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# The French Nuclear Weapons Program

Submitted by the  
**DIRECTOR OF GENERAL INTELLIGENCE**

Concurred in by the  
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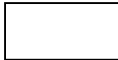
# The French Nuclear Weapons Program

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## THE FRENCH NUCLEAR WEAPONS PROGRAM

### THE PROBLEM

To estimate the present state and future pace of French programs for nuclear weapons and delivery systems, and their international implications.

### CONCLUSIONS



*(Paras. 1, 3)*

B. At least until 1969, France will be dependent on a delivery system consisting of 50 Mirage IV jet bombers, all of which are to be operational by the end of 1966. Operating alone as a separate national force and without highly sophisticated delivery tactics, this delivery system would be vulnerable to air defense measures which are already available to the Soviet Union, and would be even more vulnerable to the improved air defenses which the USSR will probably have by the end of 1966. On the other hand, the Soviet Government probably will regard the Mirage

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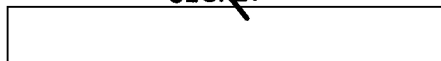
IVs as a meaningful albeit small threat, because it must assume that a few of these aircraft might penetrate its defenses. (*Paras. 8, 11*)

C. Work is also underway on a second delivery system to consist of three nuclear submarines, which under French plans are to become operational in 1969, 1971, and 1973, respectively, and are to be armed with 16 missiles each having a range of 1,600 n.m. (3,000 km). We believe, however, that the first French missile firing nuclear submarine will become fully operational at the earliest in 1970, and possibly even later. (*Paras. 12, 13*)

D. The cost of the *force de frappe* is high and has risen more rapidly than the government expected several years ago, but is within French capabilities. In addition to the strategic nuclear force, the French also plan a large-scale modernization of their conventional arms and equipment, and have indicated that they do not intend total military spending to rise above its present share of gross national product. The growth of the economy will probably be sufficient to support all these objectives, although rising military expenditures may cause some strains. As long as de Gaulle is in power, the French Government will almost certainly continue its nuclear weapons program, and will make whatever sacrifices are necessary in other military or economic sectors. If it became necessary, the French would probably stretch out spending on the modernization of conventional forces rather than hold down outlays on the nuclear strike force. (*Paras. 16, 22-23*)

E. De Gaulle regards the *force de frappe* as having a deterrent effect on the Soviet Union, as enhancing French leadership in Western Europe, and as making Western Europe more independent of the US. We believe de Gaulle will not submit French nuclear weapons to any form of NATO control. French spokesmen have recently argued with increasing frequency that the *force de frappe* should be regarded as a first step toward a strictly European nuclear deterrent. The idea of an eventual deterrent force not under US control has adherents in European circles which are otherwise opposed to de Gaulle. In the maneuvering over European political association in the next several years,

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Gaullist intimations that the *force de frappe* could serve as the nucleus of a European deterrent will probably be intended to induce an increasing number of Europeans to favor forms of political ties among European states which enhance de Gaulle's position. (Paras. 24-26, 31)

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## DISCUSSION

### I. CURRENT STATUS AND FUTURE DEVELOPMENTS OF FRENCH PROGRAM

#### A. Nuclear Weapons

1. [REDACTED]

[REDACTED] der present plans, France will have until 1967 only [REDACTED]

[REDACTED] Un-  
fission

2. The French will not be able to produce weapon-grade U-235 until 1967, when they expect the gaseous diffusion plant under construction at Pierrelatte to be completed. This plant originally was to have begun producing weapon-grade material in 1963, but technical difficulties have delayed the completion date by four years. [REDACTED]

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4. Thermonuclear weapons would of course make de Gaulle's *force de frappe* more impressive, and we believe he intends to produce them.



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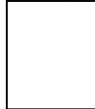
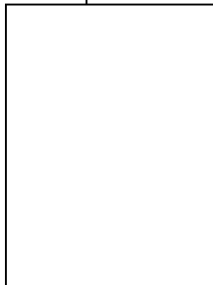


Table I shows estimated cumulative production of fissionable material from these sources, and also the larger production of plutonium potentially available for weapons if the maximum attainable from Chinon is included.

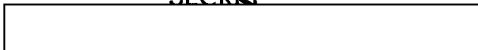


6.



These weapons would, of course, be far in excess of those needed for the strategic delivery systems now planned.

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7. Present French plans also call for production of tactical nuclear weapons for the ground forces beginning in 1970. We have no information on the types or quantity of tactical weapons planned, but the availability of fissionable material is not likely to be the limiting factor for a modest production of such weapons.

#### B. Delivery Systems

8. France is planning two strategic delivery systems for the next decade. The first system will consist of 50 Mirage IV jet bombers.<sup>1</sup> This aircraft has a gross weight of about 66,000 pounds. Carrying a full payload of 3,400 pounds, the plane has an operational radius of about 1,150 n.m. without refueling and 1,500 n.m. with one refueling. To achieve these operational radii, the Mirage IV would have to fly most of the way at altitudes of 40,000 to 50,000 feet and at a cruising speed of Mach 0.9, with only one high speed dash of about 250 miles at Mach 1.7.<sup>2</sup> Lower altitudes or prolonged supersonic speeds would cut the aircraft's operational radius drastically.

9. The French Air Force will begin receiving production models of the Mirage IV by the end of 1963, and we believe that full operational status of the planned force will be achieved as scheduled by the end of 1966. For refueling purposes, France has ordered 12 KC-135 tanker aircraft from the US, with delivery to begin this year. The French could extend the operational radius of the Mirage IV weapons systems somewhat by developing a stand-off air-to-surface missile.

10. As a supplement to the Mirage IVs, the French Navy has proposed that 30 Etendard IV subsonic tactical bombers assigned to aircraft carriers be modified so that they can carry nuclear bombs. The government has so far not allocated funds for this purpose, and may never do so because of budgetary considerations and the marginal strategic value of these relatively slow aircraft.

11. Operating alone as a separate national force and without highly sophisticated delivery tactics, the French aircraft delivery system would be vulnerable to air defense measures which are already available to the Soviet Union, and would be even more vulnerable to the improved air defenses which the USSR will probably have by the end of 1966. On the other hand, and despite its protestations to the contrary, the Soviet

<sup>1</sup> Recent reports indicate that French plans envisage a total inventory of 50 Mirage IV bombers, not an operational force of 50. Some 36 aircraft apparently are to be kept operational at all times, the remainder being used for training or grounded for maintenance. If the French Government later decides on a fully operational force of 50 Mirage IVs, an inventory of about 70 aircraft would be needed.

<sup>2</sup> On a one-way, "no return" mission, and assuming the same altitudes and speeds as described here, the Mirage IV has an estimated maximum range of 2,650 n.m.

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Government probably does regard the Mirage IVs as a meaningful albeit small threat, because it must assume that a few of these aircraft might penetrate its defenses.

12. French plans call for a second delivery system consisting of three ballistic missile nuclear submarines, each armed with 16 missiles of about 1,600 n.m. (3,000 km.) range. The French have said that the first submarine should be operational in 1969, the second in 1971, and the third in 1973. Assuming that Pierrelatte starts producing U-235 in 1967, the nuclear propulsion system for the first of these submarines should be ready on time. In addition, an acceptable position-finding system for the submarine should be available by 1969. By the same year, the missiles for the system probably will also be ready for use. French research and design work on missiles appears to be of high caliber, and flight tests of the 1,600 n.m. solid fuel submarine missile will probably begin in 1965. This missile will probably carry a warhead weighing about 1,500 pounds. [redacted]

[redacted] The French should be able to develop by 1969 a guidance system which would provide the missile with a degree of accuracy acceptable to them. [redacted]

13. While the French probably can, if they encounter no serious, unforeseen difficulties, produce all the principal components of missile firing nuclear submarines by 1969, they will require more time to put the various parts together into an operational weapons system. Perfecting and testing the system as a whole, as well as training personnel to man it, are complex and time-consuming tasks. We believe that the first French missile firing nuclear submarine will become fully operational at the earliest in 1970, and possibly even later. When the whole system does become fully operational, of course, it will pose much more of a military threat to the Soviet Union than the Mirage IV bombers.

14. Recent French statements have indicated that the government considers a land-based IRBM system in metropolitan France unacceptable and is not now planning such a system. If during the next several years the French Government changes its policy in this respect or determines that its schedule for the nuclear submarine missile system will in fact slip badly, however, it could deploy by 1968 a land-based IRBM system for an interim capability.

15. The French have already benefited considerably through their commercial purchases of components for their advanced weapons programs. If the French obtained wide access to the classified technology of other nations which are ahead of them in nuclear weapons and

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delivery systems, they could appreciably shorten the timetable as well as reduce the research costs of developing their nuclear strike force.

## II. COST AND BURDEN TO THE FRENCH ECONOMY

16. Costs of the French nuclear program and weapons delivery systems are high and have risen more rapidly than the government expected several years ago. Since 1946 France has spent a total of about \$2.5 billion on its nuclear program,\* including expenditures for peaceful purposes. Expenditures on the nuclear program will be more than \$800 million in 1963, and, if present trends continue, may reach about \$1.9 billion in 1966. As a share of the French gross national product (GNP) in current market prices, expenditures on the nuclear program have grown from about 0.6 percent in 1960 to an estimated 1.1 percent in 1963, and, if present trends continue, may be about 2 percent by 1966. These outlays, although larger than originally expected, are almost certainly within the capabilities of the French economy. After 1966 the percent of GNP devoted to the French nuclear program will probably level off or even diminish if the economy continues to grow at a fairly rapid rate. A number of major projects, including the expensive gaseous diffusion plant at Pierrelatte (estimated cost \$1.2 billion), should be completed in 1966 or 1967.

17. Not all the expenditures on the nuclear program are part of the cost of acquiring nuclear weapons. Although more than one-third of the \$2.5 billion spent through 1962 was for exclusively military purposes, most of the balance represented joint costs of military and nonmilitary projects. These costs are not easily separated, but we estimate that at least two-thirds of the total \$2.5 billion was associated with military aspects of the program. If this proportion continues, the cost of military aspects of the nuclear program will be about \$540 million in 1963, will average about \$870 million annually during the four year period 1963-1966, and by 1966 will be about \$1.3 billion.

18. The probable cost of the delivery systems planned by the French is much less than that of the nuclear program. The cost of developing and producing 50 Mirage IV jet bombers will be on the order of \$250 million. To this must be added some \$50 million for the purchase of KC-135 tankers from the US. Later modifications to the Mirage IV, installation of electronic countermeasures equipment, and the addition of air-to-surface missiles could add another \$200 million to \$250 million. The cost of developing and producing the three nuclear-powered ballistic missile submarines should be about \$1.5 to \$2 billion, exclusive of warheads.

\*The dollar values used throughout this estimate are conversions from current French francs at a rate of 4.9 francs to \$1.

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19. The cost of delivery systems will be spread over a number of years, but will be largest after 1966. In very general terms, we believe that French expenditures on all aspects of the *force de frappe* (nuclear weapons, Mirage IVs, missile and nuclear submarine development) have averaged about \$600 to \$700 million annually from 1960 through 1962; will average about \$1¼ billion to \$1½ billion annually from 1963 through 1966; and about \$2 billion to \$3 billion annually from 1967 through 1970.

20. It should be noted that our estimates of the costs of the French nuclear strike force are substantially higher than those given by the French themselves. French Defense Minister Messmer has indicated that expenditures on the *force de frappe* will amount only to about 13 percent of the military budget or \$500 million in 1963, and will rise to 25 percent of the military budget or \$1.3 billion in 1970.

21. We believe the French figures are low for several reasons. First, the government is facing domestic criticism of the cost of the *force de frappe* and inclines therefore to present conservative figures. Secondly, the French figures apparently cover only research and production costs, omitting operating expenses, and very probably associated equipment and support costs. Moreover it is almost certain that Messmer has not included the military share of that part of the nuclear program which has peaceful as well as military purposes. The authorizations for "the atom" in the 1963 military budget would cover only 72 percent of the estimated military share of the total costs of the nuclear program in 1963. The remainder will come from sources outside the military budget. Thirdly, French estimates may be lower than ours simply because the government does not yet have the experience with nuclear weapons systems to predict costs accurately. For example, the cost of the Pierrelatte gaseous diffusion plant has greatly exceeded the original French estimates because of unexpected technical problems.

22. In addition to the *force de frappe*, the French plan a large-scale modernization of their conventional arms and equipment. They have also indicated that in spite of an expected increase of about \$200 million annually until 1970 in the military budget, military spending is not expected to rise above its present share of GNP. In each year since 1958 the military budget has actually decreased as a share of GNP. There are signs that economic growth may slow down somewhat over the next few years, but the rate of increase probably will still be sufficient to support present objectives even though rising military expenditures may place some strains on the French economy.

23. As long as de Gaulle is in power, the French Government will almost certainly continue its nuclear weapons program, and will make whatever sacrifices are necessary in other military or in the economic sectors.

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We do not believe that mounting costs or problems of obsolescence will induce de Gaulle to abandon his program as the British abandoned the Blue Streak missile. If economies become necessary, the French will probably stretch out spending on the modernization of conventional forces rather than hold down outlays on the *force de frappe*.

### III. POLITICAL CONSIDERATIONS

#### A. De Gaulle's Justification for the *Force de Frappe*

24. While the French started their nuclear weapons program several years before de Gaulle returned to power in 1958, he has made it his own and has pushed it with vigor and determination. A principal justification in de Gaulle's mind for French possession of nuclear weapons is to strengthen the French position within the Western Alliance. The *force de frappe* is thus an integral part of French foreign policy vis-a-vis Western Europe and the US, as well as the USSR. De Gaulle regards development of a national nuclear force as a major means of enhancing his own leadership in Western Europe, and making Western Europe more independent of the US. He may even believe that US opposition to his plans strengthens his position in Europe, since it shows others that he can in fact act independently.\* In addition, de Gaulle believes that the *force de frappe*, even though relatively small, will make future Soviet aggression against Western Europe less likely, by reducing the chance that the USSR might think it could win a military success in Western Europe without nuclear war.

25. We believe that de Gaulle will insist on retaining national control of the *force de frappe*, although he has offered to "coordinate" its use with NATO. He might be willing to associate the *force de frappe* with some strictly European grouping, if he was convinced that he could thereby enhance materially his political leadership in Western Europe, and at the same time retain essential control of his nuclear weapons.

26. In justifying the *force de frappe*, Gaullist spokesmen have argued with increasing frequency of late that the French force should be regarded as the first step toward a European nuclear deterrent. They have indicated that political relations in Europe have not yet reached the point where a European nuclear force is feasible, but imply that France will use its own force as a bargaining tool to extend French influence in any future negotiations for a closer association of European nations. This portrayal of the French nuclear force as a way-station toward a European deterrent is probably in part a tactic of the Gaullists to stimulate domestic support for their program. We believe that de



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Gaule actually does regard his nuclear force, however, as one means of furthering, on his own terms and under his leadership, the political organization of Europe.

27. In attempting to develop increased support within France for the nuclear strike force, government spokesmen have also argued that the program gives a big boost to French economic and scientific progress. A recent economic report prepared by a committee of the French National Assembly claimed that the economic and scientific advances of Nazi Germany during the 1930s and the US during the 1940s and 1950s were directly related to the intense armament efforts of these countries. France, the report continued, must make a comparable effort to improve its position in the world technological race. These sentiments are not yet widely accepted in France, but are likely to strike a responsive chord as they are repeated. Support of sustained or increased defense spending could easily spread if a downturn should occur in civil sectors of the economy.

28. Inside France the *force de frappe* almost certainly has wide support. All the Gaullist justifications for the force which are described above are not accepted equally by the population, but their combined weight has clearly left the opposition in a minority which has grown less effective in recent months. The continuing rise in the cost of the *force de frappe* may cause some increase of opposition in coming years, but we expect such opposition to make little headway against the momentum of the program and the increasingly strong support of military and business interests.

29. After de Gaulle's departure from the scene, any government led by the Gaullist party (the UNR) will almost certainly continue the nuclear weapons program. Even a coalition successor government including members of non-Gaullist parties in key positions (but excluding the Communists) would be unlikely to give up the program, although it might be somewhat more willing than de Gaulle to cooperate with other western nations in NATO. If a popular front, Socialist-Communist government should take over, French policies in this area would probably be substantially changed if not reversed.

#### B. European Support for de Gaulle's Program

30. Elsewhere in Western Europe, de Gaulle has not yet made much headway in establishing himself as leader of Europe or his national *force de frappe* as beneficial to Europe. Nevertheless, some of the justifications for the force given by the Gaullists have aroused sympathy elsewhere in Western Europe. There is a not inconsiderable element which is uncertain that US nuclear power would be used in the event of a Soviet attack on Europe, or is at least uncertain that the Soviets would

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estimate that the US would necessarily use its nuclear power in the event of an attack on Europe. This element would attach value to a French strike force as a trigger mechanism which would increase the credibility of the US commitment to Europe.

31. In addition, the idea of an eventual European deterrent with no US involvement has some adherents in other European countries. The recent emphasis by Gaullist spokesmen on the French program as a first step in this direction may therefore make the French force more palatable in other countries. Most supporters of a European deterrent are firm advocates of an integrated Europe allied with but independent of the US. They argue that to be independent Europe must some day have its own nuclear arms. Even such European integrationists and close friends of the US as Jean Monnet and Paul-Henri Spaak have expressed support for this concept. For the present, most of these people disapprove of de Gaulle's proposals for a loosely organized confederal Europe of the Six with no supranational authority. They believe that there must be progress from the start toward supranational institutions, which would operate to limit the powers of individual national leaders such as de Gaulle. Gaullist intimations that the *force de frappe* could serve as the nucleus of a European deterrent are probably intended to induce other Europeans who want such a force to lessen their opposition to Gaullist leadership of Europe.

32. If de Gaulle does use his nuclear force as a means of developing support for the kind of European political association he wants, he will probably have as an additional important motive the desire to get economic or technical aid for the French program. With regard to both motives, the first country toward which De Gaulle might make an initiative is West Germany, the nation most able to provide meaningful aid to the French and the one with which de Gaulle believes it most important to have close relations. There have been reports and rumors that the French recently approached the West Germans for aid in the French nuclear weapons program. Our evidence is insufficient to corroborate these reports, and French and German officials have denied them. We believe that no cooperative program is now in existence. However, if the French encounter serious difficulties in their program, we believe they might seek German technical assistance, which they would probably consider of more immediate benefit than financial assistance. We do not believe that de Gaulle at this time will give up any control over his *force de frappe*, but he might be willing to offer the Germans some limited degree of participation in the French program in return for aid.

33. One other element in de Gaulle's justification for the *force de frappe* has also aroused some sympathy throughout Western Europe.

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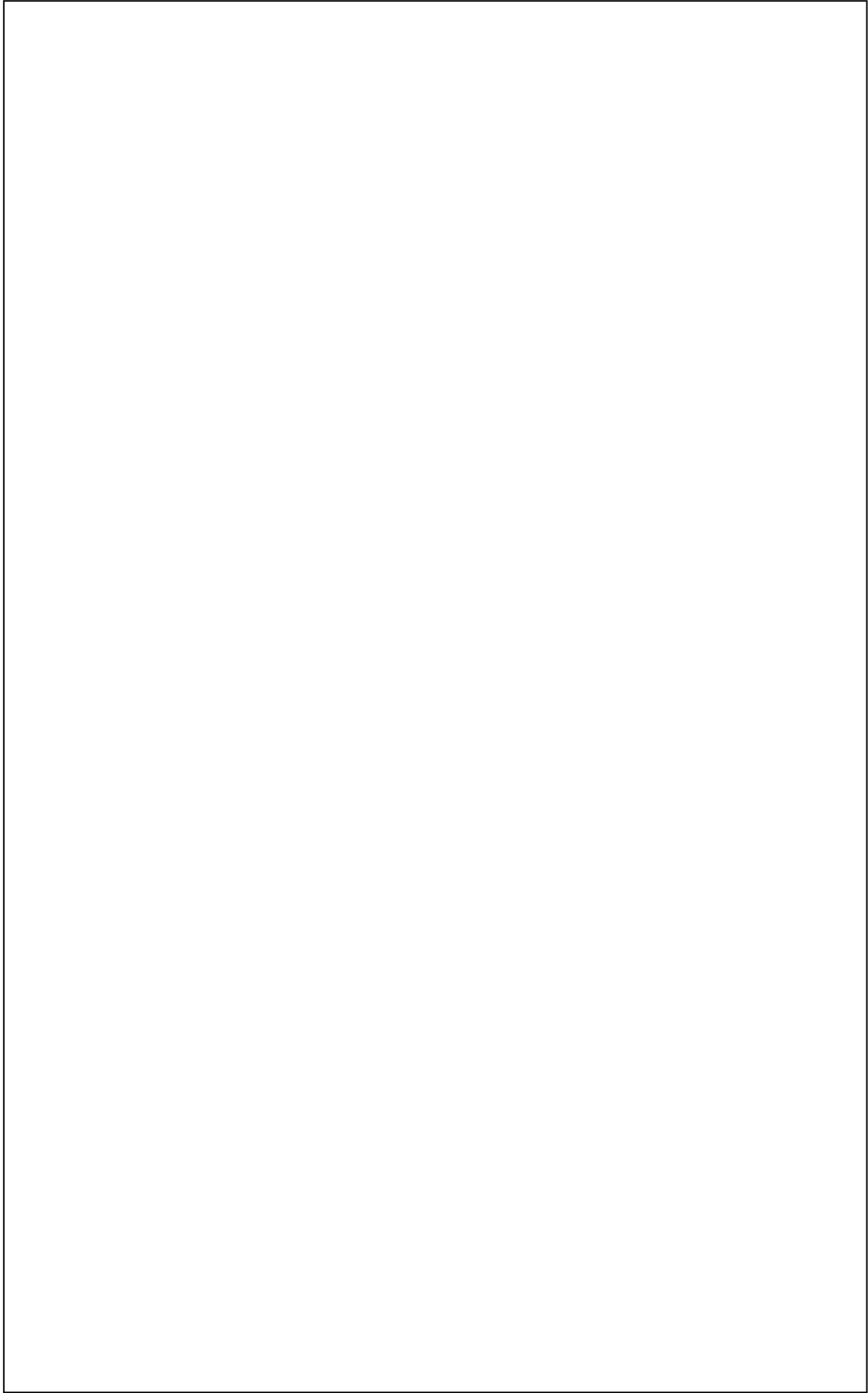
This is the alleged impetus to the economy of a country which derives from research and production of nuclear and other advanced weapons. Although France is the only nation of the Western Alliance where this concept is publicly extolled, it has some support elsewhere. Even Belgium's Spaak has stated that without the *force de frappe* important avenues of progress in certain scientific and industrial fields would be closed to the French, and that this to some extent justifies the French program.

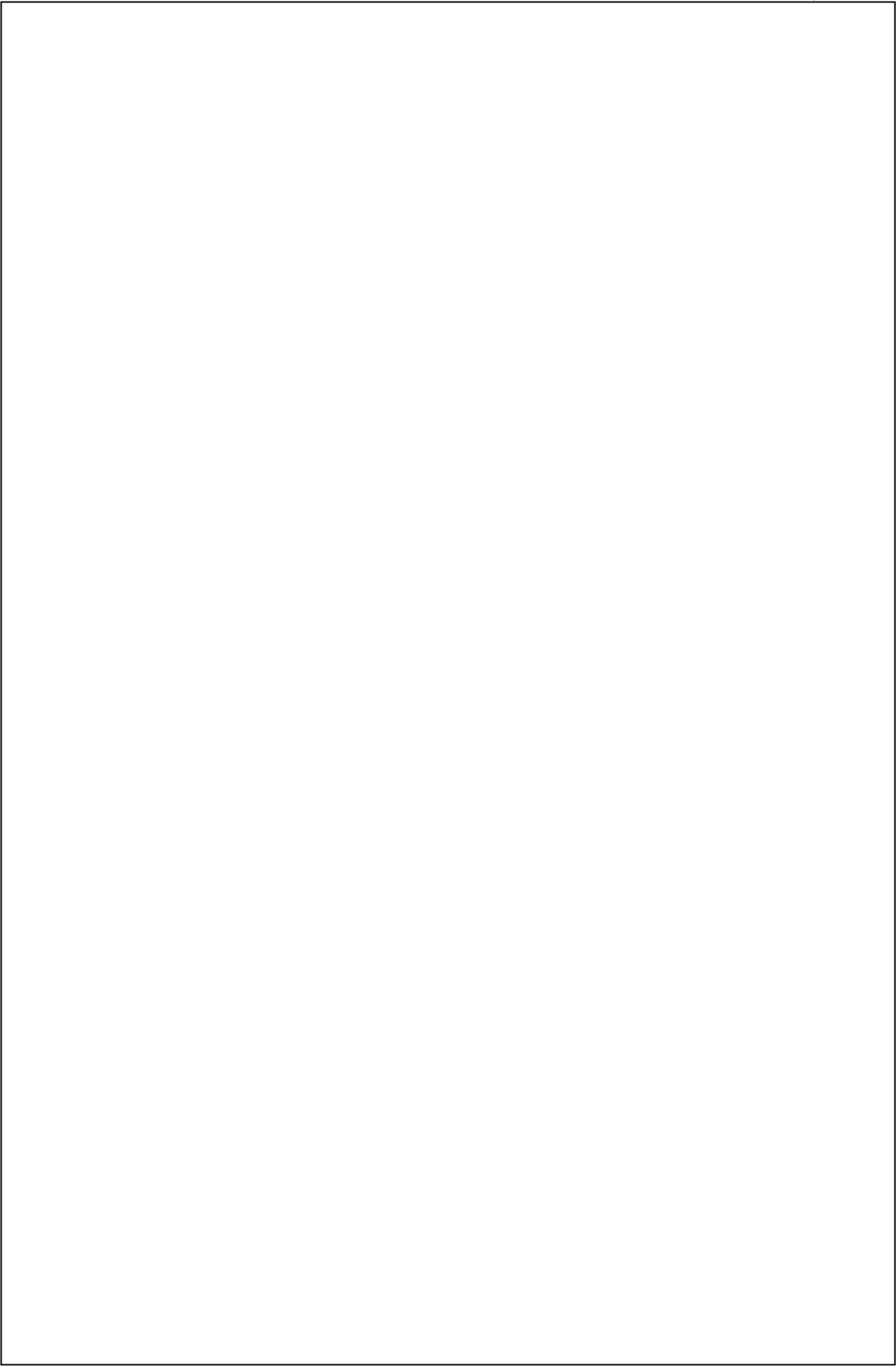
#### C. French Reaction to a Nuclear Test Ban

34. We do not believe that a Soviet-US-UK nuclear test ban agreement would affect the development of the French nuclear weapons program as described in this estimate. France would almost certainly not sign such an agreement at least until such a time as it had a thermonuclear warhead for medium range missiles. Even though de Gaulle were subjected to intense political and propaganda pressures from Western, Soviet Bloc, and neutral powers, he would almost certainly not be deterred from atmospheric testing in order to achieve a thermonuclear capability.\* It is possible that if de Gaulle were given complete designs and materials for producing a thermonuclear warhead, he might yield to pressures for signing a test ban agreement. However, de Gaulle is almost certainly as interested in the political effects of being known as a thermonuclear power as in the military significance of the weapons. He would be reluctant to forego the test which would demonstrate that he had produced a thermonuclear weapon.



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