

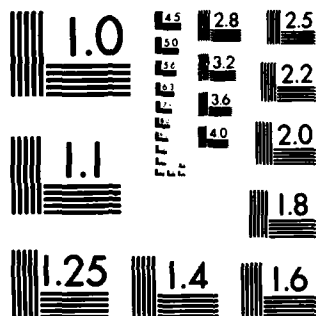
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UNCLASSIFIED PAPER

NAVAL WAR COLLEGE

Newport, R. I.

FRENCH NUCLEAR FORCES

by

John J. Hyland, III
Captain, USN

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A paper submitted for consideration in the 1984 Colbert Memorial
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The contents of this paper reflect my own personal views and are
not necessarily endorsed by the Naval War College or the Depart-
ment of the Navy.

Signature: John J. Hyland III

5 May 84

Paper directed by
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Charles C. Chadbourn

REPRODUCED AT GOVERNMENT EXPENSE

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INTRODUCTION

Recent articles in a variety of newspapers, magazines, and journals have highlighted growing interest in the strategic policies and forces of medium powers. The Washington Post, NATO's Sixteen Nations, International Defense Review, and Foreign Affairs have published articles treating various aspects of France's Forces Nucléaires Stratégiques (FNS).¹ Politique Étrangère, France's leading foreign policy journal, devoted a significant portion of a recent issue to eight articles on specific features of French security policy.²

French nuclear forces constitute a two-edged sword. Too large and too significant to be ignored by the Soviet Union, they are vulnerable enough to tempt a preemptive Soviet attack.

Several factors prompt a fresh look at France's nuclear posture. These include:

- presentation of the Mitterand government's five year defense plan(1984-1988) to the Assemblée Nationale in 1983;
- continuing debate concerning the feasibility of a middle-sized power maintaining an independent deterrent force;
- France's attempts to maintain a triad of deterrent forces similar to those of the United States and the Soviet Union;
- France's unique position in the Atlantic Alliance but outside the integrated military structure of NATO.

This paper briefly reviews French declaratory strategy, explores France's current and projected force structure,

develops a first order approximation of her nuclear force capabilities, and draws some implications from France's strategic modernization program.

STRATEGY

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."³

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 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 official 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 the FNS is deliberate and necessary for three reasons. First, France argues that uncertainty about whether or under what circumstances she would use her deterrent forces increases deterrence. The Soviet Union faces a more difficult problem when it does not know the cost of a given aggression, according to this view.

Second, the ambiguity accomodates 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 two key issues. The first is 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.

The second key issue 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 FNS 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 FNS. The consensus depends on the principles of proportional deterrence and the symbolic nature of the FNS not on a mature consideration of how France would actually use her nuclear forces, however.

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."⁴ 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 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, because the expansion will so dramatically increase her capability.

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 gives them the incentive to avoid precision in open debate.

CURRENT AND PROJECTED NUCLEAR FORCES

The French nuclear arsenal includes both strategic and tactical systems. Tables 1 and 2 summarize the 1984 systems. French strategic forces (La Force Nucléaire Stratégique or FNS) consist 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 a tactical missile--Pluton--deployed by the French Army.

Thirty-four Mirage IVA strategic bombers and 11 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 26% of the force's warhead total.

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

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% of the deliverable megatonnage and 60% of the warheads in the FNS. Since 1983

France has maintained three SSBNs on patrol and a fourth 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 the size of France. 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. Realistic evaluation of France's deterrent posture must account for these interrelated weaknesses, which affect all elements of the French triad:

- 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 decreases in the times required to prepare and to launch them significantly heightened 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.

To decrease the risk to the aircraft of the strategic air force (La Force Aérienne Stratégique or FAS) the six squadrons of Mirage IVA aircraft use nine airfields dispersed throughout France. Nevertheless, because France enjoys such limited warning of a Soviet strike and does not maintain her aircraft on airborne alert, the land-based air arm of the FAS remains vulnerable.

Even more exposed and vulnerable are the eighteen S-3 missiles deployed on the Albion Plateau. Although housed in hardened silos and capable of launch in less than ten minutes, this leg of the FNS triad is exceptionally vulnerable to the increased accuracy of Soviet weapons.

The French government has recognized the increased risk to the IRBM element of the FAS. The government has declared, nonetheless, that the missiles remain useful because an attack on them would indicate definitively the full extent of a Soviet attack and justify the release of France's remaining strategic forces.

The third element of the FNS in jeopardy is the command, control, communications, and intelligence system. Since the locations of these headquarters, command posts, radar sites, and communications stations are known, they are particularly vulnerable to preemptive strikes. Communications between the elements are relatively secure land links, but the terminals remain exposed, as do the VLF antennas needed to communicate with on-station SSBNs.

In addition to their vulnerability to attack, the FNS forces are vulnerable to technological advances in two cri-

tical areas--anti-submarine warfare(ASW) and anti-ballistic 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.

Whether or not the USSR would attempt to locate and to track all deployed French SSBNs is a matter of conjecture. The Soviet Navy's capacity to execute the mission is not. And the French Navy's emphasis on its SSBN protection mission reflects, in part, a concern for this possible scenario.

The second area of technological vulnerability, to advances in ABM technology, arises from the limited number of French warheads. Soviet ABM defenses face only 132 strategic warheads from French strategic forces in 1984:

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% at sea rate of SSBNs reduce further the maximum of 132 warheads. Thus, the FNS profits from the 1972 ABM Treaty and the 1974 Protocol to it, which limit 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 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. The Mirage IVA aircraft, which entered service in 1964, illustrates the problem of obsolescence.⁵ 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 future combat aircraft (Avion du Combat Futur or ACF) program will keep 18 Mirage IVA in strategic service until 1996.

Obsolescence compared with the US 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 in her sixth SSBN, 15 years after the United States began MIRV deployments.⁶

Obsolescence of this kind results from France's limited research and development (R & D) capability compared with that of the superpowers.⁷ Unlike Great Britain, which has profited from the United States's 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, increased costs and slowed developments in both nuclear and conventional weapons. The French defense budget is not large enough to cover all areas equally; over the last two decades nuclear R & D has normally recieved 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 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 lie the real budget and resource constraints of a middle-size power like France. The decision to pursue independent development of her military capabilities aggravates the effects of this set of constraints. Reliance on a smaller French military-industrial complex deprives France of the benefits of competition and of economies of scale. Moreover, amortizing the R & D and basic investment costs over a small number of weapons raises costs. One result of these factors is an incentive to export arms in order to reduce unit costs by increasing the size of the production run. "Such exports represented 20 per cent of French arms production between 1970 and 1975 and approximately one-third of production in 1976."⁸

Despite this level of arms exports, creation and maintenance of the FNS has imposed severe costs on France's conventional posture. Delays in introducing new equipment have been common, for example. The size of the French Army has

shrunk noticeably, and the average age of French Navy ships has increased.

The cost of independence to France also appears in any comparison of the costs 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 20% 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 (Loi de programmation) calls for significant improvements in every element of the FNS.

To the extent that past performance indicates future performance, the 1984-1988 defense program will be plagued by delays and cutbacks. Yet, in the 1990s after the delays and cutbacks are overcome, 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 law which 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 a 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.⁹ In 1984 SSBNs carry 80 of 132 strategic warheads(61%). By 1988 the figures will be 256 of 328(78%); in 1992, when the M-4 retrofit program is complete, 496 of 617(80%).

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% and 80% of the total French strategic capability will remain in the SSBNs of the FOST.

Using current at sea rates of 60%, 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 Eten-dard modified to carry ASMP and the FAS will have 54 similar-ly 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 clari-fication of the issue of French willingness to participate in the defense of West Germany and to concert with NATO. Devel-opment 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's range will permit France to continue to base her missiles in France and to attack Soviet Operational Maneuver Groups(OMG) before they enter West Germany.

This indicator of increased French interest in participat-ing in the forward battle(la bataille de l'avant) receives confirmation from the planned creation of the Rapid Action

Force (La Force d'Action Rapide or FAR). This 47,000-man, air-mobile force will be capable of operating "alongside our allies" in Europe.¹⁰

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 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 numerous assumptions. Estimating the French ability to inflict damage on the USSR can establish a measure of the FNS's deterrent value.

Deterrence is a function of capability and credibility or of risks and stakes. Both are necessary, but exact relationships between them are difficult to establish. For example, as capability to inflict damage increases, credibility may decrease but must remain above some minimum value. And as capability decreases, credibility must somehow increase for deterrence to work.

In the case of 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 to make "la dissuasion du faible au fort" credible. 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% of the population and 50-66% of the industrial capacity of the

Soviet Union.¹¹ To achieve these levels of destruction requires a delivery capability of 200-300 MTE.¹² 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 is and probably will remain beyond the capability of all countries except the US 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% of the urban population and 60% of the industrial capacity of the USSR in 1988. In 1992 the figures rise to 20% and 70% 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.¹³ 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 ten Soviet cities would jeopardize 25% of both the urban population and the industrial capacity of the USSR. According to Kemp's calculations this ten-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 eleven 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.¹⁴

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 ten largest cities in the USSR, less Moscow and Gorkiy, places 11% of the urban population and 15% of the industrial capacity at risk. Including Moscow and Gorkiy and dropping the eleventh and twelfth cities from a ten-city attack raises the respective figures to 16% and 25%. Expanding the attack to 200 cities brings the destruction into the range of McNamara's assured destruction: 55% and 62% 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 unalerted 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 ten 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 1 MT and 115 150 KT. Twenty-eight 1 MT weapons are required to attack the ten 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 150 KT 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 1 MT weapons after an attack on Russia's ten largest cities, less Moscow and Gorkiy. By 1992 the continued increase in warhead delivery capacity will enable France to attack Russia's ten largest cities, including Moscow and Gorkiy, and also to provide a secure reserve force of 16 1 MT and 100 150 KT weapons at sea. Seen from another

angle, the 1988 and 1992 FNS will enable France to attack substantially more than the ten 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."¹⁵

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-a-vis the USSR's forces.

Additionally, the growth in strategic capability is opening the debate over the proper use of the flexibility inherent in the more modern force structure. The French strategy of graduated response(*la réplique graduée*) 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 intra-war bargaining and war termination. Her new capabilities, although orders of magnitude smaller than the United States's, 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% 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 forces 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 US and the USSR to reconsider the impact of France's attack 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.¹⁶ 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.¹⁷ 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 US wants 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 US 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 US by the USSR in order to prevent the US from attaining a position of strategic superiority with regard to the USSR.

The expansion of FNS capabilities has other implications for the US 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 her position in this regard.¹⁸

Finally, 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.

CONCLUSION

The 1984-1988 French defense program provides a tentative answer to the question of the feasibility of a middle-sized power maintaining an independent deterrent force. The Mitterrand program demonstrates that a middle-sized power can maintain an independent deterrent, but it also shows that maintaining it imposes costs in conventional capacity and that the resulting force will be heavily dependent on its SLBM leg. Force structures like the superpowers's triads appear to be beyond the capability of a middle-sized power.

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.

TABLE 1

FRENCH STRATEGIC NUCLEAR FORCES (1984)

MISSILES

Category & type	Deployed Total 7/83	First Year	Range (km)	Warheads & Max. yield	CEP	Comments
Land-based IRBM SSBS S-3	18	1980	3500	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	1977	3000	1 x 1MT	--	See Tables 3 and 4 for details of the SLBM force.

AIRCRAFT

Category & type	Deployed Total 7/83	First Year	Range (km)	Warheads & Max. yield	CEP	Comments
Strike aircraft Land-based Mirage IVA	34	1964	3200	1 or 2 AN- 22 free fall bombs 60-70KT	--	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.

NOTES

1. Ranges given in km; for nautical miles, divide by 1.852. Use of maximum payload may reduce a missile's operational range by up to 25% of figures shown. Figures for aircraft are theoretical maximum unrefuelled range at optimum altitude and speed. Higher speeds, lower altitudes, and full weapons loads reduce range. For instance, a high-low-high profile reduces the ranges of French aircraft as follows:

Mirage IVA	1500km
Mirage IIIE	800km
Jaguar	720km
Super-Etendard	650km
2. Eleven KC-135 tankers, which entered service in the mid-60s, support the Mirage IVA strategic aircraft.
3. CEP(circular error probable)=the radius of the circle around a target within which there is a 50% probability that a weapon aimed at that target will fall.
4. Warhead yields will vary greatly; figures given are estimated.
5. Sources for this table and the following ones are:
The Military Balance, 1983-1984 and previous issues(London:International Institute for Strategic Studies)
Jane's Fighting Ships, 1983-84 and previous issues(London: Jane's)
Jane's Weapons Systems, 1983-84 and previous issues(London: Jane's)
Jane's All the World's Aircraft, 1983-84 and previous issues(London: Jane's)
Robbin F. Laird, French Nuclear Forces in the 1980s and 1990s(Alexandria, Va.: Center for Naval Analyses, 1983)
New York Times
Washington Post
Le Monde
La Programmation Militaire 1984-1988(Paris, France: Ministere de la Defense, Service d'Information et de Relations Publiques des Armees, Dossier d'Information no. 72, 1983)
M. Luc Tinseau, Rapport sur le projet de loi(No. 1452) portant approbation de la programmation militaire pour les annees 1984-1988(Paris: Assemblée Nationale(No. 1485), 1983)
Defense Nationale, 1983 and 1984

TABLE 2
FRENCH TACTICAL/THEATER NUCLEAR FORCES (1984)

MISSILES						
Category & type	Deployed Total 7/83	First Year	Range (km)	Warheads & Max. yield	CEP (m)	Comments
Land-based SRBM Pluton	42(46)	1974	20- 120	1 x 10KT	150- 300	Some sources report 46 missiles. Reports of the AN-51 nuclear de- vice'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						
Category & type	Deployed Total 7/83	First Year	Range (km)	Warheads & Max. yield	CEP (m)	Comments
Strike aircraft Land-based Mirage IIIE	30	1964	2400	2 x AN-52 15KT each	--	AN-52s are gravity bombs.
Jaguar	45	1974	1600	1 x AN-52 15KT		Not all sources list Jaguar as nuclear capable.
Carrier-based Super Etendard	36	1980	1500	2 x AN-52 15KT each		These aircraft will be modified to carry ASMP.

NOTES
See Table 1.

TABLE 3

FRENCH STRATEGIC SUBMARINE FORCES

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

NOTES

1. See Table 1 for sources.
2. All SSBNs are built at the Cherbourg Naval Dockyard.
3. 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 LMT warhead, until she reaches the end of operational life in 1997.
4. The retirement of the first SSBN (Le Redoutable) in 1997, three years after the scheduled entry into service of the seventh SSBN, means that the force will remain a six submarine force for all intents and purposes.
5. The seventh SSBN, which is scheduled to enter the force in 1994, will be the first to carry the new M-5 missile. This missile will be spin-stabilized and have six MIRV warheads according to some reports.

TABLE 4

FRENCH STRATEGIC SUBMARINE MIRV RETROFIT PROGRAM

SSBN	Operational with M-4	End of Opera- tional Life
L'Inflexible	1985	2012
Le Tonnant	1987	2008
L'Indomptable	1989	2004
Le Terrible	1990	1999
Le Foudroyant	1992	2002

NOTES

1. See Table 1 for sources.
2. The M-4 missile is reported to have six 150KT warheads and a range of 6400km.
3. The retrofit program has reportedly fallen behind the originally promulgated schedule.
4. The end of operational life dates are based on a 30-year life from the submarine launch date. Launch dates from July to December are arbitrarily considered to fall in the following calendar year for these calculations.
5. 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	

NOTES

1. See Table 1 for sources.
2. The S-3 IRBM is reported to carry a single 1MT warhead to a range of 3000-3500km.
3. The M-20 SLBM is reported to carry a single 1MT warhead.
4. The M-4 SLBM will reportedly carry six 150KT warheads in a MIRV configuration.
5. 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.
6. Mirage 2000N are credited here with a single, medium range (100km at low altitude; 300 at high altitude) ASMP with a 100-150KT warhead.
7. Mirage 2000N are smaller, less ambitious aircraft than the proposed Avion du Combat Futur(ACF) whose development was stopped in favor of the 2000N. Designed with terrain-following radar for low altitude penetration, it will have a range of 1800km with two 1700 liter drop tanks. Although shown here as part of the FNS, the Mirage 2000N may also be considered as the replacement for the nuclear capable Mirage IIIE and Jaguar aircraft of the tactical nuclear forces.

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

NOTES

1. See Table 1 for sources.
2. Aircraft are credited with one weapon per aircraft for conservatism.
3. $EMT = NY^{2/3}$ where N=number of warheads of a given yield and 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

NOTES

1. See Table 1 for sources.
2. France is credited with 46 Pluton according to some sources.
3. The Hades will reportedly carry a single 150-300KT warhead to a range of 350km and be more accurate than Pluton.
4. Two squadrons of Mirage IIIE are nuclear capable; each aircraft carries two weapons.
5. Three squadrons of Jaguar are nuclear capable; each aircraft carries one weapon.
6. 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 ASMP.
7. Mirage 2000N are in Table 5 under the FNS.

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 IIIE	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

1. Survivability in preemptive attack

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

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

FOOTNOTES

1. Michael Dobbs, "French General Challenges Cornerstone of Nation's Independent Defense Strategy", Washington Post, 19 March 1984, p. A20.
Lawrence Freedman, "The Small Nuclear Forces", NATO's Sixteen Nations, December 1983-January 1984, p. 25-27.
Pierre Hassner, "France, Deterrence and Europe", International Defense Review, February 1984, p. 133-142.
Pierre Lellouche, "France and the Euromissiles: The Limits of Immunity", Foreign Affairs, Winter 1983-84, p. 318-334.
2. Politique Etrangere, Ete 1983.
3. M. Luc Tinseau, Rapport sur le projet de loi(No.1452) portant approbation de la programmation militaire pour les annees 1984-1988(Paris: Assemblée Nationale(No.1485)), p. 78. Cited hereafter as Rapport 1984-88.
4. Lellouche, op.cit.(fn 1), p.323. See also Politique etrangere, Ete 1983.
5. Lothar Ruehl, La Politique Militaire de la Cinquieme Republique(Paris: Presses de la Fondation Nationale des Sciences Politiques, 1976), p. 375-378.
6. John Vinocur, "Allies Like Warhead Limits but Don't Want Theirs Included", New York Times, 8 May 1983, p. E3.
Rapport 1984-88, p. 48.
7. David S. Yost, "French Defense Budgeting: Executive Dominance and Resource Constraints", Orbis, Fall 1979, p. 579-608.
8. Ibid., p. 606.
9. Rapport 1984-88, p. 48.
10. Jacques Isnard, "La force d'action rapide pourra intervenir en Europe", Le Monde, 20-21 novembre 1983, p. 1,8.
11. Geoffrey Kemp, Nuclear Forces for Medium Powers, Part I; Targets and Weapon Systems(London: International Institute for Strategic Studies, Adelphi Paper 106, 1974), p. 25-27. Cited hereafter as Kemp, Part I.
12. Kemp, Part I, p. 27.
13. Kemp, Part I, p. 27-28.
14. Ruehl, op.cit.(fn 5), p. 403-413.
15. Laurence Martin, "The Determinants of Change: Deterrence and Technology" in The Future of Strategic Deterrence, Part II (London: International Institute for Strategic Studies, Adelphi Paper 161, 1980), p. 17.

16. Charles Hernu, "Equilibre, Dissuasion, Volonte: la Voie Etroite de la Paix et de la Liberte", Defense Nationale, decembre 1983.

17. Raymond Aron, Le Grand Debat (Paris: Calmann-Levy, 1963), p. 133.

18. Rapport 1984-88, p. 40.

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