY

Having previously described the French nuclear strategy in 2000 with its weaknesses, this paper will now explore its possible evolution into the 21st century. France will remain a nuclear power at least through the first portion of the next century. Thus, France must deal with global political pressures regarding nuclear disarmament, continued discussion of a Eurobomb, and continued restrictions on nuclear testing. Furthermore, France must maintain public support in order to afford its nuclear forces.

Undoubtedly, France will **remain a nuclear power** to ensure its security and keep its freedom of action. In the post-Cold War era, conventional operations often occur without any concern for nuclear deterrence. While this trend is likely to continue, it does not mean that France will abandon nuclear weapons. In a 1997 defense budget report, Jean Michel Boucheron, the speaker of the Socialist Party, explained why: “Since it is impossible to foresee the evolution of the geostrategic situation in Europe over the next fifteen or twenty years with sufficient reliability, it is therefore necessary to preserve the credibility of our deterrence for this period and beyond. It is therefore essential to preserve our capability to develop and maintain a credible deterrent in the very long term, including warheads, vehicles [missiles], and launch platforms [nuclear powered submarines].”⁷⁹

⁷⁹ Jean Michel Boucheron, Rapport n°305, Projet de loi de Finances, Annexe 40, Défense, (12 November 1997), 85.

In the 21st Century, France's nuclear arsenal can no longer be justified by appeals to the greatness of France or the need to safeguard the country's rank within the international hierarchy, but only through **appeals to security**. Thus, France can easily justify its nuclear capability. The world situation is too unstable for France to safely renounce deterrence as the cornerstone of its national defense strategy. Moreover, France threatens no one with its nuclear strategy.

The purpose of France's nuclear arsenal is to prevent any attack on its territory and/or its vital interests. Nevertheless, the use of nuclear weapons will not always be appropriate in defending France's vital interests. For instance, the risks coming from proliferation cannot be eliminated by one single instrument of national power. It is necessary to consider a larger spectrum of courses of action, such as preventative measures, international sanctions, as well as the use of military force. With regards to its force structure, France has reapportioned its conventional and nuclear budgets since 1994 in order to increase its conventional force capabilities. In French defense strategy, nuclear weapons no longer occupy the central place they had during the Cold War. Therefore, have nuclear weapons lost their utility? The answer is no. Deterrence has never been the response to every military threat. As previously mentioned, nuclear arsenal aims to protect France's sanctuary and vital interests. The non-use or even lack of the threat of use of nuclear weapons during the Gulf War or in Yugoslavia illustrated only that there were no vital interests for France in these areas.

How will France's remaining a nuclear power impact its status as a world leader, given the rising opposition to nuclear weapons by the non-nuclear states? Its

status as a world leader should remain secure as long as France continues the following policies:

- strict deterrence with no first-use of nuclear weapons,
- downsizing of its nuclear arsenal,
- compliance with the Comprehensive Test Ban Treaty,
- active participation in non-proliferation and arms negotiations.

The disadvantages of the Eurobomb will continue to outweigh the advantages well into the 21st century. The factors previously discussed will remain unchanged. The promise of sharing the financial burden of nuclear weapons with other countries will ensure that the Eurobomb will have its advocates. The greatest utility of the Eurobomb would be to protect the vital interests of Europe. However, French vital interests do not necessarily coincide with European vital interests, and the Eurobomb has the potential of limiting France's sovereignty. Concerted deterrence allows the European to transcend French sovereignty at a most fundamental level – security. Though France is committed to the European system in many respects, France's national security remains to be interpreted only by France herself. Consequently, France needs to keep an independent nuclear arsenal, supported by simulation, increasing cooperation, and French public opinion.

To maintain a credible arsenal, France will henceforth use simulation in conjunction with GB and U.S cooperation. By 2002 the plants at Pierrelatte and Marcoule, which manufacture fissile material for nuclear weapons, will close. Nevertheless, by destroying the Hades missiles, France retrieved fissile material, which is being added to the military stock for use in future M51 warheads and the

ASMP/A. Therefore, the cut-off of fissile material production is not a major concern for France, which has a stockpile of fissile material to last for the next fifty years. This capacity for the French arsenal to evolve is a guarantee of its future credibility.

Domestically, France's nuclear arsenal is supported by a large consensus. This consensus must be a permanent concern for the government in order to let France preserve its freedom of choice between a Europeanization of its capability and an independent arsenal. Indeed, an independent arsenal needs to be supported by French public opinion to strengthen the government in the face of international opposition. Therefore, the French government needs to educate its people on that subject in order to prevent the appearance of a fragility inside the new generation, which would not be concerned by the Cold War.

Limits

This study is constrained by several limits. First, the level of classification surrounding nuclear subjects imposes limits. The included comments about cooperation and simulation are provided without much source reference. Second, the silence of the politicians, who fear this subject due to its volatility with the Greens and some non-governmental organization such as Greenpeace, is also an important obstacle that stymies any serious debate on the subject. Speaking of nuclear deterrence is always criticized by a minority, whose voice can be strengthened by this topic, regardless of the fact that French public opinion agrees with current nuclear strategy.

CONCLUSION

The recovery of the independence is the main goal of our nuclear forces

(General de Gaulle)⁸⁰

The French nuclear arsenal has its roots in France's history. Three invasions in less than one century, the defeat of 1940, and the Suez Crisis constitute the main historical elements, explaining the IVth Republic's will to develop a nuclear program. The return of President de Gaulle and the establishment of the Vth Republic modified the very nature of nuclear weapons, making them a new tool of France's independent policy. Nuclear weapons offered France freedom of action and influence and gave France the ability to play a key role in international community as a global power. France gained the image of a strong modern nation independent from the bipolarity of the Cold War.

Supported by a strong consensus in public opinion and in political circles, the nuclear arsenal demonstrated the French will to prevent invasion or serious threats to France's vital interests. For economic reasons, France has developed a deterrence which followed the principle of sufficiency. Therefore, this strategy of means resulted in deterrence by the weak against the strong.

French deterrence still consists of both nuclear and conventional components. The end of the Cold War has shifted the focus from the nuclear arsenal to conventional forces. Well-trained and equipped professional forces are henceforth necessary to deal with contingencies, while nuclear forces need to be maintained for the defense of vital interests. To ensure a defense capable of protecting its vital

⁸⁰Alain Peyrefitte, C'était de Gaulle, (Paris: Fayard, 1997), 119.

interests, France requires nuclear missiles able to strike anywhere in the world. This can be done by the sea-based component while the air-based component is assigned the short-range,” tactical” mission.

With the end of the Cold War, France joined the other nuclear powers to negotiate arms control and disarmament. With this shift, France abandoned its historical nuclear independence and understood that it had many things in common with the other nuclear powers, especially its will to remain nuclear. France does not believe that nuclear disarmament opposes nuclear deterrence. Indeed, for France, nuclear weapons remain the best means to prevent war. Nevertheless, implementing non-proliferation, safety, and confidence-building measures and dismantling excess stocks of weapons contribute to the development of a safer world.

For the foreseeable future, France must maintain its independent nuclear capability and not implement the Eurobomb concept. Maintaining an independent nuclear capability provides the following benefits:

- Continuation of French freedom of action;
- Protection against all-azimuths threats by ensuring immediate reprisals in case of attack;
- Reinforcement of the US nuclear “umbrella” with France as an independent center of decision-making, linked to NATO;
- Ability to offer Europe a common nuclear capability in case of a withdrawal of US nuclear weapons from Europe;
- Continued coherence of French deterrence as the cornerstone of French defense strategy.

However, an independent nuclear capability is not without costs, which are as follows:

- Isolation of France by non-nuclear European countries:

This isolation can easily be outmatched, given the fact that the world is nuclear. The opposition of the non-nuclear European countries is possible only because of the protection provided by the American nuclear umbrella, which is reinforced by the British and French arsenals.

Moreover, continued arms control and disarmament negotiations will demonstrate that French deterrence is established to avoid war and the use of nuclear weapons

- High economic cost:

An independent French nuclear capability is more expensive than the Eurobomb because France cannot cost-share with its allies. France can bear the higher costs only by maintaining strong public support for its policy.

The consensus of the French people will be strengthened by stimulating the debate about nuclear weapons to illustrate the importance of such weapons in French Defense. This debate will compel French decision-makers to accept its outcome, whether for or against continued nuclear capability. This would modify the current process in which only the president makes decisions regarding nuclear strategy.

- Internal political cost:

Such a debate would also require the government to define a real nuclear strategy, whether independent or otherwise. This strategy should link civilian nuclear power plants with the military nuclear arsenal. Indeed, the

problem of the destruction or stockpile of radioactive wastes outlines the common problems of both civilian and military nuclear applications. By following a combined civil-military nuclear strategy, the decisions would be consistent with French security needs.

In conclusion, for France the benefits of maintaining an independent nuclear arsenal outweigh the costs. French independent deterrence is required as long as the world remains nuclear. As a result, France needs to keep its nuclear capability in order to maintain its security and protect its vital interests.

ANNEX 1: CHRONOLOGY

1945	Creation of the Atomic Energy Center (C.E.A.).
20 January 1946	General de Gaulle resigns as Chief of Government.
15 December 1948	The first French nuclear battery is activated.
7 April 1954	General de Gaulle advocates a French Nuclear arsenal.
1956	Suez Crisis: Washington refuses to guarantee French and British security.
30 November 1956	Agreement between the C.E.A., the Defense Secretary, and the Finances Secretary to accelerate the nuclear program.
25 March 1957	The European Community of the Atomic energy (EURATOM) created by the Rome Treaty.
1 January 1958	Implementation of EURATOM.
13 May 1958	Insurrection in Algiers.
29 May 1958	General de Gaulle comes back to power to solve the Algerian crisis.
17 September 1958	General de Gaulle proposes to the U.S. and to Great Britain the establishment of a three-member directorate within NATO.
13 February 1960	Explosion of the First French atomic bomb at Reggane.
1960	First Procurement law is established with funding priority granted to maintain a nuclear arsenal.
1964	The Nuclear Strategic Force becomes operational.
24 August 1968	Explosion of the First French thermonuclear bomb at Mururoa.
29 Mars 1967	The first nuclear submarine “ le Redoutable” is launching.
1971	The ballistic missiles of plateau d’Albion become operational.

1974	The Ottawa convention recognized a real role of the French and British forces in the Western general deterrence.
1974	The Pluton Missiles enter into service.
1974	France ratifies Protocol I of the Tlatelolco Treaty.
1981	The election of President Mitterrand has no consequences on the French dissuasion.
1992	France ratifies Protocol II of the Tlatelolco Treaty.
April 1992	French unilateral moratorium on testing.
June 1992	The Hadès missile is placed in a non-operational storage status.
August 1992	France adheres to the Non-proliferation Treaty.
July 1993	France agrees to negotiate a comprehensive Test Ban Treaty.
April 1994	The French White Paper is published.
October 1995	The declaration on nuclear posture about common vital interests with the United Kingdom is published.
13 June 1995	President Chirac announces that France will commit to the CTBT following a final series of tests.
22 February 1996	Dismantlement of the missiles of the Plateau d'Albion and of the Hadès Missiles.
29 January 1996	Chirac announces on TV the definitive end to French nuclear testing.
1996	Launching of the first Triomphant-class submarine.
25 March 1996	France signs the Protocol to the Rarotonga Treaty.
11 April 1996	France signs the Pelindaba Treaty.
1997	France launches her second Triomphant-class submarine.

ANNEX 2: The 1994 White Paper threat assessment: six scenarios⁸¹

Table 1: The 1994 White Paper Threat Assessment: Six Scenarios

Number	Scenario	Role for nuclear weapons
No. 1	Regional conflict that does not involve French “vital interests”	No role for nuclear weapons
No. 2	Regional conflict that may involve French “vital interests” in Europe or “in a longer time-frame, in the Mediterranean and in the Near and Middle East”	“A deterrent maneuver, adapted to this particular context, might be necessary to accompany our decision to intervene”
No. 3	Attacks on French territories overseas (French West Indies, French Guiana, and Indian Ocean and South Pacific islands)	These territories are covered by deterrence, with no further details regarding the role for nuclear weapons
No. 4	“Implementation of bilateral defense treaties” (primarily with African countries)	No role for nuclear weapons
No. 5	“Operations in favor of peace and international law”	No role for nuclear weapons unless the peace mission evolved into a no. 2 scenario
No. 6	“Resurgence of a major threat against Western Europe”; although considered “hardly plausible today,” this scenario, if it ever occurred, would present “a deadly risk” for France	The role of nuclear deterrence is certainly central in this scenario

Source: *Livre blanc sur la défense*, 1994.

⁸¹ From Camille Grand, “A French Nuclear Exception,” *Occasional Paper N°38*, (Washington, D.C.: The Henry L. Stimson Center, January 1998), 14.

ANNEX 3: Nuclear Weapons Database

Nuclear Weapon Database:

French Arsenal⁸²



Note: All specifications are from recent Jane's Information Group publications (*Strategic Weapon Systems*, *Fighting Ships*, *Naval Weapon Systems*, and *All the World's Aircraft*), except "Throw-weight", and "Yield" which are from the International Institute for Strategic Studies' *Military Balance 1995-6*, "Locations," and "Number Deployed" are from Arkin and Norris, *Bulletin of the Atomic Scientists*. Disagreements are footnoted (with hypertext links), as are selected facts in the text.

The entries are listed as follows:

- [Sea-Based Strategic Weapons](#)
 - [L'Inflexible SSBN](#)
 - [Le Triomphant SSBN](#)
 - [M-4 SLBM](#)
 - [M-45 SLBM](#)
- [Air-Based Strategic Weapons](#)
 - [Mirage 2000N](#)
 - [Super Etendard](#)
 - [ASMP SRAM](#)
- [Footnotes](#)
- [Link to Brief Summary of French Arsenal](#)

Sea-Based Strategic Weapons

L'Inflexible (SNLE M4) SSBN

⁸² Source: www.webcom.com/~larkin/ZNW/LWGraf.NuclearDesigns.html



- o Year Deployed: 1973
- o Displacement: 8,080 tons surfaced, 9,820 tons dived¹
- o Dimensions: 128.7 meters length, 10.6 meters height, 10 meters diameter
- o Propulsion: Nuclear, 1 shaft, 1 propeller
- o Speed: 25 knots dived, 20 knots surfaced²
- o Missiles: 16 M-4 SLBMs
- o Locations: Ile Longue, Brest - 4
- o Number Deployed: 4 submarines
- o Primary Contractor: Direction des Constructions et Armes Navales³

These ballistic missile submarines (SSBNs) were previously known as the Le Redoubtable class (and are sometimes referred to as the modified Le Redoubtable class). But when the vessel bearing that name was decommissioned in 1991, they were renamed the L'Inflexible class, after the newest vessel. The other four submarines have undergone a two and a half year modernization overhaul in the 1980s which fitted the M-4 missiles, replaced the missile launch system, installed new reactor cores, updated the sonar, and improved quieting up to the standard of the L'Inflexible. These boats are scheduled to begin retirement one already retired in 1996, with two others scheduled in 1998, and 2002 -- four new Le Triomphant SSBNs will gradually replace them.⁴

Like U.S. and British SSBNs, the French have two rotating crews for each of their missile boats, which they call Rouge (red) and Bleu (blue). The submarines usually spend two months on patrol, then return to Brest to exchange crews and perform maintenance before heading back out to sea.⁵ French policy has been to maintain three SSBNs ready at all times, with two at-sea on patrol. This was difficult with the early M-1 SLBMs and M-2 SLBMs, which had to patrol off Norway's north coast to reach inland targets in Russia. The M-4 has cut down dramatically on transit time to patrol areas, which because of range can include the western Atlantic. With the M-4 missiles, the SSBNs can even reach some targets in Russia from dockside in France.⁶ Each SSBN carries several predetermined "target

dossiers" on magnetic disks. The entire complement of 16 M-4 missiles can be fired in 3-4 minutes.⁷

Unlike the British, who developed a sea-based deterrent with significant U.S. aid, the French did it largely on their own. While there was much sharing of nuclear design and test data with the United Kingdom, including the outright sale of SLBMs, there was little such cooperation with the French. In the spirit of Charles de Gaulle's independent *force de frappe*, and its later incarnation, the *force d'dissuasion*, the French embarked on constructing their own nuclear triad. Little American aid was forthcoming during initial development, though there was some U.S. nuclear aid after 1972, after the French had developed their first generation of weapons. French SSBNs and SLBMs consequently have lagged at least a generation behind the U.S. Today the U.S. is sharing testing and simulation data with the French to maintain their arsenal under the Comprehensive Test Ban Treaty.⁸

With President Chirac's announcement in February, 1996 of the elimination of the S-3 IRBMs, as well as other recent reductions, the SSBNs will play an even larger role in France's nuclear deterrent. In addition to destroying the S-3 silos on the Plateau d'Albion, the short-range Hades missile (follow-on to the retired Pluton) will be eliminated as well, as have Jaguar and Mirage IVP aircraft from the nuclear role. However in an interesting counterpoint to these reductions, France is going ahead with modernization of its remaining nuclear forces in the next decade, including a new short-range attack missile, the ASMP+, a new SLBM, the M-51, and equipping the new fighter-bomber, the Rafale D, for the nuclear role. The French policy brings some welcome reductions, but the modernization program seems excessive given the lack of an enemy.

Le Triomphant SSBN (SNLE-NG)



- o Year Deployed: 1996
- o Displacement: 12,640 tons surfaced, 14,335 tons dived dived⁹
- o Dimensions: 138 meters length, 12.5 meters height, 17 meters diameter
- o Propulsion: Nuclear K-15 reactor, 1 shaft, pump jet propulsor¹⁰

- o Speed: 25 knots dived dived^{[11](#)}
- o Missiles: 16 M-45 SLBMs
- o Locations: Ile Longe, Brest - 1
- o Number Deployed: 1 submarine
- o Primary Contractor: Direction des Constructions et Armes Navales^{[12](#)}

The Le Triomphant boats are the latest addition to the French missile submarine force, the FOST (Force Oceanique Strategique). They are referred to as the SNLE-NG (SSBN, New Generation). A class of six was originally planned, but that was reduced to four. There was widespread speculation that this total might be further reduced to three, but President Chirac has reaffirmed that four Le Triomphants will be built. These submarines are a replacement for the aging L'Inflexible class of SSBNs. The first of the class was expected to conduct its first patrol by the end of 1996. The second boat is scheduled to become operational in 1999, the third in 2001, and the fourth in 2005.^{[13](#)}

The Le Triomphant class will be quieter than its predecessor, heavier, able to dive deeper, and have more advanced computers and software.^{[14](#)} It is built of HLES 100 steel, and capable of diving to 500 meters, twice that of its predecessor. Much though has been given to quieting, and the radiated noise level has been described as "less than that of the sea bottom noise ... reduced to a few millionths of Watts."^{[15](#)}

The Le Triomphants will initially use the M-45 SLBM with TN-75 warhead, but are planned to use a new missile, the M-51, which is under development. The proposed M-51 SLBM is a very long term project; backfitting of the Le Triomphant class to carry the proposed M-51 is scheduled to begin in 2010. Four boat loads of M-51s were originally to be ordered but this number will likely be reduced to three to rotate among the four planned submarines. In addition to torpedoes for self-defense, the Le Triomphants also carry an unknown number of SM-39 Exocets.^{[16](#)}

M-4 SLBM



- o Year Deployed: 1985
- o Dimensions: 11.05 meters length, 1.93 meters diameter¹⁷
- o Weight: 35,000 kilograms
- o Propulsion: Three stage solid-fuel
- o Throw-weight: Unknown
- o Range: 4,000 kilometers¹⁸
- o Guidance: Inertial plus computer payload control¹⁹
- o Circular Error Probable: Unknown
- o Warhead: 6 x MRVs, TN-70/1
- o Yield: 150 kilotons
- o Locations: 4 L'Inflexible SSBNs
- o Number Deployed: 48 missiles
- o Primary Contractor: Aerospatiale, Space and Strategic Systems Division

The M-4 is the fourth SLBM, or MSBS (Mer-Sol-Balistique-Strategique - Sea to Ground Strategic Ballistic missile), deployed by the French. It has a relatively short range, and is comparable to the American Polaris and Poseidon SLBMs. First tested in 1981, the missile was deployed on the five L'Inflexible (modified L'Redoubtable) boats, which were modified in the 1980's to carry it.²⁰

The M-4 represents a significant increase over its predecessor, the M-20, particularly in terms of range (4,000 kilometers compared to 3,000 kilometers) as well as warheads (6 compared to 1). Accuracy is assumed to have improved from the M-20's 1000 meter CEP as well, though details are unknown. The M-4's six warheads are believed to have a limited independent targeting capability. The warhead "footprint" of the M-4 has been reported as capable attacking targets within a 150x350 kilometers area.²¹

A primary goal of the M-4 was defeating the upgraded Soviet ABM system. To this end, the TN-70/-71 warheads were "extremely hardened" to resist EMP effects from nearby nuclear blasts, and were miniaturized. With U.S. aid, the French were able to space (using explosive charges to propel the warheads away from the central missile bus) the incoming warheads so that a Soviet ABM nuclear blast would only destroy one of the missile's six warheads. 96 of the earlier TN-70 warheads were manufactured (missiles carrying the TN-70 are sometimes referred to as the M-4A). An improved variant, the TN-71, has a lower radar cross section and is reported as more survivable against ABM defenses -- 288 warheads were manufactured (missiles with the TN-71 are sometimes called the M-4B)²²

The M-4 was briefly considered as a replacement for France's S-3 IRBMs, but that plan, as well as the S-3's, has been scrapped. The last M-4 will be retired with the last L'Inflexible SSBN, expected in 2002.

M-45 SLBM

No Picture Available

- o Year Deployed: 1996
- o Dimensions: 11.05 meters length, 1.93 meters diameter²³
- o Weight: 35,000 kilograms
- o Propulsion: Three stage solid-fuel
- o Throw-weight: Unknown
- o Range: 5,300 kilometers²⁴
- o Guidance: Inertial
- o Circular Error Probable: Unknown
- o Warhead: 6 x MIRVs, TN-75
- o Yield: 100 kilotons
- o Locations: 1 Le Triomphant submarine
- o Number Deployed: 16 missiles
- o Primary Contractor: Aerospatiale, Space and Strategic Systems Division

The M-45 is an upgraded SLBM which will be equipped on the new Le Triomphant SSBNs. Compared to its predecessor, the M-4, the M-45 has upgraded electronics, reentry vehicle, and warhead. The reentry vehicle is coated with a new material and precisely designed shape, has a high reentry speed, and is accompanied by advanced penetration aids to defeat ABM defenses. The new TN-75 warhead is miniaturized and hardened against EMP effects. The TN-75 warhead has been described as "almost invisible" for its stealth characteristics.²⁵ The talk of ABM defenses and SDI in the 1980s spurred the design to be resistant to such measures. As President Chirac stated, the French nuclear tests at Mururoa Atoll in 1995-6 in part stemmed from the need to test this new warhead design. The M-45 is expected to be deployed until 2010-15, when a follow-on M-5 SLBM will be deployed in its place. ²⁶

The proposed follow-on to the M-45, the fifth generation M-5, has been in the design stages since 1988. The greatly increased range of the proposed M-5 over the M-45 (11,000 kilometers versus 5,300 kilometers) represents a large increase in capability. The M-5 will also carry modern penetration aids tailored to defeat upgrades to the Moscow ABM system.²⁷ The missile will even be hardened against laser weapons based on space platforms. The M-5's proposed TN-76 warhead has been described as stealthy and having maneuvering reentry vehicle technology (MARV) -- it will be able to spin and maneuver in flight. However, given that France cannot test such a new warhead under the Comprehensive Test Ban Treaty, it may settle for deploying the M-45's tested TN-75 warhead instead. It can carry a maximum of 12 warheads, but will likely to carry less (probably six) given the relaxed world security situation.²⁸

Air-Based Strategic Weapons

Mirage 2000N



- o Year Deployed: 1988
- o Dimensions: 14.55 meters length, 5.15 meters height, 9.13 meters wingspan²⁹
- o Weight: empty - 7,600 kilograms, max takeoff - 17,000 kilograms³⁰
- o Propulsion: SNECMA M53-P2 turbofan
- o Speed: Mach 2.2
- o Range: (hi-lo-hi) 1,205 kilometers³¹
- o Maximum Loadout: 1 ASMP (plus two Magic conventional air defense missiles)
- o Weapon Load: 6,300 kilograms³²
- o Locations: Luxeil 30 aircraft (2 squadrons), Istres - 15 aircraft (1 squadron)
- o Number Deployed: 45 aircraft
- o Primary Contractor: Dassault Aviation

The Mirage 2000N (Nucleaire) is the nuclear strike component of France's Force Aérienne Stratégique (FAS). It is the seventh generation of Mirage combat aircraft. The Mirage 2000N is a two-seater, single engine, delta wing, low altitude penetration variant. The first batch became operational in 1988, with production ending in 1993. Some of the earlier models have been fitted for a dual-use conventional ground-attack capability. To carry out their mission, they are fitted with terrain-following radar, two inertial guidance platforms, two Magic self-defense missiles, and a ECM jamming suite.³³ In 1989 the number of deployed nuclear-armed Mirage 2000N aircraft was cut from 75 aircraft in five squadrons to 45 aircraft in three squadrons. Before 1991, they were armed with the AN-52 nuclear gravity bomb, but with its retirement, they carry the ASMP short-range attack missile. France no longer has any nuclear gravity bombs.³⁴ With the retirement of the Mirage IVP strike aircraft in July 1996, the Mirage 2000N has become the sole French land-based nuclear-armed aircraft. Mirage IVPs had been on ground alert since 1964, with nine four plane squadrons deployed at nine separate bases -- one Mirage IVP at each base was ready to take off with 15 minutes' notice. The Mirage 2000N will likely be replaced by the next generation fighter/bomber, the Rafale. The Rafale D is slated to take up the nuclear role in 2005.³⁵

Super Etendard



- o Year Deployed: 1980
- o Dimensions: 14.31 meters length, 3.86 meters height, 9.60 meters wingspan
- o Weight: empty - 6,500 kilograms, maximum takeoff - 9,450-12,000 kilograms³⁶
- o Propulsion: SNECMA Atar 8K-50 non-afterburning turbojet
- o Speed: Approximately Mach 1
- o Range: (hi-lo-high) 850 kilometers³⁷
- o Maximum Loadout: 1 ASMP
- o Weapon Load: 2,100 kilograms³⁸
- o Locations: Aircraft carrier Foch
- o Number Deployed: 24 aircraft
- o Primary Contractor: Dassault-Breguet

In addition to missile submarines and ground-based strike aircraft, the French retain a nuclear capability based on their two aircraft carriers. Since the U.S., Russia, and Britain have removed such weapons, and China is not suspected to have them, France is the only nuclear power remaining with deployed, naval-based, non-SLBM nuclear weapons. This capability is based France's Clemenceau class carriers, the Clemenceau (R98) and Foch (R99), which have Toulon as their home port. Referred to by the French as PANs (Porte-Avions Nucleaire) the carriers are equipped with a varying number of Super Etendard nuclear-capable strike aircraft. Since 1988, only the 20 aircraft assigned to the Foch have carried nuclear weapons, since only that carrier was modified to handle the ASMP missile. Previously, both carriers were equipped to carry the AN-52 nuclear bomb, since retired.³⁹ The Super Etendards in the nuclear role were reduced from 50-55 airplanes to 24, with 20 ASMPs allocated to them. The new de Gaulle-class carrier is scheduled for deployment in 1998 (with a second planned but not yet ordered), and will also carry Super Etendards and later nuclear-capable Rafale strike aircraft.⁴⁰

The Super-Etendard is a single-seat, single-engine, all-weather, fighter/bomber. Production ended in 1983. It is the successor to France's previous carrier-based strike aircraft, the Etendard IV-M. It was supposed to have great commonality with its predecessor, but the addition of a more powerful

engine, improved aerodynamic features, and other enhanced capabilities gave it a 90% new design. It is designed for a low to medium altitude flight profile, and is capable of in-flight refueling. It should be noted that an export version sold to the Argentines launched the Exocet which sunk the British destroyer HMS Sheffield in the Falklands War.⁴¹

ASMP SRAM



- o Year Deployed: 1986
- o Dimensions: 5.38 meters length, .38 meters diameter⁴²
- o Weight: 860 kilograms⁴³
- o Propulsion: Solid propellant booster and ramjet
- o Throw-weight: Unknown
- o Speed: Mach 2⁴⁴
- o Range: 250 kilometers
- o Guidance: Inertial and terrain mapping
- o Circular Error Probable: 350-400 meters⁴⁵
- o Warhead: TN-81
- o Yield: 300 kilotons
- o Locations: 45 Mirage 2000Ns and 20 Super Etendards
- o Number Deployed: 65 missiles
- o Primary Contractor: Aerospatiale, Space and Strategic Systems Division

The ASMP (Air-Sol Moyenne Portee -- medium-range air to surface missile) appears to be the French analogue of the recently retired U.S. short-range attack missile (SRAM). The ASMP replaced the AN-22 gravity bomb, and gave the French nuclear-armed fighter-bombers a standoff capability against heavily defended targets. The ASMP was designated for carriage by the Mirage 2000N, Mirage IVP (recently retired), and Super Etendard.

The wingless ASMP uses a solid fuel booster initially to reach speeds of approximately Mach 2 within five seconds, then switches to a ramjet for the remainder of the flight. Range depends upon the altitude of the firing platform, with a 250 miles range at high altitude, down to a minimum of 80 kilometers at low levels. The missile is programmed prior to takeoff via data cassette with specific launch and target parameters, although the missile receives a last-minute guidance update before firing.⁴⁶

80 ASMP missiles were ordered. 18 were allocated to the Mirage IVP strike aircraft, which have since been retired. The

missile was designed with a 20 year lifespan in mind, which would mean it would retire in 2006 (though it would not be surprising if this were extended).⁴⁷ A stealthy, longer-ranged (800-1200 kilometers) ASLP was proposed in 1989, but with the security climate, such an upgrade is unlikely. Instead, President Chirac has announced France will pursue an "ASMP+" program, a missile with an extended range of 500 kilometers.⁴⁸

FOOTNOTES:

¹ L'Inflexible displacement is listed as 8,174 tons surfaced, 9,144 tons submerged in Robert Norris, Andrew Burrows, and Richard Fieldhouse, *Nuclear Weapons Databook: British, French, and Chinese Nuclear Weapons* (Boulder; Westview Press - National Resources Defense Council, 1994), p. 294.

² L'Inflexible speed is given as 27 knots submerged in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p.294.

³ Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 294.

⁴ *Jane's Fighting Ships 1996-7* (London: Jane's Information Group, 1996), p. 211.

⁵ Joshua Handler and William Arkin, *Nuclear Warships and Naval Nuclear Weapons: A Complete Inventory*, Neptune Papers, No. 2 (Washington, DC: Greenpeace and Institute for Policy Studies, 1988), p. 29.

⁶ British American Security Information Council, *French Nuclear Policy Since the Fall of the Wall* (Washington, DC: BASIC, 1993), p. 13.

⁷ Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, pp. 294-5.

⁸ BASIC, *French Nuclear Policy Since the Fall of the Wall*, p. 6.

⁹ Le Triomphant displacement listed as 14,120 tons submerged in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 298.

¹⁰ Le Triomphant propulsion system listed as large diameter propellor as opposed to pump jet propulsor in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 298.

¹¹ Le Triomphant listed as about 30 knots dived in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 298.

¹² Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 298.

¹³ William Arkin and Robert Norris, "Nuclear Notebook" *Bulletin of the Atomic Scientists* (November 1996), p. 65.

¹⁴ Yves Boyer, "French and British Nuclear Forces in an Era of Uncertainty," in *Nuclear Weapons in the Changing World*, eds. Garrity and Maaranen, p. 113.

¹⁵ Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 299.

¹⁶ *Jane's Fighting Ships, 1996-7*, pp. 211.

¹⁷ M-4 listed as 11.07 meters length and 1.95 meters diameter in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 303.

- ¹⁸ M-4 range listed as 5,000 kilometers in International Institute of Strategic Studies, *Military Balance 1995-6* (London: IISS, 1995), p. 288.
- ¹⁹ M-4 guidance described as inertial with star-fix or transit satellite update in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 303.
- ²⁰ "M-4," *Jane's Strategic Weapon Systems*, (London: Jane's Information Group, 1990).
- ²¹ Max Walmer, *Strategic Weapons* (New York: Prentice Hall Press, 1988), p. 60.
- ²² Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, pp. 218-9, 255.
- ²³ Listed as 11.07 meters length and 1.95 meters diameter in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 303.
- ²⁴ M-45 range listed as 6,000 kilometers in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 304.
- ²⁵ Handler and Arkin, *Nuclear Warships*, p. 29.
- ²⁶ Arkin and Norris, "Nuclear Notebook" *Bulletin of the Atomic Scientists* (November 1996), p. 65.
- ²⁷ "M-5," *Jane's Strategic Weapon Systems*.
- ²⁸ Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, pp. 260, 306.
- ²⁹ Mirage 2000N length listed as 14.94 meters and 5.20 meters height in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 283.
- ³⁰ Mirage 2000N empty weight is listed as 7,900 kilograms, maximum takeoff weight is 16,500 kilograms in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 283.
- ³¹ Radius of action listed as 690 kilometers in IISS, *Military Balance, 1995-6*, p. 288, also listed as 2,778 kilometers in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 283.
- ³² In IISS, *Military Balance, 1995-6*, p. 288.
- ³³ *Jane's All the World's Aircraft 1996-7*, (London: Jane's Information Group, 1996), p. 83.
- ³⁴ Arkin and Norris, "Nuclear Notebook" *Bulletin of the Atomic Scientists* (November 1996), pp. 65-6.
- ³⁵ Arkin and Norris, "Nuclear Notebook" *Bulletin of the Atomic Scientists* (November 1996), p. 66.
- ³⁶ Super Etendard empty weight listed as 6,250 kilograms, maximum takeoff weight listed as 11,900 kilograms in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 321.
- ³⁷ Super Etendard radius of action listed as 650 kilometers in IISS, *Military Balance, 1995-6*, p. 289, also combat radius listed as 700 kilometers at low level in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 321.
- ³⁸ In IISS, *Military Balance, 1995-6*, p. 288.
- ³⁹ BASIC, *French Nuclear Policy Since the Fall of the Wall*, p. 18.
- ⁴⁰ Arkin and Norris, "Nuclear Notebook" *Bulletin of the Atomic Scientists* (November 1996), p. 66.
- ⁴¹ *Jane's All the World's Aircraft, 1982-3*, (London: Jane's Information Group, 1982), p. 65.

⁴² ASMP diameter listed as .35 meters in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 287.

⁴³ ASMP weight listed as 840 kilograms in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 287.

⁴⁴ ASMP speed quoted as high as Mach 4 in Walmer, *Strategic Weapons*, p.40), quoted as Mach 2.5-2.7 in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 230.

⁴⁵ ASMP CEP estimated in Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 288.

⁴⁶ Walmer, *Strategic Weapons*, p. 40.

⁴⁷ Norris, Burrows, and Fieldhouse, *British, French, and Chinese Nuclear Weapons*, p. 230.

⁴⁸ Arkin and Norris, "Nuclear Notebook" *Bulletin of the Atomic Scientists* (November 1996), p. 66.

Compiled by Ted Flaherty
11 December 1996
updated 2 January 1997



1971 French test at Mururoa Atoll

Current World Nuclear Arsenals⁸³



Minuteman III test launch

Click on the country's flag for more detailed information

	Country	Suspected Strategic Nuclear Weapons	Suspected Non-Strategic Nuclear Weapons	Suspected Total Nuclear Weapons
	China	290	120	410
	France	482	0	482
	India	60+?	0	60+?
	Israel	100+?	0	100+?
	Pakistan	15-25?	0	15-25?
	Russia	7,500	7,000-15,500	14,500-23,000
	United Kingdom	100	100	200
	United States	7,300	4,700-11,700	12,000-19,000

⁸³ Source: www.webcom.com/~larkin/ZNW/LW Graf.NuclearDesigns.html



French Nuclear Arsenal

Strategic Delivery Systems

Strategic Nuclear Delivery Vehicle	Year Deployed	Maximum Range (km)	Launcher Total	Warhead	Warhead Yield	Notes
SLBM						
M-4	1985	4,000	48	6 x MRV, TN-70/72	150 KT	On 4 L'Inflexible SSBNs
M-45	1996	5,300	16	6 x MIRV, TN-75	100 KT	On 1 Le Triomphant SSBN
Air						
Mirage 2000N	1988	1,205	45	1 ASMP	300 KT	-
Super Etendard	1980	850	24	1 ASMP	300 KT	Carrier-based

Summary of French Nuclear Arsenal:

The French nuclear arsenal, largely a legacy of De Gaulle's insistence on French strategic independence, is the third largest in the world. Until 1996, it was deployed on a triad mirroring those of Russia and the United States. However, in February 1996, President Chirac announced his intention to eliminate the land-based deterrent, destroying the Hades and SSBS S3D missiles.

Yet in tandem with this reduction, France is undertaking a modernization of its sea-based deterrent force, with the first of a new SSBN class, the Le Triomphant, along with a new SLBM, the M-45. The controversial nuclear testing at Mururoa Atoll in 1995-96 was reportedly done to perfect warhead design. The French are even pressing forward with an advanced SLBM design, the M-51, complete with a stealthy, maneuvering warhead called the TN-76.

The means of air delivery will remain potent, though the last French nuclear gravity bombs have been retired. The Mirage 2000N and carrier-based Super Etendard fighter-bombers are available to deliver short-range nuclear ASMP missiles. A follow-on to the current ASMP missile, dubbed the ASMP+ is under development and is slated to enter service in 2007. The new French nuclear role aircraft, the Rafale D, should be ready then as well.

The French arsenal at the moment is rife with contradictions -- while the reductions are sweeping and encouraging, the modernization program is

widespread. The French would probably not engage in multilateral arms control until the U.S. and Russia came down to approximately the same warhead level.

Strategic Nuclear Weapons: 482

Nonstrategic Nuclear Weapons: 0

Total Nuclear Weapons: 482

Bibliography

- Barillot, Bruno (1992). French Finesse Nuclear Future, the Bulletin of the Atomic Scientists, www.bullatomsci.org/issues/1992/s92/s92.barillot.html
- Binnendijk, Hans & Goodby, James (1997). *Transforming Nuclear Deterrence*, Washington. DC: Institute for National Strategic Studies.
- Boniface, Pascal (1999). *The Future of the French Nuclear Posture*. www.idsa-india.org/an-nov9-6.html
- Bozzo, Frédéric (1996). *Dissuasion Concertée: le Sens de la Formule*. Relations Interantionales et Stratégiques, n°21, Spring 1996.
- General Buchalet, Albert (1985). *L'aventure de la bombe*. Paris: Plon.
- Butcher, Martin & Nassauer, Otfried & Young Stephen (1998). *Nuclear futures: Western European Options for Nuclear Risk Reduction*. www.basicint.org/nufu3-0.htm
- Center for Counterproliferation Research (1998). *U.S. Nuclear Policy in the 21st Century*. National Defense University Center for Global Security Research.
- Chaliand, Gérard & Blin, Arnaud (1998). *Dictionnaire de Stratégie Militaire*. St-Armand-Montrond: Perrin.
- Chirac, Jacques (1999). *Discours de Monsieur Jacques Chirac Président de la République devant L'assemblée Générale de l'Association du Traité de l'Atlantique*. www.elysee.fr/mag/atlant02.html
- Cour International de Justice (1996). *Licéité de la Menace ou de l'Emploi d'Armes Nucléaires*. www.ddh.nl/org/ialana/avisf.html
- Courtier, Paul (1983). *La quatrième République*. Vendôme: Que Sais-je?
- Defense Minister (1994). *Livre Blanc sur la Défense 1994*. Paris: UGE Collection 10/18.
- Doise, Jean & Vaïsse, Maurice (1992). *Politique étrangère de la France, Diplomatie et Outil Militaire, 1871-1991*. Manchecourt: Collection du Seuil.
- Ferro, Marc (1995). *1956, La Mémoire du Siècle, SUEZ*. Bruxelles: Collection Complexe.
- Fricaud-Chagnaud, Charles-Georges (1996). *Dissuasion Concertée: Vers un Partenariat Stratégique*. Relations Internationales et Stratégiques N°21, Spring 1996.
- Freeman, Allen (1997). *From Gaullist Annoyer to Euro-Gaullist Leader :French Foreign Policy under Jacques Chirac*. www.is.rhodes.edu/Modus_Vivendi/Modus1997/4.html
- Gaulle, Charles (de) (1970). *Mémoire d'Espoir*. Paris: Plon.

- Gompert, David (1998). *Rethinking the Role of Nuclear Weapons*. National Defense University, www.ndu.edu/inss/strforum/forum141.html
- Grand, Camille (1998). *A French Nuclear Exception?* Washington, DC, The Henry L. Stimson Center, Occasional Paper N° 38.
- Grand, Camille (1999). *French Nuclear Policy after the Cold War: How to combine Deterrence and Arms Control*. www.idsa-india.org/an-july8-3.html.
- Gompert, David & Kugler, Richard & Libicki, Martin (1999). *Mind the Gap*. Washington, DC: Institute for National Strategic Studies.
- Hibbs, Mark (1996). *Tomorrow, a Eurobomb?* The Bulletin of the Atomic Scientists, Vol 52, N°1, www.bullatomsci.org/issues/1996/jf96/jf96Hibbs.html.
- Joseph, Robert & Reichart, John (1999). *Deterrence and Defense in a Nuclear, Biological, and Chemical Environment*. Washington, DC: Institute for National Strategic Studies.
- Laird, Robert (1995). *French Security Policy in Transition: Dynamics of Continuity and Change*. Washington, DC: Institute for National Strategic Studies.
- Laird, Robin & Mey, Holger (1999). *The Revolution in Military Affairs: Allied Perspectives*. Washington, DC: Institute for National Strategic Studies.
- Lellouche, Pierre (1985). *L'Avenir de la Guerre*. St-Armand-Montrond: Perrin.
- Moreau Defarge, Philippe (1989). *Les Relations Internationales dans la Monde d'Aujourd'hui, Conflits et Interdépendances*. Nancy: Editions S.T.H.
- Moreau Defarge, Philippe (1994). *Relations Internationales, T1& 2*. La Flèche: Editions du Seuil.
- Passeron, André (1962). *De Gaulle parle*. Paris: Plon.
- Poirier, Lucien (1994). *La Crise des Fondements*. Paris: Economica.
- Roche, Douglass (1995). *An Unacceptable Risk: Nuclear Weapons in a Volatile World*. Waterloo: Nuclear Age Peace Foundation/ Project Ploughshares.
- Sagan, Scott (1996-97). *Why Do States Build Nuclear Weapons*. International Security 21, N°3, Winter 1996/1997.
- Schmidt, Peter (1993). *The Special Franco-German Security Relationship in the 1990s*. Paris: Chaillot Paper 8, www.weu.int/institute/chaillot/chai08e.html
- Sicherman, Harvey (1996). *Chirac: Beyond Gaullism*. The National Interest (Winter 1996)
- Tertrais, Bruno (1998). *The French Nuclear Deterrent after the Cold War*. Santa Monica: Rand, P 8012.

The United States Commission on National Security (1999). *New World Coming: American Security in the 21st Century*.

Zakaria, Fareed (1998). *From Wealth to Power*. Princeton: Princeton University Press.

Revue de la Défense Nationale (National Defense Review)

Jacques Bouchard. *La Simulation et le Renouveau de L'Armement Nucléaire*. May 1996.

Boyer, Yves. *Les Armes Nucléaires Françaises et L'Europe*. August/ September 1996.

General Chassin, Jean-Marie. *Réflexions stratégiques sur la guerre d'Indochine*. December 1954.

Dabiezies, Pierre. *Réflexions sur le Livre Blanc*. n°55, December 1993.

Duval, Marcel. *Perspectives d'Avenir de la Dissuasion Française*. November 1996.

Duval, Marcel. *L'Arme Nucleaire dans le Monde: Etat des Lieux*. January 1998.

Duval, Marcel. *L'Europe est-elle Menacée par la Prolifération?* July 1999.

Flosse, Gaston. *Le Traité de Rarotonga*. October 1996.

Lambert, Denis. *Les Armes de Destruction Massive, Un Concept Global mais peu Pertinent*. November 1999.

Pons, Olivier. *L'Attente Stratégique est-elle encore Adaptée?* October 1998.

Sarre, Georges. *Préserver notre Autonomie de Décision et nos Capacités Techniques Stratégiques*. December 1998.

Le Monde (Newspaper)

Chipaux, Françoise (19/08/1999). *L'Inde ébauche une doctrine nucléaire de "Dissuasion minimum crédible"*.

Fontaine, André (02/11/1999). *Guerre des Etoiles, Deuxième Episode?*

Isnard, Jacques (01/10/1999). *Les Quatre Sous-Marins Nucléaires Français coûteront 150 Milliards de Francs*.

Isnard, Jacques (06/10/1999). *Les Américains ont réussi à détruire un Missile Ballistique dans l'Espace*.

Isnard, Jacques (08/10/1999). *Vienne: le Traité d'Interdiction complète des Essais Nucléaires est dans l'impasse*.

Isnard, Jacques (10/11/1999). *Défense: la France s'essouffle*.

Isnard, Jacques (25/11/99). *Apocalypse Tomorrow? La Mondialisation touche aussi les Armes Chimiques et Nucléaires.*

Jospin, Lionel (23/10/1999). *Lionel Jospin dénonce “la nette reprise de la Course aux Armements”.*

Lellouche, Pierre (02/11/99). *Il est urgent de repenser notre dissuasion en fonction des événements.*

Rosenzweig, Luc (19/05/1999). *La Dissuasion du “Fort au Fou” mise en échec au Kosovo.*

Other Newspapers

Becker, Elizabeth. *Missile is unable to hit target in Pentagon test.* Washington Times, (19 January 2000).

Evans, Michael. *Britain asks to widen Defense system.* London Times, (31 January 2000).

Gertz, Bill. *Clinton signs Bill for Missile Defense.* Washington Times, (26 July 1999).