COMMON FUNDING IN NATO

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Among the most significant peacetime accomplishments of NATO has been its management of corporate undertakings involving the construction of military facilities, the operation of the international command apparatus, and the manufacture of standard weapons. These tasks, of course, have not been performed without frustrations, but even the limited success of the alliance in surmounting obstacles has enabled it to reach an unprecedented degree of peacetime collaboration. Lessons from this experience should be applicable to the future NATO -- or indeed to any collaborative international undertaking. It is important also to attempt to analyze the French position, for common-funding projects appear to be one of the few branches of allied cooperation in which France will continue to participate on a limited basis.

The material for this survey was compiled primarily from press reports, unclassified NATO documents, semi-official publications, and numerous interviews.

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This Memorandum is part of RAND's continuing inquiry into the nature of international organizations and the manner and effectiveness of their performance. It is the fourth in a series of studies dealing with the general subject of decisionmaking in NATO. Previous studies by the same author are: RM-3559-PR, Some Fundamentals of NATO Organization, April 1963; RM-4169-PR, Coordinated Weapons Production in NATO: A Study of Alliance Processes,
SUMMARY

This study was undertaken for the purpose, not of offering solutions to the current NATO impasse, but rather of collecting and analyzing the mass of material relating to past experience of common funding. Nonetheless, some general conclusions have emerged from the analysis and these suggest rough guidelines for future United States action. (Section VIII.)

There is an obvious but sometimes overlooked distinction between three kinds of collective endeavor: (1) infrastructure, (2) operating accounts, and (3) consortium activities. This categorization is essential to an understanding of past experience and to any prognosis for the future.

The infrastructure program has been the prime instrument of past collaboration but is now absorbing only about fifty per cent more effort than yearly operations. (Sections II-V.) Its function in helping to blend the separate forces together and in providing the wherewithal for a cohesive military structure cannot be overemphasized. Under its auspices more than 3.5 billion dollars have been collected and dispensed for the orderly furtherance of a central scheme. The infrastructure fund has provided facilities that nations would not have built individually. It has financed the construction of installations in the less wealthy countries to serve the common defense of all.

While it can be seen that the allies have the ability to combine their efforts in many infrastructure activities so as to expand greatly the scope of the program, nothing in the present situation makes it likely that this will
happen. The principal demand for future endeavors seems to come in the communication field.

An examination of the incentives for participation in the infrastructure program (Sections IV and V) leads to the conclusion that economic considerations often take precedence over concern for community security. For one thing, "brick and mortar" projects -- with their demonstrable economic appeal to the individual members -- find their way through the procedural maze with minimum difficulty. "Sophisticated equipment" projects, on the other hand, which are often more vital to the community defense but whose economic benefits cannot so easily be distributed among the membership, usually suffer lengthy delays.

Operating accounts (Section VI), which have been steadily rising as infrastructure allocations have tapered off, are used to finance a variety of permanent community institutions, like the International Staff, numerous military headquarters, the NATO Defense College, and the SHAPE Technical Center. Consortia have been used by **ad hoc** groups to build common weapons, to procure and distribute spare parts and supplies, and to operate installations that serve only a few of the NATO members.

The present examination of burden-sharing, for all categories of common funding, accepts the premise of economists and political scientists that "national interest" determines how much a country will be willing to pay for common ventures, in the absence of valid economic criteria for determining equitable national contributions. The "national interest" in a given project varies from one country to another. One will prefer to spend money for airfields, another for naval facilities. Moreover, the
enthusiasm for a project within a single nation will vary with the level of the proposed community effort: One nation may be willing to pay its share of a system up to a set ceiling but refuse to contribute to a more expensive program preferred by others. As a consequence, arrangements which, like the infrastructure, call for a set percentage from each country, no matter what the project or scale of effort, place a greater load on the international officials who must act as intermediaries in drafting programs that will please all. The flexible consortium arrangement, which lends itself to participation in proportion to each member's interests, provides a useful complement to the infrastructure through which to continue common funding on a scale comparable to that of the past.

Contrary to many opinions, all three types of common funding have served America well, though this conclusion is based primarily on a simplified comparison between gross expenditures for defense and proportional contributions to the common pool. For all defense purposes the United States expends, by almost any method of computation, more than twice the total military budget of all the other allies together. But under infrastructure, operating, and consortium accounting, the United States averages less than half what the others put into the pot. Though NATO common funds are devoted almost exclusively to European enterprises, the United States has been the major beneficiary as a user of the resulting common facilities.

Participation in future common funding activities will be advantageous to the United States as long as American strategic policy favors a strong local defense capability in Western Europe. Common funding will remain particularly
important as long as allied and U.S. strategy is oriented
toward "flexible response." As general guidelines to
future American action, the study recommends the following
(Section VIII):

1. Support the infrastructure and military budget
systems with the procedures now in effect and at the
current level of effort. Accept an equitable share of the
additional burden caused by the withdrawal of France,
recognizing that this will mean a return to contributions
as large, or larger, than those borne prior to the 1966
reductions.

2. Adopt a receptive attitude toward all proposals
for extending common funding to more binding and compre-
hensive programs. Analyze each proposal on its merits and
recognize the inherent deficiencies of community enter-
prise as well as its benefits.

3. Attempt to maintain the "set percentage" burden-
sharing system at the highest level of the communal effort,
but exploit the alternative method of NPLO and consortium
activity when projects do not produce NATO-wide enthusiasm.
In consortia, strive for a management system that gives
nations influence in rough proportion to their stakes in
the enterprise.

4. Discourage and avoid, except in unusual circum-
stances, "tying" infrastructure payments to domestic
purchases. "Tying" stipulations vastly complicate inter-
national competitive bidding and inhibit the market process.
They are warranted, however, as a last resort, to shake
loose sophisticated equipment projects that are blocked
by disagreement over technical specifications.
5. Seek an equitable basis for continued French collaboration on selected projects. The compromise should require France to pay some form of "absentee membership dues" to support the collective and indivisible alliance tasks, but not to pay the "full" share previously assigned her. Failing this, France should be required to pay a substantial surcharge for participation in the alliance endeavors of her choice.
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I. PURPOSE AND BACKGROUND

A. PURPOSE OF THE STUDY

This study was initiated as a routine survey of NATO experience to be used as a basis for functional analyses of international structures. Regional organizations have come to be of great importance since the end of World War II. Most of the literature about them, however, is oriented toward what the various authors think they ought to be, rather than toward what they are.

The common-funding enterprise furnishes the analyst with one of the few concrete examples of integrated action by the alliance. Even those familiar with NATO are hazy about the operation of the common-funding system. Is it managed as a supranational activity? How efficient is it? Should the concept of common funding be extended to other areas of alliance endeavor?\(^1\) The original objective of the study was to answer questions like these. In the past few months, however, to increase the study's relevance to the current crisis, its focus has been partly shifted.

Whatever the decisions may be regarding the future status of France vis-à-vis "the Fourteen," there will be a continuing need for some kind of common funding in NATO. Short of a deliberate decision to ostracize France, there

\(^1\) Most writers on NATO think it should. The following statement is generally typical: "If the principles followed in building the infrastructure were applied to the whole NATO program, very large savings could probably be effected by the Allied Governments." Ben T. Moore, NATO and the Future of Europe, Harper & Brothers, New York, 1958, p. 100.
will have to be some type of minimal support from fifteen nations to finance the top-level governing structure. France has indicated her intention to remain a member of the North Atlantic Council and she will probably continue to participate in the important committees of the Council unless she is forcefully ejected by the other members, an unlikely contingency.\footnote{U.S. officials do not appear well disposed toward a "quarantine" approach. The gist of Secretary of State Rusk's recent testimony implied a willingness to continue to collaborate with France on a practical basis. Dean Rusk, \textit{The Crisis in NATO}, Hearings before a subcommittee, Committee on Foreign Affairs, House of Representatives, 89th Congress, 2nd Session, p. 342.}

This study will not make suggestions on such policy questions as whether or not the other allies should allow France to continue her membership in, say, the Conference of National Armament Directors, or to fire her missiles on the community range in Crete. For legitimate political or psychological reasons the fourteen integration-minded allies may decide to deny France the privilege of picking and choosing among the possible projects for inter-allied cooperation. The fourteen might decide to encourage France to cooperate in tasks for which she is peculiarly well fitted and equipped. If the fourteen adopt the latter course, it will be necessary for allied negotiators to study each project to determine whether or not they would like to have France as an active participant. This determination would not be final, of course, but would serve merely as a backdrop for bargaining. Obviously, the French are more interested in some activities than in others. It
is understood, for example, that they still wish to cooperate in the establishment and operation of the NATO Air Defense_Ground Environment (NADGE) and that they wish to continue to contribute to and receive information from the NATO Early Warning System.³

As we shall see, opinion is divided on whether France should be granted the privilege of selective collaboration. One commentator has suggested it is in the United States' interest that France be allowed to receive air defense and warning support because "France's allies have no more interest than France in making the rudimentary force de frappe more vulnerable than it already is."⁴ It may well be argued that France contributes less to the early warning and air defense systems than she gets from them, but if so the negotiators for the fourteen possess a badly needed lever for persuading France to cooperate in other functions in which she is less interested. We need not determine the trade-offs here for it is obvious that the allies need a number of things that France has to offer, including the right of overflight for aircraft, easements for communication purposes, and the privilege of maintaining some facilities in France on a standby basis so that they could be used if France should join the other allies

³Washington Post, September 8, 1966, p. A23. According to this report, France also wants to continue to be represented at the SHAPE Technical Center at The Hague, at the antisubmarine center at La Spezia, and in the Hawk manufacturing consortium.

⁴Robert E. Osgood, The Crisis in NATO, Hearings before the Committee on Foreign Affairs, House of Representatives, 89th Congress, 2nd Session, p. 96.
in a combat situation.\(^5\) In addition to the activities from which France would seem to have more to gain than to lose (and those which benefit the other fourteen) there are a number of operations, such as the NATO POL pipeline, which it would seem to be in both parties' interest to continue. If the true goal is the best defense posture in Western Europe for a given investment, then almost any continued Franco-Allied collaboration has merit.

A number of thoughtful people have spoken out against allowing France to continue as a working partner on a selective basis.\(^6\) If the fourteen deny her this privilege, they must still face a number of critical decisions.\(^7\) Large expenditures will be required to reroute communication systems around French territory and to tie in the new military headquarters. NATO and American officials emphasize the need for an extensive new network for political-military consultation and control in crisis conditions.

\(^5\) Dean Rusk, *Crisis in NATO*, p. 342.

\(^6\) For example, the director of the Hudson Institute recommends that "between now and 1969, her [French] participation in any NATO activity not specifically defined in the NATO Treaty . . . should be refused . . . . All the 'peripheral' NATO activities such as the NATO Defense College, various political meetings, the Hague Defense Center, and the like should be restricted to the full NATO members with their roles enlarged." Herman Kahn and William Pfaff, "Our Alternatives in Europe," *Foreign Affairs*, July 1966.

\(^7\) It will be interesting to see if agreement becomes easier, as many expect, with the withdrawal of France. One criterion to watch is the Allied Mobile Force. A commentator has noted, "Perhaps because of French opposition, the NATO Council apparently has been unable to agree on a scheme for common funding of the AMF except for the minuscule headquarters." Fred S. Hoffman, "NATO's Mobile Forces," *Atlantic Community Quarterly*, Summer 1966, p. 247.
A complete new set of facilities including buildings, living areas, and a protected war headquarters will have to be constructed at the SHAPE location at Casteau, Belgium. Americans speak of asking other members of the fourteen to share part of the expense of relocating the American line of communications and redeploying U.S. Air Force units from France to new areas in Central Europe.  

This would require new interpretations of standing regulations. Hence one of the questions to be decided is whether the common-funding system -- either as it has operated in the past or in some new and amended form -- is the best way of operating in the future.

Whether NATO embraces fourteen or fifteen nations, a rocky road lies ahead for common funding. The purpose of this study is to collect and examine material on past experience as an aid to those who will be involved in the deliberations to come. Four lesser tasks of the study are: (1) to collect and organize unclassified and unrestricted data concerning common funding; (2) to determine from these data how the funding system has functioned in the past; (3) to analyze the strength and weakness of the system in the past; and, (4) to identify and evaluate the alternative courses of action open to the United States, when it comes to consider the future of common funding.

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8 A recent Congressional report concluded, "The committee believes that U.S. relocation costs [for forces evacuated from France] should be shared, to the maximum extent possible, by all the NATO allies and that the United States should not be made to pay more in the future simply because it has provided more in the past." An Investigation of U.S. Participation in the NATO Common Infrastructure Program, Report of the Committee on Government Operations, 89th Congress, 2nd Session, p. 26.
B. THE CONCEPT OF COMMON FUNDING

NATO allies have integrated their efforts more productively in common funding than in any other area of endeavor. During 1966, international headquarters, schools, and communication systems were financed from operating funds made available on a cost-sharing basis by all fifteen allies. Networks of airfields, pipelines, and other facilities needed by the composite military forces have been constructed under the NATO infrastructure common-funding principle. Subsidiary organizations of NATO have produced a number of weapons, such as the Hawk air defense missile, for general use. True, the scope of these programs suffers by comparison with the over-all defense activities of the members, but it does represent a significant dedication of resources to meet common objectives.

The common-funding experience has proved that some cooperative undertakings can be managed on an international basis; the system has provided many needed items that would otherwise not have become available. This does not mean, however, that all military requirements having commonality are suitable for financing under international arrangements; nor does it mean that the programs brought to fruition have progressed rapidly, smoothly, or efficiently. As usual,

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9Iceland does not participate in these cost-sharing enterprises. However, to avoid confusion with the now well-accepted designation of "the 14" as all the allies excluding France, we have already and will continue in this study to number Iceland among the participants. To be technically correct we should refer to all the NATO participants in the infrastructure as "the 14" and to the same group without France as "the 13," but the confusion that this nomenclature would cause is obvious.
opponents are inclined to exaggerate and supporters to minimize the deficiencies of common funding. In this study an attempt is made to assess the pros and cons without any predispositions for or against the system.

The reasoning behind common funding is simple enough. Given the vast disparity of wealth among the allies, it is only fair that major powers like the United States should contribute more to the operation of alliance institutions, like the NATO Defense College and SHAPE, than do smaller states like Luxembourg and Portugal. Moreover, if each country were expected to provide for the allied military requirement in its own territory, the total burden would be unfairly distributed. In a number of instances the load would exceed the national capacity, for some of the countries least able to finance these facilities (like Norway and Turkey) hold sovereignty over territory most appropriate for early-warning radar, airfields, and other installations used to protect the more remote countries.

Obviously, the unequal distribution of endowments -- including manpower and technical resources -- establishes a requirement for some type of community burden-sharing arrangement. But any such plan must involve contributions based on "ability to pay" and allocation of facilities according to need. The pitfalls are obvious: How is one's ability to pay to be determined and who is to define one's "strategic need"? We shall discuss this problem in Section VII, below.

Before proceeding to the history of common funding we must make several obvious but often neglected distinctions. A great number of cooperative ventures in the financial field have been handled outside NATO as bilateral or
multilateral contracts between nations. For a number of years the most impressive cooperative ventures were financed by the Canadian and U.S. Military Assistance Programs. In later years, the complex arrangement for German purchase of U.S. and British goods, to "offset" the imbalance of foreign exchange brought about by the cost of stationing troops in the Federal Republic, has resulted in a form of "common funding." These undertakings, though keyed to the over-all NATO plan for developing forces in Europe, have been directed and controlled by individual nations and have not been subject to corporate control by NATO. This study will deal exclusively with those projects in which there has been an element of international stewardship.

Let us begin by dividing the subject of common funding under NATO aegis into three parts: infrastructure, operating accounts, and consortium arrangements. The differences between these three types of funds will become clearer as we proceed. For the moment, let us stipulate only that infrastructure applies to capital investments for fixed military facilities, operating accounts apply to the running expenses for international headquarters, and consortium projects are those directed by semiautonomous bodies separate from the regular NATO governing agencies.

C. CATEGORIES OF COMMON FUNDING

1. Infrastructure

The largest and heretofore most important category, infrastructure, derives its name from a French term meaning the embankments, bridges, tunnels, and other structures
forming the bed of a railroad. Through 1965, the infrastructure of NATO had committed the allies to a program of approximately three and a half billion dollars.\textsuperscript{10} The student who is interested in the details of the infrastructure story should refer to Lord Ismay's comprehensive account of the early years of NATO.\textsuperscript{11}

At this point in the present study, we are primarily interested in the finances of the program and in any trends they may have shown through the years. These finances can best be summarized in chart form. The annual amounts committed to the infrastructure are plotted with a solid line on Figure 1, page 10. (Strictly speaking, these allocations, known as "slices" in NATO parlance, have not always coincided exactly with calendar years. However, since fifteen slices were approved between 1950 and 1965, we introduce only slight inaccuracies by considering each slice as the cost of a year's operations.)

As we have noted, the allocations for pooled infrastructure are meager in comparison with the over-all defense expenditures. (They are currently running at less than 0.2 of one per cent.) However, trends are important.

\textsuperscript{10} NATO Information Service, Facts About the North Atlantic Treaty Organization, Paris, 1965, p. 143. Throughout this study, infrastructure amounts, which are officially quoted in pounds sterling, will be converted to dollars at the rate of 2.8 dollars to the pound.

Curves are plotted to different scales

- GNP: 1 unit = 60 billion dollars
- Defense expenditure: 1 unit = 4 billion dollars (from January issues of NATO Letter)
- Infrastructure: 1 unit = 6 million £ sterling (from Facts about NATO, 1965)
- Operating accounts: 1 unit = 8 million dollars (compiled from Hearing Data)

Fig. 1—Value of total annual GNP, alliance defense expenditures, infrastructure, and operation accounts (1950–1965)
In order to help gauge the enthusiasm for infrastructure, we have also traced the course of yearly expenditures for defense purposes -- indicated by a dotted line and plotted to a different scale on Fig. 1. To further extend our trend analysis we have also shown by a broken line, to still another scale, the rise in the total yearly allied GNP over the same period. A comparison of these three profiles gives us an indication of the relative importance that the allies have attached to defense, on the one hand, and to common pooled facilities on the other.

The GNP line with its steady upward surge testifies to the remarkable recovery of the European economy and the steady growth of America's. The defense expenditure line is marked by a 1952-53 peak caused by the massive U.S. expenditures in the Korean War. It shows a sharp drop after Korea, followed by a gradual increase through the next ten years.

Infrastructure commitments follow a pattern different from either of the foregoing. After the 1952 peak, they level off (or recede) except for a slight bulge around 1957.\footnote{After the initial crash efforts, programs were approved in advance for four-year periods. NATO officials state that there have been significant differences between the figures published by NATO for programs being planned, and the ultimate annual expenditures, which are never publicly released. The graph in Fig. 1 is constructed from the only unrestricted information known to exist: Aspects of NATO, p. 14; WEU Document #215, p. 129; Facts About NATO, p. 129; Washington Post, September 8, 1966.} (The infrastructure history is covered in detail in Sections II, III, and IV.)
2. Operating Accounts

Operating accounts have been in existence since the first element of the international structure was established. They became important on the activation of SHAPE headquarters in 1951 and grew larger as the international military structure developed. Operating accounts provide for a wide variety of activities which, though each is located in one country, perform services for the community as a whole (e.g., the activities of the SHAPE Technical Center at The Hague, Netherlands).

The growth of the operating fund is indicated by the dashed line on Fig. 1. It should be noted that the scale used is approximately twice that used for the infrastructure fund. As can be seen, the cost of running common NATO institutions has grown as the institutions have developed. If the allies should decide to operate a portion of the gigantic NATO Air Defense Ground Environment (NADGE) system as a community project, the operating accounts would indeed become the most prominent of the common-funding ventures.

3. Consortium Arrangements

NATO consortium arrangements make up such a motley collection that it is impossible to tabulate total expenditures in any meaningful association.\(^ {14}\) Consortium endeavors

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\(^ {13}\) The present annual budget of the SHAPE Technical Center runs at approximately $2,750,000. *NATO's Fifteen Nations*, August-September 1964, p. 84.

\(^ {14}\) NATO officials point out that these should more precisely be designated NATO Production and Logistics Organizations (NPLOs) rather than consortia. The term consortia, they suggest, should be reserved for the commercial combinations generated by the governmental bodies. We shall discuss this in Section VI.
have been oriented toward two functions: production of equipment and logistics. More than half a dozen production consortia have been organized since 1956, each with a different composition, for the purpose of manufacturing aircraft and other weapons for the allies. No official figures are available that would allow us to assess the magnitude of these enterprises. In the logistics field, the NATO Maintenance and Supply Organization (NAMSO) and the Central Europe Operating Agency (CEOA) for the NATO POL pipeline are the two major institutions. The new NATO Missile Firing Installation (NAMFI) on the island of Crete will be operated by an association of user-states. We have little information about how this group will be organized, for it has been announced that operation and maintenance costs will be distributed among the partners in proportion to the amount each one uses the facility.

The data covering the financial activities of the consortia indicate that their activities reached a peak around mid-1964. The logistical agencies have been fairly constant in their level of operation. Large increases or decreases in consortium activity depend on the pace of the production agencies. The greatest of these, the F-104G Starfighter project, which produced about 1,000 aircraft for four European nations, reached its zenith in 1964 and production has now been completed. Though opportunities for large-scale production of modern weapons seem to abound, no follow-on action comparable in scope to the F-104G program has been planned.
D. THE COMPETING PHILOSOPHIES

The story of common funding illustrates better than any other the running conflict of opposing philosophies encountered in NATO since its inception; the conflict is as unresolved today as it was in the beginning. In essence, the contest shapes up between one school of thought known as "integrationists" and another school that we shall call the "nationalists." The division here is more one of personal attitudes than of country positions. The integrationists regard the consolidation of financial and economic activities as an end in itself, desirable not only because it would provide cheaper and more standard equipment and facilities, but also because it would represent a natural step and a helpful precedent in the evolution toward a highly interwoven alliance.\footnote{For example, Timothy Stanley has said, "But if NATO is to move forward institutionally, it may be necessary to evolve in the direction of international control and disbursement of funds." \textit{NATO in Transition}, Frederick A. Praeger, Inc., New York, 1965, p. 362.} The nationalists, who profess to be equally interested in procuring cheap and standard equipment and facilities, have pointed to the difficulties of international direction, many of which they believe to be irremediable.

In the formative years of NATO the integrationists suffered one rebuff after another. Dr. Robert Jordan, in his study of the embryonic stage, documents the optimism of many of the early integrationists. They believed that NATO would soon coalesce into a supranational directing mechanism with sweeping powers in the military and economic
fields. For instance, in his section dealing with the coordinated production of defense weapons, Jordan speaks of the philosophical beliefs of the two early directors: "Both the Defense Production Coordinator [an American, Mr. William R. Herod] and his Chief of Staff [British Lieutenant General Sir Ernest Wood] originally had favored strongly the establishment of a common defense budget of NATO. . . ."  

16 According to Jordan, Mr. Herod resigned in 1951, less than a year after taking office, when he found that nations were unwilling to accept the decisions of his office and when it became clear that his agency would not be the control mechanism for an international syndicate to take orders, design weapons, let contracts, and distribute production.  

In the early days of NATO, many aspired to the wholesale integration of logistics and supply systems. Some advocated extending the principle of integration even beyond the concept of consolidating systems and sharing equipment already in existence and called for the establishment of an international pool of funds to finance common research and development of future weapons.  

17 The wave of enthusiasm for integrated financing reached its high water mark in 1954. Many considered the European

17 Ibid., p. 383.
Defense Community (EDC) proposal, which grew out of a French plan for an internationalized army, to be the only acceptable solution for the defense of Western Europe. The real impact of EDC did not lie, as many supposed, in mixed-manned combat units. (Troop units of 12,000 or less would still have been made up exclusively of the nationals of one country.) The significant innovation of EDC would have been the consolidation of all continental defense establishments -- plus the amalgamation of the financial structures needed to support the military forces. The proposal called for a single defense budget for the regional armed services, to which each continental ally would contribute its share. From this pool would be drawn funds to pay the troops, buy their uniforms and equipment, and build the facilities they needed.

When EDC was repudiated by the French National Assembly in August 1954, the allies went through their "agonizing reappraisals" and decided to admit Germany to the coalition and allow her to rearm under the supervision of the Western European Union. Equipping and supplying armies would remain the responsibility of the separate national authorities. Thus, the concept of common ownership -- or common funding under supranational direction -- was rejected, and integration suffered a grievous setback. NATO was forced to continue to rely on the infrastructure, operating accounts, and ad hoc consortia. As we will see, this meant that ultimate decisions were to be left in the hands of national authorities.

The advocates of wider use of community funds have not been dismayed by this setback. Periodically the NATO Parliamentarians, an unofficial body of representatives
from legislatures of the member nations, pass resolutions calling for expansion of common-funding practices (e.g., for complete support of the "Allied Command Europe Mobile Force"). Private but influential observers also continue to make the case for greater combined efforts. One of the most eloquent has been Alastair Buchan, who argues thus:

But as this decade advances, every missile site in Italy and every radar station in Norway will become as vital to the defence of Britain or of Canada as they are to Italy and Norway themselves. No one would wish to saddle NATO with large-scale ownership of the means of deterrence and defence, but the number of projects that serve an Atlantic . . . purpose is expanding so rapidly that there is a strong case for seeing if the concept of common ownership cannot be broadened. . . . Mobile-based missiles, vertical take-off aircraft, warning, guidance, and anti-submarine systems -- come to serve more and more a hemispheric and less a national function.19

Nor has the integrationist's ardor been quenched by the French disengagement. On the contrary, some, like the recent U.S. Ambassador to NATO, call for a new order of consolidation among the fourteen. Mr. Finletter would not be satisfied with the same old kind of procedures, meetings, and debates. He feels the allies must "put new power into NATO."20

It is necessary at this point to deal briefly with the methodology of combined effort. Collaboration among several nations can be accomplished by two very different

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20 Thomas K. Finletter, Crisis in NATO, p. 128.
methods: either by voluntary adjustment or by mandatory direction from an international agent.  

Voluntary collaboration can be of two kinds. One type of arrangement, frequently called "associative," allows a nation to join or abstain from a common venture, but does not allow it to prevent the others from proceeding with joint action if they so desire. A second, more rigid system is based on the principle of unanimity under which one member can veto corporate action by the remainder. Most NATO common-funding ventures fall into this category. Unanimous consent is required to disburse funds from the infrastructure or operating accounts. In consortia, all participants agree on financial matters before any action is taken.

Mandatory direction scarcely exists in NATO, at least not with the kind of authority exercised by national governments. No international official is empowered to allot financial responsibility for a project among nations, to order action to be taken that will result in expenditures by nations, or to disburse funds from common accounts without the general approval of national officials. Some hierarchical officials such as the Secretary General, SACEUR, or the General Manager of a consortium can expend funds within their previously-approved budgets for day-to-day

\footnote{I have discussed this matter at length in my Studies on NATO: An Analysis of Integration, The RAND Corporation, RM-5006-PR, August 1966.}

\footnote{It makes no difference to our conception of the system that there is no actual "pool"; credits and debits, with accommodating payments where necessary, are handled bilaterally between nations. No country's infrastructure account is in arrears.}
activities, but even these limited expenditures are closely supervised by watchdog committees of national representatives. Hence, the monetary powers of hierarchical agents are confined to minor administrative matters. On major policy questions they act as advisors.

The discretionary authority granted to hierarchical agents becomes greater as the size of the agencies that they administer increases. At present, international ownership and direction is confined to a few headquarters and their appurtenant equipment. The most expensive item of community property is the ACE-HIGH communications network. There is no "common ownership" of weapon systems. Indeed, even the infrastructure facilities, which were built with community funds, apparently "belong" to the country in which they are situated, although some are subject to residual value negotiations as they come to exceed requirements. Weapons produced by NATO consortia become the exclusive property of the country that buys them.

There is an order-of-magnitude difference between the concept of "common ownership" of alliance property and a "collective effort" to build things that will be owned and operated by the individual nations. "Common ownership" requires tight political, military, and economic integration; it demands a high order of subordination to international authority. Someone has to shape the common policy -- for example, some international authority must decide whether or not to redeploy community weapons from one country to another -- and nations must acquiesce or the system will crumble. The phrase "collective effort," however, can be used whenever two or more nations have parallel interests that can be achieved more effectively by working together.
under whatever limited conditions are mutually agreeable. But for some equipment for headquarters and the agencies, NATO common funding has been confined to the "collective effort" category. "Common ownership" on a larger scale, which would involve supranational concepts out of keeping with the present atmosphere in the alliance, will not be considered in this study.
II. PRO RATA CONTRIBUTIONS AND PROCEDURES FOR MONITORING THE INFRASTRUCTURE

The infrastructure has been the largest and by far the most complex of the categories of common funding. Sections III, IV, and V will give a summary account of it.

A. PRO RATA CONTRIBUTIONS

The infrastructure program actually predated the NATO organization. The five Brussels Treaty powers recognized the need for common facilities as early as 1950 and they had already embarked on a program, later to be known as NATO's first "slice," before the principle of cost sharing had been adopted by the larger alliance. The story of these early days has been recorded by Lord Ismay and several others in interesting detail.\(^{23}\) Soon after SHAPE was established in the spring of 1951, SACEUR took over the responsibility for the initial formulation of the program. A large project for airfield and communication construction, known as Slice II, was pushed to approval in the fall and an immense, diversified program (Slice III) was accepted by the Defense Ministers at the Lisbon meeting in 1952.

Haggling over the division of costs became progressively less productive and more time-consuming. By April 1953, discussions about how to raise money to finance Slice IV had reached a dead end. The problem and its solution were described by Lord Ismay in the following

pungent words. Ismay was then Secretary General and head of the newly-created International Staff:

They dumped the whole problem in my lap, so I called in three assistant secretaries-general, and each of us drew up our own list of what we thought the percentage of sharing should be, and then we averaged them out. I couldn't for the life of me possibly say on what basis I acted, except I tried to take into account all sorts of things like the ability to pay and whether the building would be going on in a country so that it would benefit from the construction and the money spent.

Then we got into the Council meeting in April of 1953, and everybody around the table thought it was a jolly good distribution except for his own, which they thought was too high. Anyway we went round the table and finally got agreement of each to take what was given within 1.8 per cent of the total, and then we simply divided up that 1.8 per cent among the fourteen, and that's all there was to it. That's why all the shares are in those funny percentage amounts.24

Lord Ismay's tour de force set the pattern for sharing arrangements that lasted, with modifications, for more than a decade. Changes became necessary -- and welcome -- when the affluent Federal Republic of Germany was admitted to the alliance in 1955. Figure 2 lists the five different sets of percentage contributions by country that have been adopted by the allies. It can be seen that the substantial reductions in U.S. contributions in 1957 and 1961 were made possible largely by the commitments taken on by Germany.25

24 Warburton and Wood, Paying for NATO, p. 31.
25 The initial American contribution is sometimes given as 48 per cent, which was indeed the percentage pledged when Slice II was drafted in the fall of 1951. However, in 1960, the national representatives agreed to fund
### Figure 2

**THE INFRASTRUCTURE COST-SHARING FORMULA**

<table>
<thead>
<tr>
<th>Country</th>
<th>Slices I</th>
<th>Slices II to VII</th>
<th>Slices VIII to XI</th>
<th>Slices XII to XV</th>
<th>Slices XVI to XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>13.18%</td>
<td>5.462%</td>
<td>4.39%</td>
<td>4.24%</td>
<td>4.61%</td>
</tr>
<tr>
<td>Canada</td>
<td>--</td>
<td>6.021%</td>
<td>6.15%</td>
<td>5.15%</td>
<td>5.48%</td>
</tr>
<tr>
<td>Denmark</td>
<td>--</td>
<td>2.767%</td>
<td>2.63%</td>
<td>2.87%</td>
<td>3.07%</td>
</tr>
<tr>
<td>France</td>
<td>45.46%</td>
<td>15.040%</td>
<td>11.87%</td>
<td>12.00%</td>
<td>13.16%</td>
</tr>
<tr>
<td>Germany</td>
<td>--</td>
<td>--</td>
<td>13.72%</td>
<td>20.00%</td>
<td>21.86%</td>
</tr>
<tr>
<td>Greece</td>
<td>--</td>
<td>0.750%</td>
<td>0.87%</td>
<td>0.67%</td>
<td>0.65%</td>
</tr>
<tr>
<td>Italy</td>
<td>--</td>
<td>5.681%</td>
<td>5.61%</td>
<td>5.97%</td>
<td>6.58%</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>0.45%</td>
<td>0.155%</td>
<td>0.17%</td>
<td>0.17%</td>
<td>0.18%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>13.64%</td>
<td>3.889%</td>
<td>3.51%</td>
<td>3.83%</td>
<td>4.23%</td>
</tr>
<tr>
<td>Norway</td>
<td>--</td>
<td>2.280%</td>
<td>2.19%</td>
<td>2.37%</td>
<td>2.59%</td>
</tr>
<tr>
<td>Portugal</td>
<td>--</td>
<td>0.146%</td>
<td>0.28%</td>
<td>0.28%</td>
<td>0.30%</td>
</tr>
<tr>
<td>Turkey</td>
<td>--</td>
<td>1.371%</td>
<td>1.75%</td>
<td>1.10%</td>
<td>1.10%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>27.27%</td>
<td>12.758%</td>
<td>9.88%</td>
<td>10.50%</td>
<td>10.42%</td>
</tr>
<tr>
<td>United States</td>
<td>--</td>
<td>43.679%</td>
<td>36.98%</td>
<td>30.85%</td>
<td>25.77%</td>
</tr>
</tbody>
</table>

*This formula replaces the shares previously applied in Slices II, III, IVa and IVb to VII. The figure is compiled from data in Facts About NATO, 1965, p. 137, and Exhibit 1, An Investigation of U.S. Participation in the NATO Common Infrastructure Program, Report of the Committee on Government Operations, 89th Congress, 2nd Session, p. 37.*
We need not take time here to describe the vigorous discussions that have preceded each recommitment to a four-year program. Negotiations bogged down for nearly two years when it came to making authorizations to carry on after Slice XV. The most controversial aspect was injected by the Americans, who insisted on substantially reducing their percentage. This aroused opposition because the portion dropped by the United States had to be picked up by some other nations and Germany was no longer willing to bear the brunt of the increased European load. A provisional program was finally accepted to tide the alliance over through 1965 until a more permanent arrangement could be worked out.

Negotiations dragged on into 1966; agreement was finally reached in January only a few weeks before President de Gaulle announced the withdrawal of French troops from integrated commands and asked the allies to evacuate infrastructure installations on French soil.\(^{26}\) Under the new formula, the United States' share was reduced from 30.85 to 25.77 per cent; France raised her contribution from 12 to 13.16 per cent. The new sharing arrangement was to apply retroactively to 1965 and extend the program forward four years through 1969 (Slices XVI-XX). The

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allies agreed to a total authorization of $635 million for that period (an average of $127 million per year).²⁷

B. PROCEDURES FOR MONITORING THE INFRASTRUCTURE

It is surprising that anything so simple in principle as the infrastructure should be so complex in implementation. Most of the complexities, however, become readily understandable as one examines the record. Indeed, an analysis of the infrastructure provides a good starting point for understanding the problems of international collaboration.

Infrastructure expenditures have been confined largely to fixed facilities such as airfields, pipelines, and missile sites. At first it may seem incongruous that the partners have agreed to establish a common fund to build sites for guided missiles but have only infrequently been able to solve the more important task of combining their efforts to build the missiles themselves. Two facts explain this anomaly. First, one of the prime purposes of the infrastructure was to share the burden of building in one country facilities that could be used by others; if infrastructure funds could have been used to purchase mobile equipment, major contributors like the United States would have preferred to build, buy, and operate these items themselves instead of contributing to a common pool.²⁸ Second, the major contributing nations wanted to make sure that the installations they financed were employed solely for the

²⁸Several exceptions to this general rule have been granted, however, including mobile war headquarters and tactical airfield equipment.
purposes intended; mobile equipment, such as missiles or aircraft, could be too easily diverted to other uses.

The infrastructure process depends on an intricate relationship between the international military and political agencies and what is called, appropriately enough, the "host" country -- that is to say, the country where a facility is located. Often the facility is occupied by the forces of another nation, called the "user." Of course, one country can be both host and user. Furthermore, in theory at least, infrastructure facilities are built for the common good and thus are available for use by all allies.

Infrastructure regulations restrict the use of funds to capital costs; once a facility has been built it is no longer eligible for infrastructure money and must be maintained and operated by other means.\textsuperscript{29} Prime responsibility rests on the host country for maintenance and operation, but the host is free to make contractual arrangements with the user country or countries.

The organization for monitoring the infrastructure is an integral part of, and cannot be understood in isolation from, the over-all NATO governmental system. On the assumption that the reader is familiar with the fundamentals of NATO organization, we shall touch only the high points of the management of common-funding activities; even so, the reader who is not concerned with the internal

\textsuperscript{29}Under a "restoration formula," too complex to describe here, many items may be rebuilt at infrastructure expense after what is presumed to be a normal lifetime. The assumed life varies, of course, according to the type of equipment.
administration of NATO will probably prefer to skip the next five pages. 30

Infrastructure activities divide readily into those dealing with planning and approval and those dealing with implementation. Figure 3 outlines schematically both phases of the system. To the left of the break on Fig. 3 is depicted the planning and approval routine, which is described by the official brochure in the following terms:

At the outset, the subordinate Military Commanders notify their Supreme Commanders of the infrastructure work required in their areas. The Supreme Commanders then coordinate these requests after satisfying themselves that the projects proposed are essential for the support of their forces and that they are suitable for common use. During the preparation of these programmes, the Supreme Commanders consult the experts of the NATO International Staff to ensure that the cost estimates are reasonable, that projects are technically sound and that military requirements are being met at minimum cost to NATO.

The programme is then sent to the Standing Group and to the Infrastructure Committee of the North Atlantic Council. The Standing Group examines it from the point of view of military necessity and urgency and submits its comments to the Military Committee. The Infrastructure Committee examines it from the financial and technical point of view to ensure that the proposed installations are for common use and therefore qualify for common financing. The final reports from the Military Committee and the Infrastructure Committee are then submitted

This chart is a schematic condensation of the complicated presentation on page 139, FACTS ABOUT NATO. An even more detailed picture, to include internal U.S. processing, is contained in DOD Directive 2010.5, Aug. 31, 1966, Washington, D.C., entitled DOD PARTICIPATION IN THE NATO INFRASTRUCTURE PROGRAM.

Fig. 3—The infrastructure process
to the Council and considered simultaneously for approval, which automatically commits the member countries to the resulting financial contributions on the basis of agreed percentages.31

The reader referring to Figure 3 can follow the route of infrastructure action with the solid lines and arrows. The dashed lines imply cross-coordination between agencies. The planning and approval process normally takes twelve to fifteen months, if everything goes well. If the project involves innovation or controversial issues, approval can take much longer.

Once approved, the responsibility for implementation is transferred to the host country. (See right-hand portion of Figure 3.) The host must decide the exact location (in consultation with the military authorities) and draw up plans for construction. Then a new set of cost estimates (type B) based on plans approved by military authorities must be submitted to the International Staff (type A estimates are approximate and can be made before a specific site has been selected).32 Approval for commitment of funds resides with the Payments and Progress (P&P) Committee, which, like the Infrastructure Committee, is composed of a representative from every nation and depends on unanimous consent.

31Aspects of NATO, pp. 14-15. (N.B.: The Standing Group was dissolved on July 1, 1966. Its functions have been taken over by the internationalized section of the Military Committee.)

With P&P Committee concurrence the host nation may then solicit bids for the work. A complete explanation of the rules of International Competitive Bidding (ICB) would itself require a separate treatise. The object, of course, is to give interested contractors from every country an equal chance to engage in infrastructure work, no matter where the installation may be located.

One can readily understand from the foregoing why the more complex infrastructure projects amble along at a snail's pace. One should note, however, that noncontroversial projects whose eligibility has already been determined can be carried out as rapidly as any purely national endeavor. Even where eligibility is not assured, or when a program has not been approved for funding, a nation may "prefinance" on its own responsibility and, by notifying the P&P Committee, protect its right to reimbursement when infrastructure financing is later considered.

To simplify the explanation we have omitted reference to coordination with user nations or to the inspections required by international authorities. No one denies that the infrastructure program moves slowly, but there seems little likelihood of streamlining the process. Lord Ismay, on his departure in 1957, reported:

It has sometimes been said that the construction of common infrastructure projects are [sic] too slow a business. As to this it must be borne in mind,

first, that a very large number of authorities are involved in almost every transaction -- the host country, the user country, the North Atlantic Council (working through the Infrastructure Committee, the Payments and Progress Committee, and the International Staff), the Standing Group, the Supreme Commander and the subordinate commanders;
secondly, that the installations are generally highly technical and of considerable variety and that they must in all respects be up to the standards required by the military; thirdly, that installations have to be set up in 13 different countries; and, finally, that, if NATO is to get full value for money, the most thorough check and crosscheck and the most drastic screening and pruning are essential at all stages.

Every effort has been made to simplify and speed up these processes, but even so the Infrastructure Committee and the Payments and Progress Committee are in almost continuous session.³³

Lord Ismay's pessimism stemmed, not from any innate conservatism, but from a recognition that nations would balk at an attempt to eliminate any step from this procedure. Each step represents a safeguard that some nations -- predominantly the heavy contributors -- wish to retain in the procedure. If streamlining is precluded, the only possibility of speeding action is to expedite the approval at various stages; this will require that balky nations be persuaded that it is in their interest to push ahead more rapidly. To judge the likelihood of success in compressing the schedule we must look at the kind of programs that have been conducted in the past and estimate whether they will be continued into the future. This is the task of Section III. In Section IV, we shall go on to investigate time-phasing.

III. COMPONENT INFRASTRUCTURE PROGRAMS
AND THEIR STATUS

The infrastructure adventure has been conducted under nine major component headings -- each with its individual problems and requirements, and each implemented on a different time schedule.\(^{34}\) Some parts have been completed, others are phasing out, and some will continue with renewed emphasis into the future. To judge how much of a project has been completed and how much remains to be done, one should have a finite statement of the original requirement. For the infrastructure, such statements are rarely available even in classified form, for two reasons: first, military requirements are debatable; and second, no clear line has ever been drawn between what should be a national responsibility and what should be paid for from the common pool. For a rough estimate of completion status, however, the crude indicators now available should suffice.

Figure 4 shows, by a series of pie-charts, the relative efforts that have been devoted to the different subsystems. The figure demonstrates the predominant position of airfields in the early phases, the consistent expenditures for signal communications, the large allocations for missile sites in the 1957-60 period, and the latter-day prominence of NADGE.

As we turn to the component programs the reader should be warned that one encounters difficulty in reconciling

\(^{34}\) In the last few years some of these categories have been subdivided so that there are now 13 official programs.
These breakdowns are cumulative for each of the periods shown. Since the sizes of the programs differ, the three cannot be amalgamated without scale adjustments. These charts have been compiled from ASPECTS OF NATO, "Defense Production and Infrastructure", pg. 12; WEU DOCUMENT #215; FACTS ABOUT NATO; and various individual cross references.

Fig. 4—Distribution of effort by category (1951-1965)
infrastructure figures, even when working with official source material. Confusion is introduced by the habit of discussing agreed programs, authorizations, and expenditures interchangeably. The NAC considers broad general recommendations for various categories and approves in principle expenditures up to a certain ceiling; these are "agreed programs." The Infrastructure and P&P Committees, after a much more thorough scrutiny, "authorize" host nations to begin construction. Finally, the P&P Committee, after inspecting the work, concurs in the transfer of funds, which constitutes "expenditure." Some agreed programs are never fully authorized, and expenditures generally lag behind authorizations; all three classifications must be carefully segregated when making comparisons.

When the NAC approves a program, it does so on the basis of a preliminary estimate of cost, and this approval commits the member countries to supply the funds to pay for construction on the basis of agreed pro rata shares. The necessity for differentiating between agreed programs and expenditures can be appreciated when one understands that almost half of Slices XII-XV was voted in 1961 as a precommitment for the NATO Air Defense Ground Environment

35 For example, one of the most informative discussions of infrastructure is contained in WEU Document #215. Yet this pamphlet lists "total expenditures" for Slices I to XII (p. 130) when obviously the figures can only represent "agreed programs" or at best "authorizations" based on estimated costs. During this period infrastructure expenditures were averaging about 58% of authorizations. Hearings, Mutual Security Act of 1960, Committee on Foreign Affairs, House of Representatives, 86th Congress, 2nd Session, p. 599.
(NADGE). Full-scale installation of NADGE has not yet started. Consequently, some funds authorized in 1961 will possibly not be used until 1971. But even with this large amount held in escrow, so to speak, NATO authorities still had to raise money in 1965 for other purposes.

A. AIRFIELDS

As can be seen from Figure 4, airfields dominated the program in the early stages. The number available to NATO was increased from 15 in 1950 to more than 200 in 1963. Altogether, slightly more than a billion dollars, or roughly 30 per cent of all funds, have been allocated to airfields.

It is easy to imagine the problem that confronted international leaders in 1950. They needed a lot of airfields in a hurry. Unfortunately, they needed most of them in Turkey, Germany, and Norway, and none of these countries was able to come near meeting the requirements. General Norstad summed up the difficulties in this way:

We had to determine how many bases would be required and where they should be located. . . . We had to define an

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36 Partial implementation was begun, however, in 1965 when a group of nations were authorized to install the minimal facilities compatible with whatever system was finally agreed. Denmark, Germany, The Netherlands, Belgium, and Italy were allowed to commit a total of almost $27 million.

37 Statistics of this kind are used rather loosely and we shall not attempt great precision here. In Facts About NATO, 1962, we are told on page 127 that NATO airfields number "about 200." On page 129, the figure is given as "220."
airfield and decide how much would be constructed by NATO and what the user would have to provide. Then finally we had to decide how to finance these airfields. . . . All 15 nations had to agree on this.38

In retrospect, one wonders how the program moved as smoothly as it did. There were bound to be differences of opinion as to how many airfields each country should have, and of course there were wide deviations in the standards for airfield construction from country to country. Europeans felt American standards were far too lavish. Eventually, the common specifications agreeable to all nations were pared to the bare operational necessities (e.g., main runway, taxi and parking aprons, fuel and ammunition storage, operational and maintenance facilities).39 Anything over and above these essentials had to be constructed at the expense of the host or user nation. Even this arrangement worked some unfairness. The German Defense Minister pointed out that, because of the difficulties of acquiring land in the FRG, it was often necessary for German units to double up on one base. Where this happened, Germany got only one set of runways and operational facilities from NATO and had to build, at her own expense, two sets of all the other requirements.40


39NATO Information Service Press Release dated December 1, 1952, gives a list of the items furnished by NATO. Complete details are contained in a thick document called "NATO Standards for Tactical Airfields," now in the fifth edition.

Given the variations in soil conditions, accessibility of sites, terrain obstacles, and costs of labor and material, it would be meaningless to try to calculate a standard cost figure for a NATO airfield. For example, the administrative buildings at some airfields have been equipped with marble windowsills because this usually expensive material was locally cheaper than concrete.  

It should be instructive to learn whether the airfield program has been phased out because nations have lost interest or because the essential requirements have been met. One way to estimate the total requirement is to divide the NATO assigned aircraft inventory by the number to be stationed on each field. In 1960, NATO could muster about 5,000 tactical aircraft in Europe.  

We have been told that NATO plans call for the deployment of approximately twenty-five aircraft per airfield. At a rough calculation, some 200 airfields should be needed, and more than that number have been built.

Very little is known at this time about the nature and magnitude of the airfield requirement for the VSTOL fighters that may be produced in quantity by a number of nations in Europe.

B. SIGNAL COMMUNICATIONS

Signal communications -- a hybrid term combining the British and American designations for the function of

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41 NATO's Fifteen Nations, No. 2, p. 74.
getting messages from one place to another -- have been the second largest recipient of infrastructure funds. The money went to buy radio equipment (particularly the tropospheric and ionospheric scatter type which bounce their beams off the upper atmospheric boundary layers), land lines and submarine cables for telephone and telegraph, encoding and deciphering devices, and microwave relay circuits. Despite the construction of the ACE-HIGH command network, the bulk of NATO's communications load is still handled by the PTT's. The rental for these civilian telephone and telegraph lines still runs to more than $10 million per year.  

NATO had to start from scratch to put together a command and control net. In 1951, when General Gruenther first tried to call from Paris to the subordinate headquarters in Oslo, Norway, he was told it would take eight hours to get the call through and that the telephone circuit would be patched through the Soviet zone of Germany. In the southern region, jet aircraft had to be used for courier service to get messages between headquarters. When Turkey joined the alliance there were no circuits between Ankara and Istanbul; NATO installed twelve circuits, which are now used partially by civilians.  

44 Major General F. W. Moorman (former Chief Signal Officer, SHAPE), "Communications and Electronics in Allied Command Europe," NATO's Fifteen Nations, No. 16.  
45 Ibid.  
47 Moorman, "Communications and Electronics."
One major component of the present command network is called ACE HIGH. It links SHAPE and the subordinate headquarters by radio nets which operate on the tropospheric and ionospheric scatter principle. It cost approximately $75 million and consists of 80 stations. About 500 men are needed to operate the system.\textsuperscript{48} ACE HIGH represents an innovation in that it is owned and operated by SHAPE for the corporate alliance. A common language, English, is used throughout the system. Operators in each country are provided by the indigenous military forces, but trained at a community school at Latina, Italy.

Even though the infrastructure program has accomplished much in the communications field, there still remains a lot to be done, particularly in the realm of communications for discriminating command and control.\textsuperscript{49} Merely to replace the communications formerly channeled through France will be expensive, and new "tails" will have to be installed to link up with the SHAPE location in Belgium. It is reported that the United States, because of the difficulty of reaching from Belgium to southern Europe without installations in France, has suggested the stationing of a communications satellite in "synchronous" orbit at the cost of approximately $100 million.\textsuperscript{50}

\textsuperscript{48}\textit{Interavia, No. 8, 1962, p. 991, and NATO's Fifteen Nations, No. 17, p. 43.}


\textsuperscript{50}\textit{Washington Post, September 29, 1966.}
C. PIPELINES

POL, we are told, makes up more than half the bulk requirement for logistical supplies of the modern military force. To ease the load on an overworked transportation system, allied authorities decided to build pipelines from the main ports to the most likely fighting areas.

Altogether, about 5,300 miles of pipe have been laid at a cost of approximately $360 million. Individual lines and storage tanks have been built in Turkey, Greece, Italy, southern France, Denmark, and Norway. The major consolidated component, consisting of more than 3,000 miles of pipeline, 250 pumping stations, and numerous storage tanks, links the Atlantic ports of France with the main deployment areas of Central Europe.51

By 1965 NATO requirements for POL pipeline delivery systems had been met. It is possible, however, that aircraft redeployment and the denial of use of the pipeline across France might generate a need for a new main line from Low Country ports to junction points on that portion of the old system which does not lie in France.

D. WAR HEADQUARTERS

Most NATO headquarters are situated in exposed locations. Generally, for peacetime effectiveness, sites were selected near urban areas that could accommodate the workers. Obviously, these facilities would not survive in an atomic

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war, or even perhaps in the face of determined conventional bombing attacks. NATO authorities quickly drafted plans for alternate wartime locations, underground or otherwise protected and supplied with communications equipment that would withstand attack.

The program has progressed slowly, not because of lack of enthusiasm but because of the difficulty of hardening installations so that they can withstand modern weapons. The hydrogen bomb, whose properties became known to NATO in the mid-1950's, caused authorities to revise their specifications just as they were getting plans in hand for a large-scale construction program. Later programs have emphasized mobile facilities and deliberate duplication of essential equipment. Funds were released only for construction that seemed likely to offer protection against the most powerful weapons -- or for makeshift actions that seemed absolutely essential until more permanent measures could be taken.

Through Slice IX, approved in 1957, approximately $49.5 million (or two per cent) had been appropriated for this kind of construction. Larger amounts have been included in all later programs. It seems reasonable to assume that the construction of new war headquarters necessitated by the movement of SHAPE and AFCENT, plus the continuation of previously scheduled work (particularly the introduction of mobile, survivable equipment) will create a continued demand for expenditures in this category.

E. NAVAL FACILITIES

Behind the idea of a common program for naval facilities was the recognition that naval units operating far
from home -- like those of the U.S. -- would need forward facilities in time of war. It would not have been fair to ask the countries located in the forward areas to construct fuel storage tanks, ammunition depots, or overhaul facilities that would be needed by the forces of many other countries.

Through Slice IX, more than $224 million (slightly less than ten per cent) of the cumulative total was allocated for naval facilities. The high point was reached in 1955. Appropriations for this category have trickled off in the latest parcels. We can assume that the badly needed facilities have now been provided and that naval facilities will require no further significant outlays.

F. NAVIGATIONAL AIDS, RADAR, AND ELECTRONICS

Allocations for this category drifted along for several years at about five per cent of the annual authorization. Most of the outlays went for beacons, ranges, and other aids to aircraft. There were a few minor outlays to assist navigation at sea. Slice VIII, however, devoted twenty-three per cent ($62 million) to the procurement of long-range detection radar for the stations of the Early Warning System. 52

After this large one-time allocation, the appropriations again shrank until 1961, when the decision was taken

52 One article notes that the part of the system to be installed in Norway -- which comprises one-third of the total NATO border to the east -- cost about £64 million. NATO Letter, July 1956, p. 15.
in principle to build a NADGE of undefined cost and to commit for this task some $308 million from Slices XII-XV\(^53\) (forty-six per cent of the entire program for those four years). Later, in 1963, it was decided that this figure should be a ceiling.

G. TRAINING INSTALLATIONS

Funds have been authorized periodically to construct training installations for use by several nations. The item first appears in Slice III in the amount of $35 million, to be used to build four air training bases in the good-flying-weather regions of the Mediterranean.\(^54\) Some funds were also authorized to develop tank and infantry maneuver grounds.

It is difficult, from open sources, to follow the course of these funds. For several reasons, but principally owing to difficulties of land acquisition, only one ground-training area, Bergen-Hohne in Germany, was ever procured for NATO use and equipped with infrastructure facilities. Training airfields were built but, owing to difficulties in financing the operation of combined flying training schools, some fields reverted to national use. Others, like Decimomannu, Sardinia, now support a multilateral venture; it is used for gunnery and bombing training by units of the German, Canadian, and Italian

\(^53\) Former NATO Assistant Secretary General Johnson Garrett, NATO Letter, February 1965.

\(^54\) Ismay, NATO: The First Five Years, p. 124.
Air Forces.\textsuperscript{55} Solenzara, Corsica, is used by the combined forces of France, Germany, and Belgium.

In Slice IX, $13 million was allocated to start the construction of a missile-firing range on the island of Crete. The $37.6 million needed to complete the installation was appropriated in Slices X-XI.\textsuperscript{56} The range will be able to accommodate four missile battalions at one time and can handle all missiles with which European nations are equipped except the long-range Pershing. To date, although ten NATO nations have the Nike in their inventories, no missiles have been fired in Europe. The Crete range, which will be operational all the year round, will allow live practice without the lengthy trip to the United States.

In estimating the demand for funds for future training construction, one can say that the possibilities are almost unlimited. By necessity rather than design NATO nations are gradually standardizing their new equipment, at least the more expensive weapons. This makes combined training easier and more productive. Surprisingly, however, NATO has met with little success in putting together combined training programs. Future programs will need to devote funds for this function only in the event that the allies are able to increase their collaboration in the field of training.

H. SPECIAL AMMUNITION STORAGE

At the Heads of Government meeting in December 1957, the NATO Council decided to establish "stocks of nuclear

\textsuperscript{55}\textit{NATO Letter}, May 1963, p. 17.  
\textsuperscript{56}\textit{NATO Journal}, October 1962, p. 8.
weapons in Europe." The United States agreed to provide tactical bombs and warheads to be turned over to Europeans in case of war. But, by law, these weapons had to remain in U.S. custody until released by Presidential directive.

A system was set up, known as Special Ammunition Storage, under which small American detachments guard these weapons and keep them prepared for immediate use. To make the system effective, however, the weapons have to be stored near the combat units that would fire them in war. The European allies agreed to help defray the cost of keeping custodial detachments scattered through Europe by building the storage compounds with infrastructure funds. Significantly, they also agreed to provide barracks for custodial personnel -- the first time that troop accommodations had been charged to the infrastructure account. The recurring costs to the host country of fulfilling its commitment to guard these sites and to provide other services for them, such as transportation, far exceed the one-time cost of site construction.

The Special Ammunition Storage program does not look like a candidate for large outlays of additional funds. Nuclear weapons are already widely dispersed. In fact, technical developments such as electronic locking devices operated by remote control (Permissive Action Links) should make it possible to exert American custodial control with fewer people and facilities.

I. MISSILE SITES

As missiles have been introduced into Europe, replacing aircraft in certain instances, so the facilities to
support them have begun to take the place of airfield construction. An appropriation of $176.0 million was authorized in Slices IX to XI. Most types of missiles are eligible; funds have been allocated to construct sites for Pershing, Mace, Nike, and Hawk.

A typical Nike battery site will cost about $1,400,000, but in exceptional cases terrain features may cause the cost to rise as high as $2,100,000. With four batteries to a battalion, we can conclude that the $176 million appropriation will meet the bulk of the need but that some follow-up money will be needed in future slices.

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IV. THE PERFORMANCE OF THE INFRASTRUCTURE SYSTEM

Unfortunately, a mere survey of past projects leaves a lot untold about the infrastructure. We would like to know, for example, why these nine categories of construction were undertaken while numerous others were left to national auspices. We would like to know whether the older programs, which appear now to be running downhill, will be replaced with new and bigger programs. In short, has the infrastructure passed its zenith or has it, in the integrationist's terms, reached the "take-off" stage where it can sustain itself and grow even without outside pressure or assistance?

One indicator might be: Has the system become more efficient as the kinks have been ironed out? Efficiency depends on several factors. The most important -- performance in war -- cannot be evaluated. We may reasonably assume that infrastructure installations will hold up as well in war as would national ones.

Cost, another criterion of efficiency, has varied substantially from region to region because of diverse conditions of labor, material, accessibility, and general economic development. For this reason it would be meaningless to try to compare the cost of a European infrastructure installation with a similar item in the United States. In general, it must be acknowledged that the administrative machinery of international collaboration takes its toll; the infrastructure project tends to cost ten to fifteen per cent more than the same article built on a national basis. Rigid rules of procedure have been adopted
to prevent corrupt practices in letting contracts, to avoid elaborate or unequal standards in different nations, and to preclude slipshod workmanship. The program appears to have been remarkably free of abuses, extravagance, and shoddy construction.

Indeed, almost the sole complaint against the efficiency of the infrastructure has to do with its halting pace. Has the system improved as the procedures have been practiced and perfected? To study this question let us look at four major undertakings. These are not "typical" projects -- there is no such thing in the infrastructure -- but they will help us to develop broad classifications, or families of projects, which will assist our understanding of the problem. The four categories selected (primarily because more public information is available on them) are: airfields, early warning radar, pipelines, and NADGE. Bear in mind that we are interested here mainly in the timing of the program: How long did it take to get a project (or a representative portion of it) planned, approved, and constructed?

Airfields were programmed year by year. The open sources do not allow us to follow the history of each and every allocation, but we can get an impression of the rate of progress from the early days of the program. The first joint discussions took place in 1950, before Allied Command Europe was organized. Slice I included funds for thirty airfields.\(^{58}\) Twenty-one more (part new construction and part improvements to existing fields) were approved in

\(^{58}\) This synopsis is taken from Ismay, NATO: The First Five Years, p. 115.
September 1951 under Slice II. Eighty additional airfields were authorized in February 1952, and we are told that by the end of 1953 eighty new airfields had been made available to SACEUR. This pace, say two and a half years from the time the program was introduced into NATO discussions until the fields were ready for use, compares favorably with the peacetime construction rate in any allied nation.

Open sources do not reveal when the suggestion was first formally introduced that NATO, as an entity, should procure and install standard long-range early warning radars to detect air attack. Discussion of the matter must have preceded the first allocation of common funds for radar to fill gaps in the existing national coverage (Slice IV, December 1952). The decision in principle to buy new long-range radar was made by the NAC in December 1955. At that time studies had already been going on for several years to determine the kind of radar to be procured. Not until 1959 was this matter resolved and the contract let. The system was reported to be in operation in August 1962. In summary, the timetable for early warning radar ran as follows: at least three years from inception to approval in principle, three and a half more years until the contracts were let, and

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60 See *NATO Letter*, July 1956, p. 15.
61 *NATO Letter*, July 1959, p. 27.
possibly three additional years until the system was completely installed.

Multinational pipelines, like airfields, were scheduled in several stages. We shall chronicle here the progress of the Danish project, which was the fastest. We are told that the concept was first suggested at the NATO headquarters in Fontainebleau in 1952. Construction was started in the autumn of 1953 after "basic standards and specifications had been worked out and agreed by all countries concerned." The first link in the Danish system was finished in 1956 and the entire network was in operation by late 1957. The Central European complex, conceived at the same time, was not completed until four years later. The Danish timetable breaks down as follows: from inception to approval, one and a half years; from approval to completion, four years.

The NADGE system has only recently been approved, so the implementation phase of our time schedule will be purely speculative. There are hints that the system was being investigated at least by 1958. We are told that a problem then under study at SHAPE Air Defense Technical Center (SADTC) included "developing a system of transmitting, processing, and using air movement information." Approval in principle for NADGE was conferred in 1961.

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64 Ismay, NATO: The First Five Years, p. 122.
when it was decided to set aside money in Slices XI-XV. Not until 1963, however, had divergent opinions been resolved sufficiently to bring the project up for formal approval. After some dispute, the specifications were agreed and a ceiling cost set on the project.  

After competitive bidding between rival commercial international consortia (initially there were three multinational concerns in the running), we are told, the NAC in June 1966 selected a group of companies headed by Hughes Aircraft as the single source provider. Assuming that satisfactory contracts can be negotiated with each country, procurement and construction can begin in the spring of 1967. The system could be operational in 1970. Roughly extrapolated, the schedule for NADGE looks like this: at least five years from beginning plans to approval in principle; approximately three years drafting specifications and awarding contract; another four years for construction.

The relative rates of progress on these projects become more conspicuous when we plot them on a time graph. On Figure 5 the horizontal axis represents calendar years from 1950 to 1970. Across the top of the graph we have drawn a dashed horizontal line, I-N, which contains the locus of points marking the dates when projects were introduced into the system. A second dashed horizontal line, A-P, midway up the vertical axis, represents the dates when projects were approved in principle by the NAC.

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Fig. 5—Comparative rate of approval and implementation of selected infrastructure projects
The third important locus of points, the dates when projects were completed, is plotted on the horizontal axis itself. The slopes of the lines indicate the relative speed of approval and implementation.

The reader will notice that the more recent programs have a more shallow gradient, which tells us that they have proceeded more slowly. This does not necessarily indicate a decreased vitality throughout all of the infrastructure. Some others among the more recent programs, such as missile sites and special ammunition storage, are known to have progressed at a pace more akin to that of the earlier airfields and pipeline enterprises. Unfortunately, not enough information about rates of progress has been released on these later programs to enable us to plot them. The later programs we have charted were more complex than the earlier ones.

The differences in rates of accomplishment between airfields and pipelines on the one hand, and radar and electronics gear on the other, come as no surprise to old NATO hands, who intuitively separate infrastructure projects into "complicated" and "uncomplicated" types, though there seems to be no universally accepted criterion for distinguishing one type from another. Some people distinguish between those involving several nations and those that can be handled by one host nation. Others make a distinction between "concrete" and "electronics" endeavors. 68

68 Former NATO Assistant Secretary General Johnson Garrett, NATO Letter, February 1965.
Our investigation suggests that speed is affected by (1) problems of land acquisition; (2) inherent complexities of the project; and (3) the number of nations associated in it. Land acquisition difficulties have centered in West Germany where laws promulgated after World War II severely curtail the right of eminent domain accorded to the federal authorities. The intense utilization of land in the FRG, coupled with the weak position of the government with respect to condemnation, has resulted in many years' delay in acquiring the territory for military installations.

"Brick and mortar" projects involve primarily earth-moving, pouring concrete, laying pipe, and working with local labor. No complicated equipment or rare technical skill is required. "Sophisticated equipment" is the term we shall use for projects involving early warning radar, communication gear, electronics, and calibration systems for target ranges. They require technical "know-how" to manufacture equipment or to construct the system.

Whether a project is of the brick and mortar type or the sophisticated equipment type seems to make more difference in the rate of accomplishment than any other factor. On the other hand, the number of nations intimately involved plays its part too, for we have noted that it took approximately four years longer to construct the same type of pipeline in Central Europe as it did in Denmark (though the former project was appreciably larger).

From the evidence before us, however, it can be said that the pace of achievement in NATO infrastructure projects has not increased as the machinery has been used. Owing to the increasing technical requirements of the later
projects, which also tend to become less divisible into national components, the work seems to be slowing down.

Advocates of a greater role for common funding have been encouraged, however, by a recent development: the relatively rapid passage of NADGE from agreement in principle to the selection of a specific system and a manufacturer (this phase was not segregated on Fig. 5 because comparative data are not available in the other cases). Normally, the allies can agree quite easily on the general outline of an installation they want but, when it comes to specifying operational and technical characteristics, they encounter interminable delays and often can reach no agreement at all. Until 1963, NADGE, the most complex "sophisticated equipment" ever contemplated, was booted about like its predecessors. Some nations insisted on operational conditions that swelled the project to gross dimensions; others clung adamantly to operational specifications that would require more of their manufacturers' equipment. 69

There have been other serious objections to NADGE. It is, in fact, only an advanced model of the SAGE system, already installed and discarded by the United States as

69 A British writer typifies the spokesmen for national positions. Writing at the time when, he says, NATO was contemplating a system to cost more than $800 million, he cites vulnerability to radar jamming as the main weakness. "It is fortunate, therefore," he continues, "that Britain already has the answer, for British scientists and manufacturers are now producing a more advanced type of radar which has remarkable power to overcome or produce [sic] jamming." "Letter from London," NATO's Fifteen Nations, June-July 1963, p. 40.
inappropriate for a nuclear ballistic-missile environment. American air defense technicians have had serious reservations about the usefulness of NADGE, though American strategic concepts did visualize a function for a European system designed primarily for conventional war. American experts also believed that SHAPE cost estimates were unrealistically low.

The United States, plagued with a serious gold flow deficit, was obliged to play the unpopular role of the pinchpenny. At the 1963 Defense Ministers' meeting in Brussels where the political authorities got down to the task of pledging funds for specific tasks -- Secretary McNamara insisted on holding to a firm ceiling of $308 million established by the NAC. Furthermore, the United States forced the allies to agree to a radical innovation: a stipulation that the American share of the over-all cost (30.85 per cent or approximately $95 million) would be spent through U.S. business concerns so as not to aggravate the American foreign exchange position.

Other nations, objecting bitterly to this stipulation, argued that "tying" contributions to domestic economies would vitiate the concept of common enterprises and turn the clock back to the days of separate national programs. The United States -- fortified in the knowledge that it was making a generous contribution to a system that would be installed wholly in Europe -- stuck to its position, and the other partners finally accepted the limitation. Each of them in turn, however, insisted that its industry get back in contracts what it had contributed. As a result, allocations of construction and equipment money will virtually match national contributions (U.S. 30.85%, U.K. 10.5%, etc.).
This American stipulation had the incidental -- but most significant -- effect of defusing the normally explosive arguments over technical specifications. In the past a country would often insist adamantly on operational characteristics and performance requirements that would favor types of equipment in the manufacture of which it excelled, in the hope of capturing the major share of the NATO contract. With each participant now guaranteed a specified percentage of business -- and unable to obtain a larger amount even if its equipment most closely met the NATO specifications -- the premium on obtaining technical specifications that would aid local businessmen disappeared. With rivalry among the partners greatly subdued, agreement to the SHAPE-sponsored plan in reduced form was quickly obtained.

This does not mean that NADGE has arrived safely in port. Technicians estimate the system may require as much as $60 million a year for operations and maintenance. Many host countries believe these expenses should be commonly funded, while the non-continental countries prefer that operations and maintenance be a host responsibility (with exceptions in the case of Greece and Turkey). Until this crucial debate is resolved, some countries may refuse to sign implementation contracts with the Hughes Aircraft Company consortium.

On the evidence at hand one cannot conclude for or against the infrastructure as a method of monitoring collective effort. It has been useful in the past, and it

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70 Armed Forces Management, July 1966, p. 158.
appears adequate for the programs now on the books, for which funds have been assigned. Clearly it has not reached the "take-off" stage in which nations are supposed to rush spontaneously to avail themselves of its benefits. Without some external stimulus it seems destined to run downhill.
V. STIMULI AND DISINCENTIVES AFFECTING THE INFRASTRUCTURE

As political scientists know, one has to probe behind the formal mechanism to find out what really makes governmental systems tick. Although the infrastructure concept is explained officially in altruistic terms as a means of providing for the common defense, one suspects that the desire for optimal defense is not the sole reason for its success in some ventures and its failure in others. If the best common defense were the only determinant, the infrastructure would undoubtedly absorb much larger sums of money.

The more one studies common funding, the more he realizes how greatly national interest enters into the process. Success depends on satisfying the desires of every group; even a single nation can disrupt community progress.71

71 The degree to which NATO adheres to the unanimity rule is a matter of controversy. See my RM-5006-PR (cited in the Preface), pp. 11-16. Some observers imply that one nation cannot block an infrastructure project. For example, a report by the Committee on NATO of the Atlantic Council of the United States, dated November 10, 1965, states: "There have been cases, however, in the financing of major infrastructure projects where the countries primarily concerned have reached agreement among themselves and proceeded without the agreement of others." NATO officials I have interviewed are unable to cite any occasions when infrastructure funds were used in spite of the active disapproval of a member. Undoubtedly, small contributing nations have on occasion abstained from disapproving some item in which they had little interest. They probably received some compensation. But never have deliberate vetos been overridden; in fact, much of the delay in setting up the infrastructure comes from the need to satisfy nations
Three basic factors work in favor of the infrastructure and one big factor militates against it. Working in favor of approval are: (1) the military value of the installation; (2) the economic benefits to the host country or to the country that manufactures the equipment, and (3) the advantages to the user nations. The prime difficulty working against the infrastructure is the fact that every nation has to pay some part of the cost of every project. This is keenly felt by the offshore contributors like the United States, Canada, and the United Kingdom, which get little or no home construction for their money, and by countries like The Netherlands, Denmark, and Belgium, which come out about even.

Military necessity underlies the entire process; the infrastructure was established to provide things needed by the military authorities. But military requirements can never be stated authoritatively and with precision, even in homogeneous national establishments. NATO authorities encounter a more difficult problem because their need for supporting facilities depends on the kind of war they plan to fight -- and NATO nations hold various concepts about the kind of strategy to be employed, the nature of the threat, the most likely location for attack, etc. A facility that strikes one nation as absolutely essential may be viewed with indifference by another.

on programs in which they are little engaged. The
Atlantic Council statement probably refers to ad hoc
multinational ventures growing out of infrastructure ac-
tivities, but funded separately, which we have designated
as consortia and will treat in the next chapter.
The skepticism that leads politicians to suspect military officials of asking for too much plagues the international organization as well. Mr. Stikker, the former Secretary General, has charged that the NATO generals try to cover themselves against every possible risk and consequently present "unrealistic" demands. 72

The complex technology of modern equipment and the need for universal participation throughout Europe provide some of the most persuasive arguments in favor of the infrastructure. No longer can each country go its own way by establishing its own communication channels, warning network, or air-weapon control system. To be effective in modern war, a system must be planned to cover all of Western Europe. Component parts must be standardized or compatible. Unless all countries join, the system either will not operate or will have gaps that mar its performance. The infrastructure formula has provided the best way for all nations to band together to install those sophisticated equipment systems that demand standardization and NATO-wide participation.

Working both for and against the NATO authorities is a question not found on the national scene: What military requirements should be budgeted from the national treasuries and what should be financed from international funds? We shall discuss burden-sharing in Section VII; for the moment, it is sufficient to note that normally some countries favor a program and some are against it,

depending on each nation's analysis of the costs and benefits expected.

Military necessity must be judged by both the international military authorities and the member nations. Any analysis of the system cannot overemphasize the fact that the national attitude toward military necessity is subjective. A program that appears absolutely essential to several flank countries may carry little appeal for those in the center. The latter, incidentally, contribute most of the European money.

The infrastructure receives considerable support from the potential "host" countries, on whose soil facilities would be built. Nations seek such facilities for a number of reasons. First, they have intrinsic military value. Since most infrastructure is immobile, each item becomes part of the permanent facilities of the host country. Infrastructure installations, whether they be airfields, pipelines, or telegraph links, eventually become part of the national capital inventory and can be used.

73 The matter of "residual value" to the host country will certainly be debated more fully in the future as a result of France's summary ejection of allied forces from installations built in France with infrastructure funds. The treaty arrangements covering this situation are classified. Americans and other allies have talked openly of seeking financial reimbursement for infrastructure facilities in France, but it does not appear that France is willing to make any compensation.

Knowledgeable American officials contend that basic agreements call for negotiations between the host country and the other partners to determine the "residual value" of facilities no longer required by the military authorities, but they have no comment about enforcement of compensation.
by national agencies or leased to other users with the consent of the other countries.

The economic appeal of the infrastructure probably tops all other incentives for the host country. The construction activity, financed for the most part by unrequired foreign capital, increases employment and demand for local goods. Of course, the host country has to ante its share of the infrastructure pot, but the percentage of non-European capital — recently thirty-one per cent from the United States and six per cent from Canada for facilities installed exclusively in Europe\footnote{With one minor exception: a communication center built at SACLANT Headquarters in Norfolk, Virginia. The total installation cost was $1.5 million, of which the United States paid 62\% and NATO paid 38\%. \textit{Atlantic Command News Letter}, March/April 1966.} — exerts a very persuasive influence. If the facility is occupied by foreign users, there will be a continuing external stimulus to the local economy. Some installations, like telephone lines and airfields, will serve a dual military-commercial use.\footnote{American Congressmen have complained that United States infrastructure payments have gone to finance construction of airfields now used by commercial carriers in Europe and they ask if the host country should not be required to reimburse NATO for a portion of the construction funds. The Department of Defense has taken the position that these countries should indemnify NATO only if repairs become necessary as a result of the wear and tear of civilian use. \textit{Hearings, Foreign Assistance Act of 1965, Committee on Foreign Affairs, House of Representatives, 89th Congress, 1st Session}, p. 713.}

The host country is obliged to make certain contributions that reduce its profit. It must obtain the land
(no trifling matter in heavily populated areas like Germany) and provide utilities like access roads, water, and electricity up to the installation boundary. Still, the net advantage of being "host" to infrastructure projects is attested by the vigor with which each country strives to get projects assigned to its territory. 76

Given the competitive desire of countries to have infrastructure facilities on their territory, the statement of a military need by NATO authorities becomes the departure point for an extended negotiating process. Often the distribution problem can be solved by elementary ground rules. For example, it may be decided that the fund will finance one missile site for each missile battalion that a nation "assigns" to NATO. Even then, countries that expect a greater than proportional return for their infrastructure contribution will normally prefer more elaborate facilities, while countries with only a few or no missile battalions will hold out for minimum standards. The need for pipelines or naval facilities, however, cannot be reduced to simple formulas, and here the recommendations of the central military authorities play a more important part in convincing the financial representatives to appropriate funds for these purposes. As we have noted, there is no provision for a country to abstain from a specific

76 Norway, apparently, is the only country ever to demur over an infrastructure proposal for her territory. When NATO sought to install early warning establishments -- which Norway would be required to man under the infrastructure formula -- national officials balked at assuming this responsibility. A compromise manning solution was arranged.
infrastructure project or to contribute more or less than its usual share. Pro rata shares are normally determined in advance for four-year periods and apply to all programs authorized by the NAC for that period. Lacking the flexibility to charge countries according to the benefits they receive, the central officials must seek trade-offs between programs so as to compensate a contributor who receives little benefit from one program by additional dividends from another.

Figure 6 shows how infrastructure construction has been spread among the nations. The hatched columns represent the percentage contributions made by the various countries; the blank columns indicate the percentage of the total infrastructure construction in each country. These comparisons should be considered only as indicative of the general trend. The impressions one gets from Figure 6 are useful because they do not always conform to what one might expect. First, it should be noted that the picture of German returns vastly in excess of contributions is misleading because of the unrecorded monies spent by Germany before she entered the alliance. These were occupation funds taken from the local economy by the occupying powers to build facilities they needed there. As we know, the FRG now subscribes more than 20 per cent of the input. Second, one sees that a relatively large

77 The figures are taken from the Dziuban article on NATO (NATO Journal, April 1962). They apply to allocations only through 1960. As far as I can determine, no later figures have been publicly released, but NATO authorities imply that the distribution in the later stages, with the exception noted for Germany, has followed this general pattern.
Fig. 6—Distribution of infrastructure construction by country (Iceland and Luxembourg omitted)
and affluent country, France, has been the chief beneficiary. While France has not profited percentage-wise as much as, say, Turkey, she has received back in construction on her soil almost twice what she has contributed. In absolute terms of money spent, she has received far more than any other country.

Third, and most surprising, is the fact that the small countries have not been recipients to the extent one would expect in a system that operates under the rule of unanimity. One might have expected that small members, each holding a veto power, would sell their consents dearly and thus receive payments out of proportion to their contributions. This does not appear to have occurred -- at least not across the board. Through the period shown on the chart, the United States and Canada together contributed some forty-six per cent of the input (this percentage is computed by dividing their absolute contributions to Slices I through XI by the total allied effort). One would expect to find the unrequited Western Hemisphere portion allocated primarily to these smaller countries. Turkey, Greece, and Portugal did receive far more than they gave; Norway received considerably more and Denmark slightly more. But in absolute terms the totals they received over and above their payments do not equal the United States contribution alone. Norway, Greece, and Turkey, being up front on the NATO flanks, could be expected to receive a great deal of aid from the other allies who would want to use their forward terrain for defensive purposes. Some small second-tier countries, such as Belgium and Holland, actually paid more into the pool than they got back in home construction. Italy and Denmark, both somewhat
exposed, do not appear to have unduly exploited their bargaining position.

Figure 6 tends to support the opinion that the distribution of infrastructure funds has been sound from the military standpoint. This does not mean that nations have been unselfish in their dealings; it means merely that individual efforts at self-aggrandizement have either cancelled each other out or neutralized each other to the point where impartial international advice could exert effective influence. France, as the geographical linchpin in the defense crescent -- the location of two of the four major international headquarters and an ideal site for tactical aircraft -- would be expected to receive the heaviest appropriations for war headquarters, communications, pipelines, and airfields. The Portuguese percentage return seems somewhat out of line with her military position, but the actual amount involved is trivial.

Apart from being host, nations may benefit also in their foreign exchange positions. In particular, the industrial countries profit by having their manufacturers sell goods and services to NATO for infrastructure installations. Without access to classified data, it would be difficult to compute the amount each nation has profited through this process. Even with the use of such data, the picture would still be clouded because NATO records would indicate only the prime contractor, whereas many American companies subcontract to European concerns for construction work, and European prime contractors often buy equipment from United States concerns. Calculations would be

\[78\] An advertisement by IT&T describing the ACE-HIGH system announced that ten different subcontracting
further complicated by the fact that many American firms have subsidiaries and affiliates in Europe.

The impression exists that the United States has profited more than most nations by selling equipment and services to the infrastructure. This has probably been true of projects involving sophisticated equipment, which is becoming more prevalent as brick and mortar construction wanes. Viewed in this light, the American decision to "tie" its NADGE contribution to domestic purchases -- which means that American industry will get no more than thirty-one per cent of the business since all other countries will hold out for similar allocations to their manufacturers -- would seem to be a magnanimous gesture aimed primarily at speeding the contracting process. Some American manufacturers have even complained about this policy and have argued that, under free competition, United States industry would have captured more than thirty-one per cent.

The third major interest behind the infrastructure -- the advantage to the user nations -- is often overlooked, particularly by Americans. Sometimes the alliance as a whole is the user; sometimes the host nation is the user; and often the facilities built in one country are used by the forces of another country. The fact that the United

79 Alastair Buchan, a sympathetic analyst of American policy, has said, "Yet with every contract having to go out to international bidding ... it was generally an American company which was in the best position to do the job."

States has been the most extensive user has unquestionably been a key factor in American acceptance and support of the infrastructure system. Of course, some Americans argue that it is only proper that Europeans provide facilities for American forces which are there at the request of the Europeans, in the role of protectors. Whether American forces are in Europe primarily to defend Europeans or to enhance American security is a subjective question that we shall not attempt to answer here. It does seem relevant, however, to point out the advantages that accrue to the United States as a user of infrastructure facilities. Contrast these facilities with the arrangements that must be made when American units are to be deployed overseas in non-NATO areas.

A precise survey of the number of airfields, communication circuits, pipelines, and naval facilities used by American forces (or programmed for potential wartime use) would call for a knowledge of classified material. But we can get a rough idea of the scale of American involvement by a simple deduction. We know, for example, that NATO aspires to deploy no more than one air force squadron to each base. Although American deployment has declined and shifted to the United Kingdom in recent years, the United States did at one time maintain more than thirty squadrons permanently deployed to Europe.

In addition to the permanent deployment of operational units, the United States Air Force kept logistical support detachments at other bases so that they could be used in case of war. It is known also that Americans planned to use bases in central Europe to disperse tactical forces in time of emergency. Without attempting to
calculate precisely we can estimate that the United States has been a permanent user of some 35 to 40 bases and a potential user of some 20 to 30 more. In other words, Americans were the full-time users of perhaps twenty per cent of the 200-odd NATO airfields and they had a potential interest in another fifteen per cent. 81

The Special Ammunition Storage program furnishes another example where the United States apparently uses more than thirty per cent of the total NATO facilities. When the program was instituted, European countries were so anxious to have nuclear warheads near their delivery vehicles that they were willing to construct the custodial sites and barracks for American troops at their own expense and no cost to the United States. The United States also needed a number of sites to support American nuclear delivery units. Construction of these sites was already well underway before it was decided to finance them through the infrastructure funds. 82 Presumably the American representatives who sponsored common funding felt that the United States either broke even or came out ahead in the common funding of storage facilities.

To finance the construction of these storage sites and airfields, the Europeans contributed $2 for every $1

81Other authors have noted the use-payment symmetry. Lt. Col. Emmett R. Arnold observes that the United States and Germany are the "two big users of common infrastructure, and their use approximates their contributions." "NATO Infrastructure: A Success Story," Military Review, June 1965.

of American money. Furthermore, the host country has donated the land and made available normal utilities. No direct premium or rental is charged for the privilege of occupying a base on another country's territory.

When one considers the arrangements required to construct bases in, say, Morocco, Spain, or Libya the advantages of the NATO infrastructure become more apparent. In non-NATO countries the United States usually has to buy land and pay all the costs for runways, housing, and other facilities needed to make the base operational. Frequently Americans have had to build utility systems. In Spain, for example, it was necessary to install a fuel pipeline across the country from the southwestern ports to the air bases in the northeast. These unilateral construction costs to the United States are in addition to quid pro quo arrangements for the right to construct and use facilities. Usually in the form of treaty obligations, direct grants, loans, or economic aid, compensation for the grant of rights is too complex to consider here, but it is known to have been extremely high in many cases.

It could be argued that the United States acquires some title to bases constructed in non-NATO territory, whereas the infrastructure bases clearly belong to the host nation. But if this argument is technically valid, it is meaningless in practice for, as we know, the Moroccan bases are no longer available, the Libyan base is used only under severe restrictions, and the rights to Spanish bases have to be periodically renegotiated.

Americans seem to be the pre-eminent "users" in most categories of infrastructure than can be broken down by nationality. More Americans will train on the NAMFI missile
range than persons of any other nationality. The Americans have used the Central European POL pipeline 35 to 39 per cent of the time that it has carried military fuel.

Some advantages of the infrastructure to the United States can be illustrated by the pipeline example. A gallon of fuel for American aircraft based in Germany might travel from a French Atlantic seaport as far as Metz through either the NATO pipeline or a wholly-American-owned counterpart. About 37 per cent of the initial costs and operating expenses of the NATO line have been shouldered by the United States. The unilateral American line has cost about $57 million. It was built and has been operated entirely at U.S. expense.

Regardless of the over-all equity of the system, as long as it exists, Americans stand to lose by not using it whenever possible to finance installations which they intend to build anyway and which are -- or could be made -- eligible for common funding. A recent DOD directive takes note of this fact and emphasizes that "in the interest of equity and alleviation of the U.S. balance-of-payments deficit, facilities required by U.S. forces in NATO should be qualified to the maximum extent possible for infrastructure cost-shared funding in lieu of unilateral funding by the United States." 83

One final reason why nations favor the infrastructure can be found in national and interest group attitudes towards the form of the alliance. Some nations, notably the United States, the Netherlands, and Germany, are more

"integration-minded" than others. Integration demands a more authoritative international structure. The processes of common funding place in the hands of international agents certain duties and privileges that strengthen their position vis-à-vis national authorities. New programs submitted to the NAC are drafted by SACEUR and carry his recommended priority rating as they progress up the chain of approval. International military authorities determine the geographical distribution of facilities, as SACEUR did the distribution of the 200 airfields. Finally, the ability to propose or oppose a program desired by a NATO country, plus the ability to set priorities and recommend allocation schedules, gives SACEUR useful bargaining material, and hence, indirectly, strengthens the cohesiveness of the alliance.

It can be seen that the infrastructure is primarily an exercise in balancing incentives and disincentives. Military necessity, host country incentives, and benefits to users must be carefully blended and distributed so as to present a program that interests all constituents. Fortunately, the very differences in interests and endowments among the allies, make it possible to work out programs that hold universal appeal. Some nations are wealthy users, some are impecunious hosts; others are more interested in the functional contributions of the infrastructure facilities. Just as a broker in a market transaction can convince both a buyer and a seller that the same transaction is profitable to each, so the international servant can often persuade each participant that an infrastructure project is, directly or indirectly, sufficiently beneficial to it to offset the cost. But, as one can imagine, this "persuading" process is not always an easy one.
VI. OPERATING ARRANGEMENTS AND CONSORTIA

The histories of operating arrangements and consortia -- and the procedures through which they are controlled -- are far less complex than those of the infrastructure. Yet each of these categories is important in its own right. Both are needed because the infrastructure is confined to the initial construction of fixed wartime facilities. The basic concept assumes that the host will pay the operating and maintenance expenses after facilities have been built with infrastructure funds. Yet some of the poorer host nations simply could not keep up all the installations on their territory even if these were built at infrastructure expense and donated to them. It would be unfair to ask them to do so.

NATO should also have some means of collaborating to produce moveable equipment. Several countries are unable to manufacture or buy the expensive modern mobile equipment they need.

A. OPERATING ARRANGEMENTS

Under the normal NATO formula the continued functioning of a piece of community property (such as an infrastructure airfield) becomes the responsibility of the user nation, which assumes the burden of upkeep, repair, and normal operating expenses. The host country shares in the responsibility but, according to the official in charge of the infrastructure, "no NATO project is built until the
eventual user country has been determined and has signified its readiness to be responsible for maintenance.\textsuperscript{84}

Complications are introduced when all partners, or a large number of them, are users of a facility -- or at least derive some collective benefit from it. This is true of any portion of the international military organization and many of the consolidated research and educational establishments run by the central apparatus. The obvious inequity that would result if the host nation were required to furnish all support for community facilities located on its soil (such as an early warning radar or an antisubmarine test facility) made it necessary to establish some other type of common fund.

This need was accentuated by a third restriction on the use of infrastructure funds: They are reserved for facilities that have a wartime mission. Hence the peacetime headquarters buildings that house SHAPE and the facilities for the NATO Defense College are not eligible for infrastructure funding.

\textsuperscript{84}Former NATO Assistant Secretary General Johnson Garrett, NATO Letter, February 1965, p. 7. As simple as this sounds, the arrangement has nonetheless given cause for some dispute. In the late 1950's the Americans were the exclusive users of a cluster of infrastructure airfields in eastern France. After several years the runways of these airfields deteriorated to such a degree that it became dangerous to continue to fly from them. The Americans argued that the host nation, France, should repair the runways. For one thing, they charged that the damage was due to failure properly to weather-seal the runways when they were constructed. The French, for their part, maintained that the damage was caused by excessive use and should be repaired by the occupants. The compromise involved a major NATO infrastructure airfield rehabilitation program.
Monies to finance these corporate activities are administered under what was formerly known as the "Military Headquarters and Agencies" account (now called simply the "Military Budget" or "Headquarters" account). The name hardly does justice to the wide variety of enterprises, listed below, which it supports.

SHAPE  
SACLANT  
Approximately two dozen subordinate headquarters of SHAPE and SACLANT  
Assorted communications agencies (e.g., Allied Military Communications, Equipment Committee)  
Military Agency for Standardization  

NATO Defense College  
Advisory Group on Aeronautical Research and Development (AGARD)  
La Spezia Antisubmarine Warfare Center  
SHAPE Technical Center at The Hague  
ACE-HIGH Communications System  
Latina Electronics School  
NATO Early Warning Stations

As with the infrastructure, the country in which a corporate facility or institution is located has been designated as the host (except, as we have already noted, for ACE-HIGH, which is so scattered that SHAPE has been assigned that responsibility). The host either donates or leases facilities to NATO (e.g., the United States provided free office space for the Standing Group and Military Committee; Italy leases certain facilities at Latina). But the corporate NATO structure normally pays for the operational activities and such administrative costs as light and heating. Thus

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85 The maintenance and operation of seventeen of the Early Warning stations and all of the ACE-HIGH stations, although generally speaking undertaken by the host countries, are common-funded through annual reimbursements to host nations from the military budget.
the host country in a Military Budget activity carries less of a financial obligation than it does under infrastructure.

Requests for funds for the Military Budget are processed in much the same way as those under the infrastructure account. Agencies to be supported submit yearly budgets and, if necessary, supplement these by special requests for funds.\(^{86}\) One body, the Military Budget Committee, handles both authorization of programs and approval of expenditures.

Although the procedures for approving headquarters funds have been much more simplified than those for the infrastructure, the deliberations over pro rata national contributions have been equally hard fought. The shares agreed to by each country as they applied through 1957 are shown in Figure 7. It will be noted that the American share of 24.2 per cent was 12 per cent lower than what the United States was contributing to the infrastructure at that time.

We have plotted above the substantial rise in headquarters funds from less than $10 million in 1951 to some $60 million annually in 1965. (See Figure 1, page 10.) This steady rise in allocations is even more significant when we compare them to those for the infrastructure, which have gradually decreased since 1952. The principal reasons for increased operating funds are: (1) reimbursement to continental countries for operation and maintenance of the Early Warning System and ACE-HIGH; (2) rising costs in Europe; (3) increased activity of the NATO headquarters (particularly in combined exercises); and (4) new systems

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\(^{86}\) For a breakdown of support costs for the different headquarters and agencies, see USRO Brochure, NATO Military Headquarters and Agencies Program, Office of the Defense Advisor, September 1961, p. 20.
Figure 7

INTERNATIONAL MILITARY HEADQUARTERS AND AGENCIES *

<table>
<thead>
<tr>
<th>Country</th>
<th>Per cent of cost borne under present agreements</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>24.20</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>19.50</td>
</tr>
<tr>
<td>France</td>
<td>17.10</td>
</tr>
<tr>
<td>Federal Republic of Germany</td>
<td>16.10</td>
</tr>
<tr>
<td>Italy</td>
<td>5.96</td>
</tr>
<tr>
<td>Canada</td>
<td>5.80</td>
</tr>
<tr>
<td>Belgium</td>
<td>2.86</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2.85</td>
</tr>
<tr>
<td>Denmark</td>
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</tr>
<tr>
<td>Turkey</td>
<td>1.65</td>
</tr>
<tr>
<td>Norway</td>
<td>1.15</td>
</tr>
<tr>
<td>Portugal</td>
<td>.65</td>
</tr>
<tr>
<td>Greece</td>
<td>.39</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>.09</td>
</tr>
<tr>
<td>Iceland</td>
<td>.05</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

This figure is taken from Hearings, Mutual Security Act of 1959, Committee on Foreign Relations, U.S. Senate, 86th Congress, 1st Session, p. 150.

*The 1966 adjustments to the percentages shown in Figure 7 were minor. Only the United Kingdom adjustment of 1.28 per cent downward changed more than one per cent.*
that have been created and turned over to the corporate structure for maintenance and operation. The headquarters budget will continue its upward surge in Fiscal Year 1967, soaring to $81 million. Undoubtedly, this trend will continue, albeit at a lesser rate, so that possibly in several years the headquarters fund may be calling for contributions of the same magnitude as those spent on the infrastructure.

The reasons that impel nations to support operating arrangements -- or to oppose them -- are similar to those we discussed in relation to the infrastructure. First, it is probably the only way that some activities can be carried out, for it is unlikely that one or two countries would finance an institution to serve all the partners. Second, it seems to be the most equitable arrangement, all things considered. Third, some nations particularly favor certain portions of the program and for this reason are induced to accept the over-all schedule. Of course, from an efficiency standpoint, these collective programs leave something to be desired. International red tape, much of which could not be eliminated, admittedly adds something to the cost and detracts from speed and efficiency. Member nations understand this aspect and willingly suffer minor

87 These figures are approximations. They have been computed by dividing the annual American contributions ($20.4 million in FY 1967) by the American pro rata share of 24.2 per cent. The American contribution is listed in Hearings, Foreign Assistance Act of 1966, Foreign Affairs Committee, House of Representatives, 89th Congress, 2nd Session, p. 272.
diseconomies for the sake of services that cannot be procured otherwise. 88

A look at Figure 7 discloses that some nations pay significantly less, percentage-wise, to the military budget than to the infrastructure (compare with Figure 2, p. 23), and that therefore others must contribute a larger percentage to the military budget. The United States percentages for 1964 were 24.20 and 30.85 respectively; conversely, the United Kingdom was assigned quotas of 19.50 and 10.50 per cent. As one might expect, these variances cause nations to take different views on the content of the two programs. In 1957 the allies found themselves unable to agree on a new four-year sharing schedule for the headquarters fund, primarily because some countries claimed the projected undertakings were better suited for

88 Some NATO enthusiasts seem to underrate the deficiencies of combined institutions. Col. Richard J. Stillman exemplifies this trait in writing about the NATO Defense College in the Air University Review, July-August 1966. He lists numerous weaknesses of the international educational institution: i.e., many students do not understand half the content of lectures given in either of the official languages; the administrative directorate and the faculty are extravagantly staffed; senior officers are over-solicitous of subordinates from other nations, which leads to lax standards of performance; and some nations, notably the United States, do not send top-notch students. In spite of these deficiencies, some of which defy remedy, Col. Stillman recommends a general expansion of the NATO military educational system in order to take advantage of the "associations" gained by mixing nationalities.
infrastructure financing than for budgeting as operating expenses (that is, they were primarily capital expenses). 89

As a consequence, the allies were forced to resort to a complex split formula under which expenditures up to an agreed ceiling would be paid under the headquarters schedule, but any amounts above that would be apportioned according to infrastructure quotas, which placed a heavy responsibility on a few countries. This arrangement, which caused United States assessments to increase rapidly once the ceiling had been exceeded, resulted in a substantial excess charge to the United States in 1964. American representatives, therefore, were satisfied with a slight increase to 25 per cent in the United States share for the 1966 reapportionment. They believed that the abolition of the split-ceiling provision would allow the United States to pay less in the long run.

B. NPLOs AND CONSORTIA

The impetus for nations to form themselves under NATO aegis into ad hoc cooperative associations stems again from the limitations placed on the infrastructure. In the first place some nations are more interested than others in collaborating to build defense weapons or facilities, to engage in certain supply or logistical functions, and to manage facilities built from infrastructure funds, that

89 Actually, there was some precedent for this view because the earlier headquarters budgets had been segregated into two categories, with the United States paying 45 per cent of the "capital" costs. Hearings, Mutual Security Act of 1956, Committee on Foreign Relations, 84th Congress, 2nd Session, p. 89.
are not equally attractive to all NATO members. Since there is no provision under the infrastructure arrangements for selective participation, nations must get together in separate ad hoc groupings if they have an interest in projects of limited appeal.

Often these selective groupings are incorporated under NATO auspices. Rules governing the operations of these associations are set forth in a document known as Regulations for NATO Production and Logistics Organizations.\textsuperscript{90} This document specifies that each NPLO, as it is called, shall be governed by a Board of Directors composed of one representative from every participating state, each with one vote. The Board of Directors may establish its own rules. The regulations provide that "the principle of unanimity shall, however, apply to all decisions having financial implications, regarding questions of general policy or concerning the approval of staff selections at the A.5 level and above."\textsuperscript{91}

The regulations direct each NPLO to set up an executive body consisting of a General Manager and his staff. The duties of the General Manager have to do with planning, drafting budgets, and implementing the decisions of the Board of Directors. At the time the regulation was written it applied to five specific agencies; since that time two more have been added and another one is in the offing.

In addition to establishing a NATO governmental agency (the NPLO), the allies have found it necessary in the past to contract with an industrial organization to conduct

\textsuperscript{90} North Atlantic Council Document C-M(62)18, NATO, unclassified, 28 April 1962.

\textsuperscript{91} Ibid., p. 11.
the undertaking. Sometimes they have made arrangements with a firm in the host country, but in most cases they have dealt with an international business consortium. Let us look briefly at each of the past enterprises.

1. Organization to Operate the NATO Pipeline in the Central European Region

We have already described the NATO POL pipeline system. Naturally all fifteen allies were not willing to stand the cost of operating a system that would service only eight members. (If one wonders why fifteen were willing to pay the construction costs for this system, at least part of the answer can be found in the compensating constructions in Norway, Denmark, Italy, Greece, and Turkey.) Consequently, in July 1957, the North Atlantic Council established the Central European Operating Agency (CEOA) to be located at Versailles. Although this agency is a subsidiary unit of NATO its association with the larger body is quite limited. NATO supervision is exercised mainly through the requirement for an annual report from the Board of Directors. The CEOA contracts with a French business corporation, which in turn employs about 1,000 workers and operates on an annual budget of $5 million. All but about ten per cent of this amount is recovered by charging commercial firms who use the line when it is not required for transporting military fuel; the remainder is obtained by assessments against the user nations.

92Handout from the Central European Operating Agency, dated February 3, 1964, NATO, unclassified, p. 5.
The principal dispute about pipeline policy arises from that old allied bugaboo, varying national interests. The major user, the United States, wants to take in more revenue by renting the pipeline more frequently to commercial firms. There is still unused capacity, because the pipeline was designed to meet a huge wartime requirement that far exceeds peacetime military needs. The United States, whose share of the annual operating deficit (payment based on actual use) has recently been reduced from thirty-nine to thirty-seven per cent, would prefer to see the pipeline operated at a profit. The owners -- that is to say those countries in whose soil the pipeline is buried -- are reluctant to agree to the expanded civilian use because it would bring the NATO facility into competition with commercial carriers. Naturally governments must pay some heed to local interests (rail, barge, truck, and pipeline) which resent government competition in the business of transporting fuel.

As far as is publicly known the future of the CEOA is up in the air at this time, for the major portion of the pipeline runs through France. Paris made it clear to Washington in its memorandum of March 10, 1966, that the United States would have to negotiate new arrangements for use of the unilateral petroleum pipeline across France. No mention was made in this memorandum of the NATO pipeline, though the latter seems to be one of the items that France may be willing to continue. The governing mechanism of the CEOA is believed to fit the French conception of the sort of cooperative association that NATO should sponsor.\textsuperscript{93} The stumbling

\textsuperscript{93} See my RM-5006-PR, cited in the Preface.
block might be the unwillingness of the other fourteen partners to place dependence on a vital facility that might not be made available to them in an emergency France did not recognize.

2. NATO Maintenance and Supply Organization (NAMSO)

NAMSO is much more difficult to describe and evaluate. It was created in 1958 at U.S. instigation in order to centralize the procurement and supply of spare parts. Thirteen nations (all but Canada and Iceland) are members of the Board.

To give impetus to the program, the United States and Germany provided a large inventory of spare parts for five types of aircraft. (All five had been furnished to the European countries under the Military Assistance Program.) The NATO Maintenance and Supply Agency (NAMSA) set up a depot at Chateauroux, France, and paid its overhead by selling the parts supplied to it at a price above cost. The Agency, however, was unable to perform efficiently enough to satisfy most of its customers. Much of the difficulty was caused by the nations -- over whom, of course, the central authorities had no control -- who declined to follow accepted supply procedures for reporting inventories.

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94 NATO Journal, September 1961, p. 32.
95 The financial arrangements surrounding the establishment of NAMSA are obscure. The NATO Letter for April 1960 speaks of German and American action "to provide a spare parts inventory package of approximate value of $40 million." Defense Department spokesmen, explaining the $25 million requested for NAMSA in the FY 1960 bill, asserted that this was "credit assistance" -- i.e., a loan -- to be repaid over a period of three years. Hearings,
compiling consumption data, and so on. Another built-in
difficulty was the need for NAMSA to operate as a business,
keeping financial records and following accounting procedures
not necessary in a national supply system; this naturally
made its procedures cumbersome and slow. User nations did
not attempt to tie NAMSA into their national supply systems;
they generally used it only as a last resort. Even the best-
run agency would perform badly under these circumstances. 96

Eventually the Agency phased out the obsolete aircraft
spare part inventory. Its effectiveness then began to im-
prove as nations used it to handle their Nike and Hawk spare
parts. (The United States and Germany lent an initial stock-
pile of spare parts for these weapons.) The jet engine

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96 Mutual Security Act of 1959, House of Representatives,
Foreign Affairs Committee, 86th Congress, 1st Session,
p. 1240. International officials maintain there was no
specific commitment for repayment by NAMSA -- only the
right of recapture by the United States of parts it might
later wish to take back. In any event, if the parts were
sold on credit to NAMSA, the cost was a fraction of their
list value, and when the United States bought back a small
portion of this stockpile, when NAMSA quit handling parts
for these aircraft, the paper value at the higher price back
to the United States came to sixty per cent of the paper
value of the entire original provisioning.

96 General W. B. Palmer, at the time Director of
Military Assistance, explained in his usual forthright man-
ner one of the reasons international bureaucracies are less
efficient than national organizations. "There are 12 coun-
tries participating in this NATO spare parts agency. Each
is represented on the Board of Governors. Each must get
its proportionate share of jobs. It is exceedingly diffi-
cult, far worse than in the U.S. Civil Service, to get rid
of one of these characters once you have him. It has been
a real administrative headache." Hearings, Foreign Assis-
tance Act of 1962, Committee on Foreign Affairs, House of
overhaul service run by the Agency has operated efficiently and acquired some prestige and profit. NAMSA has also been awarded responsibility for procurement and supply of spare parts for the ACE-HIGH communication system and the Early Warning System.

United States support of NAMSA -- a key determinant in the success of almost any combined venture -- has been uneven. On the one hand, America has furnished the initial spare parts stockage to start several programs. Americans have funneled through Chateauroux the supply support for most Military Assistance Program equipment that the United States has furnished other countries (e.g., Nike and Honest John). On the other hand, the large American force deployed in Europe -- for good reasons already mentioned -- does not use NAMSA. The United States has also been reluctant to participate in the Agency's Mutual Emergency Support Requisition system. This project -- which involves chasing parts needed by one nation through the stock bins of others -- has been surprisingly successful. The process has kept in commission much equipment that otherwise would have been idle through lack of parts. Advocates of the system explain that a nation has much to gain and nothing to lose by participating. Each nation establishes its own required stock level so that it cannot be compelled to give up a part unless it has an ample reserve.

The future of NAMSA is hard to predict. So far as is publicly known the French appear to be willing that it remain at Chateauroux. Most support for the supply center at Chateauroux, however, has come from the United States.

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97 NATO Letter, July 1959, p. 27.
airbase unit now being evacuated. The remaining twelve participants apparently want to continue NAMSA's activities but they have not yet decided on a new location. Though NAMSA's performance has improved markedly in the past three years, the Agency still has not gained the wholehearted confidence of all member nations. NAMSA, for example, would seem to be ideally suited to take on responsibility for the follow-on spare parts support for the more than 1,000 F-104G aircraft built by the NATO consortium. The four countries involved, however, have been reluctant to place this much dependence on an unproven organization. So far they have consented only to allow it to procure a few parts for national stockpiles; for this service it will receive an agent's fee. But this is small potatoes compared to a contract for buying, stocking, and supplying all spare parts for a thousand aircraft. The other big prospective task is the handling of spare parts supply for NADGE. If NAMSA should obtain this job and perform successfully, integrated logistics would take a significant forward step.

3. NATO Hawk Production Organization; NATO F-104G Starfighter Production Organization; NATO Sidewinder Production Organization; and NATO Bull-Pup Production Organization

The first three of these organizations were in existence when the NPLO regulations went into effect in 1962. Bull Pup was incorporated soon after and placed

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under NATO auspices. Each of the four is composed of a different group of nations. Most of them have completed the tasks for which they were set up, and will probably phase out of existence in a few years. It has been apparent for several years that continuing collaboration in the F-104G consortium should be fruitful for such functions as modification, overhaul, major repair, and procurement and stockage of spare parts. Yet the four participating nations -- West Germany, Belgium, Holland, and Italy -- do not seem to have made a final decision on whether to perform these functions under the old Starfighter Management Organization, contract out some functions to NAMSA, or break up and operate individually.

The associations which have already been put together by no means exhaust the possibilities for combined weapon manufacture. Almost any modern weapon, such as VSTOL aircraft, missiles, or even trucks, seems to offer potential for standardization and the economies of combined large-scale production. But, with the exception of the Main Battle Tank, which has been the subject of German-American collaboration in research and development -- and which may be offered later (about 1970) as an item for multilateral production -- the allies seem unable to agree on any major follow-on program of consolidated weapon production under NATO auspices.

NATO Production and Logistics Organizations (NPLOs) and consortia do not eliminate national interests; they simply offer a means of filtering out the uninterested

100 See my RM-4169-PR (cited in the Preface), pp. 35-54, for the composition of these consortia and analysis of the F-104G experience.
parties while keeping the enterprise still under NATO's aegis.\footnote{101} It has been said that the United States gives only lip service to proposals for combined weapon production. If this is true, the reasons are understandable in terms of national interest. Apparently, American technology and scientific "know-how" have acquired such an ascendancy over European that the United States, if it so desired, could exercise a virtual monopoly of the manufacture of modern weapons of war. The weapons made in the United States and sold to Germany over the past few years have been a major element in the alleviation of the serious deficit in the American international balance of payments. If American weapons, which might otherwise have been sold outright, were to be produced by an international consortium, the United States would lose one source of relief for its gold-flow problem.\footnote{102} Of course American industry profits to some extent by engaging in consortia, and this source of foreign exchange is preferable to none at all. None at all would be forthcoming if Germany and Britain produced all their own weapons at home.

\footnote{101}{Apparently, there is some valuable quality to cooperation under NATO auspices that does not extend to other undertakings, though it is not immediately clear what this quality is. Witness this exchange between a Congressman and a Defense Department representative. Mr. Burleson: "I understand it would be our policy to encourage this sort of activity [French-German-Italian collaboration in weapon production] within the structure of NATO, but to discourage it outside." To which Assistant Secretary of Defense Mansfield O. Sprague replied, "Definitely." Hearings, Mutual Security Act of 1958, Committee on Foreign Affairs, House of Representatives, 85th Congress, 2nd Session, p. 790.}

\footnote{102}{See testimony of Mr. Henry J. Kuss, Jr., to the effect that Germany has spent more than $3 billion for}
4. NATO Air Defense Ground Environment (NADGE)

We have already discussed the infrastructure aspects of NADGE. The enterprise can be classified as an operating activity as well, because some funds will have to be appropriated from the military budget to run and maintain the portions of the system that will serve the international military commanders (and probably also the portions that lie in Greece and Turkey). It is important to recognize that NADGE is also an NLPO and a consortium: these other roles may offer a way to keep the project going should the French withdraw from the infrastructure organization and all parties wish to continue air defense collaboration.

For many months the NADGE effort has been directed under NPLO rules. The members have established a Board of Directors and a Management Office (NADGEMO). The General Manager is French. There seems to be no reason why NADGE could not fructify as a cooperative venture separate from NATO, provided all nations are willing.

NADGE has also been brought into existence as a consortium. The decision of 1963 to distribute production contracts in proportion to national contributions meant that one or two large contractors would no longer dominate the work. NATO officials estimate that about 120 companies were interested in a piece of the business. Many of them rapidly coalesced with American corporations and merged into three giant international consortia headed by Hughes

United States weapons in the last four years. The British purchase of F-111s will aggregate more than $2 billion. Hearings, Foreign Assistance Act of 1966, Committee on Foreign Affairs, House of Representatives, 89th Congress, 2nd Session, p. 478.
Aircraft, Westinghouse, and IT&T. The companies of each coalition agreed among themselves on a division of labor that would return to each country an amount approximating its contribution to the infrastructure. In a short time the habitual competition between nations to secure the lion's share of business for their home industry -- a system that usually broke down completely because of the one-party veto -- was transformed into a contest between three multinational consortia. The nations became relatively indifferent as to which won the contract.

Here for the first time was price competition between rival international associations for the entire production job. The problem of matching returns to inputs and of determining the proper division of labor was turned over to the commercial market.

The resiliency of the system was soon tested. When the consortia submitted their bids in late 1965, all three exceeded the $308 million ceiling authorized by the North Atlantic Council. Many felt the system could not recover from this setback. But all nations favored some kind of network. Moreover, they were less particular now about operational criteria and technical specifications. SHAPE, therefore, was able rapidly to get them to agree to another scaled-down version. New bids were solicited, the IT&T competitor dropped out, and the international authorities selected the Hughes Aircraft consortium as the winner.

103 The composition of each group is listed in NATO unclassified document, NADGEMO/PC/65/221, dated June 18, 1965.

104 Armed Forces Management, July 1966, p. 156.
The consortium officially known as NADGECO Limited, with headquarters in London, is now negotiating contracts with the individual countries.

5. NATO Missile Firing Installation (NAMFI)

The missile range that the allies are building on the island of Crete is another project that overlaps both infrastructure and consortium. Initially, ten countries were interested, including Turkey and Italy. Later the last two countries dropped out and left the eight user nations: Denmark, France, Germany, The Netherlands, Norway, Belgium, Greece, and the United States.\footnote{NATO Letter, February 1964.}

The project has been divided into three phases. The first, brick and mortar facilities for administrative and technical uses, has been completed.

The second, instrumentation of the range, involves high performance radar and computer systems. A number of companies bid on the contract. Final contestants were whittled down to three -- all American -- on the ground that the equipment of the others did not meet the rigid specifications. France and several other nations protested and the final award was delayed for at least a year. It is rumored that the settlement involved some trade-offs; France stepped aside in return for concessions in Phase III.

The third phase, for the installation and operation of a drone target system, stirred up a vigorous dispute between France and the United States. Phases I and II were funded under infrastructure; the cost of Phase III, however, which involves a long-term contract for operation
of the target drones and other equipment, was to be prorated among the participants on the basis of use. The United States, which will pay thirty-five to forty per cent of the continuing cost, expected an American firm to get the contract. Washington was shocked when the Greek government (the host country) let it be known that the French Nord CT-20 target was to be chosen. (France is programmed to use the range less than five per cent of the time.)

The United States reacted immediately. It is reported that Secretary of State Rusk cabled the American Ambassador in Athens directing him to insist that an American product (the North American Red Head/Roadrunner) be selected.106 The choice of equipment was complicated by the fact that the Roadrunner, though technically superior to the CT-20, was more expensive ($43 million compared to $38 million) and also by the fact that the CT-20 met SHAPE specifications for target missiles.

The American complaint forced Greece to reconsider, but in December 1965, more than a year later, the decision to award the contract to Nord was reaffirmed.107 The range, originally scheduled for use in 1965, will become operational in 1967, unless complications growing out of the French disengagement delay the event further.

Again the consortium, designed to direct the operation after the facility is completed, may bring the project safely into port. Very little is known publicly about this organization; it has not been established as a

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107 Armed Forces Management, December 1965, p. 27.
formal NPLO. Nor was there any mention of the French attitude toward it in the publicity release that disclosed the community projects in which France would like to continue participating. 108 It seems unlikely, however, that France will voluntarily relinquish the lucrative contract for Phase III already signed with Greece, the host country. The other partners will be chagrined, to say the least, if France proceeds to reap the benefits of doing the work but declines to use the range and pay her share of the upkeep.

108 See p. 3, fn. 3.
VII. BURDEN-SHARING CONCEPTS

Infrastructure and headquarters (military budget) funds are accumulated from assessments on all members. Normally the countries agree to a four-year infrastructure program whose general scope and pro rata assessments are decided in advance. The military budget assessments have changed less than 1 per cent since 1957. NPLOs and consortia differ substantially in this respect; assessments on the members are based on the amount of goods or services to be used by each. Hence the problem of proportional charges in a consortium can be related directly to a country's interest in one specific undertaking. For this reason, consortia are not amenable to generalized cost-sharing formulas, and they will not be discussed in this chapter.

The almost continual dispute over infrastructure and, at times, the headquarters funds stems from disagreement over distribution of costs and benefits. It is widely agreed that cost-sharing arrangements should depend on (1) the military advantages to each user; (2) the economic benefits to the host nation; and (3) the ability of each of the contributors to pay. But this compartmentalization does not solve the sharing problem. For one thing, nations disagree about criteria for determining ability to pay. For another, each nation seems to evaluate the benefits accruing to it from any project differently from its partners.

The evaluation of benefits is complicated by the fact that, in the bargaining process, nations gain an advantage by underestimating or understating their interests. Part of the reason for underestimation will be understood by anyone who has been engaged in negotiations: Never let the opponent know how badly you want whatever he has to offer. In the case of community defense, however, another complication is introduced and explained by what is known in government administration as the "theory of public goods." A public good is something which, once produced, can be shared by any member of an interested group regardless of whether or not he has helped pay for it.\textsuperscript{110} Defense measures, to the extent that they protect all allies, are "public goods." Hence the object of the bargaining process is to persuade one's partners to take defensive action while doing as little as possible at one's own expense. The impossibility of charging partners for the use of the public defense good places a premium on noncommitment and nonparticipation.

The utility of a program depends on the relationship of its cost to the satisfaction it will bring. Not only will nations differ in their preferences between items (say between airfields and naval facilities), but they will also hold divergent ideas as to how many of each item should be built from common funds.

The question of ability to pay is equally controversial. Economists, in search of a method for determining ability to

\textsuperscript{110} For a lucid discussion of this theory see Mancur Olson, Jr., The Logic of Collective Action, Harvard University Press, Cambridge, Mass., 1965, pp. 14-16.
pay, have considered two methods whose roots can be found in theories of domestic taxation. One simple method would have each nation pay into the pot a percentage equal to the ratio of its GNP to the allied total. Another scheme is based on principles similar to those of the progressive income tax. National contributions would be scaled according to per capita GNP. Presumably this method would be more equitable because the per capita comparison would provide a truer gauge of expendable wealth. The nation with affluent citizens would be asked to give up only some of its luxury while nations made up of poorer citizens would obtain relief from any threat to the necessities of life. This formula suffers from the familiar uncertainties of the progressive tax concept: First, should there be a "cost of living" exemption and, if so, how large; second, how much should the rate of taxation increase with each increment of income?

Neither system of calculation brings complete satisfaction, particularly to Americans who would be called on for contributions of at least 70 per cent under both schemes. Ability to pay is one thing; benefits from the program are another. They must be integrated in any cost-sharing formula. Americans justifiably take the position that since NATO common funds are devoted to defense efforts in Europe proper — to the great benefit of the Europeans — they should be the prime responsibility of the local inhabitants. Moreover, the common funds account for only a tiny fraction of defense expenditures. Calculations confined to common-funding ventures do not properly credit the United States for the critical service it provides to the alliance by maintaining the Strategic Air Command and the Polaris
force -- nor do they properly account for the tremendous expense of fighting Communism in Vietnam and deploying 400,000 troops in Europe. 111

For these reasons American representatives have been unwilling to argue the question of ability to pay in isolation. They prefer to base comparisons on the cruder but probably more meaningful criterion of total defense effort. In the first place, they argue, the United States defense budget has averaged 70 per cent of the total for all NATO countries, whatever the method of calculation. 112 In 1963, for example, the United States allocated approximately $52 billion for military purposes, which constituted 71 per cent of the total NATO outlay of $73 billion (exchange rate computation).

Figure 8 provides the basis for a strong American argument. It shows the percentage of GNP that each NATO ally devoted to defense purposes in the years 1958 and 1963. Given the large American absolute and percentage contribution to the defense of the free world, Washington refuses to be swayed by abstruse theoretical arguments calling for larger United States contributions to NATO common funds. As long as the United States allocates more than 10 per cent of its GNP (calculated at factor cost) to defense


112 For a professional discussion of methods of computation and relative contributions to NATO funds, see John Pincus, Economic Aid and International Cost Sharing, Johns Hopkins Press, Baltimore, Maryland, 1965.
Figure 8

INCOME PER HEAD AND SHARE OF GROSS NATIONAL PRODUCT
DEVOTED TO DEFENSE IN NATO COUNTRIES

<table>
<thead>
<tr>
<th>Country</th>
<th>GNP per capita US $</th>
<th>1963</th>
<th>Defense Expenditures as a percentage of Gross National Product at factor cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0)</td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Belgium</td>
<td>1,313</td>
<td>3.9</td>
<td>3.7</td>
</tr>
<tr>
<td>Denmark</td>
<td>1,464</td>
<td>3.3</td>
<td>3.4</td>
</tr>
<tr>
<td>France</td>
<td>1,404</td>
<td>8.1</td>
<td>6.5</td>
</tr>
<tr>
<td>Federal Republic of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>1,466</td>
<td>3.4</td>
<td>6.1</td>
</tr>
<tr>
<td>Greece</td>
<td>449</td>
<td>5.8</td>
<td>4.8</td>
</tr>
<tr>
<td>Italy</td>
<td>784</td>
<td>4.3</td>
<td>3.9</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>1,464</td>
<td>2.1</td>
<td>1.6</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1,083</td>
<td>5.0</td>
<td>4.8</td>
</tr>
<tr>
<td>Norway</td>
<td>1,374</td>
<td>4.0</td>
<td>4.1</td>
</tr>
<tr>
<td>Portugal</td>
<td>293</td>
<td>4.5</td>
<td>8.0</td>
</tr>
<tr>
<td>Turkey</td>
<td>204</td>
<td>4.5</td>
<td>5.9</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1,361</td>
<td>7.8</td>
<td>7.4</td>
</tr>
<tr>
<td>Total Europe</td>
<td>1,091</td>
<td>5.9</td>
<td>6.0</td>
</tr>
<tr>
<td>Canada</td>
<td>1,825</td>
<td>6.0</td>
<td>4.7</td>
</tr>
<tr>
<td>United States</td>
<td>2,813</td>
<td>11.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Total North America</td>
<td>2,723</td>
<td>10.7</td>
<td>9.7</td>
</tr>
<tr>
<td>Total NATO</td>
<td>1,780</td>
<td>9.1</td>
<td>8.4</td>
</tr>
</tbody>
</table>

*Extracted from Facts About NATO, 1965, p. 115.*
against Communism, and some European nations allocate less than half of that figure, there will be continued agitation in Washington to reduce the United States pro rata share.

Congressional scrutiny of American contributions to NATO, though not yet completely antagonistic, is becoming more intense. In 1960 Alastair Buchan could say, "It would seem that the easiest way for the United States to overcome the growing resistance in Washington to the idea of military aid would be to take the lead in expanding the size of the infrastructure program, and thereafter to channel its aid through it, rather than continuing the more conspicuous process of bilateral aid to the various allies."  

By 1965, however, things were beginning to change. For example, Congressman Gross noted: "In almost every statement that is made [by DOD and State Department officials] someone hopes they [Europeans] will do better, and says we are urging them to do better, but we are still in there for 30.8 per cent. I say this is unconscionable."  

In this study, fortunately, we do not have to attempt a solution to the dilemma of burden sharing. The issue has already been addressed by a well-qualified band of economists. Disappointingly, the students of international burden sharing seem united in only one fundamental conclusion: that "there is no theoretically valid objective

113 Buchan, NATO in the 1960's, p. 117.
115 While many commentators have written about international financial ventures, only a few have tried to stake out benchmarks on the slippery slope of burden sharing. The most notable contributions are: Malcolm Hoag,
[economic] criterion for determining alliance contributions.\textsuperscript{116} Country conditions and attitudes vary so disparately that it is impossible to establish an objective basis on which to make comparisons.

Having reached this conclusion, the economist moves on to the logical corollary: that political values -- not economic criteria -- must be the basic determinants of international burden-sharing practices.\textsuperscript{117} Since most political considerations are not quantifiable, this means that alliances must depend on practical ad hoc solutions worked out on the basis of "value judgments, negotiated compromises, or arbitrary decisions."\textsuperscript{118} In place of a neat formula dealing with finite quantities, the economists tell us, we must substitute a nebulous system that attempts to integrate economic considerations and value judgments, ability to pay and perceived benefits, negotiating skill and a host of other factors. Officials of the member countries


\textsuperscript{116} Pincus, Economic Aid, p. 85.
\textsuperscript{117} Gerald Garvey in World Politics, July 1966, p. 740.
\textsuperscript{118} Schelling, International Cost Sharing, p. 8.
are presumed to go through a similar process in order to determine the "national interest," which influences the part each nation will play in the combined endeavor.

The factors that make up the national interest are too diffuse and amorphous to be defined here in detail. At best we can identify only a few general characteristics. A comparison of individual country defense budgets with the common funding-accounts of the same countries demonstrates that members tend to rate their interest in the two forms of spending quite differently. A tabular comparison best illustrates this point.

Column 2 of Figure 9 sets forth the percentage of the total allied GNP which is represented by the GNP of each member country. Column 3 shows the percentage of the total allied defense allocation which is represented by the country's defense budget. Column 4 shows the relationship between these two. It can readily be seen that most European nations make defense allocations at less than half the rate at which their GNPs increase the NATO total. The United States balances the shortfall by contributing about 20 per cent more than would be its share pro-rated on a GNP basis. The point to emphasize here is that these defense budgets are drawn up independently by each country and are based primarily upon that country's evaluation of the utility of its own military effort.

As we acknowledged earlier, any comparison based on total GNP is oversimplified. At best, it furnishes only a crude indication of ability to pay (and says nothing about value received). It might be fairer to gauge ability to pay on a per capita GNP basis; in that case, individual countries would shift positions but the pattern would remain
Figure 9

COMPARISON OF ALLOCATIONS TO NATIONAL DEFENSE VIS-A-VIS INFRASTRUCTURE
(Exchange rate basis, 1963)

<table>
<thead>
<tr>
<th>Country</th>
<th>Country defense budget, %</th>
<th>Ratio, relative effort; shares of infrastructure: national defense shares</th>
<th>Country, percentage share of GNP</th>
<th>Ratio, relative share of infrastructure: shares of GNP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>of total allied defense allocations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td>% of total allied defense allocations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>.137</td>
<td>.61</td>
<td>2:1</td>
<td>4.24</td>
</tr>
<tr>
<td>Canada</td>
<td>3.91</td>
<td>2.18</td>
<td>2:1</td>
<td>5.15</td>
</tr>
<tr>
<td>Denmark</td>
<td>.81</td>
<td>.33</td>
<td>2:1</td>
<td>2.87</td>
</tr>
<tr>
<td>France</td>
<td>8.15</td>
<td>6.37</td>
<td>4:3</td>
<td>12.00</td>
</tr>
<tr>
<td>Germany</td>
<td>9.34</td>
<td>6.85</td>
<td>4:3</td>
<td>20.00</td>
</tr>
<tr>
<td>Greece</td>
<td>.43</td>
<td>.25</td>
<td>2:1</td>
<td>.67</td>
</tr>
<tr>
<td>Italy</td>
<td>4.84</td>
<td>2.27</td>
<td>2:1</td>
<td>5.97</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>.05</td>
<td>.01</td>
<td>5:1</td>
<td>.17</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1.52</td>
<td>.88</td>
<td>2:1</td>
<td>3.83</td>
</tr>
<tr>
<td>Norway</td>
<td>.57</td>
<td>.27</td>
<td>2:1</td>
<td>2.37</td>
</tr>
<tr>
<td>Portugal</td>
<td>.29</td>
<td>.27</td>
<td>2:1</td>
<td>.28</td>
</tr>
<tr>
<td>Turkey</td>
<td>.68</td>
<td>.48</td>
<td>3:2</td>
<td>1.10</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>8.11</td>
<td>7.20</td>
<td>8:7</td>
<td>10.50</td>
</tr>
<tr>
<td>United States</td>
<td>59.93</td>
<td>72.03</td>
<td>5:6</td>
<td>30.85</td>
</tr>
</tbody>
</table>

100.00 100.00

Data taken from 1963 column, table, Facts About NATO, 1965, p. 117 (conversion at average exchange rate) and table, p. 115.

the same. In spite of their imperfections, total GNP comparisons are the most frequently used kind to be found in the official NATO literature. Using GNP as a rough measure of ability to pay, it would seem from column 4 that European nations carry less of the defense load than would be expected if economic capacity were the only standard.

Column 5 switches the focus to another aspect of alliance activity. This column lists the percentage of the total infrastructure fund which each country contributes. One can readily see, matching column 5 against column 3, that all countries except the United States and Portugal make a greater contribution to infrastructure, relative to their wealth, than they do to their individual defense budgets. This relationship is shown arithmetically in column 6.

This dualistic attitude toward sharing the load in collective defense has been explored in two perceptive analyses by the economists Olson and Zeckhauser. Their studies draw attention to the difference between the independent defense efforts of a number of allies and those

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119 Pincus has compared the percentages of total allied GNP generated by each country under various methods of calculation. From his tables it can be seen that the percentage variations are not significant enough to alter the large country--small country pattern, whatever the formula on which the comparisons are based: full employment, full employment minus $300 per capita, real income, real income minus $300 per capita, the UN formula modified, or the U.S. income tax rate. John Pincus, Economic Aid, p. 78.

120 Mancur Olson, Jr. and Richard Zeckhauser, Economic Theory of Alliances.
coordinated endeavors in which there is "marginal cost sharing." "Marginal cost sharing" means in our terms simply "common funding"; it involves a measure of negotiated agreement among the partners to share the costs of a community endeavor.

In their theoretical analyses Olson and Zeckhauser develop a two-pronged hypothesis. First, in the independent programs, they contend, the more affluent nations will bear a disproportionately large share of the total burden. Second, they predict, marginal cost sharing will tend to work against disproportion in burden sharing. The data we have shown in Figure 9 -- somewhat more complete and more recent than those used by Olson and Zeckhauser -- coincide neatly with both aspects of their hypothesis. It would be an exaggeration, however, to say that these data substantiate their theory.

The extent of the disproportion and its reversal stand out vividly when column 6 is compared with column 4. The United States is the only country whose individual defense budget (column 4) represents a higher percentage of the NATO total than does its GNP of the NATO total. There is an obvious progressive drop in relative effort, the lower one goes on the power scale. The United Kingdom, France, and Germany would have to increase their efforts by only a fraction to be in line with their share of the total GNP. Portugal intrudes into the ranks of those who most resolutely help themselves. Her self-defense effort -- quite uncharacteristic of the smaller nations -- can probably be ascribed to her need for large military outlays to combat restiveness in her colonies. Portugal's defense budget doubled from 1959 to 1963. With this single
exception, column 4 shows that all countries except the
four major powers are sub-optimal contributors to defense
in terms of the relationship between their GNPs and their
national defense expenditures.

Column 6 focuses on the second point of the dual
hypothesis. It demonstrates how the non-Americans, and
the smaller nations in particular, have tried much harder,
relative to their resources, to make contributions to the
infrastructure fund than to build their own national de-
fense forces. We need not dwell on the figures; the
pattern is self-evident. All of the major non-United
States partners -- the United Kingdom, France, and Germany --
try at least one and a half times as hard for the infra-
structure fund as for their national forces. Canada and
Italy, sub-optimal contributors to their own national de-
fense in the light of their GNPs, assign two and one half
times the effort to infrastructure. A third group of
countries, geographically small but with relatively high
standards of living, is made up of Belgium, Denmark, The
Netherlands, Norway, and Luxembourg. This group contributes
to the infrastructure at 4 1/2 to 17 times the rate at which
its members are willing to support national armies.

Greece and Turkey form a category by themselves.
Already straining their economies to support sizeable na-
tional defense establishments, they probably feel constrained
to make great efforts for the support of the infrastructure
program, which brings them large profits.

Portugal, with the second lowest per capita income
in the alliance, has burdened herself with the largest
relative allocation of GNP to defense, except from the
United States. Preoccupied with domestic and colonial
problems, she has little to spare for the common fund.
The relative efforts expended on infrastructure and national defense (column 6) demonstrate that marginal cost sharing in NATO certainly mitigates the disproportion of the individual efforts. In fact, it more than reverses this relationship. Column 7 shows the ratio of the percentage that each country contributes to infrastructure beside what it would have to contribute in a straight pro rata assessment based on GNP. According to this column, many of the smaller countries carry infrastructure loads that are more disproportionate to their resources than is the share of the United States in the individual effort.

These comparisons merit attention because they do not depend on absolute quantifications. Whether the Europeans pay more or less than they should to the infrastructure is a matter of subjective judgment; that they contribute to the infrastructure at several times the rate for individual defense is a matter of fact. This fact must hold some significance for American policy makers.

Why small nations act in this way remains somewhat obscure. The military and economic benefits derived from facilities built on their soil do not seem to be the only -- or the predominant -- reasons why countries contributing as they do. The main beneficiaries of infrastructure construction (see Figure 6, p. 68) are not consistently to be identified with the heavy contributors shown in Figure 9.

Obviously motives beyond immediate advantages have impelled many NATO members to join in common funding. In the military budget accounts, which bring even smaller returns than the infrastructure to the European host nations, the smaller countries bear an even larger percentage of the burden. Apparently the people of these countries feel
rewarded merely by being part of an international cooperative enterprise. Perhaps they feel embarrassed by the inadequacy of their individual efforts. Perhaps they believe that a more substantial contribution to the corporate undertaking will give them a more influential voice in alliance affairs. Most likely, however, their increased allocations result from a rational conviction that the independent military measures of a small nation are less effective in the face of a massive threat than combined action.

It seems in the American interest to stimulate even broader efforts in the future. The relatively large investments of the European countries in common funding furnish the main argument -- seldom made explicit by the proponents of common funding -- for American sponsorship of continued or expanded use of the community programs. The United States gains appreciably, particularly in foreign exchange, when a construction project that it would have undertaken unilaterally is financed through infrastructure funds.

It is important, therefore, to learn as much as we can about the conceptions of "national interest" that motivate the various nations. In no case is national interest a fixed quantity which, once determined, will settle an appropriate level of contributions for all endeavors. We have seen that the view of national interest in relation to individual defense differs from the view of it in relation to corporate defense. There is one national interest for pipelines, another for airfields, and a third for the Allied Mobile Force. Furthermore, the engagement of national interest tends to vary according to the size of the combined effort.
An appreciation of the subtleties of national interest must underlie any attempt to stimulate enthusiasm for common funding. It is hardly likely that any two of the partners will agree on the utility function of a given project. One may put a high value on an ammunition storage facility; another will put missile sites first. One may want NATO to build 25 airfields; another will prefer 50; a third will favor 200. Each preference will depend on how a nation draws its cost-benefit curve for each type of facility. The question of motives, inducements, and incentives needs more attention than we can give it here. Supporters of common funding must concentrate their attention on this subject if they are to halt or reverse the downward trend in this kind of activity.

NATO nations now negotiate among themselves to draft general guidelines for four-year programs to which all the member countries contribute on the basis of a "set percentage" that is to say, an arrangement that remains constant for all the projects authorized during the period. Since, as we have just noted, all projects and all levels of effort do not hold the same appeal for all the member nations, many worthwhile undertakings fail to win unanimous support because they do not attract certain members.

Under the present infrastructure system, costs have been prorated in line with a "sensing" of the general utility of these collective measures to each country. The pattern of these assessments has remained relatively stable throughout the years and nations have been willing to allocate a portion of their defense resources in accordance
with these set percentages. Internecine arguments now arise less over sharing than over the nature and the size of programs to be undertaken. In the 1965-66 debates several nations set limits on the amounts they would contribute and displayed some indifference as to the percentage shares that these ceilings would represent.

The point to be emphasized here is that the allies do accept an obligation to contribute toward community defense tasks. The calculation of how much each should contribute is obviously based on considerations other than possible material returns to himself. But the enthusiasm for "set-percentage" funding tapers off at a low level of community effort. High marginal utility is most evident for things a nation cannot do by itself, such as obtaining advance warning of enemy air attack. Once the minimum necessary collaboration has been accomplished, however, a few nations feel that they no longer get adequate returns for additional investment. Consequently, many programs which could be accomplished more effectively in unison are not undertaken because they fail to command the unanimous support necessary for the "set percentage" system.

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121 Malcolm Hoag pointed out some years ago that "the great merit of turning to an infrastructure cost-sharing formula is that the acrimonious and time-consuming bargaining involved in deriving it is past." "On NATO Pooling," World Politics, April 1958, p. 481. While one might quarrel with this statement as a slight exaggeration in view of the recurring disputes over shares, in principle it expresses a significant point: Compared to any other formula for distributing the load, infrastructure percentages represent an area of unparalleled accord.
One solution immediately comes to mind: Allow nations that are less interested in a project to bear a lighter share of the cost. This would move the bargaining back into the market place, it is argued, and restore the relationship between cost and satisfaction. But such a flexible system carries severe disadvantages. If a nation were permitted to abstain from an undertaking, or to carry a reduced load, every project would be subject to endless bargaining. This would be particularly detrimental in the case of a public good, where all partners would benefit from increased protection, but in no assessable ratio. A flexible system would place a premium on real or feigned indifference to such projects, for a country that showed no interest in them would not be expected to help finance them. International stewards, responsible for putting together workable programs of a public good, would face a nearly impossible task.

In situations where the product would advantage certain countries more than others, the bargaining would be intensified. Freedom of action would encourage a "grab bag" pursuit of self-interest. Nations would be willing to pledge funds only for projects that would yield a high rate of return to them individually. Many projects that would be extremely valuable to the community as a whole, but whose pay-offs to some nations in terms of private benefit might be negligible, would not get universal support.

There is a need for both types of systems: those that operate on a set percentage basis and those that provide for adjustable pro rata sharing on the basis of expected benefits. The former are necessary because without
them there would probably be no contributions to those important community enterprises that do not bring large returns to the individual partners. The latter are necessary because the appeal of a set percentage account is so limited that without some means of sharing on a broader scale common funding seems condemned to remain at the present level or to trail off.\footnote{122}

The common-funding system now in existence provides the machinery to accommodate both requirements. Most common-funding enthusiasts have focused their attention on the infrastructure and military-budget types of corporate action. Yet it seems unlikely that any new stratagem will generate a burst of enthusiasm for them. On the other hand, new initiatives by the international servants, coupled with a willingness on the part of the United States to make unrequired contributions (something less, say, than the 26 per cent it gives up in the infrastructure account), might well generate some practical \textit{ad hoc} groupings with mutually beneficial results. It is in this direction -- the exploitation of NPLOs and consortia -- that American and international officials should look for ways to arouse enthusiasm for expanded programs.

\footnote{122}Those who have worked intimately with common funding -- or have studied it thoroughly -- seem to hold a less sanguine attitude than the occasional commentators. Pincus has noted: "In practice, burden-sharing formulas are likely to be accepted only when the sums are relatively small and when the formulas offer no binding precedents for the future." John Pincus, \textit{Economic Aid}, p. 86.

A long-time member of the International Staff, Mr. David Bendall of Great Britain, has asserted that the "obstacles are almost insuperable to further expansion of the pooling arrangement." "Burden Sharing in NATO," NATO Letter, September 1963.
VIII. TOWARD A UNITED STATES POLICY

We have looked at common funding from a number of angles. What do our investigations suggest in the way of guidelines for United States policy?

It may not be of much help but, on the value side of the ledger, one might say that the importance which Americans assign to a robust defense capability in Europe should be as great today as it was in the 1950's. The kinds of protection bought by infrastructure, operating funds, or consortia are every bit as important under a policy of "flexible response" as they were in the days of "massive retaliation." Certain pooled activities -- such as the ACE Mobile Force, ground survival measures to protect aircraft against conventional air attack, and communications facilities for discriminating command and control -- are the direct result of American-sponsored strategy.

American willingness to pay, on the other hand, has decreased substantially in the last ten years, mainly because of the amazing resurgence of the European economy and the consequent increase in the allies' ability to pay. Adjustments have been made through the curtailment of American Military Assistance Programs and through the downward revision of America's pro rata share of the infrastructure. Advocates of common funding suggest that further shifts in burden-sharing, if attempted, should be sought in the area of over-all country allocations to defense. In general these advocates believe that the cost-sharing schedules, negotiated in early 1966 shortly before France withdrew, are in line with the United States stake in NATO. France's disengagement, however, adds new dimensions to the problem.
First, with France no longer pulling an oar, the others will have to row 13 per cent harder for the infrastructure and 17 per cent harder for the military budget. Under a normal reallocation formula, the United States should take up a quarter of these shortfalls. This would bring the United States back to its previous share of infrastructure support and would increase its obligations to the military budget. Second, the United States faces heavy unilateral obligations in redeploying its national forces from France. Only Canada has a similar problem, and the cost to Canada does not compare with that to the United States, which has been estimated at more than half a billion dollars. Washington expects the allies to help defray these costs, already incurred once when the United States deployed troops to France and built the installations to accommodate them. It is quite proper for America to expect help in this situation, but it must also expect vigorous opposition from Europeans to any attempt to have these costs shared under present common-funding arrangements.

Some American critics have argued that greater harmony on strategy is necessary if common funding is to continue to be effective. This would certainly be true if the bulk of each national defense budget were devoted to community programs. But the argument hardly applies to NATO, where less than 1 per cent of the total outlay is controlled in common. If war should come, some early warning, airfields, communications, and war headquarters would be needed, whatever the strategy. The many and various facilities required
by divergent national strategies can be financed by the individual nations.\textsuperscript{123}

It is difficult to discuss the current French dispute without distorting perspectives. The principal task today is to keep the organization of the "fourteen" on an even keel. The acrimonious contest with President de Gaulle's regime must not be allowed to divert attention from the fundamental problem. Yet the French issue cannot be swept under the rug.

France, whether she admits it or not, is profiting from many of the installations and services provided by the other allies and the NATO organization. She cannot be forced, of course, to acknowledge this or to make a contribution commensurate with her ability to pay and the benefits that accrue to her. This is an inherent characteristic of a "public good."

France wishes, however, to continue to participate in certain combined activities -- and it is in the interest of the others that she do so. It is a fundamental principle of clubs, groups, or associations that outsiders not be allowed to benefit from communal activities or facilities at the same rate as contributing members. Many organizations establish "associate" or "absentee" memberships to govern relationships like that between France and NATO. Other organizations levy a surcharge on outsiders for the use of communal goods or services.

\textsuperscript{123} This is a principal reason why suggestions for putting all, or a heavy portion, of a country's defense appropriations into a common pool lack practical appeal.
In one way or another, affluent France should be required to pay a share of the continuing and indivisible costs of NATO. It is particularly important that the fourteen hold the line on the project that France seems to want most, NADGE. They can either demand French contributions to over-all common funding at a reduced membership fee or require France to pay a hefty surcharge for participation in the particular projects she selects.

As for the remaining fourteen members, it is clear that changes will be necessary in both the scope and content of new programs and in the sharing formulas. As usual, these changes will be debated with vigor. Our analysis does not support the common view that the problems of multilateral agreement on financing will virtually disappear with the withdrawal of France. However, the "new" NATO can not be allowed to founder on the rocks of financial dissension. And of all the allies, the United States has the most prestige to gain or lose.

For the longer term, the United States can afford to adopt a wait-and-see policy regarding the expansion of common funding. On balance, common funds, as they are now constituted, appear to be good for the United States. They bring forth relatively greater effort from the Europeans; they provide facilities that a cohesive military alliance cannot do without; they tend to foster integration. Yet, as we have seen, community efforts have drawbacks as well. They usually cost more, take longer, and are less clear-cut and dynamic than national programs. The curtailment of national freedom of action, which cooperation with other countries inevitably entails, is most burdensome to a strong and wealthy state capable of acting effectively on its own.
In the short run, American policy must develop pragmatically, in response to confrontations that are already just discernible. The following general guidelines are suggested:

1. Support the infrastructure and military budget systems with the procedures now in effect and at the current level of effort. Accept an equitable share of the additional burden caused by the withdrawal of France, and recognize that this will mean a return to contributions as large, or larger, than those borne prior to the 1966 reductions.

2. Adopt a receptive attitude toward all proposals for extending common funding to more binding and comprehensive programs. Analyze each proposal on its merits, and recognize the inherent deficiencies as well as the benefits of community enterprise.

3. Attempt to maintain the "set percentage" burden-sharing system at the highest level of the communal effort, but exploit the alternative method of NPLO and consortium activity when projects do not produce NATO-wide enthusiasm. In consortia, strive for a management system that gives nations influence in rough proportion to their stakes in the enterprise.

4. Discourage and avoid, except in unusual circumstances, "tying" infrastructure payments to domestic purchases. "Tying" stipulations vastly complicate international competitive bidding and inhibit the market process. They are warranted, however, as a last resort to shake loose sophisticated equipment projects that have bogged down in disagreements over technical specifications.
5. Seek an equitable basis for continued French collaboration on selected projects. The compromise should require France to pay some form of "absentee membership dues" to support the collective and indivisible alliance tasks, but not to pay the "full" share previously assigned her. Failing this, France should be required to pay a substantial surcharge for participation in the alliance endeavors of her choice.