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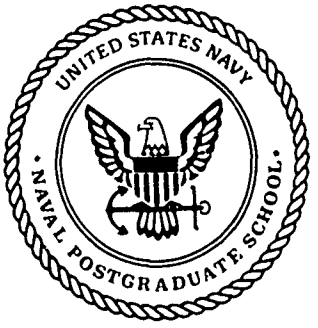

THESIS

BRITISH AND FRENCH
STRATEGIC NUCLEAR FORCE MODERNIZATION:
PROGRAMS, STRATEGIES, AND IMPLICATIONS

by

Darryl W. Bates

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Thesis Advisor: David S. Yost

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British and French Strategic Nuclear Force Modernization: Programs, Strategies, and Implications

by

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ABSTRACT

Britain and France are currently modernizing and expanding their nuclear arsenals. This thesis examines the current British and French strategic nuclear force modernization programs and weapon systems. It specifies the important differences between the two nations with regard to strategic rationales for nuclear forces and nuclear targeting. It includes an analysis of several additional factors affecting their respective modernization programs, including alternative options considered, domestic politics, technology, national economies, defense spending, and American co-operation. After examining these modernizations within the context of the past and present development of British and French deterrence and strategic nuclear policies, the thesis suggests implications for British and French nuclear programs and strategy for the next decade and into the twenty-first century.

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I. INTRODUCTION

A. CONCEPTUAL FRAMEWORK AND ANALYTICAL PURPOSES

Britain and France are currently modernizing and expanding their strategic nuclear arsenals. According to some accounts, when the currently envisaged modernizations are completed in the year 2005, British and French strategic forces will not only be more accurate but will have seven times the number of warheads at their disposal today (in December 1989) [Ref. 1:p. 1]. These modernization programs have a number of implications for present and future U.S. defense planning. These modernization programs will affect not only the nature and composition of the Western nuclear deterrent but also the size and strength of West European conventional defenses. The most important question concerns the deterrent postures of these two West European allies, one of which remains fully within the integrated military structure of NATO, while the other continues to follow an independent nuclear path. Furthermore, the programs may influence the future role of the United States in the Atlantic Alliance. By examining the modernization programs within the context of the historical development of British and French strategic nuclear deterrence policies, this thesis will explore the possible courses for British and

French nuclear strategy for the next decade and into the twenty-first century.

At first glance it appears reasonable to consider the French and British nuclear forces as categorically similar: independent strategic nuclear deterrent forces, comparable in weapon systems composition, development, and deterrence theory rationale. In fact, such a judgement is superficial and far from the truth. British and French strategic nuclear capabilities, doctrinal developments, political objectives, and policy determinants (including co-ordination with allies) differ in substantial and noteworthy respects.

This thesis examines the current British and French strategic nuclear force modernization programs and specifies the important differences between these two nations with regard to nuclear weapons issues and nuclear deterrence policy. The study of the rationales behind these program developments in the thesis identifies distinct differences in the British and French outlooks on the changing international environment, their future geopolitical positions and roles, their threat perceptions, the evolution of their nuclear doctrines, and their specific internal domestic constraints. This review of the British and French nuclear modernization programs provides a basis for judgments about these nuclear force postures in next decade and the early twenty-first century.

A complete historical review and analysis of British and French nuclear policy development and force deployments is beyond the scope of this work. However, a focus on their modernization programs permits emphasis on current issues and debates, as well as bringing to the surface past rationales, policy decisions, and doctrinal developments that have led to the present programs.

The United Kingdom's Trident program will be considered first. Discussion began in the late 1970s in Britain over a replacement for the aging Polaris force. Some circles advocated the curtailment of Britain's nuclear deterrence capability altogether and suggested other programs on which the money could be usefully spent. However, on 15 July 1980 the Thatcher government announced its intention to build four new submarines, each carrying 16 American Trident I C-4 missiles, as a replacement for Polaris. Following the U.S. Government's October 1981 decision to accelerate Trident II D-5 development, the U.S.-British agreement was renegotiated and the British government announced in March 1982 that the Polaris system would be replaced by the Trident II D-5 program. The Trident II D-5 missile represents over a 250 percent increase in missile range and hence increased target coverage. The British government has also acknowledged that a single Trident vessel could threaten up to 128 targets with 128 weapons compared to two Polaris

boats which could threaten a maximum of 32 targets with 96 warheads [Ref. 2:p. 120].

The increased striking capability of the Trident system has already created political concerns in Britain which have in turn altered policy. Although the D-5 missile is capable of carrying 14 MIRV (multiple independently targeted reentry vehicle) warheads, the actual number to be carried in U.K. service is classified. Apparently because of a wish to convey an image of moderation in pursuing a strategy of minimum deterrence (i.e., that Britain is not speeding up the "arms race" or seeking a "war fighting" capability) the British government indicated that it will not use the full capacity, and that each submarine will carry no more than the number of warheads (128 warheads) that would have been deployed if the Trident I C-4 missile (8 warheads) had been installed.

However, some strategic questions remain unanswered. What will be the strategic roles of Trident? How will the more widespread, flexible, and selective targeting capability be employed and incorporated in NATO planning? How credible is the policy assertion that Britain maintains a minimum deterrent force, in view of Trident's increased capacities?

The major change brought about by French strategic modernization is the expansion of striking power in the SSBN (nuclear ballistic missile submarine) fleet. The

deployment of missiles with multiple independently targetable reentry vehicles on most of their SSBNs, the M-4 retrofit program, will increase by a factor of five the number of warheads carried by the SSBN fleet. There are also plans (temporarily postponed) to develop and deploy the S-4, a land-based, intermediate-range ballistic missile of 2,000 to 4,000 kilometer range capable of reaching targets in the Soviet Union. In addition 18 Mirage IVs will be fitted with ASMP (Air-Sol Moyenne Portée) medium-range air to ground missiles with increased standoff capability. The French strategic system improvements will enhance the survivability of the French deterrent posture as well as greatly expand its striking power.

What does this imply for the traditional French declaratory policy of proportional deterrence strategy and autonomy in defense matters? The French already talk of an "enlarged anti-cities" strategy. With an increase in the number of survivable warheads and more efficient target coverage, a wider range of multiple strike options will become possible. Could this suggest the emergence of a French strategy of flexible response, the NATO strategy which the French currently reject? Could the capability of limited strikes, made possible through the modernization programs, undermine the credibility of deterrence by the weak of the strong?

There are significant differences in the reasons for modernization in the two countries. In the case of Britain, the policy rationale relies heavily on Britain's contribution and commitment to NATO's strategy of nuclear deterrence. The Ministry of Defence Open Government Document 80/23, The Future United Kingdom Strategic Nuclear Deterrent Force, which outlined the modernization program, reveals Britain's commitment and unique contribution to NATO's strategy of deterrence and the value that the government placed on Anglo-American co-operation. The arguments against the Trident I and II decisions raised by the government's critics reflect the political and social environment in which nuclear weapons issues and roles are decided in Britain. For example, some critics view the continued Anglo-American nuclear co-operation as a political liability in Britain's relations with Europe. In 1982 British politics were so polarized over the Thatcher government's decision to develop a new generation of independent deterrent means based on nuclear submarines that the Labour, Liberal, and Social Democratic parties withdrew their support for the Trident II program. The options which were available but not selected (such as a land-based system instead of a submarine launch platform or a cruise instead of a ballistic missile delivery vehicle) revealed a great deal about the roles assigned to nuclear weapons in British

defense policy as well as about British political and fiscal constraints.

French modernization efforts are rooted in different factors. Improvements in technology have permitted the French to fit their submarines with multiple warhead missiles as well as to improve the range and accuracy of the missiles and the penetration capability of the warheads. Also, the French nuclear effort has been useful in gaining broad popular domestic support for France's overall defense posture, for it has been seen as the linchpin in maintaining the independence of French security policy. Because French public opinion, nuclear weapons, and independence are intertwined, it is necessary to keep nuclear force modernization a high political priority. By modernizing, the French also seek to deter Soviet coercion and/or aggression. Doctrinal statements indicate that the French are seeking an ability to target the infrastructure of the Soviet economy and administration rather than simply population centers.

The analytical review of British and French strategic nuclear force modernization programs and strategies in this thesis is intended to fulfill the following objectives:

1. By understanding current and proposed modernization programs in Britain and France, to enable the defense planner to forecast better the nuclear balance of forces in Europe through the next decade.

2. To analyze the publicly proposed strategies for employment of these new weapons systems for compatibility between official stated policy and actual hardware capabilities.

3. To draw conclusions regarding strategic implications for these countries and NATO as a whole.

4. To improve the defense planner's contextual understanding of the countries involved and to provide insight into some of the political, social, and economic dynamics that affect the national nuclear planning processes and the force postures.

5. Through a better contextual understanding of the countries involved and a knowledge of what weapon systems they are developing and deploying, to aid the defense planner in anticipating British and French government policies as well as their probable reactions toward potential American initiatives in the nuclear arena.

6. By examination of the modernization programs, to reveal several important differences in the nuclear capabilities and policies of Britain and France, thereby providing a richer analysis than one that would collectively categorize Britain and France as essentially identical "medium" nuclear powers.

B. METHODOLOGY

A comparative analysis methodology will be employed. The weapon system programs under development and in deployment stages along with details of the hardware and weapon system capabilities are examined in Chapter II. Chapter III considers the strategic rationales behind both nuclear forces and reviews the unclassified literature concerning British and French nuclear targeting. This chapter includes a discussion of the implications for change in strategic doctrine and targeting options afforded by the British and French arsenal upgrades. Additional factors

affecting the modernization programs are examined in Chapter IV. The factors considered include alternative options that the two nations considered for modernization in the 1980s and 1990s, British and French domestic politics and the nuclear modernization issues, economic bases and technology capabilities, and perspectives concerning American co-operation. Chapter V offers an analytical comparison of the two national modernization programs and strategies, and contrasts the implications and perspectives regarding the foreign and domestic environment. Conclusions and findings are also summarized.

II. MODERNIZATION PROPOSALS AND PROGRAMS

A. BRITAIN

1. Polaris/Chevaline

The current British strategic nuclear deterrent force consists of four submarines of the 8,500 ton Resolution class which entered service between October 1967 and December 1969 (HMS Resolution, October 1967; HMS Repulse, September 1968; HMS Renown, November 1968; and HMS Revenge, 1969). Since early 1969 one has always been on patrol and available for operational employment. Currently HMS Renown is in a long refit and will be followed by HMS Revenge, whose third long refit will begin in 1990 [Ref. 3:p. x]. No fourth refit is planned for HMS Resolution or any other Polaris boat, although the option will remain open for the next few years. The Ministry of Defence has ackowledged the risk of reduced deterrent capability in this plan should there be a "major reduction in SSBN availability due to an unforeseen emergency (e.g., an accident, or significant delay to SSBN 05 or 06 [Vanguard or Victorious]; or a loss of a Polaris submarine)." [Ref. 3:p. xvi]

Each SSBN can carry 16 Aerojet/Hercules Polaris A3 two-stage solid-fuel SLBMs (submarine-launched ballistic missiles) with inertial navigation and a range of 2,500 nautical miles. Although capable of carrying three 200

kiloton MRV warheads [Ref. 4:p. 26], the Chevaline design may, according to some speculation, carry six re-entry vehicles of 40 kilotons each of either the MRV (multiple re-entry vehicles) or MIRV (multiple independently targeted re-entry vehicles) variety [Ref. 2:p. 20]. Even though the British government has not made such information publicly available, the Polaris stockpile is reported by one account to be 70 missiles and 45-50 warheads [Ref. 5:p. 648]. In 1978, however, the U.S. Department of Defense Security Assistance Agency announced in its publication Foreign Military Sales and Military Assistance Facts that a British order for 31 Polaris missiles had been approved for delivery in the 1980s, in addition to the 102 Polaris missiles already delivered [Ref. 3:p. xvii].

Until the principal British modernization program (Trident) becomes operational, Britain will remain dependent upon the Polaris fleet for its independent strategic nuclear deterrent. Two programs have recently been completed to maintain this capability into the 1990s--the purchase of new rocket motors for the missiles from the United States and the development of a new front-end for the missiles (Chevaline). After refit schedules between 1982 and 1988 all four Polaris SSBNs are now able to patrol with a full load of Chevaline-tipped Polaris missiles.

The Conservative government decided to develop the Chevaline upgrade to the Polaris A3 missiles in 1972

following the signing of the ABM Treaty between the United States and Soviet Union. This decision was also confirmed by the Labour government when it came to power in 1974. With an assurance that the Soviets would not significantly improve their anti-ballistic missile defenses (or at least remain limited to 100 launchers around Moscow), the British government felt confident in pursuing an expensive unilateral project to upgrade the penetrating capabilities of its missiles. Chevaline has been described as two maneuvering clusters of real warheads and decoys, capable of penetrating Moscow defenses [Ref. 6:p. 93]. This was done by developing a sophisticated liquid-fueled post-boost vehicle capable of maneuvering deep in space (exoatmospheric) to confuse enemy radars as it descends toward earth [Ref. 2:p. 20]. The concept was to rain a series of warheads and decoys simultaneously over target areas to swamp the defenses. However, one expert on British targeting suggested that the effects come not from the contents of a single missile but from the combined contents of a number of missiles, possibly the complement of one SSBN [Ref. 6:p. 93].

There have been inconsistent statements and speculations regarding the MRV or MIRV capability of the Cheveline re-entry vehicles. One former British official acknowledged reports indicating that the system was of the MRV design vice MIRV type [Ref. 4:p. 26]. This raises the

issue of limited flexibility and probable difficulty in attacking many targets. One published source indicated that Chevaline re-entry vehicles did not increase the yield of the Polaris missiles and that the warheads are said to be capable of separation between impact points of a maximum of 70 kilometers [Ref. 7:p. 21]. On the other hand, some senior British officials involved with the program suggested that it did have a smaller number of larger yields warheads with MIRV qualities [Ref. 2:p. 21]. However, it is noted that most observers do not attribute MIRV capability to Chevaline.

2. Trident II D-5

On 15 July 1980 the British government announced its intention to build four new submarines, each equipped with 16 Trident I missiles as a replacement for the Polaris fleet. The fact that the Government did not commit to five SSBNs surprised some since operational experience with Polaris had shown it incapable of keeping two SSBNs on continuous patrol, but the Thatcher government played down the urgency of procuring a fifth boat. For one thing the new Rolls-Royce PWR-2 reactor could operate longer between refits. Secondly, even if only one British Trident SSBN were on patrol during hostilities, it was argued that a single Trident vessel could threaten up to 128 targets with 128 weapons compared to two Polaris boats which could

threaten a maximum of 32 targets with 96 warheads. [Ref. 2:p. 120]

But the procurement question was not settled. Following the U.S. Government's October 1981 decision to proceed with Trident II D-5 development, the Reagan administration proved even more co-operative in contract negotiations than the Carter administration. The 1963 Polaris Sales Agreement framework was retained allowing Britain to purchase the missiles, complete with multiple independently targetable re-entry vehicles but without the warheads themselves, at U.S. Navy unit costs; the British research and development contribution was fixed in real terms at $116 million, rather than 5 percent over cost of the missile as under the Trident I agreement, since development costs were uncertain at the time [Ref. 2:pp. 118, 121; Ref. 8:p. 204]. The U.S. Government also suspended the "Buy American Act" to allow British firms to compete for subcontracts on the production run [Ref. 8:p. 204]. With these favorable terms the British government announced on 11 March 1982 the decision to buy the Trident II D-5 strategic weapon system.

In January 1989 the Secretary of State for Defence announced a revised estimate for the cost of the Trident program of £9,089 million at 1988-89 prices, covering a period of expenditure from 1980 to 2000 [Ref. 3:p. v]. Including the savings that resulted from the 1982 decision

to refurbish the missiles at the U.S. facility at King's Bay, Georgia, rather than at the Royal Naval Armaments Depot at Coulport, Scotland, the present estimate is approximately 17 percent lower than the 1981 estimate [Ref. 3:p. v]. There has been a continuing tendency over the past three years for the estimate to fall in real terms.

Most of the savings have been on expenditure expected to be incurred in the United States. Estimated expenditure in the U.S. on the missiles is now only 61 percent of the 1981 estimate and the expected cost of the strategic weapons system equipment is now only 69 percent of the 1981 estimate. In the United Kingdom part of the program, the main savings have been in the cost of the submarines, where estimated expenditure is 79 percent of the 1981 estimate. [Ref. 3:p. vii]

By December 1988 some 44 percent of the total Trident program budget had been committed and nearly a quarter of the total had been spent. By the end of the 1988-89 fiscal year, expenditure was expected to have totaled £2,300 million. Annual expenditure will be £938 million in 1989-90: and in 1990-91 it will reach its peak at £1,025 million and then the rate of expenditure will decline gradually. [Ref. 3:p. vii]

The first two submarines of the 15,000 ton Vanguard class are under construction at Vickers Shipbuilding and Engineering Limited. (HMS Vanguard was laid

3 September 1986; and HMS Victorious was laid 3 December 1987.) Orders for the remaining two boats (HMS Vengeance, HMS Venerable) are expected by the end of 1989 [Ref. 9:p. 24]. Although the actual in-service date for the first of the Trident boats remains classified, the British Ministry of Defence has consistently given the in-service date for Trident as the mid-1990s. However, Prime Minister Thatcher was more specific when she gave a date of 1994 at a news conference following the March 1988 NATO Summit [Ref. 10:p. xxvi]. In general, the British press and open source literature refer to this latter date. Despite a prolonged three month strike preceeded by a two month industrial slowdown at Vickers Shipbuilding in 1988, submarine construction remains within contract deadlines for Vanguard and Victorious [Ref. 3:p. xiv].

Each submarine will carry 16 three-stage solid-fuel Lockheed Trident II D-5 missiles with stellar inertial guidance and a maximum range of 6,500 nautical miles. Development of the D-5 missile was on schedule in the United States until the first submarine-launched test of the missile from the USS Tennessee on 21 March 1989; this was a spectacular failure. British Defence Committee members were briefed in April 1989 in the United States on the details of the test failure (problems with thrust vector control of the first-stage rocket motor) and concluded that there was no cause for concern as a result of this one failure, citing

the superior test record of the missiles compared to that of the Polaris A-3 at a similar stage of development [Ref. 3:p. xvii]. However, "concern" was the reported official British reaction to a second submerged test failure 16 August 1989 from the USS Tennessee off Cape Canaveral, Florida [Ref. 11:p. 6]. U.S. Navy preliminary investigations revealed that a design flaw caused the test failures [Ref. 12:p. A1]. Because the Trident II D-5 missile is much larger than the Trident I C-4 more compressed gases are needed to eject the missile from the submarine. As water rushes in to fill the space left by the gas bubble, a plume of water follows the missile as it breaks the ocean surface. This larger than expected plume of water is believed by engineers to be exerting force and consequently damaging the nozzles. The revised U.S. deployment date for the missile of 31 March 1990 should not affect the British Trident program schedule [Ref. 12:p. A1].

At the start of its commission each Trident boat will be loaded with 16 missiles at Kings Bay, Georgia. The boat will then return to Britain and the warheads will be fitted at Coulport. When the submarine is ready for her long refit (after seven to eight years), the warheads will be removed and serviced in the United Kingdom and the missiles returned to King's Bay, Georgia. There will not be specific American or British Trident missiles; the missiles will comprise a single pool of which Britain will own a

fixed number [Ref. 10:p. xxvi]. Although the U.K. will purchase its required number of missiles, to which it will take title, specific missiles will not become U.K. property. This represented a £784 million savings in the Trident program. The interpretation that the British are in effect renting their deterrent forces has been denied vehemently by British officials. In October 1987 the Secretary of State for Foreign and Commonwealth Affairs argued:

> The idea that we will only be leasing or hiring Trident missiles is absolutely nonsense. We shall buy them outright and they will remain ours.... ...We shall continue to own the same number of missiles at all times. They remain in United Kingdom hands at all times. [Ref. 10:p. xxxi]

The Defence Committee of the House of Commons in its Third Report on the Progress of the Trident Programme defended the arrangement: "The point at issue in the American, rather than British, refurbishment of Trident missiles is whether the independence of the British nuclear deterent is to any degree compromised. We do not believe it will be." [Ref. 10:p. xxxi]

Although the D-5 missile is capable of carrying 14 MIRV warheads, the actual number carried in U.K. service is classified. The British government indicated, however, that each submarine will carry no more than the number of warheads (128 warheads) that would have been carried if the Trident I C-4 missile (eight warheads) had been procured [Ref. 13:p. 6]. By setting the self imposed limit in terms of warheads per submarine the British are still free to vary

the number of warheads on each missile. The number can be varied without major alterations to the missile. Although a particular submarine may actually only carry 128 warheads some of the missiles could be fitted with the maximum of 14 warheads and other missiles on the submarine downloaded. Even though the warheads per submarine restriction appeared to have been imposed to curb public fears of irresponsible proliferation of offensive nuclear delivery systems by the British government, the Ministry of Defence is still afforded a great deal of flexibility in targeting by being able to vary the number of warheads per missile. A fully loaded missile can provide a large footprint whereas the downloaded ones offer extended range. An investigation by The Independent reported that the yield of Britain's warhead will be about 100 kilotons [Ref. 14].

There do appear to be schedule problems with Trident warhead production in the United Kingdom. The Trident warhead design was "frozen" in 1987 at the conclusion of what the Director of Atomic Weapons Establishment (AWE) described as a "complex but highly successful development programme". The AWE Aldermaston complex is now involved in three main areas of Trident work: Trials and Assessments, Technology Transfers, and Production. The Trial and Assessments program, which concerns safety, performance and effectiveness such as operations in extremes of temperature and vibration, and assessment of any aging effects, is on

schedule. Technology Transfers work covers the manufacturing technology for non-fissile components for the warheads; and, despite some manpower shortages, this program is also expected to meet delivery schedules. [Ref. 3:pp. xxi-xxii]

However, the Trident warhead production program is vulnerable to problems with the construction of a capital works program (A90 facility) at AWE Aldermaston and manpower shortages at AWE Burghfield and AWE Aldermaston. The production of fissile material involves plutonium pits and highly enriched uranium components which are produced only at AWE Aldermaston and mated with non-fissile parts from AWE Burghfield and AWE Cardiff for assembly at AWE Burghfield. Each re-entry body assembly takes approximately three months. [Ref. 3:p. xxii] Although production of fissionable components at AWE Aldermaston began in early 1988 with the first service plutonium pits completed on schedule, the aging A45 facility cannot accommodate full Trident program production. In addition, staff shortages have been plaguing the government weapons facilities on account of resignations, retirements, and failure to attract additional staff due to low civil servant pay. The capital works program and the fulfilling of staff requirements at AWE Aldermaston are of critical importance to the Trident program and are major sources of potential delay. The

Defence Committee subsequently concluded in June 1989 from evidence submitted that

> ...the in-service dates of the second, third and fourth Trident boats remain contingent on the satisfactory operation of A90. In turn, the achievement of production in A90 on schedule (1992) and at required levels will depend on recruiting and retaining the staff required. [Ref. 3:p. xxvi]

3. ASMP, SRAM-2

Great Britain considers its submarine-launched ballistic missiles to be its only truly strategic nuclear capability. The British government has decided to buy a new advanced nuclear missile to replace its old stockpile of 200-odd aging gravity nuclear bombs. There has been no reference from the government or press to this purchase as a strategic nuclear weapon system. However, because one of the systems under consideration is the French air-launched ASMP (Air-Sol Moyenne Portée) which the French do regard as a strategic nuclear system, the topic will be reviewed here since it constitutes a major potential improvement in British nuclear forces with a possible "strategic" application.

Britain's stockpile of free fall nuclear bombs (WE 177) carried on the RAF Tornado is becoming obsolescent and will need to be replaced by the mid to late 1990s. Because British assessments indicate that improving Soviet air defenses will make it harder for bombers to penetrate Warsaw Pact air space, a standoff nuclear missile capable of being

fired from bombers at a safe distance is being considered as a replacement.

Published reports suggest that prospects for a proposed joint British-French development of an advanced nuclear missile have fluctuated over the last two years. Throughout most of 1988 the British remained less enthusiastic over the program than the French. As late as March 1989 press reports indicated that Britain was set to back out of the proposed British-French missile deal. The problem with the missile proposal was that France's existing ASMP missile built by Aérospatiale on which it would have been based has insufficient range (186 miles) to meet Royal Air Force requirements (250 miles) or NATO's Supreme Allied Commander in Europe guidelines for future nuclear weapon deployment. France saw no need for a longer range missile and hence insisted that Britain would have to bear most of the development costs. In addition the French missile would employ 1970s technology which the British felt would be outdated by the time the weapon entered the British arsenal. One press report in August 1988 stated that Prime Minister Thatcher was also reluctant to jeopardize Britain's special nuclear relationship with the United States and was wary of reliance on France [Ref. 15:pp. 1-2].[1]

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[1]See Chapter IV, Section D, "Anglo-American Relations" for a more complete discussion of the U.S.-U.K. nuclear relationship.

British interests subsequently have turned to the American short-range attack missile (SRAM-2). The Boeing missile under development will have a range acceptable to the Ministry of Defence (250-300 miles). It would also represent an off-the-shelf, state of the art technology purchase for Britain. The British government has emphasized that the warheads on any new missile would be solely British and manufactured at AWE Aldermaston, as in the Trident program. [Ref. 15:pp. 1-2, Ref. 16]

Some British and French press reports have indicated that London's decision is leaning towards the American missile. However, on 14 September 1989, while meeting with French Defense Minister Jean-Pierre Chevènement, British Defence Minister Tom King announced that the Anglo-French missile construction remained a serious option on a par equal to the American one [Ref. 17:p. 8]. He did not indicate when a final decision would be made, although one is expected by the end of 1989.

4. Command, Control, Communications

The high degree of secrecy surrounding nuclear weapons in the United Kingdom makes it difficult to determine how much attention has been paid by political and military authorities to command, control and communications (C^3) issues. Despite the British government's investment in the Chevaline project and Trident program, no single significant program to improve British C^3 performance or

survivability has been publicly acknowledged. Some records suggest that perhaps some funding for Trident related C^3 are concealed under other headings in the Ministry of Defence's Long-Term Costings implying that there are indeed C^3 modernization projects but the funding of which is hidden for security or other reasons in other programs [Ref. 18:p. 28]. However, the Ministry of Defence Statement on the Defence Estimates 1989 does not mention a C^3 modernization program.

According to David Greenwood's account, in responding to persistent questioning by the Labour MP and former Minister of State for Defence Dr. John Gilbert, at the Select Committee hearings on 17 March 1982, Secretary of State John Nott referred to "a continuing, on-going programme for the updating of our command and control systems in all areas." [Ref. 18:p. 28] His testimony also suggested that funds budgeted for the maintenance of the integrity of the command and control systems are included in the totality of the Trident program and in the defence budget in general [Ref. 18:p. 28].

The following summary of British command and control arrangements for the sea-based nuclear deterrent is based on an unclassified, unofficial source, and it may not be entirely correct. To transmit orders from Royal Navy Headquarters at Northwood to its Polaris submarines the U.K. relies upon three VLF (very low frequency) transmitters at

Criggion, Rugby, and Anthorn. Criggion and Rugby are both civil and Royal Navy sites whereas the Anthorn transmitter is operated by NATO. Should these sites go off-line in wartime a variety of back-up communication systems are available. It has been reported that mobile transmitters exist which would be dispersed and which could use structures such as bridges and building complexes as antennae. It has been speculated that Britain once used an airborne VLF communication system similar to the U.S. Navy TACAMO operating from the RAF base at Wyton in Cambridgeshire. However, such a system is not believed to be operational today. [Ref. 19:p. 66]

In addition the Royal Navy operates LF (low frequency) transmitters at Inskip and Crimond whose signals can reach the submarines. The Royal Navy also has plans to use the British Broadcasting Corporation LF transmitters (BBC Radio 4) at Droitwich in an emergency. [Ref. 19:p. 66] It is reasonable to assume that standard Royal Navy shore-to-ship communication systems (MF, HF, VHF, UHF transmissions) are also available for back-up. Some reports have indicated that Britain has also had the use of VLF stations at Halifax, Canada, and Simonstown, South Africa, and for emergency contingency purposes U.S. VLF stations for communication with SSBNs. [Ref. 4:p. 34]

From the early to mid-1980s the VLF transmitters at Criggion and Rugby have undergone a major modernization

while the Anthorn transmitter is being similarly upgraded by NATO. New receiving and transmitting equipment was installed to improve VLF signal quality and to provide for the automation of signal formatting for simpler operations and quicker execution. [Ref. 19:pp. 66-67]

Evidence suggests some British efforts to build an ELF (extremely low frequency) transmitter in the United Kingdom. In March 1984 U.S. Senate Armed Services Committee testimony indicated that Britain had exchanged technical information regarding ELF with the United States and had indicated an intention to develop an ELF transmitter. By March 1985 several Scottish sites were being considered because of suitable rock formations and geological conditions. By late 1985 Glen Garry near Fort William in Scotland had been chosen as a site pending funding. [Ref. 19:p. 68] Subsequent development is not known.

Overall British defense C3 have been undergoing improvements. A new bunker control center code-named "Pindar" has reportedly been built beneath the Ministry of Defence Headquarters in Whitehall [Ref. 19:p. 19]. Project UNITER is the principal phase of a project designed to provide a secure, survivable, integrated network for defense communications. Stage one of Project UNITER will provide the communications for the new UKADGE (United Kingdom Air Defence Ground Environment) air defense system by the late 1980s [Ref. 19:p. 50]. The Royal Navy's OPCON (Operational

Control) program, when integrated with UKADGE, is designed to provide a comprehensive and centralized command and control network for maritime operations around the United Kingdom. The whole system will interface with SACLANT, CINCNORTH, and IBERLANT war headquarters. [Ref. 19:pp. 95-96] However, no British programs have been identified in public sources as being specifically devoted to improving British strategic nuclear command, control, and communications.

B. FRANCE

1. SSBN: M-4, M-45, M-5

Five French SSBNs of the 9,000-ton Redoutable class entered service between 1971 and 1980. (Le Redoutable, December 1971; Le Terrible, December 1973; Le Foudroyant, June 1974; L'Indomptable, December 1976; and Le Tonnant, May 1980.) Each submarine has carried 16 M-20/TN 60 two-stage solid-fuel SLBMs with a 3,000 kilometer range, penetration aids, and a one megaton yield hardened re-entry vehicle. Under the current modernization program all except the Redoutable are expected to be backfitted with the new M-4 SLBM between 1987 and 1993. (Le Tonnant, 1987; L'Indomptable, 1989; Le Terrible, 1991; and Le Foudroyant, 1993) [Ref. 5:p. 166]. An operational test launch of the M-4 was conducted by Le Tonnant on 15 September 1987 in the Atlantic [Ref. 5:p. 166]. The M-4/TN-70 is a three-stage solid-fuel SLBM with a 4,500 kilometer range, inertial

guidance, and six multiple re-entry vehicles of 150 kilotons each [Ref. 5:p. 165]. An improved version, designated M-4C, is reportedly being developed with slightly extended range to be carried in Le Tonnant, this due to the effects of a lighter TN-71 warhead being installed [Ref. 7:p. 5].

A sixth SSBN entered service in March 1985, and it was equipped with 16 M-4 SLBMs. The reason for the 1978 program to build an additional SSBN was that six hulls would be required to meet the criteria of three submarines continuously available, two of which would be on patrol [Ref. 5:p. 165]. Since January 1983 three submarines have been on patrol at all times; previously a third SSBN was available on patrol only 150 to 200 days a year [Ref. 20:p. 138]. Had she been funded in 1975 as originally planned she would have carried the M-20 missiles like her predecessors. As it is, L'Inflexible is of an intermediate design between Le Redoutable and its new generation replacement, the Le Triomphant class.

One hull of the new 14,200 ton Triomphant class, which is approximately one and a half times the displacement of the Redoutable class, is already under construction. The first was ordered in fiscal year 1986 and the second is expected to be ordered in fiscal year 1989, and a third in fiscal year 1991, with a total of six planned at a total cost of 65 billion francs. [Ref. 5:p. 165] However, by mid-1989 the cost, already 20 percent higher than

anticipated, was close to 80 billion francs [Ref. 21:p. 54]. In September 1989 Prime Minister Michel Rocard stated that the cost over runs were so serious that the decision-making process that led to the program would be reviewed [Ref. 22:p. 9]. The six Triomphant class submarines are expected to replace the older SSBNs from 1994 to 2010 on a one for one basis; hence, no expansion in SSBN fleet size is planned [Ref. 23:p. 10]. The first two new generation SSBNs will be be armed with 16 M-45 SLBMs and will later be retrofitted with the M-5 SLBM under development [Ref. 23:p. 10]. The M-45 SLBM, an improved version of the M-4, is reported to have a range in excess of 5,000 kilometers and carry six "independent trajectory" warheads of unknown yield [Ref. 23:p. 10]. The M-45 may carry the TN-75 warhead described in one account as being equipped with "remarkable stealthiness." [Ref. 24:p. 176] The M-5 was initially funded in 1988 and is expected to be in service by 2002 with unit three [Ref. 5:p. 165]. The M-5 has been reported to be capable of carrying as many as 12 MIRVed warheads [Ref. 25:p. 66]. The missile will have a range of 11,000 kilometers and sophisticated penetration aids to defeat perceived developments in the Moscow ABM defenses [Ref. 7:p. 5]. Despite cost overruns in the submarine program and the projected expenditure of 73 billion francs for the new generation M-5 missile, the French government is persistent in continuing modernization of its submarine nuclear forces

at the expense of its land-based force improvements [Ref. 26:p. 12]. However, in June 1989 the Minister of Defense Jean-Pierre Chevènement conceeded that the SSBN program would experience a six month delay in order to alleviate planning problems and the backlog of work orders at the Cherbourg Dockyard facility [Ref. 27:p. 14].

2. IRBM: S-4

The land-based element of French strategic nuclear forces consists of 18 intermediate-range ballistic missiles (IRBMs) in hardened silos on the Plateau d'Albion in Haute-Provence. The site was originally selected for its high altitude (for range enhancement), low population density, and good climate (for construction and maintenance) [Ref. 28:p. 19]. The currently installed S-3 missile came into service in 1980-1982. The S-3 has a 3,000 kilometer range with a one megaton yield and improved penetration aids such as decoys and re-entry vehicle hardening against the effects of a high-altitude nuclear explosion from an ABM system. Despite reaction time being reported as about three and a half minutes, long term survivability remains a problem for the land-based IRBM forces due to their vulnerability [Ref. 7:p. 4]. Although President Giscard d'Estaing decided to support construction of a land-based mobile missile, SX, to succeed the S-3, it was not until the Socialist government came to power that it was determined

that SX would be ballistic rather than cruise [Ref. 28:p. 20].

The RPR-UDF government in office from March 1986 to May 1988 originally proposed building 30 single-warhead mobile IRBMs now designated S-4 to replace the 18 fixed S-3 IRBMs and the Mirage IV-P bombers by 1996 [Ref. 24:p. 176]. The military program law for 1987-1991 described S-4 as "a light ballistic missile capable of depressed trajectories and equipped with a penetration capability permitting it to reach defended targets." [Ref. 29:p. 5649] Some have likened the S-4 to the U.S. Midgetman missile [Ref. 30:p. 40]. Jane's Weapon Systems 1988-89 described the planning for the S-4 as a two-stage, solid-propellant, land-mobile system with a range of 4,500 kilometers, each missile carrying three targetable and possibly MIRVed warheads in the 20 kiloton range capable of random dispersal around France by air or road in a period of tension [Ref. 7:p. 4].

Basing modes for the S-4 have yet to be determined, however. In September 1988 the French Defense Minister Jean-Pierre Chevènement, in presenting the military budget program for 1989 indicated that the S-4 project would undergo a significant delay due to cost overruns in the new generation nuclear submarine program [Ref. 31:p. 35]. The S-4 program was placed on hold in 1988 and is still in an uncertain status. The program technicians have been directed to maintain a certain technological know-how

without proceeding to a development stage [Ref. 32:p. 14]. Some military officials have expressed an interest in seeing the S-45, a land version of the M-45 submarine missile, placed in the silos rather than to have them abandoned completely [Ref. 33:p. 9].

Ultimately several questions remain unanswered by the French government at this time. Should the missile force on the Plateau d'Albion be modernized at all, and how? Should a dedicated land-based triple-warhead missile (S-4) be developed? If it is developed, how should it be deployed? At any rate, as stated before, the French government under President François Mitterrand continues to place priority on submarine strategic nuclear modernization at the expense of land-based force improvements.

3. ASMP

The air leg of France's strategic nuclear forces consists of 34 Mirage IV-P land-based strike aircraft, 18 of which carry the ASMP (Air-Sol-Moyenne-Portée) air-to-surface nuclear stand off missiles. The ASMP is a supersonic (Mach 3) liquid-fueled ramjet powered missile with integral solid-propellant booster with pre-programmed inertial guidance and has a range of 100 kilometers at low altitude (300 kilometers at high altitude). Several flight profiles are possible. [Ref. 7:p. 709] Some sources indicated that it carries a 100 to 150 kiloton warhead [Ref. 25:p. 66]. Others claim that a 300 kiloton warhead was developed by the

government agency Commissariat à l'Energie Atomique [Ref. 7:p. 709]. Former Defense Minister Charles Hernu also indicated that the missile could carry a 300 kiloton warhead [Ref. 25:p. 66].

Developmental flight tests of the ASMP began in 1980 and operational deployment was in May 1986. As stated above, the ASMP has been deployed on a force of 18 Mirage IV-P bomber conversions which will gradually be replaced by Mirage 2000 Ns. The 18 Mirage IVs underwent conversion to Mirage IV-P (for pénétration) from May 1983 to December 1987. The modernization made improvements to the Mirage IV's navigation and bombardment equipment as well as advanced countermeasure systems. [Ref. 34:p. 13] The modified aircraft attained initial operational capability with Escadron de Bombardment 1/91 'Gascogne' at Mont-de-Marron on 1 May 1986 followed by Escadron de Bombardment 2/91 'Marne' at St. Dizier on 1 December 1986 [Ref. 35:pp. 66-67]. The original plan was for the 18 Mirage IVs to remain in service until the S-4 was deployed, at which time the ASMP would become the main nuclear armament of the Mirage 2000 N force. The latest statements indicate that they will remain in service until 1996 [Ref. 36:p. 15].

Procurement under the loi de programmation militaire 1990-1993 is planned for 45 (vice 75, previously) Mirage 2000 Ns by 1991 [Ref. 27:p. 14]. Eight ASMP-capable Mirage

2000 Ns were funded in 1988 and six in 1989 [Ref. 35:p. 68]. As of June 1989 a total of three (rather than five) squadrons in the FATAC (Force Aérienne Tactique) will be equipped with this aircraft. The first squadron became operational 01 July 1988 at Luxeuil and the second is expected to be operational at the end of 1989. The third squadron will come into service in 1990-91. [Ref. 34:p. 19]

The 2000 N aircraft are equipped with terrain-following radar for low-altitude penetration and will have a range of 1,800 kilometers with two 1,700 liter drop tanks. The payload consists of a single ASMP. France's strategic aircraft would require refueling from eleven KC-135 tankers to reach targets in the Soviet Union, and hence, even though the Mirage 2000 N is an improvement over the Mirage IV-P it is still not considered a strategic bomber by U.S. definition. [Ref. 37:p. 84]

4. Command, Control, Communications: Astarte, Ramses

An upgrading of the command, control, and communications network for French nuclear forces has been an important priority. The primary goal of the Ramses program was to protect the network from EMP (electromagnetic pulse) effects of a high altitude nuclear explosion. Former French Defense Minister Hernu in 1982 stressed the importance of hardening and redundancy in the C3 networks, arguing that EMP would be an attractive means for the Soviet Union to interupt or disrupt nuclear launch orders thereby

neutralizing the French strategic forces without direct strikes on French soil [Ref. 28:p. 27]. The modernization consists of two programs: Astarte (Aviation Station Relais de Transmissions Exceptionelles) and Ramses (Réseau Amont Maille Stratégique et de Survie).

The Astarte program was initiated in 1982 and is expected to enter service in 1989. It consists of four airborne transmission stations aboard four new version Transall aircraft equipped with redundant transmission means for release authority to the SSBNs, land components, and eventually to the airborne component. The program entails purchasing and modifying the four aircraft; equipping the airborne stations to tie into the Ramses network and to retransmit the messages; purchasing VLF transmitters and their associated antenna systems from the United States; and studying and effecting EMP hardening in the aircraft. [Ref. 34:p. 19] The Astarte has been likened to the U.S. Navy's TACAMO program [Ref. 37:p. 85].

The Ramses program is a reliable, protected land-based network that ensures that governmental decisions reach the nuclear forces, both strategic and pre-strategic. There are a multitude of lines connecting terminals and nodes, and reliable communication with Astarte is achieved through redundancy. The network system handles telephone, telegraph, and digital data and is capable of automatic reconfiguration to ensure continued on-line service. Two

stages of the system have been undertaken. Ramses Stage 1 serves the principal governmental and military authorities in the Paris area, the Astarte bases, and the ground Astarte communications station. This Stage 1 went into service in 1988 for user evaluations. Ramses Stage 2 will complete the network with extensions into the east and south of France with connections to the First Army, the FATAC (Force Aérienne Tactique), the Hadès Division, the Mirage 2000 N bases, the Plateau d'Albion, FAS (Force Aérienne Stratégique) bases not covered in Stage 1, ground Astarte communication stations to support Mediterranean patrols, and to FOST (Force Océanique Stratégique) fixed radio stations transmitting to the SSBNs. The stage 2 upgrade will occur between 1989 and 1993. A third stage is planned for the 1995-1996 time frame to improve security and to better network management. [Ref. 34:p. 21] Total costs for the Astarte and Ramses programs represent an investment equivalent of another SSBN [Ref. 28:pp. 26-27].

III. STRATEGIES AND TARGETING

A. BRITAIN

British nuclear strategy and targeting are closely guarded state secrets and are not as widely discussed in public as in France. Of course defense and nuclear issues are debated in the British press and Parliament, but these discussions rarely concern specifics of nuclear strategic planning and targeting criteria. A great deal of the information concerning these topics must be gleaned from secondary sources. John Baylis noted that information through interviews of retired and serving officials (both military and civilian) was provided as long as the talk was off-the-record and the source neither quoted nor identified [Ref. 38:p. 229].

In emphasizing the critical importance of the Trident system for Britain's defense, the British government has stressed the technical and financial issues of the procurement and has remained vague concerning the details of the strategic rationale for Trident. This trend especially concerns such specifics as how the increased accuracy and number of warheads will affect Britain's future thinking on nuclear employment doctrine and targeting. For example, in 1982, following the procurement decision, a Liberal MP asked Conservative Prime Minister Thatcher about the circumstances

that would lead the government to consider the independent use of its strategic nuclear forces; she replied in rather vague terms that the Trident nuclear forces were the only proper and prudent choice should Britain have to stand alone against any potential aggressor [Ref.39]. When the Labour opposition claimed, in response to the Conservative government's refusal to discuss the strategic implication that the Trident decision was an emotional spasm, the Minister of Defence John Nott answered, "If it is an emotional spasm it has been a disease of eight successive Governments" [Ref. 40], implying that the strategic rationale is well-thought-out, only not discussed openly in detail.

Such public vagueness has been typical of the British nuclear policy-making process. According to Christopher Bowie and Alan Platt, several factors have contributed to this lack of public information regarding British nuclear strategies [Ref. 41:pp. 1-84]. One of these factors includes the extreme secrecy afforded the British government under the 1911 Official Secrets Act, which states that no official can release confidential information pertaining to government decisions. The act makes it a criminal offense for a government official to disclose any information obtained in the course of his employment, classified or not, to unauthorized persons. It is also an offense for anyone having been formally entrusted with such information in

confidence to disclose it under any but authorized circumstances. Therefore, the possibilities for criminal prosecution under the 1911 Official Secrets Act are enormous.

The media are also tightly controlled under the "D-notice" system under which each newspaper must voluntarily submit materials relating to national security to Whitehall for approval before publication. Although these notices are voluntary and have no binding legal authority, they are frequently used successfully to discourage the British media from reporting on military issues. With the exception of a few left-wing journals the result is that the media, having very limited access to detailed technical information needed for a direct input into the defense and nuclear policy-making process, typically play the role of transmitting government defense policy to opinion leaders and the public, rather than trying to influence policy or exercise an independent voice.

In addition the deep secrecy surrounding the internal operations, public information on the British government's practices is limited by guidance given to civil servants in the Cabinet Office in 1982 which stated that disclosure of the government's decision-making processes would weaken its cohesion and, hence, the existence of the particular cabinet committees, their composition, subjects of discussion, etc., were not to be disclosed [Ref. 42:p. 34]. In essence, leaks

on general foreign policy issues are viewed as tolerable within the system, but leaks concerning national security information such as nuclear policy are strictly forbidden [Ref. 41:p. 73]. Compartmentalization of nuclear weapons information further hides British nuclear weapons policy under a cloak of secrecy within the executive branch.

Britain's parliamentary system enhances the executive branch's predominant influence on nuclear issues. All governments in the post-1945 era (with the exception of the Labour administration of 1974-1979) have held a working majority in Parliament and have been able to pursue issues of nuclear policy with little to no interference by the political opposition in the House of Commons. Given the secrecy with which nuclear policy-making is carried on in Britain, the executive branch is able to present Parliament with policy faits accomplis. To stay in power a British government must maintain a majority in the House of Commons. If the executive is unable to gain a majority vote on an issue central to government policy, it must resign or seek a vote of confidence. To avoid being turned out of office British political parties have developed internal unity, cohesiveness and voting discipline, especially on such issues as nuclear policy. With such strict party discipline the ruling party can easily vote to terminate parliamentary debate on a nuclear issue and therefore has little trouble in pushing its programs through Parliament. At least in the

area of national security and nuclear policy, the major function of Parliament is the ratification of policy rather than its formulation or alteration, and ratification is generally automatic. [Ref. 41:pp. 18-19] The net result is a lack of public discussion of national nuclear strategy even within the House of Commons.

Under the British political system the dominance of the executive branch, the weak role of Parliament, and the powerful civil service mean

> ...that British parliamentarians or media commentators are unable to engage in sophisticated discussion of strategic targeting plans of British nuclear systems because except for a few executive branch members no one knows anything about British nuclear strategic planning except through speculation that Moscow is a logical target. [Ref. 41:pp. 17-18]

1. Strategic Rationales for a British Nuclear Force

Public discussion and debate have decreased within the last few years as the Trident program has matured. Hence, one must look back to the original discussions and debates in the late 1970s and early 1980s as the procurement decision was being made in order to determine the strategic rationales for Britain's nuclear deterrent force replacement.

Several statements concerning reasons for acquiring the expensive Trident system have been put forward by the Thatcher government. First and foremost the British government has defended its decisions on the grounds that the Trident system will enhance deterrence. Most official

statements on the role of the British deterrent are couched in reference to the Alliance and its important contribution to NATO defense policy. The credibility of the overall NATO as well as the British national deterrent is enhanced by the concept of a "second center of decision" role. A more basic purpose of Britain's nuclear forces, however, is to deter a nuclear strike on Britain itself. The decision to modernize its strategic nuclear forces rather than abandon them may also be seen as an effort on Britain's part to maintain a perceived "great power status". Each of these apparent rationales for a British nuclear strategic force is discussed more fully below.

a. Allied Deterrence

British defense policy in general rests solidly on allied co-operation within NATO. The Statement on the Defence Estimates, 1988 reported: "British defence policy remains founded on membership in NATO. We cannot ensure our security other than through the collective strength of the Alliance."[Ref. 43:p. 4] British security is almost never described as being independent of the Western alliance structure. Perhaps this is partly the result of Britain's recent historical experience of achieving victory in two world wars through successful alliances.

The British rely on the NATO "flexible response" strategy for the earlier stages of deterrence and defense. The Ministry of Defence declared in its Statement on the

Defence Estimates 1989 that British defense policy is "...committed to NATO's strategy of deterrence based on a mix of nuclear and conventional forces...that underpins flexible response."[Ref. 9:p. 3] The government has declared that the Trident Force will be "...committed to NATO and targetted in accordance with Alliance policy and strategic concepts under plans made by the Supreme Allied Commander Europe (SACEUR), save where Britain's supreme national interests otherwise require."[Ref. 44:p. 1] The British nuclear forces therefore are under national command during peacetime, but they are under SACEUR in time of emergency, although the British reserve the right to withhold use of their nuclear arsenal and to pursue their own employment preferences.

Various government statements have described NATO deterrence as the supreme role of the British strategic nuclear forces. Defence Secretary John Nott, in justifying the purchase of the Trident system in 1980, defended the government's decision on the grounds that it would enhance deterrence: "The crucial role which our nuclear forces play in enhancing Alliance security lies in providing a nuclear deterrent capability committed to the Alliance yet fully under the control of a European member."[Ref. 45] Similarly, the Ministry of Defence paper, The Future United Kingdom Strategic Nuclear Deterrent Force, provided further evidence of British emphasis on a deterrence strategy and

the view that NATO defenses are integral to British national security:

> Britain commits all its nuclear capability to NATO in conformity with concepts of collective deterrence worked out in the joint forum of the Nuclear Planning Group. The decisive consideration in favour of a British capability that is ultimately independent is the contribution it makes to NATO's strategy of deterrence and thus to our own national security.[Ref. 44:p. 3]

In fact, the text of the letter of 11 March 1982 sent by Prime Minister Thatcher to President Reagan proposing the Trident II sales agreement revealed that before the sale it was understood that the United Kingdom Trident II force would be assigned to the North Atlantic Treaty Organization and that, except where supreme national interests were at stake, the force would be used "...for purposes of international defence of the Western alliance in all circumstances."[Ref. 46]

b. Second Center of Decision

The notion of independent nuclear decision centers has been used as a rationale for the British nuclear strategic forces since the 1960s, when Defence Secretary Denis Healey advocated the idea. The concept of a second center for decision-making has allowed the United Kingdom to show loyalty to NATO and also to play an independent role. The logic underlying the concept of a second center of nuclear decision-making within the Alliance is that uncertainty improves deterrence, two decision centers provide more uncertainty than one, and therefore a second

decision center improves deterrence. In 1980 then Defence Secretary Francis Pym described the strengths of twin decision centers to the House of Commons:

> Soviet leaders would have to asesss that there was a greater chance of one of them using its nuclear capability than if there were a single decision maker across the Atlantic. The risk to the Soviet Union would be inescapably higher and less calculable. This is just another way of saying that the deterrence of the Alliance as a whole would be the stronger, the more credible and therefore the more effective.[Ref. 47]

A key assumption of this rationale is that uncertainty improves deterrence. However, it is important to understand exactly where that uncertainty lies. First, the implication is that there is no uncertainty in the British will to use nuclear weapons. The second center is understood in essence not to add to confusion regarding nuclear release but actually to expedite the launch should the Prime Minister's allies be unwilling to "push the button." When questioned in the House of Commons in October 1987 under what circumstances the independent deterrent would be used Secretary of State for Defence George Younger avoided a specific answer and instead replied, "It is not only important that we should be prepared to use them [strategic nuclear deterrent forces], but it is vital that the other side knows that we are prepared to use them. That is the whole purpose." [Ref. 48:p. 209]

Secondly, there is no expressed British government uncertainty or doubt regarding the U.S. nuclear

umbrella. London has expressed faith in the American nuclear guarantee and does not seek by purchasing Trident to substitute a British guarantee for the American one.

> The United States has massive nuclear striking power. It has repeatedly made clear by its words and actions, including its major force deployments in Europe, its total commitment to help defend the integrity of its European allies by whatever means are necessary, without exception. The Government has great confidence in the depth of resolve underlying the United States commitment. [Ref. 44:p. 3]

The burden of uncertainty therefore falls on Soviet planning. The official strategic rationale for Britain's independently controlled nuclear forces is to increase Soviet uncertainty in gauging any NATO military response to aggression. According to British policy papers the Soviet leaders have to be convinced that even if they thought that at some critical point in a conflict the U.S. might hold back, the British force could still inflict a blow so destructive that the penalty for aggression would prove too high [Ref. 44: p.5]. In defending the Trident procurement decision Defence Secretary John Nott stated:

> Even if in some future situation Soviet leaders imagined that the United States might not be prepared to use nuclear weapons, having to take account of enormous destructive power in European hands would compel them to regard the risks of aggression in Europe as still very grave. This additional element of insurance--'the second centre of decision'--has been a feature of Alliance deterrence for over twenty-f've years." [Ref. 45]

Obviously what matter are Soviet perceptions.

The second center role also appeared to have set the criteria in terms of the striking power that the follow on to Polaris would have to have. In 1980 the Ministry of Defence explained that to effectively meet the deterrence purpose of providing a second center of decision-making within the Alliance the British force had to be "visibly capable" of posing a massive threat on its own, not dependent on U.S. forces for defense suppression, assent to use or supplemental destruction capability [Ref. 44:p. 5]. In other words the striking power offered by the Trident system was required for a credible second center of nuclear decision-making role.

The attraction of the second center of decision-making approach for Trident lies in the fact that it allows Britain to maintain an independent force while insisting that it is for the good of the Alliance. By emphasizing an independent deterrent capability it plays on doubts about the credibility of the U.S. nuclear guarantee but insists that only the Soviets, not the British government, accept these doubts. An important aspect of the concept, according to Lawrence Freedman, is that British deterrence rests not on a certainty of nuclear retaliation but rather on the uncertainty that retaliation would be withheld [Ref. 49:pp. 129-130].

c. Last Resort National Nuclear Force

Trident must also be seen in the light of the strategic protection it provides Britain itself, including

the hedge it offers Britain should an alliance breakdown occur. The Defence Secretary was quoted in 1982 as saying, "I'm not buying it [Trident II] for NATO. In the last resort we must be able to stand alone. I'm greatly in favour of the Alliance, but you never can tell, and I can't be sure that the Alliance will be as healthy in 20 years time as it is today." [Ref. 50] To quote Prime Minister Margaret Thatcher:

> We have never been alone before. I trust we will never be alone again. It is reasonable and prudent to make proper provision for the defence of this country if we were. Only then could we stand up to any potential aggressor. [Ref. 39]

In a March 1987 interview in Moscow, the Prime Minister was, in contrast to the above statement, more emphatic about the need for nuclear weapons should Britain have to stand alone in its defense.

> Nuclear deterrence is the only means allowing small countries in effect to stand up to big countries. On the basis of conventional weapons this simply cannot be done. A small country, if it stands alone can stand up to a big country if it has nuclear weapons.... Historically, Great Britain had occasion to stand alone. Hitler occupied the whole of Europe, and we were alone. America had not yet entered the war and Hitler had not yet attacked the Soviet Union. We have this experience. We were alone. [Ref. 51]

Hence, an underlying reason for continuing the deployment of a strategic nuclear system with the Trident program is that NATO may not last and that ultimately Britain is responsible

for her own defenses and cannot "shuffle them off on another nuclear power." [Ref. 52:p. 25] Some view the implicit role of British nuclear weapons as a last resort national deterrent to be the only fully rational argument for the British nuclear deterrent's existence [Ref. 4:p. 6]. Placing emphasis on its national rather than NATO role as "the ultimate guarantor of national security" or as a "last resort" also plays on national sentiments to garner greater public support for the expensive weapon system.

It is certainly difficult to imagine scenarios and situations in which there is a strategic rationale for using the Trident firepower independently of NATO. It is equally difficult to say with confidence that there would never be circumstances when the British might not want a last resort deterrent. This analysis led Lawrence Freedman to conclude

> The most compelling strategic rationale for a British nuclear force, therefore, resides less in the immediate requirements of British defence than in the uncertainties of the future. It is a rationale that has an appeal that is more primitive than intellectual, but is no less powerful for that. [Ref. 13:p. 139]

d. Great Power Status

One additional argument is that Britain's decision to modernize its nuclear strategic forces was significantly influenced by the desire to enhance or ratify British international status as a great power. For Britain, nuclear weapons were seen as a cheap means of deterring

aggression in Europe while keeping an Empire and Commonwealth. But nuclear weapons have not arrested the relative economic decline of Britain nor did they arrest the crumbling of the Empire. Nonetheless a dominant theme of Conservative Party politics has been the belief that nuclear weapons confer Great Power prestige and influence upon Britain, thus enabling British interests to be advanced in superpower and NATO negotiations. Britain proudly proclaims, that unlike France, she is the only European nation whose nuclear forces are clearly committed to the collective Alliance deterrent concepts, planning and strategy, and no other European NATO member has even the potential to make such a commitment. As published in the Statement on the Defence Estimates 1989, "We [United Kingdom] are...the only European nation to contribute to all three legs of the NATO triad of forces--strategic nuclear, theatre nuclear, and conventional--that underpins flexible response."[Ref. 9:p. 3] "The Government regards this distinctive British contribution to NATO as of great importance."[Ref. 44:p. 4]

The fact that Britain's nuclear deterrent forces were compared with, and deemed uniquely superior to the French forces because of the British contribution to NATO, suggests that London considered the implications of a course of action (or inaction) with regard to their nuclear force modernizations that would have left France as the only

European nuclear power. Hence, even though the costs of procuring Trident might be enormously expensive for an economically declining medium power, the political rationale is clear. The British government was not about to accept or admit defeat politically by allowing France to remain as the only European nuclear power, as Lawrence Freedman described, "confirming its ascendancy over Britain." [Ref. 49:p. 139] The prospect of France surviving as the only independent strategic nuclear power in Europe has been used to criticize the Labour Party's defense policy of placing British strategic forces (including Trident) in arms control negotiations with the Soviet Union [Ref. 53:p. 15]. Having a nuclear arsenal commands a sort of respect and it might be a valuable source of international power in some unforeseen circumstances.

2. British Nuclear Targeting

Targets for the British strategic nuclear forces are allocated by the Joint Strategic Target Planning Staff (JSTPS) at the U.S. Strategic Air Command in Omaha, Nebraska. There, a European team along with British officers participate in the planning. Operational plans are formulated by the Nuclear Activities Branch at Supreme Headquarters Allied Powers, Europe (SHAPE). The targets that British SSBNs are eventually allocated form part of the European Nuclear Operations Plan (NOP) which in wartime

would be directed by the Supreme Allied Commander Europe (SACEUR). [Ref. 54:p. 119]

However, in order to be able to carry out plans in support of uniquely British national interests, separate targeting packages are believed to be carried by the SSBNs during patrols. These separate U.K. plans are worked out at the Ministry of Defence headquarters. They were the responsibility of the Navy Department and the Defence Intelligence Staff, but in the reorganization of the Ministry of Defence in early 1985 nuclear targeting was made the responsibility of the Nuclear Policy Directorate, headed by a civilian under the Deputy Under Secretary (Policy). Although target planning details are still left to the military, there appears to have emerged an increased input from the civilian policy side regarding general targets to hold at risk. [Ref. 54:pp. 120-121]

a. Moscow

It is generally agreed by experts that the existing Polaris force could be used to threaten to destroy civilian population and industry in the Soviet Union. According to Catherine Kelleher, British targeting plans have in the past concentrated on counter-city use, especially against Moscow and roughly ten major urban-industrial complexes in the Soviet Union [Ref. 55:p. 465]. The Polaris system has not been considered ideal for theater strikes since it is rather inflexible, unresponsive

and too inaccurate for military targeting. Hence, the idea gained ground that the British force was suitable largely for counter-value retaliation (and would be held in reserve during the early stages of nuclear retaliation). It is widely believed that the British government has placed a high priority on being able to attack Moscow. The United Kingdom has spent over £1 billion on a re-entry vehicle (Chevaline) intended to preserve a capability against Moscow. Sir Michael Quinlan, as deputy under secretary of state in the Ministry of Defence, confirmed the "Moscow criterion" in parliamentary evidence: "There is a concept which Chevaline makes clear, that Governments did not want a situation where the adversary could have a sanctuary for his capital and a large area around it." [Ref. 56:p. 107] However, there is speculation that the Polaris/Chevaline system, in order to achieve a penetrating effect on Soviet ABM defenses, might have committed Britain to an attack on a few and possibly no more than one large target [Ref. 54:p. 123].

b. Semi-Hard Military and Civilian Targets: "Key Aspects of Soviet State Power"

As early as 1977 the argument was raised that for a successor deterrent system it might be advantageous for Britain to deploy a force capable of threatening a qualitatively wider range of targets in the Soviet Union than was feasible with the Polaris system [Ref. 4:p. 7]. It

was argued that for deterrence to work Britain must exert the necessary influence on Soviet leaders.

The argument continued that a small deterrent force did not necessarily have to pursue targeting for the destruction of civilian population and industries. Rather, by increasing its accuracy the British force could launch an effective attack on soft civilian targets and soft military and semi-hard military or civilian targets including ABM and air defenses, early warning and control radars, hydroelectric or thermal (nuclear) power stations, heavy industrial complexes, military airfields and naval ports. The argument had technical and strategic implications: by procuring and investing in a missile system with increased accuracy, Britain could pose a more credible threat to semi-hard military and civilian targets as well as soft civilian targets. [Ref. 4:p. 42]

The Trident system certainly offers more discriminating capabilities. It has been reported that with the Mark 12A/W78 re-entry vehicle/warhead combination Trident II D-5 is expected to achieve a single shot probability of kill (SSPK) of 0.364 against 3,500 psi silos and 0.709 against 1,000 psi silos [Ref. 57:p. 186]. If two such re-entry vehicles were cross-targeted with reported CEPs of 0.05 nautical miles then Trident II D-5 can achieve an SSPK of 0.837 against 3,500 psi silos/shelters and 0.993 against 1,000 psi hardened ones [Ref. 57:p. 186]. This

accuracy has led some American advocates of the system to claim that its counter-silo capability is essentially equivalent to that of the best U.S. land based ICBMs [Ref. 57:p. 186]. This capability was noted in the British press and some people criticized the acquisition of the Trident II system as having "first strike" implications. In covering the failed test shot of the missile on 21 March 1989 The Guardian reported, "The Trident II is designed to give submarines the ability to destroy Soviet missiles in their hardened silos," implying that that was the British intent [Ref. 58:p. 8].

British government defense documents indicate otherwise:

> The Government wishes to make it absolutely clear that the increased accuracy of the Trident D-5 system played no part in its decision to adopt the more modern system.... The reasons for our choice are those sent out in this document; essentially they hinge on the retention of commonality with the United States Navy. [Ref. 13:p. 6]

Survivability concerns led to a submarine-based system, and cost-effectiveness criteria encouraged the selection of the most modern U.S. SLBM to enjoy the benefits of "commonality."

The size of the British force has repeatedly been described as that suitable for a policy of "minimum deterrence", i.e., the minimum size compatible with ensuring a cost-effective deterrent at all times. However, the government did opt for 16 missile tubes per submarine rather

12 tubes which had been a studied option and for a missile system capable of carrying a larger number of warheads than currently planned to "...provide flexibility to cope with any possible improvements in Soviet anti-ballistic missile defences throughout the life of the force." [Ref. 13:p. 6] The Ministry of Defence was quick to point out that this did not imply that the maximum capacity would be deployed, and that the total number of warheads would not exceed those based on the C-4 missile system [Ref. 13:p. 6].

This increased flexibility apparently caused a rethinking of British targeting policy in the early 1980s. A 1980 memorandum on the Trident system suggested that the British consider in judging their targeting requirements "...what type and scale of damage Soviet leaders might think likely to leave them critically handicapped afterwards in continuing confrontation with a relatively unscathed United States." [Ref. 44:p. 5] Even though the U.K. government refuses to make public its nuclear targeting policy and plans or to define precisely what it deems the minimum level of destructive power necessary for deterrence, it did indicate a shift with Trident away from a policy of anti-cities destruction to one which targeted Soviet state power and infrastructure. "The Government however thinks it right now to make clear that their concept of deterrence is concerned essentially with posing a potential threat to key aspects of Soviet state power." [Ref. 44:p. 6] The 1987

defense white paper reconfirmed the criteria of targeting key aspects of Soviet state power rather than the maximum possible number of individual targets and indicated that Trident forces would deploy with the minimum number of warheads consistent with this requirement [Ref. 59:pp. 40-41].

This shift in targeting strategy is believed to have been largely inspired by Sir Michael Quinlan, the Permanent Under Secretary at the Ministry of Defence, who as a senior MoD official involved in the purchase of Trident in 1980 and as a devout Catholic, believed that attacks on the Soviet civilian population would be immoral [Ref. 60:p. 4]. Through white papers and parliamentary evidence he pushed forward new views for how Trident's enhanced capability should be used. The new British strategy would offer the option of nuclear steps short of an all-out strike on Moscow. However, it has been reported that the Prime Minister does not necessarily share Sir Michael s views regarding the need for a more discriminating strategy [Ref. 60:p. 4]. In evidence to Parliament Sir Michael Quinlan suggested that "Soviet state power" may "...embrace a range of targets lying between hitting a large city and hitting a silo." [Ref. 56:p. 85] However, since the 1980 Open Government Document was issued there has been little

clarification as to which targets should be assigned to the Trident submarines, either under a NATO or national strike plan.

B. FRANCE

The specifics of France's nuclear strategy and targeting are closely held national defense secrets. However, a greater effort is made by French officials than by British ones to disseminate national nuclear policy, and consequently it is more widely discussed in public. Such open discussion appears to have contributed to broad popular and political support for the French declaratory policies of proportional deterrence and autonomy in defense matters. As a result, France is among the few Western countries with strong domestic support for nuclear forces and associated policies.

In order to maintain this national consensus, statements concerning French nuclear policies and strategies are the result of a carefully co-ordinated and orchestrated bureaucratic process involving several French governmental agencies including the Elysée Palace, the Hôtel Matignon (the office of the prime minister), the Rue St. Dominique (the Defense Ministry), and the Quai d'Orsay (the Foreign Ministry) [Ref. 20:p. 128]. Like Britain's Parliament, France's Senate and National Assembly have minimal roles in defense policy formulation and no role at all in nuclear

targeting [Ref. 20:pp. 128-129]. But in contrast with the situation in Britain, in France relatively extensive discussions of national nuclear employment options take place. Detailed and informative articles are often published by Defense Ministry officials and other high government officials in the monthly journal Défense Nationale. Even though technical and financial considerations have affected French strategic nuclear modernization efforts, the political and strategic rationales for these nuclear programs have been emphasized by French officials. These improvements and modernizations demonstrate a French determination to provide a nuclear force better able to carry out published strategic doctrine.

French strategic nuclear force modernizations of the late 1980s have not been accompanied by any new declared strategic doctrine or targeting policy. Recent speeches and statements by President François Mitterrand, Prime Minister Michel Rocard, and Defense Minister Jean-Pierre Chevènement have described the force modernizations in terms similar to those of policies announced in the 1970s and early 1980s, with some refinement.

Two factors may account for the lack of innovation in publicly articulated French targeting plans. One possibility may be that there are serious divisions of opinion among government officials as to what that policy should be and whether changes are needed. The continuing

debate regarding flexible limited options and force modernizations is discussed more fully below. A new or refined targeting policy, in keeping with past French actions, is unlikely to be announced until there is a clear consensus behind a new policy. At this point it apparently is not worth risking the political capital invested in the domestic support for nuclear weapons to raise the thorny issue publicly.

A second factor may be Mitterrand's strategic vision for France and Europe. Mitterrand has emphasized a policy for the French nuclear deterrent whose raison d'être is to prevent war, and he has encouraged U.S.-Soviet and East-West conventional arms control initiatives in order to reduce the risks of war. Given Gorbachev's initiatives and reforms in Eastern Europe, progress on U.S.-Soviet strategic arms reduction talks, movement on reducing conventional forces in Europe, and an apparent widening of East-West detente, now is probably not an opportune moment for policy announcements concerning the specific targeting of French nuclear weapons against the Soviet Union.

1. Strategic Rationales for a French Nuclear Force

Since France first developed an independent deterrent, its doctrine has been that there is a fundamental difference between nuclear and conventional weapons and that nuclear weapons are only usable when national survival is at stake. This French understanding of the chasm between

conventional and nuclear war was recently reiterated by Defense Minister Jean-Pierre Chevènement before the Soviet General Staff Voroshilov Academy in April 1989.

> In the art of war, the nuclear weapon has brought about a fundamental discontinuity. For a long time, certain theorists have wanted to see in the nuclear weapon only a more powerfully destructive weapon than conventional artillery....
>
> In reality, the nuclear arsenals, by their destructive powers, have made war outdated as a rational political means for settling conflicts between advanced countries, when they are endowed with such weapons. [Ref. 61:p. 18]

The French strategy which has evolved from this perspective regarding nuclear weapons is centered upon one of proportional deterrence. The rationale for an independent nuclear arsenal has been to "sanctuarize" French territory. Although this nuclear protection is understood to encompass France's vital interests, exactly what constitutes the nation's vital interests has remained deliberately ambiguous. The independent French nuclear forces and their subsequent modernizations are not only the foundation of French defense policy but have been seen by some as a pillar of European security, thus ensuring France a role in European and world affairs. Each of these rationales for French nuclear forces (proportional deterrence, sanctuarisation, deliberate ambiguity, and great power status) as they relate to the strategic nuclear force modernization programs is examined below.

a. Proportional Deterrence

The primary strategic rationale for French nuclear forces is dissuasion or deterrence. The doctrine announced by General Charles de Gaulle in 1964 when the first Mirage IV bombers became operational has essentially remained the same.

> The path of deterrence is henceforth open to us, for the act of attacking France would be equivalent for any aggressor to undergoing frightful destruction himself. Of course, the megatons that we could launch would not equal in number those that Americans and Russians are able to unleash. But, once reaching a certain nuclear capability in as far as one's own direct defense is concerned, the proportion of respective means has no value. [Ref. 62]

The declaratory French nuclear strategy remains based on a theory of proportional deterrence. It is rooted in a capability to inflict damage greater than the value to the Soviet Union of destroying France. The basic logic of this "deterrence by the weak of the strong" (la dissuasion du faible au fort) is that France's threat of nuclear retaliation can deter the Soviet Union because the damage France could cause by targeting Soviet cities exceeds what the Soviet Union would stand to gain in conquering or destroying France. Although there has been criticism of the doctrine, on grounds that the remaining nuclear capabilities of a partially maimed and bitter Soviet Union could totally devastate France, official statements continue to defend the concept. In 1976, French President Valery Giscard d'Estaing reiterated the doctrine by stating that French strategic nuclear force capabilities represented "an almost

unprecedented disparity between what an aggressor stands to gain and what he risks losing as a result of his aggression." [Ref. 63:p. 13] More recently in a speech of 11 October 1988 before the Institut des Hautes Etudes de Défense Nationale, President François Mitterrand reaffirmed the French strategic doctrine in the context of the government's strategic nuclear modernization programs and France's sufficiency criteria.

> Deterrence, is not formed in order to win war, but rather in order to prevent it, to hinder it. It requires that we maintain our forces in a state of sufficiency--in quantity, in quality, in capabilities--, in order to be in a position to inflict upon the aggressor damages at least equivalent to the stake that we represent. Our nuclear force can destroy, a tragical hypothesis but which serves as the basis of our reasoning, a territory at a distance of 4,000 kilometers with a surface area at least equal to that of our own territory. What would be the interest for anyone in attacking a country like ours which, after a nuclear war would have to deal with a frightful devastation while the aggressor would suffer as much?
>
> Our nuclear capacity...is sufficent to fulfill the role that we attribute to it. [Ref. 64:pp. 16-17]

On 5 April 1989 before the Soviet General Staff's Vorishilov Academy in Moscow Defense Minister Jean-Pierre Chevènement reiterated these same concepts of proportional destruction in explaining French nuclear deterrence policy as a basis for the defense policy of a medium-sized nation in Europe [Ref. 61:p. 19].

Recently there seems to have been a refinement in the sufficiency criteria, perhaps in order to justify cutbacks, delays, and procurement stretchouts owing to

fiscal constraints in the French strategic nuclear modernization programs. In the early 1980s, from statements by then-Prime Minister Pierre Mauroy, Col. Guy Lewin of the Defense Ministry planning department, and Gen. Jeannou Lacaze, chief of staff of the armed forces, the sufficiency criteria for proportional deterrence appeared to be based on France being able to inflict on an aggressor damage "judged superior" to the vital interests or demographic and economic potential of France [Ref. 20:p. 131]. The more recent statements above from President Mitterrand and Defense Minister Chevènement in 1988 and 1989 suggest that the criteria for sufficiency have been scaled back; the preferred terminology in describing the proportional deterrence sufficiency criteria now appears to be the ability to inflict damage "at least equivalent to" the potential of France. Although there may be subtle changes in the exact meaning of sufficiency, one may nonetheless view French strategic nuclear force modernizations as reflecting a continuing effort to meet the sufficiency criteria of a theory of proportional deterrence.

b. Sanctuarisation

Because of the radical nature of weapons of mass destruction in terms of the levels of damage and death that they can inflict, the French have argued that they are usable only when the survival of a nation is at stake. Reasoning that a nation (e.g., the United States) would not

risk its ultimate survival even for the sake of an ally, France felt a need to develop an independent force in order to defend itself in the nuclear era. The possession of nuclear weapons is therefore believed to turn French territory into a sanctuary, the argument being that if France has the capability to attack Soviet territory directly with nuclear weapons, France is less likely to be subject to nuclear strikes. As David S. Yost has noted, the most explicit statements of when France's strategic nuclear forces might be used concern direct nuclear attack on France itself [Ref. 20:p. 150]. "As concerns the use of nuclear weapons, there are all sorts of situations and possible hypotheses.... But there is a central point in our planning, that any nuclear attack on France's soil would automatically provoke nuclear retaliation." [Ref. 65]

The continued emphasis of the strategy on the primacy of independence, defined as protecting the national "sanctuary" with nuclear weapons, may by due to concerted efforts to maintain the domestic national consensus for nuclear weapons. Robbin F. Laird has suggested that extensive public debate about the use of French nuclear weapons for any purpose other than for the defense of French territory would intensify conflict over the political purposes to which French nuclear forces would be employed and erode domestic support for French nuclear weapons policy [Ref. 66:p. 84]. Nonetheless, since the mid-1970s, French

leaders have at times backed away from the rigid, inflexible notion of exclusively sanctuarized French territory. President Giscard d'Estaing expanded the scope of potential interests served by French military power including the nuclear forces by introducing in 1976 a concept of an enlarged sanctuary (sanctuarisation élargie). A year earlier Prime Minister Jacques Chirac had declared, "we cannot be content to 'sanctuarize' our own territory, and we must look beyond our frontiers." [Ref. 67:p. 12] The French government ceased using the term after public criticism of the move in French policy from one of defending national territory to one of apparent extended deterrence [Ref. 66:p. 85].

Whether the Federal Republic of Germany is under France's nuclear deterrent protection is a question of much debate. Although Defense Minister Hernu stated in June 1985 that France and West Germany share security interests in common, it has been pointed out that security interests are not vital interests. This implies that the extent of France's nuclear guarantee remains as ambiguous as before. [Ref. 20:p. 152]

c. **Deliberate Ambiguity**

French strategic nuclear doctrine insists on uncertainty, incalculability, and ambiguity in order to enhance deterrence. This element is well illustrated in the deliberate ambiguity surrounding the concept of French

"vital interests". Since the sanctuarisation élargie controversy in 1976, statements by government officials have remained ambiguous as to what constitutes France's vital interests and as to what distance the French nuclear deterrent extends. Defense Minister Charles Hernu explained the reason for not explicitly defining vital interests being that it placed the burden of uncertainty upon the aggressor, knowing that a miscalculation would bring an immediate mortal response [Ref. 68:p. 13]. The argument is that the deterrent's value is diminished if the adversary knows beforehand the conditions under which it will be used. Regarding France's vital interests Raymond Barre alluded to the "approaches" to France, to "neighboring and Allied territories," and to "immediate" neighbors [Ref. 69:p. 15]. Subsequent governments have been equally vague in defining the extent of French nuclear deterrence. Prime Minister Pierre Mauroy in 1981 and 1982 said that, "Aggression against France does not begin when an enemy penetrates the national territory." [Ref. 70]

One of the more recent statements concerning France's vital interests was given by Defense Minister Jean-Pierre Chevènement in April 1989 in Moscow. The ambiguity is obvious.

> In fact, our nuclear forces protect at the same time both our national territory, which is defined in geographical terms, and our vital interests, whose definition is political. Now, being given the limited expanse of the European theater and the heavy density of

> its population, France sees its destiny particularly tied to that of its neighbors, that is to say, that its vital interests can be very quickly affected. [Ref. 61:p. 21]

This statement is evidence of a growing tension in French nuclear doctrine, the domestic need to emphasize the independence of French nuclear forces protecting the national sanctuary and the need to demonstrate France's involvement in extended European security responsibilites while at the same time remaining completely ambiguous regarding employment criteria.

d. Great Power Status

France developed nuclear weapons primarily in order to strengthen her defense posture, but nuclear weapons and the technological accomplishments associated with their development also contributed to restoring a certain perceived "grandeur" that befitted France [Ref. 71:p. 306]. Following the humiliation and devastation of World War II, the possession of nuclear weapons has been seen by successive French governments as one means (among others) of re-establishing France's prestige and status in Europe and of ensuring French influence in world affairs [Ref. 72:pp. 168-169]. Nuclear weapons were seen by de Gaulle as a "jeton de présence" (token of presence) among the superpowers of the world and a force de persuasion to enable the voice of France to be heard [Ref. 72:p. 169]. Admiral Marcel Duval has concluded after analyzing many of General

de Gaulle's statements that de Gaulle's personal commitment to rapidly developing a thermonuclear capability was political rather than strategic in nature; such a military capability, in addition to being a requirement of national independence, offered France a "means of sitting down at the same table as the major powers." [Ref. 73:p. 6] Statements by French officials in the last few years have also emphasized the essential contribution that the French nuclear deterrent forces offer to the balance of power for war prevention in the world and particularly in Europe [Ref. 61:p. 21; Ref. 64:p. 15].

Jolyon Howorth has observed that with regard to the strategic nuclear role, under Mitterrand there has been an intensification of Gaullist great-power posturing, in terms of the declaratory priority attached to nuclear doctrine [Ref. 71:p. 311]. A statement regarding such great power influence and nuclear weapons can be found in a the speech by Prime Minister Michel Rocard of 12 September 1989.

> In order to guarantee its independence and to cement its national identity, our country has made the choice of an independent defense, founded upon an autonomous strategy of nuclear deterrence. This strategy constitutes an element of stability for our international affairs of state: it allows our country to play an essential role in the world wide balance of powers, it constitutes today the promise of sustained influence. [Ref. 74:p. 5]

Therefore nuclear weapons, their modernization, and associated doctrines are viewed within the French government as a means to restore and maintain French influence in world

affairs, in particular, as regards stability and security in Europe.

2. French Nuclear Targeting

The responsibility for the preparation of targeting plans for French strategic nuclear forces has remained with the chief of staff of the armed forces since September 1968. The procedure for selecting targets has been described as follows:

> ...selections of possible targets...are assigned to the delivery vehicles and...are enumerated and regularly updated by the command posts at Taverny and Lyon-Mont-Verdun. It is the chief of state, assisted by his Conseil de Defense, who designates these targets from a catalogue submitted to him. [Ref. 75]

This summary suggests that the chief of staff of the armed forces and his subordinates (e.g., commanders of the specific strike forces) actually prepare the operational strike plans which concern such details as timing and deconfliction. It is the President of the Republic, with the advice of the leading officials concerned with national security who comprise the Conseil de Défense, who selects targets for an execution. It appears that prior to developing specific target plans, the military receives targeting guidance from the civilian policy side--namely, key Defense Ministry officials, the President, and the Conseil de Défense.

a. Enlarged Anti-cities

French targeting has historically been aimed at cities, primarily due to technological and strategic capability limitations. For instance, from 1964 to 1971

Mirage IV bombers were France's only means of delivering nuclear weapons; France had little choice but to target Soviet population centers as a deterrent. The objective of the targeting plans was to cause a certain number of Soviet fatalities, roughly equivalent to the population of France. [Ref. 20:p. 131] However, in 1980 there was a "refinement" of strategic targeting plans. More emphasis was placed on the threat of destroying the infrastructure of Soviet administrative control, as well as economic and industrial assets, the oeuvres vives or vital works of the adversary. This new targeting criteria is known as an enlarged anti-cities strategy. This strategy emerged in part due to the realization expressed in 1977 by General Mery that Soviet civil defense could, by offering some population protection, lessen the effect of the anti-cities deterrent. [Ref. 20:p. 131] Col. Guy Lewin of the Defense Ministry's planning department annouced the new strategy in January 1980.

> The neutralization of the adversary [state's] administrative, economic, and social structures, the destruction of the framework of life and activity of millions of persons constitute damage that would be difficult to accept even if a part of the population concerned by these destructions escapes immediate death. [Ref. 76:p. 27]

Later that same year Prime Minister Raymond Barre also referred to France's ability to inflict assured destruction upon both an adversary's cities and economy [Ref. 69.p. 12].

Despite the shift in French doctrine to an enlarged anti-cities strategy, it has not been so great as to be a question of counter-force priorities displacing the "counter-cities" policy. Defense Minister Charles Hernu in 1981 stated that Mitterrand's strategic nuclear force modernization did "not imply any change in our anti-cities strategy, corollary of deterrence of the strong by the weak." [Ref. 77:p. 15]

The new targeting policy has been described as enhancing French deterrence policy by being more operational and credible because it holds at risk what Soviet leaders value most; that is, economic and administrative control rather than civilian lives [Ref. 20:p. 133]. This change in doctrine, however, was made possible by improvements in French strategic nuclear forces, both in numbers of warheads and accuracy, especially in the submarine leg of the triad. Modernizations have not and probably will not for the forseeable future change France's declared counter-value targeting policy. The French are likely to continue with a strategy that is not counter-force and does not threaten Soviet strategic forces; doing otherwise might encourage a Soviet desire to preempt French forces in a crisis. As Capt. John J. Hyland, USN, has pointed out, French strategic modernizations have expanded the range of targets France can now threaten [Ref. 78:p. 79]. This in turn has changed France's deterrent measure of effectiveness from simple

proportional assured destruction to a complex threat to the Soviet civil and economic infrastructure [Ref. 78:pp. 79-80]. Improved survivability of the counter-value element in French deterrence continues to be emphasized; this is evident in the primary focus of modernization efforts being directed to the submarine programs.

b. Continuing Debate on Flexible Limited Options

The improvements in French strategic nuclear systems in terms of warhead numbers, range, accuracy, and survivability have prompted a debate over whether French targeting plans should include flexible limited options. The issue of targeting flexibility remains relatively controversial in France. Several observers have suggested that more flexible targeting of strategic forces might enhance the credibility of French policy [Ref. 20:p. 141]. In particular, General Pierre Hautefeuille in 1980 argued for targeting flexibility on the grounds that it reduced the likelihood of self-deterrence, it provided an anti-cities strategic nuclear reserve for intrawar deterrence and war termination, and it offered the ability to respond in kind and hence would help to deter Soviet limited strikes [Ref. 20:p. 141]. Limited French nulear strikes were not to be understood as constituting a willingness to fight a nuclear war, but rather like the tactical nuclear weapons, as a warning to demonstrate French will and resolve to use nuclear weapons against an aggressor. More recently in

early 1988 Jacques Chirac suggested that the S-4 IRBMs could be used to deliver an "ultimate warning" against the "sanctuary" of the aggressor [Ref. 24:p. 365].

However, French government spokesmen have rejected the concept of flexible limited options for several reasons. One is that France lacks the resources, both financial and military, to build to credible levels of strategic nuclear power for a policy of limited options including counter-force [Ref. 20:p. 142]. Only an anti-cities strategy, it is argued, is credibly within France's means.

> We aim at the adversary's cities because these targets are easy to reach, without great accuracy in the missiles required, and especially because one can thus cause important damage with a limited number of weapons.... It is only in the framework of an anti-cities strategy that the desirable level of damage can be guaranteed with the means that remain in proportion to the scientific, industrial, and economic possibilities of France. Any other strategy would necessitate much more important means, without doubt beyond our reach, and could not but weaken deterrence. [Ref. 79:pp. 24, 31]

Another reason given by the government for rejecting the idea of limited options for targeting is that it conveys a sense of "manageable" French response and a doubt that France would respond by carrying out an "unthinkable" massive retaliation [Ref. 20:p. 143]. General Lacaze summarized the argument as follows: "This idea implies in itself a doubt in the presidential determination to have recourse to strategic reprisals and, consequently,

would lead to weakening the credibility of our deterrence by the weak of the strong." [Ref. 80:p. 12]

Although the modernized strategic weapon systems and C^3 systems will offer improved capabilities for limited strikes, French declaratory "anti-cities", massive retaliation targeting policy is unlikely to change significantly in the near future. French policy-makers are likely to continue to reject the idea of a flexible nuclear response and instead continue to expand its counter-value criteria and goals as newer, and more capable systems enter the arsenal. The French declared operational policy will probably remain as Adm. Jacques Bonnemaison, commander of the Force Océanique Stratégique in 1983, figuratively indicated, "We wouldn't operate in sausage slices. We give them the entire sausage." [Ref. 81:p. 28] A major factor preventing a radical change in the French anti-cities targeting policy may ultimately be, as David S. Yost has concluded, that too much domestic political capital has been invested in the policy, in terms of politics, bureaucracy, and the military, for it to be altered readily [Ref. 20:p. 144].

IV. ADDITIONAL FACTORS AFFECTING MODERNIZATION DECISIONS

Factors other than strategic considerations have influenced British and French nuclear force modernization. Several of these factors are examined in this chapter. Alternative modernization options that the two nations considered are reviewed along with some of the reasons why those alternative programs were rejected. Domestic politics in both Britain and France significantly affected the course of the modernization plans; the policies on defense and nuclear weapons of the major political parties and the effects of domestic public opinion are examined. Each nation's economic base and technological capabilities are considered. Lastly, perspectives concerning American co-operation are examined.

A. ALTERNATIVE OPTIONS CONSIDERED FOR MODERNIZATION IN THE 1980S AND 1990S

1. Britain

Several other options were available to the British at the time of the government's decision to proceed with the Trident program. In January 1987 the Ministry of Defence published a booklet explaining the misconceptions in arguments that supported the case for an independent British nuclear deterrent but which claimed that other systems were

more appropriate and cost-effective for Britain [Ref. 82:pp. 1-9]. Several of thes. alternatives are discussed below.

Britain ruled out early in the decision-making process any ground-launched systems. The primary concern was that of their vulnerability to surprise attack, the same concern that forced the cancellation of the technically promising Blue Streak silo-based ballistic missile in 1960. This concern was accentuated by Britain's small territory and close proximity to Soviet land-based and sea-based missiles. The government stated: "No ground-launched force based in Britain could achieve the special standard of invulnerability to surprise attack appropriate for our ultimate strategic capability." [Ref. 44:p. 11]

One of the options available to the British was to replace its aging Polaris forces with submarine-launched cruise missiles (SLCMs), namely one derived from the U.S. Tomahawk version. However, the maximum range of the Tomahawk missile is 1,600 nautical miles compared to 4,000 to 6,000 nautical miles for the Trident missile. The government's assessment was that a British Trident submarine would have approximately 15 times more sea room in which to hide than a SLCM-firing submarine [Ref. 82:p. 2]. The use of sea-based cruise missiles would have reduced the operational effectiveness of the U.K. deterrent by forcing the U.K. submarines carrying the nation's ultima[illegible] deterrent into waters that could be strongly contested by Soviet ASW

(anti-submarine warfare) forces. The Trident option, on the other hand, made use of large tracts of ocean; this would oblige Soviet ASW forces to deploy away from home bases through areas dominated by British naval forces.

Given that cruise missiles carry only one warhead where as the Trident is MIRVed and given that Soviet air defenses are not limited by treaty and are rapidly being strengthened with look-down shoot-down fighters, surface-to-air missiles, and increasingly capable satellite, airborne, and ground sensor systems, it was calculated that Britain would need at least 400 SLCMs at sea to provide the assured minimum deterrent equivalent to a deployed Trident system. For the foreseeable future, the British government considered ballistic missile warheads much less vulnerable to interception than cruise missile warheads.

Moreover, the Ministry of Defence judged that dedicated submarines would be required to carry Britain's SLCMs, primarily because the British SSN (nuclear attack submarine) fleet is too small and already fully committed to other missions and somewhat vulnerable by having to sail in harm's way. The Defence Open Government Document 82/1 stated:

> The alternative of installing very small numbers of cruise missiles on our existing hunter-killer submarines (SSNs) also makes little sense; apart from the doubtful deterrent value of such a small force, the role of the SSNs as our most powerful anti-submarine warfare (ASW) system is totally incompatible with that required of a strategic deterrent force, both in deployment area and nature of operations. To hold back our SSN force for a

> strategic role would effectively make it impossible for it to fulfill its crucially important ASW function. [Ref. 13:p. 4]

It was noted that, although some U.S. SSNs carry SLCMs, they do not provide the United States' sole strategic deterrent. To achieve the same effects of the Trident deterrent the following rationale was used to figure the number of dedicated cruise missile submarines required:

> To achieve the deployment of the 400 SLCM's needed to match the deterrence effect of Trident would require a force of 5 SSCNs on patrol at all times, assuming 80 missiles per submarine. To maintain 5 SSCNs on patrol requires 8 in the operating cycle, and this, allowing for a 25% margin of missiles in maintenance would involve the purchase of 800 SLCMs. In order to run a viable operating and refit cycle, a total force of 11 SSCNs would be needed to sustain 5 submarines on patrol. [Ref. 82:p. 4]

In a similar train of reasoning, it was judged that a large number of air-launched cruise missiles would be required to match the striking power of the Trident force. In addition, more airfields, support facilities, and hardened shelters would be required, thereby necessitating a very substantial investment in facilities and equipment. To avoid using aircraft already in service with conventional missions, dedicated nuclear delivery aircraft would have to be bought, again an expensive proposition. Even so, such a deterrent force would still be vulnerable on the ground at known airfield locations. Continuous airborne patrols were deemed too costly in terms of resources and manpower and were therefore rejected. The Defence Open Government Document 87/01 stated, "Furthermore, to have RAF nuclear

armed aircraft on permanent patrol in and around UK airspace would be unprecedented and inherently undesirable." [Ref. 82:p. 6] A previous government document stated, "Moreover, no British Government would want to have numerous nuclear weapon carriers constantly airborne, year in and year out in crowded airspace above and around our small country." [Ref. 44:p. 11] Furthermore, permanently airborne forces could not be sustained long if the support airfields were destroyed and the government did not want to find itself in the compelling situation to launch its ultimate capability in response to strikes on airfields [Ref. 44:p. 11].

The British government also examined the possibility of replacing Polaris by a French missile. However, the only possible missile, the M-5, was just beginning development and would not have been available on the same timescale as Trident, thereby running the risk of prolonged reliance on an ineffective and aging Polaris force or suffering a gap in deterrent capability. Besides, the adaption of the nuclear warheads to the French missile and redesign to the submarine would increase both the costs and delays. Therefore to meet the mid-1990s in-service date the Trident program was the most cost-effective option for meeting the U.K.'s requirement for a minimum deterrent to succeed Polaris/Chevaline. [Ref. 82:p. 8]

Although it was considered feasible for British industry to develop and build ballistic missiles, this was

not an attractive option due to cost. Refurbishing the old Polaris missiles and missile support equipment was evaluated as too costly and as likely to provide too little reliability, as the Chevaline experience suggested. Any modernization program which kept the Polaris missiles or bought the Poseidon system would have meant substantial costs to Britain, because Britain would have to bear all the expenses of continuing support for systems being phased out of the U.S. arsenal. The Trident system was chosen partly because it was likely to remain in the United States' service for many years, during which all the economies of commonality would be available to Britain [Ref. 44:p. 20].

Also considered were options for sea-launch from surface ships. However, these options were deemed not to be significantly cheaper for a given missile-carrying capability, speed, or endurance. Surface ships would also have been more vulnerable to enemy tracking than submarines. Diesel submarines were also studied as a replacement for the nuclear-powered boats now in service. Although quieter than nuclear submarines when operating on battery power, the diesel submarines would have been vulnerable to detection when on the surface or snorkeling to recharge the batteries. It was also considered not feasible to build a large diesel submarine with sufficient electrical power to carry a substantial number of missiles. Therefore, a large number of small submarines would have driven up the cost in

resources and manpower as well as in developing an infrastructure and support industry in an area in which the United States had chosen not to proceed. Although diesel submarines could have operated close to shore, that was considered too vulnerable to mining. Therefore, nuclear ocean-going submarines were deemed the best launch platforms for a British missile force. [Ref. 44:p. 13]

2. France

The alternative options considered for French modernization do not seem as extensive as those for the British primarily because the French modernization programs do not involve replacement of the entire deterrent force with one weapon system and because it was more reasonable to continue existing systems' deployment patterns and to undertake technological upgrades. No major confrontational debate took place over whether the French would modernize their submarine and air-delivered weapons systems; it was rather a question of how many would be built.[2] An expensive research and development and industrial infrastructure was already in place. Therefore it was not cost-effective to

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[2]See Chapter IV, Section B, "France", for a discussion of the political debates in France over nuclear modernization options.

undertake radical, experimental new weapon systems that might entail enormous expenses and a possible technological deadend.

In 1980 the main debate focused on how many additional SSBNs to build. Some Gaullists wanted 15 SSBNs by the year 2000 but the Socialist government seemed to hold the belief that more than seven or eight SSBNs by the turn of the century would be unreasonable because it would lead France away from what Mitterrand called her established sufficient capacity for deterrence and would entail targeting secondary targets at the expense to France of additional personnel, support, and infrastructure [Ref. 28:p. 21]. Nonetheless, the Mitterrand administration has placed priority on submarine strategic modernization at the expense of land-based improvements. Mitterrand himself said in October 1988, "We are modernizing in priority our ballistic missile nuclear submarines, the principle component [of the French nuclear force], their weapons, their platforms and their communications in order to preserve their invulnerability." [Ref. 64:p. 17]

It should be noted that the French have chosen not to develop a follow on strategic bomber to the Dassault Mirage IV which is programmed to be phased out of deployment in the mid-1990s. Although the ASMP missile on Mirage 2000 Ns compensates somewhat for this loss, French defense planners have apparently rejected the option of pursuing a

new generation of manned penetrating strategic bomber. It has been suggested that this may be due to concerns over subjecting French personnel to the hazards of effective Soviet air defenses and an unwillingness (driven by fiscal restraints) to invest in expensive countermeasures and aircraft design to improve penetration capability [Ref. 24:p. 20]. Instead the French have decided to rely on a medium-range stand off missile to the demise of the air leg of France's defense triad. Defense Minister Chevènement has also referred to the possibility of developing a long-range air-delivered missile, but has said that this is "scarcely foreseeable before the year 2000." [Ref. 83:p. 11]

The only real list of alternative options for French nuclear modernization has been centered around the IRBM upgrade question. These alternatives originally focused on its basing mode (fixed silo or road-mobile), and the options were rooted in political and doctrinal considerations. Although a road-mobile system offered the advantage of enhanced survivability, there were concerns that nuclear weapons trucked about the French countryside would frighten people and contribute to undermining the French consensus regarding nuclear weapons and their employment [Ref. 33:p. 9]. Furthermore, since enemy destruction of fixed IRBMs in hardened silos would require a direct attack on French "sanctuarized" territory, justification for nuclear retaliation would be relatively uncontroversial [Ref. 28:p.

20]. "An attack on [the plateau of] Albion would signify that we were already at war, nuclear war. By the same token, the launch of our strategic nuclear forces would be instantaneous. We would not have time to philosophize." [Ref. 64:p. 17] Maintenance of a land-based system is also seen as a hedge against possible technological breakthroughs that might jeopardize the other components of the French nuclear forces [Ref. 64:p. 17].

The French did have the option of pursuing a ground-launched cruise missile system rather than a ballistic one. Reasons for the French rejecting a cruise missile system included: the prohibitive costs of producing sufficient inventories to saturate Soviet air defenses, the strategic warning time that the long flight profiles of cruise missiles would offer to Soviet authorities, and the lack of adequate French satellite mapping capability for cruise missile guidance systems [Ref. 28:pp. 20-21]. It has been suggested that the French opted for the ballistic missile delivery vehicle because it offered substantial throwweight, the possibility of deploying multiple warheads, and better prospects for penetration of Soviet defenses; it was also within French technological and fiscal capabilities [Ref. 28:p.21]. However, with the IRBM program currently on hold with a minimal research and development program, fundamental questions as to whether the missile force on the

Plateau d'Albion should be modernized at all appear to be unanswered.

B. MODERNIZATIONS AND DOMESTIC POLITICS

1. Britain

a. Conservative Party

The Conservative Party in Britain has traditionally supported a strong defense establishment with the perspective that Britain should play a powerful role in world affairs. A dominant theme running throughout the party's politics is the power and prestige that nuclear weapons confer upon Britain. Emphasized in party rhetoric is the need to maintain an independent nuclear deterrent. This is evident in the Conservative government's staunch advocacy of Trident and in the 1983 Conservative manifesto, which promised to "...maintain our own independent nuclear contribution to British and European deterrence." [Ref. 84]

Because most Tory MPs have a strong pro-defense orientation, periodic conflicts have arisen within the party regarding support for an independent nuclear deterrent at the expense of conventional forces. Some within the party feel that the program is a duplication of effort, and that because Britain is fully under the U.S. nuclear umbrella, it should redirect its resources to sea lane protection and out-of-area capabilities [Ref. 85:p. 51]. Arguments for more conventional defense within the party have had the effect not of threatening the cancellation of the Trident

program, but rather of increasing overall defense budgets or of arresting declining expenditures on the Royal Navy, as in 1982 following the Falklands conflict. In sum, the Conservatives are divided over the amount of resources that should be devoted to the nuclear deterrent, not over the need for a nuclear deterrent.

The Conservative Party is clearly associated with the fundamental principles of British postwar defense policy, including multilateralism and strong support for NATO, possession of an independent nuclear deterrent force, and deployment of American nuclear weapons on British soil. The Conservative manifesto for the 1987 elections stated, "Only the Conservative party stands by the defence policy which every postwar government has seen to be necessary and which has kept the peace of Europe for more than a generation". [Ref. 86:p. 71-72] With an overwhelming victory in 1987 and the next elections not expected until 1991 or 1992, the Conservatives with general party consensus are likely to continue a strong policy of defense and pursuit of the Trident program. In the future, however, such a policy of all-around contribution to NATO may become more difficult to sustain for fiscal reasons and may spark Conservative dissension on defense resource allocation and strategy.

b. Labour Party

The Labour Party's first postwar government made the initial decision to build British nuclear weapons and a strategic bomber force. Although the Conservatives in 1962 made the Polaris procurement decision, subsequent Labour governments have adhered to the decision and have made important modernization commitments (e.g., Chevaline) as well. But by 1980, with the Trident decision, the British bipartisan consensus on nuclear issues had clearly collapsed, with the two parties widely separated on theoretical and ideological approaches to nuclear policy.

The Labour Party suffers from friction between its right and left wings, and nuclear policy has been particularly unsettling and divisive. The party's left-wing faction views nuclear weapons deployment as immoral, as likely to increase the probability of war, and as a waste of British resources, which could be (in their view) better devoted toward building a socialist state. This faction often supports pacifism and has championed within the party the policy of unilateral nuclear disarmament. The right wing of the party draws support from some sectors of the trade union movement and tends to be more pragmatic; it focuses more on domestic economic problems than on nuclear issues. The result has been a frequently shifting policy, the most recent turn having come at the Labour Party Conference in October 1989. [Ref. 41:p. 47]

Since Labour's defeat in the 1979 elections, the party's political power has shifted dramatically toward the left due to procedural and structural changes within the party. This move to the political left of the party's power base has placed Labour increasingly at odds with Conservative positions regarding defense and nuclear weapons. Since 1980 Labour has called for the dismantling of Britain's own nuclear forces and the elimination of U.S. nuclear weapons facilities in Britain. At the 1982 party conference Labour's anti-nuclear policy was one of:

> Opposing unconditionally, the replacement of Polaris by Trident or any other system, and the deployment of cruise missiles, neutron bombs and all other nuclear weapons in Britain....
>
> Closing down all nuclear bases, British or American, on British soil or in British waters. [Ref. 87]

In the 1983 and 1987 election campaigns Labour promised, if elected, to cancel the Trident procurement in a unilateral nuclear disarmament move and to allocate the money saved to conventional forces. Labour was defeated by the Conservatives decisively in both elections, due in large part (it is widely believed) to Labour's defense policy.

In early October 1989 at its party conference, the Labour Party voted to scrap the unilateralist defense policy. Left-wing party members accused the leadership of selling their souls for the chance of winning an election. [Ref. 88:p. 48]. Many observers have viewed this move as a pragmatic step in Labour leader Neil Kinnock's reform

program to improve the party's chances of winning the next election. In criticizing Labour's defense policy, even Conservative Prime Minister Thatcher acknowledged it as a pragmatic move when she declared that Labour's policy was not "...a defense policy to see Britain through the 21st century and beyond. It's a form of words to see the Labour Party through the next election." [Ref. 89]

A Labour government would, the party leadership says, keep three Trident submarines, because it would be more costly to cancel them than to complete them and they would be used as bargaining counters with the Soviets to increase prospects for world nuclear disarmament [Ref. 90:p. 1]. Labour leaders reasoned that a unilateral removal of nuclear weapons could be reversed by a subsequent government, but a treaty signed on behalf of Britain by a Labour government could not [Ref. 90:p. 1]. Labour's "new realism" would also accept the U.S. nuclear umbrella, end British nuclear testing, cut £5 billion from the defense budget, call on NATO to renounce first-use of nuclear arms, oppose modernization of NATO's short-range nuclear weapons and support Gorbachev in a pledge to eliminate all nuclear weapons from the world by the year 2000 [Ref. 90:p. 1; Ref. 91; Ref. 92:p. A3]. On the three existing Tridents Labour would keep the number of nuclear warheads down to the 32 carried on one boat load of existing Polaris missiles [Ref. 93].

Although Labour's defense policy has stiffened, it is far from hawkish and could bring about the elimination of Britain's independent strategic nuclear forces through cancellation of further construction and nuclear testing, and arms control negotiation. A bipartisan consensus between the Conservative and Labour parties regarding an independent nuclear strategic force is still absent.

c. Prospects for Unilateral Nuclear Disarmament

The prospects for British unilateral nuclear disarmament now appear remote at best. For much of the 1980s the Labour Party was committed to unilateral disarmament. Had Labour been voted into office, the prospects would have been high that the Trident program would have been cancelled. After three resounding defeats at the polls, Labour leader Neil Kinnock announced in May 1989, "I am not again going to make that tactical argument for the unilateral, independent abandonment of nuclear weapons without getting anything in return. I will not do it." [Ref. 94:p. 1]

Labour may no longer be committed to unilateral nuclear disarmament, but it is still committed to nuclear disarmament. Ken Livingstone, a left-wing party member, summarized the party division over nuclear weapons as follows: "We all accept that the whole objective of the party is to try to achieve the removal of all nuclear weapons. What we disagree about is the best way of

achieving that." [Ref. 94:p. 1] The party has pledged to incorporate British nuclear weapons, including three Trident submarines, into superpower arms control negotiations with the objective of obtaining greater concessions from Moscow. Labour leaders met with Soviet authorities in February 1989 and received Moscow's backing for the view that Britain should play a larger role in multilateral disarmament. [Ref. 95:p. 1] However, a "reality" of the situation also was that by 1992, because of deliberately built-in penalty clauses, only cancellation of the fourth Trident hull would be cost-effective, and would result in saving less than £350-£450 million [Ref. 3:p. xiv].

Having discarded one of its greatest electoral liabilities (unilateral nuclear disarmament), Labour now appears potentially capable of threatening continued Tory rule in the 1990s. Should Labour's defense policy be implemented, it would probably not be called unilateral disarmament, but it might eventially have the same net effect: the reduction or elimination of British nuclear weapons (including Trident). Labour's goal is multilateral nuclear disarmament, but it remains to be seen if this will be feasible.

d. Public Opinion

Post-1983 election analysis has shown that the percentage of voters who regard defense and nuclear weapons as the most important issue facing Britain has remained

steady at between 20 percent and 30 percent [Ref. 96:p. 3]. In December 1986 it had been 26 percent [Ref 96:p. 3]. Although this may seem small, it is a historically high figure for the postwar period, and in fact, defense has been the second concern behind unemployment [Ref. 96:p. 3]. It has been noted that the high unemployment concern (78 percent) has not been translated into votes for Labour at elections, whereas Conservative positions on defense issues have contributed to election victories. Hence, defense remains a major issue in British politics.

There is some evidence of a slight shift in popular opinion in Britain regarding the continued need for the British nuclear deterrent force in the context of superpower nuclear force reductions. A December 1986 Harris survey for TV/AM showed that 70 percent disagreed that the United Kingdom should rid itself of its nuclear weapons, whereas 24 percent agreed [Ref. 97:p. 114]. A MORI survey conducted in March 1989 posed the question whether Britain should get rid of its deterrent even in the event of a superpower agreement to cut nuclear forces; 21 percent favored scrapping the nuclear deterrent force, 36 percent favored some reduction in British nuclear forces, and only 33 percent favored no change in Britain's nuclear deterrent forces [Ref. 98:p. 7]. If there were no nuclear weapons by the year 2000 (a position supported by Labour), 37 percent responded that Britain would be safer than today and 39

percent felt Britain would be as safe as today [Ref. 98:p. 7]. The postwar political consensus that the British nuclear deterrent is a necessary instrument in maintaining peace in Europe seems to be eroding. Some sources suggest that British public opinion appears to be moving toward a delegitimization of nuclear deterrence and nuclear weapons. This shift in British public opinion regarding nuclear weapons is attributed in large part to a reduced perceived threat from the Soviet Union and Warsaw Pact [Ref. 98:p. 7].

The Labour Party's shift on defense policy from unilateral nuclear disarmament to a multilateral commitment is likely to pick up votes. Polls suggest that about two-thirds of the Conservatives support nuclear deterrence and that two-thirds of Labour voters favor a non-nuclear defense policy [Ref. 96:p. 2]. An ICM poll conducted in May 1989 revealed that 40 percent of the Labour voters questioned said a switch to a multilateral nuclear disarmament commitment would make them more likely to vote Labour, and only eight percent said it would make them less likely to do so [Ref. 99:p. 1]. Twelve percent of those planning to vote for other parties said they would be more likely to consider voting for Labour if it switched to multilateralism [Ref. 99:p. 1]. One in three Democrats and Social Democrats would likely vote for Labour if it switched to multilateralism [Ref. 99:p. 1].

Public support for Labour over the Conservatives has definitely increased in 1989. In January 1989 polls showed Conservatives with 44 percent and Labour with 40 percent [Ref. 99:p. 1]. By May 1989 both parties were even with 43 percent [Ref. 99:p. 1]. Results of the June 1989 European elections revealed voting for the Conservatives at 34 percent and for Labour at 39 percent [Ref. 100:p. 46]. At the Conservative Party conference in mid-October 1989 polls had the Conservatives five to ten percentage points behind the opposition Labour Party [Ref. 101:p. 4]. Elections do not have to be called until 1992 and the Conservatives hope to regain public favor by then, but the Conservatives seem likely to face a more formidable Labour opponent on economic and defense issues than in the last three elections.

2. France

a. Socialist Party

French defense policy under the Socialists has been characterized by continuity rather than change, consensus rather than confrontation. The Socialists have in general carried out the programs inaugurated under Giscard d'Estaing in the late 1970s. However, in their articulations of nuclear doctrine, the Socialists have appeared to have taken the Gaullist mantle. [Ref. 71:p. 311]

Socialist President François Mitterrand holds that deterrence will be effective if the West threatens

strikes deep into the Soviet heartland with strategic nuclear weapons [Ref. 102:p. 9]. The priority is being placed on the sea-based leg with new submarines, more warheads, and longer-range missiles. Mitterrand has rejected proposals to modernize the IRBMs in the near-term as a waste of scarce defense resources. Although Mitterrand does not support the S-4 mobile land-based system, Mitterrand may eventually pursue development of a longer-range version of the ASMP to meet France's strategic needs [Ref. 102:p. 8].

Many Socialists have been uncomfortable with tactical nuclear weapons because of the implications of a nuclear battlefield limited to Europe. There is a non-belligerency, non-war emphasis toward deterrence and nuclear weapons in general. The Socialists even renamed French tactical nuclear weapons as "pre-strategic" nuclear weapons in order to de-emphasize the notion of a limited nuclear strike and to stress instead the massive retaliation nature of a French nuclear response. The essence of French nuclear doctrine, as expounded by the Socialists, is deterrence.

Under fiscal and economic pressures to reduce projected defense spending, the Socialists justify their plans to cut some defense programs drastically (such as S-4) and maintain others (such as Le Triomphant and M-5 SLBM development and construction) as necessary in order for

France in the twenty-first century to be internationally credible in three areas: military, economic and social, and monetary [Ref. 103:p. 14]. The Socialists argue that their current defense plans anticipate the future environment, yet at the same time maintain programs demanded by the French defense consensus. This consensus rests on three fundamental principles: the existence of an independent and credible strategic nuclear force controlled exclusively by the President of the Republic, French membership in the Atlantic Alliance based on conventional forces independent of the integrated NATO structure but dedicated to the support of the alliance in the event of aggression, and the means for long-range power projection of its forces to protect global French interests [Ref. 103:p. 14]. Hence, the Socialists are likely to seek increased interdependence for French security policy but to continue to defend France's efforts to modernize its own independent strategic nuclear deterrent.

b. RPR and UDF

The right-wing Gaullist Rassemblement pour la République (RPR) has emphasized the primacy of France's independent nuclear force and the secondary role of conventional forces in deterring the Soviets. Credible deterrence is believed to depend on a secure second-strike strategic force. Gaullists have generally advocated a significant increase in the French strategic arsenal, namely

strategic nuclear submarines and mobile land-based missiles. Jacques Chirac during his presidential campaign of 1981 called for 15 SSBNs by the year 2010 [Ref. 71:p. 312]. Also in an alternative military program law for 1984-1988 RPR proposed nine SSBNs be operational by 1994 [Ref. 66:p. 93]. François Fillon, one of RPR's most prominent defense experts, argued that France could support eight or nine SSBNs and should seek to implement that goal [Ref. 66:p. 93]. Some analysts associated with the RPR such as Pierre Lellouche have insisted that five French SSBNs at sea is the minimum number for credibility [Ref. 71:p. 312]. The RPR generally advocates increased defense spending; in 1984 the party called for an increase in the defense budget to five percent of the gross domestic product [Ref. 71:p. 312]. To pay for this military program the Gaullists would have France reduce its tactical nuclear investments; some Gaullists believe that recent modernization programs for these weapons imply a battlefield rather than pre-strategic role. However, Jacques Chirac in his 1988 presidential campaign, against some party oppostion, argued for a more explicit role for tactical nuclear weapons for a de facto extended deterrence [Ref. 102:p. 8].

Jacques Chirac as president of the RPR has denounced what he perceives as Mitterrand's overemphasis in an SSBN-based strategic force. It was Chirac's government during the 1986-1988 cohabitation period which proposed the

mobile missile SX project (now S-4) opposed by Mitterrand. Chirac in June 1989 criticized the Socialists for, in his view, gravely undermining the French deterrent by extending the planned service of France's vulnerable fixed silo-based IRBMs and by placing the S-4 project on hold. A mobile land-based missile, he argued, would add a second modern component to French strategic nuclear forces and an important European dimension which the force currently lacks. In reference to the Socialist emphasis on SSBN force modernization he accused the government of making a mistake by relying solely on a "nuclear stronghold" for defense rather than contributing to the principle of a European pillar of defense. [Ref. 104:p. 18]

The Union pour la Démocratie Française (UDF), a centrist coalition of small political parties, has emphasized France's need to solidly support the Alliance. The UDF has frequently accused the Mitterrand administration of overinvesting in nuclear forces. "The decision to give increased priority to nuclear arms...in a reduced budget package is likely to produce a purely illusory 'sanctuarization' of defense whose inevitable result is neutralism in Europe and impotence in the world." [Ref. 105]. The UDF has maintained that the continued extensive strategic nuclear force investments, "a new Maginot line", will erode French conventional forces dramatically in the future [Ref. 66:p. 96].

In contrast to the RPR, the UDF has stressed the importance of French tactical nuclear weapons. In the 1988 presidential campaign Raymond Barre favored an extended deterrence role for French forces through modernization of battlefield nuclear weapons [Ref. 102:p. 8]. The UDF has held that modernized tactical nuclear weapons would constitute a more effective deterrent than the strategic nuclear forces because their threatened use would be more credible. [Ref. 71:p. 313]. Barre also expressed reservations about a primarily SSBN-based strategic force, and some UDF advisors have suggested cancelling some French independent programs in favor of more collaborative ones with Alliance members such as a British-French sea-launched missile system or a joint Franco-German neutron bomb venture [Ref. 102:pp. 8-9]. The UDF has generally opposed nuclear modernization programs that would result in increased range of weapons, believing instead that nuclear weapons should be deployed on the front lines, particularly in view of French perceptions of pressures within NATO for a no-first-use policy and alliance division over short-range nuclear modernization [Ref. 71:pp. 313-314].

It was during the Giscard d'Estaing administration in the late 1970s that the "enlarged sanctuary" concept was proposed in an attempt to show some form of solidarity with France's European neighbors. The UDF has viewed French security as residing not so much in

the possession of independent strategic nuclear forces as in co-operation and co-ordination with NATO forces at the conventional and tactical nuclear levels.

c. Prospects for Consensus on Nuclear Weapons Issues

The decision by the Socialist Party to support nuclear deterrence in 1978 has been identified as one of the key factors that made the French defense consensus possible [Ref. 106:p. 22]. For the last decade French officials have consistently upheld the legitimacy of nuclear deterrence as a means to prevent war and assure France's independence and international status. Even during the 1988 presidential election, the candidates were in broad agreement on the fundamentals of French defense policy. However, there were some nuances of difference among the candidates on nuclear weapon issues. The most noteworthy differences concerned the S-4 mobile land-based system (the Plateau d'Albion modernization) and the role of French pre-strategic nuclear forces. Robbin Laird has suggested that these nuances reflected in political party platforms may in the future become large fissures in the defense consensus, especially if public opinion swings to demand defense expenditure reductions [Ref. 102:p. 8]. David S. Yost has also identified evidence of fragility in the consensus [Ref. 106:p. 23]. French officials have often sought to minimize public discussion of possible selective employment concepts

for the strategic forces partly due to fears of undermining the consensus [Ref. 106:p. 23].

Socialist President François Mitterrand won a second term in office in 1988 but was denied a majority in the parliament. In the European elections of June 1989 the Socialists made slight gains over their previous seating, but with only 24 percent of the vote [Ref. 100:p. 46]. Some French Socialist leaders have indicated that the party may be increasingly susceptible to pressures to join the European socialist and social democratic mainstream positions on security, namely detente and arms control priorities rather than an emphasis on military preparedness [Ref. 106:p. 23]. Should the party follow such a security policy and the president and prime minister be forced to govern from the position of a minority government, a significant breakdown in the defense consensus could indeed occur in France.

It is unlikely that French officials would forsake the primacy of strategic nuclear weapons in French defense policy simply due to the tremendous amount of political and military capital that has been invested in the strategic nuclear weapons and their associated doctrine. However, the status of the defense consensus may affect the future force mix. Mitterand and the Socialists most likely will probably continue to emphasize the SSBN-based strategic

force modernization at the expense of the other nuclear forces on the grounds that it is survivable, mobile, and a cost-effective independent deterrent for France. In addition, by basing its future independent strategic nuclear deterrent force largely on submarines, France might more easily avoid a public revision of French nuclear doctrine that might potentially further undermine the consensus. French officals could instead continue to play on the doctrinal ambiguities.

But in a future riddled with strategic uncertainties, the right and center parties may be able to mount increasingly credible opposition to a defense policy which has France placing all of her eggs in one basket, so to speak. Instead, the argument is likely to be for more diversification of launcher platforms (such as the S-4) and more flexibility in force structure, targeting, and employment options (such as a longer-range ASMP to enhance deterrence). Such a force mix would require France to clarify its policy for both domestic and foreign audiences. A future environment of a lessened threat perception from the East and of increasing demands to move French resource allocations away from defense sectors is likely to reveal and exacerbate clear rifts in the defense consensus regarding nuclear weapons and is likely to lead eventually to its demise.

d. Public Opinion

A reduction in the threat perception from the East is likely to underpin a reduction in public support for defense. A Gallup opinion poll published in early 1988 revealed that 51 percent of the French approved of the modernization of French nuclear forces as opposed to 56 percent in 1986 [Ref. 102:p. 7]. Only 24 percent believed in the real possibility of a nuclear attack against France and a mere six percent feared a conventional attack by the Soviet Union against France [Ref. 102:p. 8]. One in two Frenchmen favored French participation in nuclear arms control talks as long as the two superpowers continue reductions in their respective nuclear arsenals [Ref. 102:p.8].

The Gorbachev diplomatic initiatives and U.S.-Soviet progress on strategic nuclear arms reductions are likely to have a continuing effect on French public opinion as illustrated by the trends from 1986 to 1988. Although there may be a broad consensus on defense issues among the major political parties in France (with the exception of the French Communist Party), the political elite may face increasing difficulties in maintaining public support for a strong defense and nuclear weapons modernization.

C. TECHNOLOGY, ECONOMY, AND DEFENSE SPENDING

1. Britain

The need to incorporate national technology into the weapon system did not enter into the modernization decision for the British to the extent that it did for the French. It was not advances in British technology that drove the Trident decision but rather the technical obsolescence of an aging weapon system. That is not to say that British technological advances have been trivial or that they are not being employed. Chevaline has been described as a "remarkable technical achievement." [Ref. 2:p. 21] Nor is there any question of British capability to produce MIRVs [Ref. 2:p. 113]. National manufacture of the missiles was apparently not beyond British industrial or technological means either. British Aerospace Dynamics which had recommended ballistic over cruise missiles had originally proposed that solid-fuel missile development be undertaken immediately [Ref. 2:p. 114].

Associated costs with such a program, however, were thought to be prohibitive and unpredictable. The Chevaline program had demonstrated how inherently expensive "United Kingdom unique" strategic weapons innovations would be. The British believed it to be in their best interest to remain "in sync" with American development and deployment programs; and should later modifications be necessary, Britain would enjoy the economic benefits of collaborative research, development, and procurement. By purchasing the Trident

system, Britain saves the cost of creating an industrial rocket infrastructure and test ranges while maintaining access to state-of-the-art technology in that area. From a technological aspect the dominant factor in the Trident decision was to maintain commonality with American developments and deployments to reduce costs.

The Conservatives' argument for Trident, which were based largely on cost considerations, exemplifies a basic dilemma of postwar British defense policy; domestic economic growth has not kept pace with the continual rise of the real costs of defense. When the Thatcher government came to power it was committed to making defense a priority and pledged to increase defense expenditure by three percent per year. However, according to the 1988 defence estimates the defense budget was planned to be held roughly level in real terms between 1988-89 and 1990-91 [Ref. 9:p. 36]. As early as 1986 Secretary of State for Defence George Younger had to acknowledge a declining real value in the defense budget which forced difficult choices over relative priorities [Ref. 107:p. 40]. With the re-elected Thatcher government unwavering in its support for Trident and its funding, the hardships have fallen on British conventional forces. Most of the criticism against Trident budget-wise has been not that the Conservatives negotiated a necessarily bad deal but rather in the opportunity costs to Britain that Trident represents.

Introducing Trident at the expense of conventional capabilities, some critics have argued, may have the strategic effect of lowering the nuclear threshold in Europe [Ref. 108:p. 22]. Mr. John Stanley, Minister of State for the Armed Forces, stated in June 1984:

> It is claimed that if we have Trident we shall have to cut back on conventional weapons, but that, I suggest, misses the key point. The central question is not whether if we have Trident we shall have less to spend on conventional weapons--that is obviously the case--but whether the sum of money to be spent on Trident will be a better addition to Britain's and NATO's defenses than the same sum of money spent on conventional weapons. That is the key question, and...our view is that the sum being spent on Trident will give us an amount of deterrence which we could not possibly get by spending the same sum on conventional weapons. [Ref. 109:p. 176]

According to David Greenwood's calculations and hypothesis, there is a widening funding gap between the resources required and the relatively level funding allocated to sustain a British defense effort (or "output") along current lines with provisions for modernization [Ref. 107:pp. 66-68]. He estimated that by 1991 there will be a 21 percent, or £5.3 billion, difference between the funds allocated for defense and the funds required to maintain Britain's current force structure [Ref. 107:p. 67]. Although Trident may not be the cause of this defense underfunding, it has been pointed out that, because Trident expenditures are equivalent to half the overall underfunding for 1987-1988 and 1988-1989, Trident cancellation has been identified as a partial quick fix (albeit temporary) to

Britain's defense funding dilemma [Ref. 107:p. 73]. Some Tory critics have also joined others in Britain asserting that a wiser defense investment would reside in strengthening sea lane protection, out-of-area capabilities, or land forces on the Continent. In other words, the Trident program is perceived by many to be forcing Britain (because of resource constraints) to redefine its defense priorities and to choose between maintaining its present naval strength or its land forces in Europe (British Army of the Rhine).

Britain has pursued a variety of measures to resolve its defense funding problems. It has emphasized competition in procurement, reduced force operational tempo, and encouraged joint armaments ventures to procure the best value of weapons for money. If the rising unemployment and inflation visible in late 1989 continues, the Conservative government will be under increasing pressure to provide more funds for domestic services and to freeze or reduce defense spending. Unless the British economy improves dramatically in the near-term with significant capital infusion and modernization, some have argued, the British contribution to NATO may have to be channeled toward selected tasks rather than toward an insufficient all-around contribution, especially in a period of leveling defense expenditures coincident with the peak years of Trident expenditure.

2. France

One of the factors which has helped to shape the direction of French nuclear modernization efforts has been advances in French technology. Although some experts believe that the French have not exploited the advantages of the MIRV technology nor that they have achieved individual re-entry vehicle guidance accuracy comparable to that of American and Soviet MIRV designs, the M-4 and M-5 programs, nonetheless, represent significant improvements in the range and accuracy of French missiles as well as in improved penetration capability of the warheads [Ref. 25:p. 67; Ref. 28:p. 22]. A major factor in the expansion of the French strategic force's striking power has been their ability to fit their SSBNs with multiple-warhead missiles. Similarly, advances in submarine quieting technology and a decrease in SSBN salvo firing time have been incorporated into the Inflexible and new generation SSBNs. Although published sources do not indicate that any French ballistic missile system has depressed-trajectory capability, the term has been mentioned as a means of complicating Soviet ballistic missile defenses and as a possible requirement for a replacement missile on the Plateau d'Albion [Ref. 24:p. 174; Ref. 32:p. 14]. This suggests that depressed-trajectory capability may be within French technological and engineering capacity. The ASMP air-launched attack missile and the MIRAGE 2000 N are also the products of advanced

French aerospace technology and an industry with a global market. In order to possess a force with greater capability to deter the Soviets, the French must exploit their technological capabilities. Therefore advances in French technology can be seen as one of the driving factors behind France's modernization programs.

Though the Socialist government is committed to a strong defense policy, some economists predict that overall French economic growth expectations are not high enough to ensure the future maintenance of the French defense system. Although some of the negative economic trends in the French economy of the early 1980s have been reversed (namely falling savings and investment rates, decreasing labor productivity, and a high inflation differential between France and its principal trading partners), the French economy is still plagued by negative balance of trade payments and government deficits [Ref. 110:p. 188]. Projections by the Wharton Economic Forecasting Associates indicate that the three percent average rate of growth of the French economy needed to maintain French defense spending as programmed by the Socialists in 1983 will not be obtained [Ref. 111:p. 162]. The conflict between increasing defense expenditures and the state of the economy, evident throughout the early to mid-1980s, was reiterated by President François Mitterrand in October 1988, but the commitment remained with defense.

> There is no solid defense without a healthy economy. The economic and budgetary imbalance would thwart our defense, would compromise our security. The nation consents to important sacrifices for the military budget to the detriment of other sectors. Not only must this be accepted but it must be announced, on the condition of keeping the necessary good sense and knowing how to distinguish between what can and cannot be done. The essential point is that our means of defense meet the nature of the threats while at the same time the evolution of techniques. [Ref. 64:p. 16]

In 1987 the five year program accepted by socialists and the center-right government of Jacque Chirac set a spending target on weapons to increase by six percent a year after inflation; by 1989 this had fallen to 5.7 percent [Ref. 21:p. 54]. A review of the spending program was held in the spring of 1989. When the new programmation militaire for 1990-1993 was announced on 7 June 1989, military spending for equipment was limited to four percent increase per year after inflation [Ref. 32:p. 14]. Although the reductions were described by some critics as "catastrophic", the text of the military program added, "The only lasting credible defense is one which respects the economic balances." [Ref. 112:p. 14] The Defense Minister said in a press conference following the announcement that the "priority remained with the nuclear deterrent," but at the same time he announced a six-month delay in the submarine Triomphant construction, reduction down to three squadrons (45 planes) of Mirage 2000 Ns and postponement until at least the turn of the century of decisions on the future of the IRBM force [Ref. 27:p. 14].

Current spending on the modernization of the nuclear forces is consuming 32 percent of the French military budget [Ref. 1:p. 29]. As the modernization progresses in the 1990s the share of the defense budget, especially its share of the equipment budget, is expected to increase [Ref. 111:p. 162]. In the face of pressures to increase spending on conventional defenses and domestic programs, the Socialist government has chosen to stretch out over longer periods of time some of the nuclear programs. Clearly France is facing a fiscal dilemma. A recent Congressional Research Report concluded that being committed absolutely to their nuclear modernization program, the French must either increase defense spending further to support a conventional modernization program, or alter their projected force structure, either conventional or nuclear [Ref. 1:p. 31]. The French have been patient and persistent in their nuclear weapons efforts in the past. It is unlikely that they will cancel any nuclear projects, but rather (like past govenments) will stretch procurements out with delays, thereby maintaining a vital defense-industrial base and easing fiscal and monetary pressures on the French economy, permitting it to better compete in international markets.

D. AMERICAN CO-OPERATION

1. Anglo-American Relations

Some have argued that the driving force behind the British independent deterrent has been London's desire to restore and maintain the special nuclear relationship with Washington [Ref. 2:p. 46]. However, Peter Malone is probably correct in assessing that Britain's deterrent capability has been shaped mainly by security concerns. He summarized,

> ...the American connection has been primarily a mechanism for maximizing the effectiveness and minimizing the costs of that capability although governments have unquestionably felt that nuclear co-operation, as the central strand of a complex bilateral relationship, yields political-military influence [Ref. 2:p. 46].

The importance of Anglo-American co-operation in developing a follow-on to Polaris can be seen in the statements made when the Trident decision was announced.

> Given that, as with Polaris, our operational independence can remain unimpaired, there is great financial advantage in the maximum possible commonality with the United States, especially in view of their high technology, the massive scale of their own missile procurement and our long experience of working together [Ref. 44:p. 9].

Since delivery-system technology rather than weapons technology has become the most costly element of the deterrent posture, Britain saves both time and money through co-operative links with the United States.

It has also been suggested that it would have been difficult indeed for the British government not to maintain

the American connection and instead to pursue more European co-operation; relinquishing it would have implied that some fundamental reassessment of the British-American relationship had taken place [Ref. 113:p. 9]. The government also reasoned that collaboration with France or any other venture to modernize its strategic nuclear deterrent would show a lack of faith in NATO, and particularly in the United States. There is no doubt that the Anglo-American "special relationship" is highly valued by both countries for its enduring mutual benefits. Note the White House communiqué following Prime Minister Thatcher's visit in December 1979:

> The President and the Prime Minister agreed on the importance of maintaining a credible British strategic deterrent force and U.S.-U.K. strategic cooperation. The leaders agreed that their governments should continue their discussions of the most appropriate means of achieving these objectives for the future. [Ref. 114:p.24]

Although cultural heritage links between the two democracies, a common language, and past close co-operative ventures in defense matters certainly affect U.S.-U.K. relations, economic considerations rather than the Anglo-American special relationship seemed to determine the ultimate decision to buy Trident. The French had intimated that they would have welcomed a bid for their M-4 missile [Ref. 2:p. 114]. A number of British politicians and academics were arguing at the time that Anglo-American nuclear co-operation was an enduring political liability in

Britain's relations with Europe and that it was time for Britain to demonstrate European credentials and renounce further dependence upon the Americans [Ref. 2:p. 114]. Had the French missile been comparable to Trident in cost, delivery time, and technology the British may very well have decided to buy European. But the cost-effectiveness of the American system outweighed these political concerns and was the basis of the Conservative defense argument for the Trident weapon system.

Some have contended that the special relationship in the early 1980s was partly the result of deteriorating East-West relations and partly the result of viewpoints shared between Margaret Thatcher and Ronald Reagan. Each regarded the other as an important ally in a campaign to improve Western defenses. The favorable terms offered the British in the agreements may have been an American response to Prime Minister Thatcher's strong support for cruise missile deployments in Europe in the face of large scale opposition. Some have speculated that, through the promise of extra jobs and fixed research and development, Reagan may have been trying to ease domestic pressures on the Conservatives, who were facing high unemployment and protest movements. [Ref. 33:p. 185]

No doubt the British have a great deal of confidence in American co-operativeness now and in the future and will probably use it to reduce their costs--as with, for example,

the arrangement to refurbish British missiles at King's Bay, Georgia. However, they are sensitive to any insinuation that the special relationship (including strategic weapon system procurement and joint targeting planning at Omaha) somehow reduces the independence of their strategic nuclear force. Independence is based on the following considerations: the submarines and warheads are designed, built, and overhauled in the United Kingdom; the British have the capability to change targeting if they so desire; and only the British government has release authority over the weapons. It is a firmly held belief that the Anglo-American co-operation has substantial cost benefits but in no way compromises the independence of the British strategic nuclear forces. The Trident agreements of 1980 and 1982 reaffirmed the special defense relationship in that both sides agreed on the importance of maintaining an independent nuclear deterrent, on remaining committed to the NATO military structure, on upgrading the Alliance's defenses, and on relying on nuclear weapons as the basis of deterrence. The fact that a new "Nassau Agreement" sustaining the nuclear relationship was possible signified that the continuing intimate partnership between the two countries was alive and well.

2. Franco-American Relations

In stark contrast to Britain's reliance on the United States for its strategic weapon systems, the French

nuclear force modernization programs developed within a context of (and continue to be) a demonstration of a rejection of arrangements that suggest a subordination to U.S. decisions or an encroachment upon French sovereignty. Given the long history of U.S. efforts to block French nuclear weapons programs and French efforts to maintain the nation's independence and freedom from superpower constraints, it is not surprising to find little Franco-American co-operation with respect to nuclear modernization programs, since French independence and rank as a great power hinge in part on France's autonomous nuclear accomplishments. Any major French-American nuclear co-operation might significantly erode this linchpin of French domestic and international politics, if it implied that France was not a fully equal partner. The only direct French-American co-operation uncovered by this research with respect to French nuclear force modernization efforts was the U.S. Defense Department's approval of the sale of Rockwell Collins VLF transmitters in support of the Astarte airborne communications relay [Ref. 115:p. 20].

In the summer 1989 issue of Foreign Policy magazine, Richard H. Ullman of Princeton alleged that in a highly secret arrangement the United States has provided substantial assistance for much of the last 15 years to the French nuclear weapons program; Washington supposedly furnished France with information on how to design and build

nuclear weapons and deliver them by missiles and aircraft [Ref. 116:pp. 3-33]. "The French sought and received advice on miniaturizing their warheads and on shielding them from electromagnetic radiation generated by nearby nuclear explosions." [Ref. 116:p. 13] To circumvent U.S. law prohibiting such transfer of technical information, Ullman wrote, a technique of "negative guidance" was used [Ref. 116:p. 10]. He also wrote that France and the United States have exchanged nuclear targeting data [Ref. 116:pp. 24-27]. The article prompted a French Ministry of Defense communiqué on 28 May 1989 which acknowledged, "Exchanges of technical information in the nuclear sphere take place...between France and the United States principally in the areas of security and safety." [Ref. 117:p. 1] Such exchanges, it stated, were permitted by unclassified agreements reached in 1961 and amended in 1985. The 1985 agreement was in fact reported in Le Monde on 4-5 August 1985 as permitting co-operation and information exchange regarding safety and security but not transfer of weapons, components, or nuclear materials [Ref. 118:p. 4]. The 28 May 1989 communiqué reaffirmed France's non-dependence on foreign technologies and components and added, "France builds up an independent nuclear deterrent with her own means." [Ref. 117:p. 1]

Some assert that any French efforts to maintain a credible deterrent must imply an indirect Franco-American co-operation. Despite the improvements in the French

nuclear arsenal, its credibility depends upon a tacit de facto linkage with the enormous striking power of U.S. nuclear forces. The American forces have been described as a force multiplier for the French forces. Since the French obviously can not hope to compete on the same level as the Soviets, the concept of the weak deterring the strong should be understood as the strong augmented by the weak deterring the strong. [Ref. 66:p. 83] The French strategy of proportional deterrence, that is the capability to inflict damage greater than the value to the Soviets of destroying France, rests on the Soviet recognition that the French might do enough damage and weaken the Soviet state enough to allow the U.S. to dominate the war-termination process [Ref. 119:p. 13].

Nonetheless, the French vehemently deny any suggestion or insinuation that their nuclear weapons, nuclear defense strategy, and nuclear weapons targeting are the result of any co-operation with foreign allies, direct or indirect. Too much investment, both political and monetary, have gone into developing and maintaining an independent nuclear force for the concept of independence to be easily compromised by a coordinated venture or allegation of such.

V. ANALYTICAL COMPARISONS AND CONCLUSIONS

One might initially expect the current British and French strategic nuclear force modernization programs to be similar for several reasons. First, they are both products of West European medium-sized powers of comparable size, population, and geographic location. Second, the ultimate purpose of both nations' nuclear forces is the preservation of their national identities and independence and the protection of their respective vital national interests. With such fundamentals in common one might anticipate similar rationales for strategic nuclear modernization, analogous force structures, and comparable strategic nuclear doctrine and targeting criteria. Working from those assumptions the fundamental goal of the thesis was to investigate through a symmetrical framework of comparative analysis the strategic nuclear force modernization programs of these two West European democracies.

Research quickly revealed that the differences in the two nations' modernization efforts were more significant and revealing than their similarities. The basic outline for the thesis was revised several times because a strictly symmetrical comparison between British and French strategic nuclear doctrine and their force structures was found to be inappropriate; in some cases the initially hypothesized

symmetry was simply nonexistent. Nonetheless, the original comparative framework was maintained. The awkwardness in the symmetrical comparative analysis was the result of an effort to force into the same artificial framework for analysis two unique nuclear force structures and associated doctrines. The difficulty in maintaining a hypothesis of symmetry in the British and French nuclear modernization programs within the analysis, however, is itself conclusive. Although Britain and France designed and developed their strategic nuclear weapon systems and modernization programs within the same generally polarized East-West international environment, with a common perceived threat (namely, the Soviet Union), and with similar resources, each nation's resultant programs, strategies, and doctrine exhibits unique features. These features appear to be determined to a large degree by each nation's domestic political traditions and national historical experiences.

A. SIMILARITIES

There are, nonetheless, significant similarities in the two nations' nuclear arsenals. For the most part, both nations' nuclear arsenals are seen as the ultimate guarantors of national sovereignty. Both nations hold that their strategic nuclear arsenals represent enough credible destructive power to dissuade a potential aggressor from initiating direct attacks against the United Kingdom or France. The French have been more explicit than the British

regarding this rationale in their doctrine of "sanctuarisation" of the French homeland. Nonetheless, the same rationale is evident in British arguments that Trident represents a last resort national nuclear force should Britain have to stand alone in her defense.

Although both countries rely on the capability to inflict massive destruction, expressed as an anti-cities targeting strategy in the case of France and as the "key aspects of Soviet state power" target base in the case of the United Kingdom, neither finds the credibility of its strategic nuclear deterrent forces dependent upon a criterion of mutual assured destruction. The ability only to maim partially an adversary is deemed sufficient for deterrence. The British hold that their strategic nuclear forces, even with Trident, meet this minimum deterrence level without fueling the nuclear "arms race". Similarly, the French maintain that their modernization programs will ensure that French nuclear forces meet their definition of minimum sufficiency for proportional deterrence. This approach to deterrence relies upon the assumption that the aggressor would have to consider the risk of being fatally weakened vis-à-vis his other potential adversaries. Hence, the credibility of the proportional or minimal deterrence argument for both Britain and France relies to a large extent on superpower rivalry and confrontation and U.S.

capabilities to deter aggression and, if necessary, to dominate escalation and the war termination process.

Both Britain and France have clearly alluded to the Soviet Union as the principal threat to their security and that of Western Europe as a whole. Although the French were not explicit in identifying the Soviet Union as the threat until 1983, both nuclear arsenals and associated modernization programs were clearly designed and targeted against the Soviet Union. In the case of Britain, the Chevaline warhead system and Trident II D-5 ballistic missile system were selected because of their assessed ability to penetrate Soviet anti-ballistic missile defenses. The British have made it clear that their objective is to be able to hold at risk Moscow and "key aspects of Soviet state power."

Similarly, French investments and continued emphasis on modernization of the submarine nuclear forces and development of the advanced M-4, M-45, and M-5 SLBMs with sophisticated penetration aids reflect extensive efforts to defeat perceived developments in the Moscow ABM defenses. The decreased reliance by the French on the manned penetrating bomber element of the French triad through the phasing out of the Mirage IV-P in the mid-1990s may be seen as a tribute to the Soviet air defense network, although the French have not ruled out developing long-range air-launched missiles around the turn of the century. The enlarged

anti-cities strategy of targeting the infrastructure of Soviet administrative control as well as industrial and economic assets has been seen as a French decision to respond to Soviet civil defense programs. It is clear that both the British and French strategic nuclear force modernization programs were designed against a specific perceived threat from the East--namely, the Soviet Union.

To enhance their doctrines of minimal deterrence, both countries have advanced deliberately ambiguous policy articulations and have emphasized the uncertainties and incalculability facing a potential aggressor. Hence, the British stress the contribution to deterrence that the British strategic nuclear forces offer by providing a second center of nuclear decision-making; the French remain vague regarding the definition of France's vital interests. The British and French declare that there is no uncertainty in their will to use nuclear weapons, but both nations' leaders apparently believe that specifying with any degree of precision the conditions under which their nuclear forces would be used would undermine their deterrent value.

Both British and French policy-makers have viewed possession of nuclear weapons as a means to achieve a sort of great power status. Continued possession of a modern strategic nuclear arsenal is seen as a way to maintain membership in an elite "club" of international players which ensures inclusion and participation in European and world

security matters. This perception that great power status and nuclear weapons are integrally related leads to the next conclusion.

Both British and French nuclear forces were planned and procured under the assumption that nuclear weapons have served a useful and "legitimate" role in maintaining peace and security in Europe. The function of nuclear forces as the linchpin of French defense programs, policies, and strategy and the continued extensive efforts to modernize those forces clearly reflect decisions of the French leadership based upon the expected continued efficacy of nuclear weapons as valid instruments of policy in international relations. The British decision to modernize their strategic nuclear force with the Trident program rather than to abandon it altogether reflects a similar assumption that nuclear weapons will continue to function as a credible deterrent to aggression even in an uncertain future.

B. DIFFERENCES

It is the differences in the two nations' modernization efforts which are more significant and revealing. The major fundamental contrasts between British and French nuclear programs, doctrines, and strategies are analyzed below.

British and French defense policies differ fundamentally in their perspectives regarding allied co-operation, especially with respect to strategic nuclear

forces. The current modernization programs and the associated public announcements reconfirm those basic differences. The French emphasize their independent employment options; the British emphasize the commitment of the Trident nuclear forces to NATO. The British underscore the contribution that their strategic nuclear forces make to the Allied deterrent posture. British policy relies on NATO's flexible response for the earlier stages of deterrence and defense. The French consensus, on the other hand, includes a rejection of any arrangements that might entail a perceived subordination of French interests to collective ones or that might suggest a perceived infringement upon French sovereignty. Hence, there are no French plans to return to an integrated status in NATO and there is no strategic nuclear targeting co-ordination.

These differing perspectives on alliance co-operation for defense may stem in part from the two nations' recent historical experience. Britain was able to achieve victory in two world wars through successful alliances, whereas the French appear to have less confidence in the efficacy of alliance relationships. The influence of history on post-war British and French overall defense policies is clearly reflected in their respective doctrines concerning nuclear weapons, the manner in which they contribute to deterrence, and the rationale for strategic nuclear modernization programs.

Another major difference in British and French nuclear policies and programs is the value placed not only on co-operation within an Alliance structure but also on co-operation on nuclear matters with the United States. The British, especially under Conservative leadership, highly prize the "special relationship" with the United States in nuclear and intelligence matters. The British forces reflect in all ways close co-operation with the United States in terms of targeting, spare parts, refurbishment of the missiles, and the actual purchase of the missiles. The British strategic nuclear modernization program may be viewed as a continuation of British efforts to maintain the wartime nuclear relationship with the United States.

French modernization programs apparently are not dependent on any American co-operation. The French leadership has denied all suggestions to the contrary. Current French nuclear modernization efforts independent of American co-operation may be seen as having evolved from the experience of having been distrusted and excluded from nuclear weapons develpment during World War II, as well as from perceived anti-French behavior on the part of the United States, including the U.S. failure to support France in the 1956 Suez crisis and Defense Secretary McNamara's opposition to French nuclear weapons programs in the 1960s. Hence France's autonomous nuclear accomplishments and their

continued improvements are necessary to ensure that France's political status is not threatened by either superpower.

This fundamental difference in political orientation has generated further differences in resource allocation and force structure. France's nuclear independence has been expensive. The French have had to bear alone the enormous costs of nuclear weapons research, design, testing, and production with a relatively small military-industrial complex, whereas the British have sought cost reductions by avoiding expensive national infrastructure investments and by purchasing proven weapon systems. Consequently, 32 percent of the 1989 French military budget is represented by nuclear programs [Ref. 26:p. 12]. In contrast, British Ministry of Defence estimates for 1988 stated that the proportion of the Defence Budget which the Trident program takes over its procurement period is less than three percent on average with a peak expenditure estimated at six percent [Ref. 10:p. xxix]. However, the British may have paid a political rather than financial price for their deterrent force in that Britain is dependent upon continued U.S. support in order to maintain a credible nuclear capability [Ref. 120:p. 35].

Although both the British and the French claim that their forces contribute to deterrence by providing an additional center of nuclear decision-making, their attitudes differ. Even in policy statements for its

strategic nuclear modernization Britain continues to affirm its confidence in American reliability, whereas France has expressed doubts on whether the U.S. could be trusted to honor its nuclear guarantees to Europe. For the French, this is a further rationale for an independent force.

As for differences in the hardware of the respective modernization programs, Britain has chosen to modernize her entire strategic nuclear force at once. This was due mainly to the fact that she was facing bloc obsolescence in the previous single-leg system. France, on the other hand, in order to avoid the possibility of a technological breakthrough that might neutralize its strategic nuclear forces, has tended to spread its modernization investments over several launching systems. The British strategic nuclear modernization program will continue to rely on a totally submarine-based deterrent with at least one submarine deployed at all times. The French modernization programs, though focused primarily on the submarine leg, include several types of improved submarine-launched ballistic missiles, continued research into a new land-based intermediate-range ballistic missile, and deployment of an air-launched stand off missile. Both powers have foregone modernization of a manned penetrating bomber, giving up flexibility in targeting and recall capability and emphasizing instead survivable second-strike capability with submarine-launched ballistic missiles.

France appears to have placed a greater emphasis than the United Kingdom on the survivability of its command, control, and communications infrastructure. However, this judgment is speculative because of the lack of open literature on British C3.

Another significant difference in the modernization programs is the lack of British domestic political consensus concerning nuclear weapons compared to that which exists in France. Britain's entire nuclear capability appears vulnerable to shifts in domestic politics. Should the Labour Party win the next election, which may take place in 1991 or 1992, a real possibility exists that the fourth Trident submarine's construction would be cancelled and the remaining British strategic nuclear deterrent forces negotiated away in a bilateral (or multilateral) agreement. On the other hand, except for the Communists, French political parties appear generally to support French nuclear policy. French politics is divided more over program specifics, such as basing options and resource allocation priorities. A dramatic reduction in French nuclear capability would require fundamental changes in French defense and security perspectives.

C. CONCLUSION

Although there are some similarities between the British and French strategic nuclear force modernization programs, the differences between them are fundamental and

significant. These differences and the various factors which have affected the modernization programs have direct implications for these two European nuclear powers as they face similar difficulties and uncertainties. The British and French nuclear modernizations appear to confront several potential common obstacles. These include public perceptions of a dramatically lessened threat of aggression from the U.S.S.R. (the adversary against whom the weapons have been designed and targeted), increased domestic political and economic pressures to reduce defense spending, and a potential collapse of public consensus regarding the legitimacy of nuclear weapons as symbols of international status and as effective instruments in deterring war.

Even though both nations' nuclear modernization programs face common potential problems, the two countries are likely to react according to their own national perspectives in dealing with nuclear weapons issues in the future. For example, the two nations may well take somewhat different approaches with regard to arms control and nuclear co-operation in Western Europe. Each nation has invested so much politically, militarily, and economically in its nuclear policies and programs that it seems highly unlikely that either will be willing to compromise on their fundamental features to create a common European nuclear force, unless the incentives to do so are truly imperative. Of course, these are questions for additional research

beyond the scope of this thesis. But given the different developments of nuclear programs and doctrine in Britain and France in their past efforts, the defense planner must not assume that the two powers will behave similarly as regards their future strategic nuclear forces.

It appears that with the rapid sequence of events of late 1989 in Central and Eastern Europe, including the collapse of several East European Communist regimes, the opening of the inter-German borders, and the crumbling of the Berlin Wall, both as a physical barrier and as a symbol of East-West Cold War division, a fundamental reassessment of the role of nuclear weapons with respect to Allied and international security issues must be undertaken. The current British and French strategic nuclear modernization programs and their associated doctrines will inevitably be affected. The specific hardware systems, strategic doctrines, force mix, and possibly their entire reason-for-being are likely to be questioned by some West European defense experts and political elites. The two West European nuclear forces will nonetheless remain important elements in the calculation of the political and strategic balance of power and security in Europe. Therefore, the roles, missions, and capabilities of these modernized nuclear forces (as well as the factors that have affected and continue to influence them) remain important considerations for the defense planner.

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