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French Nuclear Forces

Captain John J. Hyland III, US Navy

Declared French nuclear strategy rests today on the Gaullist doctrine of proportional deterrence elaborated more than two decades ago. Proportional deterrence doctrine states a weak state (France) can deter a strong state (USSR) when the weak nation possesses the capability to inflict enough damage on the strong one so that the value of the conquest of the weak country to the strong one is less than the value of the damage which the weak can inflict on the strong. French commentators often describe this as deterrence of the strong by the weak (*la dissuasion du faible au fort*).

French strategic thinking does not differentiate clearly between strategic and tactical nuclear weapons. Instead it links tactical and strategic nuclear systems. The 1983 report to the *Assemblée Nationale* describes this linkage: "Tactical nuclear weapons are not the instruments of a nuclear war. Their mission is to raise the stakes in a developing conflict as an ultimate military demonstration of our determination to resort to a strategic response if aggression should continue. Their mission is, therefore, to reinforce deterrence."¹

This posture also permits France to deny the possibility of a tactical nuclear battle for Western Europe.

Three essential elements combine in France's nuclear doctrine. First, by acquiring nuclear forces France has acquired special status. Any potential adversary must consider the possible costs of going to war with a nuclear state as extremely high and extremely risky, given the uncertainties involved in such a decision. Second, in her doctrine France accentuates the risk an adversary runs by threatening a nuclear crisis that could become uncontrollable in contrast to the American penchant for searching for means to control a crisis. Third, French strategic doctrine is a no-war strategy, a purely deterrent strategy, which, recognizing the destructiveness of any modern war, conventional or nuclear, considers all war unacceptable. That aspect of French doctrine which links theater weapons, like the *Pluton* missile, to strategic forces and denies the possibility of a tactical nuclear battle in Western Europe reflects this sensitivity. The brouhaha which arose when

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Giscard d'Estaing implied greater French willingness to participate alongside Nato in the battle for West Germany provides another example of French sensitivity to the use of nuclear weapons in a warfighting role.

Proportional deterrence theory has sparked considerable discussion since 1960. But this paper is not the appropriate vehicle to review these discussions, which center around the two issues of:

- how much capability the weak state needs to make its deterrent forces credible, and
- the psychological question of whether the weak state can ever make a suicide threat credible.

The French Government stated its policy officially only once, in a 1972 Defense White Paper. As is so often the case with officials documents, the 1972 Defense White Paper is ambiguous. Specifically, it does not state clearly what France would do with her nuclear forces in the event of war. The ambiguity concerning the use of these forces is deliberate and necessary for three reasons.

First, France argues that the uncertainty about whether or under what circumstances she would use her deterrent forces increases deterrence. The ambiguity accommodates the three major tendencies in French foreign policy—*independent*, *European*, and *Atlanticist*—without forcing a choice between them. It permits France to remain vague on the degree and timing of French participation in the defense of West Germany and Europe. Specific answers to this question would provoke disputes between advocates of independence and those of more open and complete solidarity with France's allies. Giscard d'Estaing and General Méry provoked such a dispute in 1976 when they proposed an "enlarged sanctuarization" policy and postulated greater French participation in the battle for West Germany. In the ensuing controversy Giscard retreated to the prior policy of "national sanctuarization" and to ambiguity about French plans for participation in the forward battle.

Second, is the extent of French cooperation with Nato in a more general sense than the defense of West Germany. Clarification of this policy would impact on the French policy of "independence," which in its extreme form can sometimes look like armed neutrality; clarity would provoke debate between independents and Atlanticists. Because West German defense and Nato defense are so closely linked, debate on either issue tends to result in a division in France along European-Atlanticist versus Independent-Armed Neutrality lines.

Third, France's internal consensus concerning defense policy in general and the French strategic forces in particular requires imprecision. The consensus on the need to maintain France's independence, to have a national deterrent force, and not to rejoin Nato is almost universal in France. This support represents one of the significant strengths of the *La Force Nucleaire*

Stratégique (FNS). The consensus depends on the principles of proportional deterrence and the symbolic nature of the FNS, not a mature consideration of how France would actually use her nuclear forces.

Some observers of French politics, while they admit France enjoys widespread agreement on defense issues, question the depth of the consensus. For example, Pierre Lellouche writes, “. . . this consensus rests much less on the actual military value of French weapons in case of war than on a set of rather abstract and highly ambiguous principles.”² He argues that any attempt to clarify the basic ambiguities in French defense policy with regard to the real margin of independence France enjoys would undermine the existing consensus.

The consensus is similarly vulnerable to more precise definitions of France's roles in the defense of Europe and in cooperation with Nato, since increased policy precision in these areas would necessitate decisions concerning the use of nuclear weapons in war. The planned expansion and added capability of both tactical and strategic nuclear forces in the 1984-1988 defense program will create added pressures to define France's role in these two related areas. Debate on these defense issues is inhibited by French political parties, which often encompass within their membership more than one of the three prevalent foreign policy tendencies previously discussed. Their recognition that becoming specific about how France intends to use her nuclear forces could fragment the existing consensus, leads them to avoid precision in open debate.

Current and Projected Nuclear Forces

Tables* 1 and 2 summarize the 1984 French systems. French strategic forces, La Force Nucléaire Stratégique or FNS, consists of three systems similar to the American triad. France's tactical nuclear forces (L'Arme Nucléaire Tactique or ANT) include a variety of land and carrier-based aircraft, and the tactical missile Pluton deployed by the French Army.

Thirty-four Mirage IVA strategic bombers and eleven KC-135 tanker aircraft, operating from nine bases in France, constitute the manned aircraft component of the FNS. These aircraft carry about two percent of the FNS's deliverable megatonnage and about twenty-six percent of the force's warhead total.

Eighteen land-based IRBMs make up the second leg of the French triad. The silo-based missiles, located in southeastern France, contribute approximately 18 percent of the deliverable megatonnage and about 14 percent of the warheads in the FNS.

*All tables are located at end of article.

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The strategic ocean force (La Force Océanique Stratégique or FOST) deploys the third leg of the FNS, five strategic missile submarines. A sixth submarine, *L'Inflexible*, armed with MIRVed missiles, will join the FOST in 1985. Current plans call for a seventh submarine of a new, improved class to enter service in 1994. Tables 3 and 4 describe the SSBN force and the M-4 MIRV missile retrofit program. Each SSBN carries 16 M-20 SLBMs with a single one-megaton warhead. Thus, the FOST carries almost 80 percent of the deliverable megatonnage and 60 percent of the warheads in the FNS. Since 1983 France has maintained 3 SSBNs on patrol and a 4th available to deploy in a crisis.

From a strictly military point of view today's French nuclear forces represent an impressive record of achievement for a country of its size. Comparison with current British forces shows more clearly the French accomplishments. Without the assistance of the United States, which the United Kingdom enjoys, the French have created and maintained a nuclear force whose size and diversity exceeds Britain's.

In spite of this considerable achievement, France's current nuclear forces have several significant weaknesses. Interrelated weaknesses which affect all elements of the French triad and should be accounted for are: vulnerability to preemptive attack; vulnerability to technological advances; technological obsolescence; and fiscal and budgetary constraints.

France's nuclear forces are exposed and vulnerable to preemptive attack. Increases in numbers of Soviet theater nuclear forces, improvements in their ranges and accuracies, and a decrease in the time required to prepare and to launch have increased the vulnerability of French forces to a preemptive attack in the past decade. The land-based elements of France's forces—aircraft, air bases, silo-based missiles, C³I installations—as well as SSBNs in port became vulnerable to increased, but varying, degrees.

In addition to their vulnerability to attack, the FNS forces are vulnerable to technological advances in two critical areas—antisubmarine warfare (ASW) and antiballistic missile (ABM) defense. Advances in ABM defense could jeopardize the ability of FNS warheads to penetrate Soviet defenses. Advances in ASW could endanger the currently survivable second-strike leg of the FNS, its SSBNs.

Of the two vulnerabilities, ASW appears today to be the more immediate threat. The expansion of the Soviet Navy's ASW capability in quantity and quality of aircraft, surface ships, and submarines has created the numbers of platforms and the technical capacity to locate and to track continuously a strategic submarine force the size of France's. No major advance or breakthrough in ASW technology would be needed.

The vulnerability to advances in ABM technology stems from the limited number of French warheads. Soviet ABM defenses face 132 strategic warheads from French strategic forces: 18 1MT S-3 IRBM, 80 1MT M-20

SLBM, and 34 60KT AN-22 bombs. The vulnerability of aircraft and IRBMs to preemptive attack, of aircraft to attrition from air defenses, and the 60 percent at-sea rate of SSBNs reduces further the maximum of 132 warheads. Thus, the FNS profits from the 1972 ABM Treaty and the 1974 Protocol to it, which limits the USSR to a single 100-launcher system around Moscow. Expansion or improvement of the existing ABM system will decrease France's already severely limited capability to target the Moscow area. Abrogation of the ABM Treaty and construction of a more advanced and more extensive ABM defense system could jeopardize the French capability to threaten the Soviet Union with a significant attack.

Obsolescence also threatens the capability of the FNS and the Mirage IVA aircraft, which entered service in 1964.³ Originally designed for high altitude bombing and subsequently modified for low-level penetration, the Mirage IVA was not expected to remain in the FNS beyond 1970. Delays in developing the IRBM and SLBM legs of the French triad initially conspired to keep these aircraft in strategic service. Later fiscal constraints, development problems with a replacement aircraft, and cancellation of the future combat aircraft (Avion du combat futur or ACF) will keep 18 Mirage IVA in strategic service until 1996.

Obsolescence compared with the United States and the USSR also affects other components of the FNS. For example, France's ballistic missiles are all single warhead missiles. France will not deploy her first MIRVed missile until 1985, 15 years after the United States began MIRV deployments.⁴

Obsolescence of this kind reflects France's limited research and development (R&D) capability compared with that of the superpowers.⁵ Unlike Great Britain, which has profited from the United States' R&D, France has maintained an independent, smaller capability. Independently developing the full panoply of strategic weapons systems, as well as continuing R&D in conventional weapons, has increased costs and slowed developments in both nuclear and conventional weapons. The French defense budget is simply not large enough to cover all areas equally and over the last two decades nuclear R&D has received priority. These R&D/budget limitations will persist and result in a trend toward obsolescence throughout French forces. The abandonment of the ACF in favor of the less ambitious Mirage 2000 provides one example of this combination of budget and R&D limits affecting the FNS.

Behind this trend toward obsolescence lies the budget and resource constraints of a middle-sized power like France, and the decision to pursue independent development of military capabilities aggravates the constraints. French reliance on a smaller military-industrial complex deprives her of the benefits of competition and of economies of scale, and the amortizing the R&D and basic investment costs over a small number of weapons increases costs. France has been able to reduce unit costs by increasing the size of the production run through export. "Such exports represented 20 percent of

French arms production between 1970 and 1975 and approximately one-third of production in 1976."⁶

Despite this level of arms exports, creation and maintenance of the FNS has imposed severe costs restraints on France's conventional posture. Examples are delays in introducing new equipment, the size of the French Army shrinking, and the average age of French Navy ships increasing.

The cost of independence to France also appears in any comparison of the cost of French and British nuclear weapons programs. Yost estimated that France spent three times as much as Great Britain on her nuclear program between 1964 and 1975. He further noted that in 1975 Great Britain spent two percent of her defense budget on strategic nuclear forces, while France spent twenty percent of hers on those forces.

In spite of the problems of vulnerability, obsolescence, technological constraints, and fiscal constraints, France embarked on an ambitious strategic modernization program in 1983. Covering the period 1984-1988, this defense program calls for across-the-board improvements in the FNS.

To the extent that past performance indicates future performance, the 1984-1988 defense program will be plagued by delays and cutbacks. Yet, accepting the "normal" delays, in the 1990s the FNS will emerge from this modernization program with greatly enhanced capability and credibility. Tables 5-8 summarize the growth in strategic and tactical nuclear force capability in this program law.

Elements of the 1984-1988 program that affect the FNS and ANT include the following:

- deploying the MIRV SLBM M-4 in 1985 in the sixth SSBN;
- backfitting the M-4 into four of the first five SSBNs;
- ordering a seventh SSBN of the new class for delivery in 1994;
- modifying land and carrier-based aircraft to carry the medium-range air-to-ground missile (ASMP);
- developing a mobile IRBM(SX) and deploying it in 1996;
- hardening the strategic communications network;
- deploying an airborne command post (Astarté) by 1988;
- introducing the Mirage 2000N with ASMP into service in 1988;
- replacing the Pluton tactical missile with the longer range Hades missile beginning in 1992.

Several facets of this significant modernization program deserve specific mention.

First, the FOST will continue to dominate the FNS. The M-4 SLBM will carry six 150KT MIRV warheads.⁷ In 1984 SSBNs carry 80 of 132 strategic warheads (61 percent). By 1988 the figures will be 256 of 328 (78 percent); in 1992, when the M-4 retrofit program is complete, 496 of 617 (80 percent).

The growth in the capability of the FOST is equally striking in terms of equivalent megatonnage (EMT). From a value of 80 EMT in 1984 the FOST

grows to almost 166 EMT in 1988 and to slightly more than 270 EMT in 1992. Throughout the period 1984-1992 between 75 percent and 80 percent of the total French strategic capability will remain in the SSBNs of the FOST.

Using current at-sea rates of 60 percent, the portion of the FNS immune from preemptive attack will grow in direct proportion to the growth of the FOST. In terms of warhead numbers and EMT the following summarizes this growth in secure, second-strike capability;

Year	Warheads	Emt
1984	48	48
1988	153	99.6
1992	297	162

Second, the credibility of the land-based components of France's nuclear forces will improve. Equipping aircraft with a standoff air-to-ground missile will improve their ability to penetrate Soviet air defenses. A mobile, air-transportable IRBM will improve the survivability of that arm of the triad. Finally, increasing the number of warheads and EMT will improve the FNS's credibility.

Third, the defense program will increase tactical nuclear capability. By 1988 the French Navy will have 43 Super Etendards modified to carry ASMP and the FAS will have 54 similarly equipped aircraft, 18 Mirage IVA and 36 Mirage 2000N. Although the number of warheads remains essentially stable, the total EMT and MT both increase by a factor of more than six. Tables 7 and 8 show this force growth.

Fourth, implicit in this force procurement plan is a clarification of French willingness to participate in the defense of West Germany and to concert with Nato. Development of the Hades missile with its 350 km range will allow France to escape the dilemma which the 100 km range Pluton created. Based in France, the Pluton could attack Soviet army concentrations only in West Germany or in other Nato countries. Neither West Germany nor the other alliance members appreciated that kind of help from France. Hades' range will permit France to continue to base her missiles in France and to attack Soviet Operational Manenver Groups (OMG) before they enter West Germany.

Such indication of French interest in participating in the forward battle is confirmed by the planning for a Rapid Action Force (FAR). This 47,000-man, air-mobile force will be capable of operating "alongside our allies" in Europe.⁸

Fifth, the 1984-88 defense program attacks the whole gamut of weaknesses in French strategic forces. For example, the increase in warhead numbers and EMT reduces the vulnerability of the FNS to preemptive attack and to

improvements in Soviet ABM defenses. Reducing vulnerability to preemptive attack lies behind several other initiatives such as hardening the strategic communications network and deploying an airborne command post and a mobile IRBM. Equipping aircraft with ASMP, replacing older aircraft with Mirage 2000N, and dispersing nuclear-capable aircraft into the French Navy's carriers also contributes to reducing vulnerability to preemptive attack.

Current and Projected Capabilities

Assessing the capability of existing and future French strategic forces to deter the USSR involves both subjective judgment and some assumptions. Estimating the French ability to inflict damage on the USSR can establish a measure of the FNS's deterrent value.

For a middle-sized power like France, the lack of capability threatens to undermine all credibility. France's goal must be to maintain sufficient second-strike capability. Faced with the USSR as an adversary possessing the full range of conventional and nuclear forces, France has the challenging task of making the FNS sufficiently capable so that the threat of its use remains credible.

The level of damage to the Soviet Union which constitutes unacceptable damage is a subjective matter. Robert McNamara established the "assured destruction" capability of the United States as the ability to destroy in a second strike 20-25 percent of the population and 50-66 percent of the industrial capacity of the Soviet Union.⁹ To achieve these levels of destruction requires a delivery capability of 200-300 MTE.¹⁰ Tables 6 and 8 reveal that France will have more than 200 MTE in her nuclear arsenal by 1988. But a second-strike capability of this magnitude probably will remain limited to the United States and the USSR. France's second-strike capability in 1988 will be on the order of 100 EMT and will rise to about 162 EMT in 1992. These second-strike capabilities will allow France to hold at risk about 15 percent of the urban population and 60 percent of the industrial capacity of the USSR in 1988. In 1992 the figures rise to 20 percent and 70 percent respectively.

Geoffrey Kemp argues that middle-sized countries like France need not meet McNamara's criteria to have a credible deterrent and suggests that a 10-100 MTE, second-strike capability is adequate.¹¹ France meets Kemp's less demanding criteria in 1984 with 48 EMT in her deployed SSBNs.

In addition, Kemp speculates destruction of urban population as distinct from total population may be a key variable in determining deterrence requirements and notes that attacking the top 10 Soviet cities would jeopardize 25 percent of both the urban population and the industrial capacity of the USSR. According to Kemp's calculations this 10-city attack requires only 10 MTE. France meets this requirement several times over in her FOST.

Lothar Ruehl applied Kemp's analysis to French strategic forces and offered several insights into possible French strategies. He points out that a medium force like the FNS would find attacking some or all of the 11 major industrial areas of the Soviet Union identified by Kemp difficult. Although Moscow has special value to the Soviet Government and presents an especially vulnerable soft target, the ABM defense there presents formidable problems to France's 1984 FNS. Ruehl suggests the optimum targeting strategy for the FNS would be to focus its attack on industrial targets chosen for their critical nature in the Soviet economy or to concentrate on heavily populated urban areas and to avoid areas protected by ABM defenses. Finally, he proposes to leave Moscow untargeted and to announce beforehand the intention not to strike Moscow in an attempt to convince the USSR to leave the Paris region untargeted.¹²

Kemp's analysis shows that by choosing either of Ruehl's basic options—critical industrial targets or populated urban areas—France would accomplish both of them. Attacking the 10 largest cities in the USSR, less Moscow and Gorkiy, places 11 percent of the urban population and 15 percent of the industrial capacity at risk. Including Moscow and Gorkiy and dropping the 11th and 12th cities from a 10-city attack raises the respective figures to 16 percent and 25 percent. Expanding the attack to 200 cities brings the destruction into the range of McNamara's assured destruction: 55 percent and 62 percent respectively.

Tables 5 and 6 show the maximum capacity of the FNS without degradation for readiness rate, weapon system reliability, vulnerability to preemptive attack, and attrition by air and ABM defenses. The following analysis reduces the maximum FNS capability and produces a first order approximation of the French second-strike capability from an unaltered posture. The key assumptions, which are those used in Kemp's study with the exception of ASW attrition of SSBNs, are summarized in Table 9.

Evaluation of the 1984 FNS shows that France maintains at sea the capacity to destroy the 10 largest cities in the Soviet Union less Moscow and Gorkiy. Even when all SSBNs are at sea, France does not have the warhead numbers necessary to target Moscow.

By 1988, however, the increased number of warheads as a result of M-4 MIRV retrofits will almost bring Moscow and Gorkiy within the capability of attack. France will have 153 warheads at sea, 38 1MT and 115 150KT. Twenty-eight 1MT weapons are required to attack the 10 largest cities less Moscow and Gorkiy. Degrading the remaining 125 weapons for various reliability factors leaves 101 weapons to attack Moscow. One hundred and nine 150KT weapons are needed to exhaust the 100-launcher Galosh system and to have 29 weapons penetrate the defenses, assuming an ABM SSKP of 0.8.

The 1988 FNS will provide France with a secure reserve force of 115 150 KT and 10 1MT weapons after an attack on Russia's 10 largest cities, less

Moscow and Gorkiy. By 1992 the continued increase in warhead delivery capacity will enable France to attack Russia's 10 largest cities, including Moscow and Gorkiy, and also to provide a secure reserve force of 16 1MT and 100 150KT weapons at sea. Seen from another angle, the 1988 and 1992 FNS will enable France to attack substantially more than the 10 largest cities in Russia should she choose not to retain a secure reserve force.

This perspective of increasingly capable and credible deterrence options assumes no contribution from manned aircraft or from silo-based IRBMs. Any success these FAS elements of the FNS enjoy constitutes a bonus. From another perspective this analysis shows the vulnerability of France's land-based systems will be of increasingly small import to the credibility of her deterrent forces.

Implications

Martin summarized the effect of the French strategic modernization program in general terms: ". . . the existing lesser nuclear forces, although perhaps doomed for the indefinite future to remain qualitatively and quantitatively inferior to the super-powers, will be perpetuated and will rise to absolute levels of destructive power at which it will be increasingly difficult to leave them out of calculations: the projected French SLBM force-loading of over 700 warheads is a case in point."¹³ This growth in France's strategic capability has implications for France, for the United States, and for the Soviet Union.

For the past two decades French conventional forces have been sacrificed to nuclear forces in the budget. France needs both conventional and nuclear forces, but whether she can fit both into her defense budget is doubtful. The debate over the proper balance between conventional and nuclear forces and over how to budget for them will continue in France for the foreseeable future. Continued budgetary emphasis on nuclear forces will inevitably slow the modernization of France's conventional forces and reduce their effectiveness vis-à-vis the USSR's forces.

The growth in strategic capability will further the debate over the proper use of the flexibility inherent in a more modern force structure. The French strategy of graduated response, linking tactical and strategic systems, demonstrated France's willingness to change her initial policy of massive retaliation when her forces permitted the graduated response option.

France has not followed the US evolution of strategic nuclear theory to countervailing strategy or to concerns of intrawar bargaining and war termination. Her new capabilities, although orders of magnitude smaller than the United States, provide that option and may provoke such an evolution.

Moreover, these new strategic capabilities, along with the development of the Hades missile, are prompting renewed discussion of France's role in the

defense of West Germany and Europe, her level of cooperation with Nato, and prospects for a European nuclear force built around a Franco-British nucleus. France's remarkable, but tenuous, domestic consensus on military matters may not be able to survive detailed debate of these issues.

The Soviet Union cannot contemplate the expansion of the FNS with equanimity, much less joy. The USSR's ability to knock out the FNS will diminish considerably in the 1984-92 time frame. Even though this paper has credited the USSR with the capacity to destroy 100 percent of France's land-based systems in a preemptive strike, Soviet planners are unlikely to assume such perfection and must plan to deal with a certain percentage of these forces.

Two additional factors complicate Soviet planning for the FNS. First, French strategic thinking does not distinguish between tactical/theater strikes and strategic strikes. Any use of nuclear weapons on French soil will bring a French strategic response. Moreover, France's response to a nuclear strike on targets outside France is not clearly specified in French doctrine. Thus, French doctrine forces the Soviet Union to accept a substantial countervalue attack on her homeland if the USSR or the Warsaw Pact conducts a preemptive strike against the FNS and it may result in a similar response to a strike outside France as well.

Second, the nature of targets in the European theater blurs the distinction between the tactical/theater and the strategic. Many targets in Eastern Europe within range of tactical aircraft are strategic targets. The USSR depends on them as much as it depends on facilities in the western Soviet Union. This complicates planning an attack on French air forces, because it requires the Soviet planner to consider all nuclear-capable aircraft not just FAS aircraft as potential strategic strike vehicles and increases the risk of such an attack substantially. The expansion of tactical nuclear capability, the development of the ASMP, and the growth of French Navy nuclear capacity draw their significance, in part, from these targeting considerations.

Growing French nuclear capabilities will force both the United States and the USSR to reconsider the impact of France's FNS on the balance between the Soviet Union and the United States. Charles Hernu, the French Defense Minister, has claimed Western Europe now holds the balance between the two superpowers.¹⁴ As France's capabilities expand, her ability to affect the basic US/USSR balance increases. Bluntly, the question becomes: Can the Soviet Union accept the damage from a French attack and allow the United States to escape unscathed? Or must the Soviet Union attack the United States in order to preserve the essential superpower balance?

France's ability to affect the American-Soviet relationship has been and remains an implicit rationale for her nuclear forces. It surfaces in the guise of the "trigger" or "detonator" rationale in discussions of French forces.

In his discussion of the first generation of the FNS, Raymond Aron argued that French nuclear forces must not cause the United States to back away from Europe.¹⁵ In the context of superpower parity, the growth of French nuclear capacity may well enable France to involve the United States in a conflict where the United States might wish to opt out.

This extension of the detonator theory argues that France will be able to damage the Soviet Union to an extent that the USSR could not allow the United States by the USSR to remain aloof and unscathed in the event of a French attack. Thus, the French attack on the USSR would provoke an attack on the United States by the USSR in order to prevent the United States from attaining a position of strategic superiority with regard to the USSR.

The expansion of FNS capabilities has other implications for the United States as well. The existence of the FNS already complicates arms control negotiations. As the FNS grows, the USSR is even less likely to ignore it in arms control contexts. France has refused to participate in arms control negotiations until the superpowers reduce their arsenals significantly and is unlikely to change this position.¹⁶

The expansion of France's nuclear capabilities has more general implications. FNS developments indicate the direction in which other medium power deterrent forces may evolve. These increasingly capable forces must be accounted for and provide France with a hedge against the unpredictability of the diplomatic future and demonstrate what a sustained and determined effort can produce to other medium powers.

Finally, France's expanded strategic forces are generating renewed pressure for a reevaluation of her relationship with her most important ally, West Germany, and with the Atlantic Alliance and Nato.

Notes

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2. Pierre Lellouche, "France and the Euromissiles: The Limits of Immunity," *Foreign Affairs*, Winter 1983-84, p. 323; see also *Politique étrangère*, Ete 1983.

3. Lothar Ruehl, *La Politique Militaire de la Cinquieme République* (Paris: Presses de la Fondation Nationale des Sciences Politiques, 1976), pp. 375-378.

4. John Vinocur, "Allies Like Warhead Limits but Don't Want Them Included," *The New York Times*, 8 May 1983, p. F3; *Rapport 1984-88*, p. 48.

5. David S. Yost, "French Defense Budgeting: Executive Dominance and Resource Constraints," *Orbis*, Fall 1979, pp. 579-608.

6. *Ibid.*, p. 606.

7. *Rapport 1984-88*, p. 48.

8. Jacques Isnard, "La force d'action rapide pourra intervenir en Europe," *Le Monde*, 20-21 November 1983, pp. 1, 8.

9. Geoffrey Kemp, *Nuclear Forces for Medium Powers, Part I: Targets and Weapon Systems* (London: International Institute for Strategic Studies, Adelphi Paper 106, 1974), pp. 25-27.

10. *Ibid.*, p. 27.

11. *Ibid.*, pp. 27-28.

12. Ruehl, pp. 403-413.

13. Laurence Martin, "The Determinants of Change: Deterrence and Technology," *The Future of Strategic Deterrence, Part II* (London: International Institute for Strategic Studies, Adelphi Paper 161, 1980), p. 17.
14. Charles Hernu, "Equilibre, Dissuasion, Volonté: la Voie étroite de la Paix et de la Liberté," *Défense Nationale*, December 1983.
15. Raymond Aron, *Le Grand Débat* (Paris: Calmann-Lévy, 1963), p. 133.
16. *Rapport 1984-88*, p. 40.

Table 1
Deployed French Strategic Nuclear Forces (July 1983)

Category & Type	Total	Range (km)	MISSILES		Remarks
			Warheads & Max. Yield		
Land-based IRBM SSBS S-3	18	3,500	1 x 1MT		2 squadrons of 9 missiles each are housed in hardened silos in southeastern France on the Albion plateau and controlled by 2 launch centers.
Sea-launched SLBM MSBS M-20	80	3,000	1 x 1MT		See Tables 3 and 4 for details of the SLBM force.
Strike aircraft Mirage IVA	34	3,200		AIRCRAFT	The payload is variously reported as 1 or 2 bombs. 18 Mirage IVA will be modified to carry the medium range air-to-ground missile (ASMP) beginning in 1987. Beginning in 1988 Mirage 2000N will enter service. See Table 5. In 1996 the mobile IRBM SX will replace the Mirage IVA.

Table 2
Deployed French Tactical/Theater Nuclear Forces (July 1983)

Category & Type	Total	Range (km)	MISSILES	
			Warheads & Max. Yield	
Land-based SRBM Pluton	42	20-120	1 x 10KT	Some sources report 46 missiles. Reports of the AN-51 nuclear device's yield vary between 10 and 25KT. 5 regiments of 3 batteries of 2 launchers are based in eastern France. The 350-km range Hades missile will begin to replace the Pluton in 1992. 100 Hades are planned.
AIRCRAFT				
Strike aircraft Land-based Mirage IIIE	30	2,400	2 x AN-52. 15KT each	AN-52s are gravity bombs.
Jaguar	45	1,600	1 x AN-52. 15KT each	Not all sources list Jaguar as nuclear capable.
Carrier-based Super Etendard	36	1,500	2 x AN-52, 15KT each	These aircraft will be modified to carry ASMP.

Table 3
French Strategic Submarine Forces

Name	No.	Laid Down	Lannched	Operational
<i>Le Foudroyant</i>	S610	12 Dec 69	4 Dec 71	6 Jun 74
<i>Le Redoutable</i>	S611	30 Mar 64	29 Mar 67	1 Dec 71
<i>Le Terrible</i>	S612	24 Jun 67	12 Dec 69	1 Dec 73
<i>L'Indomptable</i>	S613	4 Dec 71	17 Aug 74	31 Dec 76
<i>Le Tonnant</i>	S614	Oct 74	17 Sep 77	3 May 80
<i>L'Inflexible</i>	----	27 Mar 80	mid-82	1985
-----	----	1986-88	-----	1994

1. *Le Redoutable* will not be retrofitted with the MIRV SLBM M-4 missile. She will carry the M-20 missile, which is reported to have a single 1MT warhead until she reaches the end of operational life in 1997.
2. The retirement of the first SSBN (*Le Redoutable*) is scheduled for 1997, three years after the scheduled entry into service of the seventh SSBN.
3. The seventh SSBN, which is scheduled to enter the force in 1994, will be the first to carry the new M-5 missile (Est. 6 MIRV's).

Table 4

French Strategic Submarine MIRV Retrofit Program

SSBN	Operational with M-4	End of Operational Life
<i>L'Inflexible</i>	1985	2012
<i>Le Tonant</i>	1987	2008
<i>L'Indomptable</i>	1989	2004
<i>Le Terrible</i>	1990	1999
<i>Le Foudroyant</i>	1992	2002

1. The M-4 missile is reported to have six 150KT warheads and a range of 6400km.
2. The end of operational life dates are based on an estimated 30-year life from the submarine launch date.
3. *L'Inflexible* will deploy with M-4 missiles when she becomes operational in 1985, so that she is not technically a retrofit.

Table 5

Strategic Warhead Delivery Capability

	1984	1988	1992	1996
IRBM				
S-3	18	18	18	?
SX				IOC: 1996
SLBM				
M-20	80	64	16	16
M-4	0	192	480	480
M-5				IOC: 1994 in 7th SSBN
AIRCRAFT				
Mirage IVA	34	18	18	0
Mirage 2000N	0	36	85	85
TOTAL	132	328	617	

1. The S-3 IRBM is reported to carry a single 1MT warhead to a range of 3000-3500km.
2. The M-20 SLBM is reported to carry a single 1MT warhead.
3. The M-4 SLBM will reportedly carry six 150KT warheads in a MIRV configuration.
4. Mirage IVA are credited here with a single AN-22 free-fall bomb capability. This is conservative in that they are reported in some sources as capable of carrying two bombs.
5. Mirage 2000N are credited here with a single medium range (100km at low altitude; 300 at high altitude) ASMP with a 100-150KT warhead.

Table 6
Strategic Megatonnage (MT)/Equivalent Megatonnage (EMT)
Delivery Capability

	1984 MT/EMT	1988 MT/EMT	1992 MT/EMT
IRBM			
S-3	18/18	18/18	18/18
SX	-----	-----	-----
SLBM			
M-20	80/80	64/64	16/16
M-4	-----	28.8/101.952	72/254.88
M-5	-----	-----	-----
AIRCRAFT			
Mirage IVA	2.04/5.202	2.7/9.558	2.7/9.558
Mirage 2000N	-----	5.4/19.116	12.75/45.135
TOTAL			
MT	100.04MT	118.9MT	121.45MT
EMT	103.202EMT	212.626EMT	343.673EMT

1. Aircraft are credited with one weapon per aircraft for conservatism.
2. $EMT = NY^{2/3}$ where N = number of warheads of a given yield.
Y = yield of warhead in MT.

Table 7
Tactical Warhead Delivery Capability

	1984	1988	1992
SRBM			
Pluton	42	42	0
Hades	---	---	100 (total deployment)
AIRCRAFT			
Land-based:			
Mirage IIIE	60	60	60
Jaguar	45	45	45
Carrier-based:			
Super Etendard	72	43	53
TOTAL	219	190	258

1. Two squadrons of Mirage IIIE are nuclear capable; each aircraft carries two weapons.
2. Three squadrons of Jaguar are nuclear capable; each aircraft carries one weapon.
3. French Navy Super Etendard carry two bombs each. By 1988 these nuclear capable Super Etendard (36) and seven additional aircraft will be modified to carry ASPM.
4. Mirage 2000N are in Table 5 under the PNS.

Table 8
Tactical Megatonnage (MT)/Equivalent Megatonnage (EMT)
Delivery Capability

	1984 MT/EMT	1988 MT/EMT	1992 MT/EMT
SRBM			
Pluton	0.42/1.9488	0.42/1.9488	-----
Hades	-----	-----	15/53.1
AIRCRAFT			
Mirage IIIb:	0.9/3.636	0.9/3.636	-----
Jaguar	.675/2.727	.675/2.727	-----
Super Etendard	1.080/4.3632	4.3/19.952	5.3/24.592
TOTAL			
MT	3.075MT	6.295MT	20.3MT
EMT	12.675EMT	28.2638EMT	77.692EMT

Table 9
Assumptions

- Survivability in preemptive attack

IRBM	0%
Aircraft	0%
SSBN (in port)	0%
SSBN (at sea)	100%
- Compound weapon system reliability 81%
- ABM single shot-kill probability (SSKP)

40% (inefficient system)
80% (more efficient system)
- SSBN operational availability (at sea) rate 60%
- Soviet ASW attrition probability 0%
- Overpressure calculated at 5 psi to determine number of weapons of a given yield required to cause moderate to severe damage to soft targets.

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It may be said without fear of contradiction that logistics has a powerful, if not absolutely a controlling, influence upon the *type* of war a nation is able to wage. Whether a nation can assume the offensive in war or be forced to act upon a pure defensive will be determined by the conclusion whether or not the logistics of the campaign will support an offensive movement.

Commander C. Theo. Vogelgesang, US Navy
Logistics—Its Bearing Upon the Art of War