THE FUTURE OF COLLABORATIVE WEAPONS ACQUISITION

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September 1978
The Rand Paper Series

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I. INTRODUCTION

II. NATO'S ROLE: A BRIEF HISTORY

III. NATIONAL MOTIVES AND PRESSURES BEHIND EUROPEAN COLLABORATION
   - Utilization and Preservation of Existing Capacity
   - Distribution of High R & D Costs Through Expanded Exports
   - Maintenance of a Diverse National Technology Base
   - Preservation of National Defense Capabilities
   - Budget Restraints and Savings Through Collaboration
   - Standardization

IV. THE SHAPE OF COLLABORATION
   - Concentration in High Technology Areas
   - Lack of Longer-Term Industrial Integration
   - Restricted Number of National Participants
   - Collaboration as a Political Process

V. GENERATING COMMON MILITARY REQUIREMENTS

VI. ISSUES IN US-EUROPEAN COLLABORATION

VII. PROSPECTS
THE FUTURE OF COLLABORATIVE WEAPONS ACQUISITION*

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I. INTRODUCTION

Over the last half decade the obvious diseconomies in European defense planning and production have commanded new attention due to pressures to reduce defense budgets and to the build-up of Warsaw Pact conventional forces. Widely acknowledged deficiencies in NATO's conventional force posture and the strain on national resources have led to a declaratory consensus that increased defense cooperation—specifically, the pursuit of standardization, interoperability, collaborative acquisition and general rationalization—can significantly redress the East-West military imbalance without placing major new demands on national defense budgets. This impulse is reinforced by the postulate that advances in conventional arms technology—notably in anti-tank and anti-aircraft guided weapons—have altered the tactical environment, shifting the balance of military advantage, to an even greater degree, to the defense. Outfitting European forces with the most advanced weapon systems is seen as a means of compensating for the Warsaw Pact's quantitative advantage. The military logic is debatable. What is not subject to question is the perceived need of the larger NATO European states to maintain the capability to develop and produce high technology weapon systems.

But highly sophisticated technology has also changed the economics of defense, placing the national development and production of many weapon systems beyond the reach of individual countries. Insufficiently large national markets for costly advanced systems logically dictate that their development and production be undertaken cooperatively. As

*This paper was originally prepared for a Rand Conference on European Defense in the 1980s, in April 1978. The author is grateful for comments on an earlier draft by his colleagues Robert Perry, Michael Rich and Thomas McNaugher.
a result of these factors, collaborative acquisition has captured the attention of officials and defense planners on both sides of the Atlantic.

The weapons acquisition process in the NATO countries is carried out domestically, and defined by national military and industrial objectives. Acquisition decisions remain the prerogative of individual governments. In comparison to the resources devoted to developing and procuring weapons nationally, the extend of past international collaboration has been small. NATO organizations have worked to encourage a variety of forms of collaboration. And yet progress toward a more systematic, internationalized acquisition process has been meager.

This essay seeks to generalize on the basis of nearly two decades of European experience in collaborative acquisitions, primarily that of Britain, France, and Germany, since in the aggregate the three account for approximately 75 percent of non-U.S. NATO defense expenditures. The determining motive has been to preserve and extend an independent defense industrial base for national political and economic reasons, recognizing at the same time that maintaining technical progress and industrial capacity depends in important part upon the success of international industrial consortia producing for markets larger than national needs. Each country has been guided by the urge to protect future weapons and technology sources, as well as domestic employment and weapons export markets.

The obstacles to collaborative acquisition in Europe are considerable. Each country's options and interests are governed by the industrial bases from which existing weapons inventories have come, by current and future resources, and by the military requirements and replacement schedules which determine national acquisitions decisions. Collaborative programs oblige agreement between prospective partners on costs, and on development and production schedules. They also oblige firm commitments on long-term major expenditures, with each participant having only limited power to vary that expenditure unilaterally. National military requirements and technical specifications, themselves the product of national staff planning procedures and service
interests, must be made to conform where technological risk and uncertainty are often high. It is these incentives and constraints, the politics of the national defense acquisitions process, which have influenced the extent and shape of collaboration efforts in Europe. And it is only an appreciation of that which permits a realistic estimate of its future.
II. NATO'S ROLE: A BRIEF HISTORY

Collaborative acquisition and the need for common operational requirements to stimulate it are objectives as old as the alliance itself. As early as 1952 the NATO Secretariat issued plans for "correlated production programs of major items of equipment," to include aircraft, artillery, vehicles and ammunition. Little came of this early effort as national authorities favored home industries in the interests of economic rehabilitation and growth, and were reluctant to finance multinational projects. Some degree of standardization did emerge over an extensive range of equipment at this early stage, the result of purchases from the US under defense assistance programs.

Procuring spare parts for such equipment brought the European countries into close cooperation on the basis of Standardization Agreements (or STANAGS) designed to retain uniform components. The NATO Military Agency for Standardization (MAS) was formed in 1951 to implement standardization, "to enable NATO forces to operate together in the most effective manner." MAS formulates STANAGS, and upon approval by a minimum of seven nations they are declared official by its chairman. Interchangeable ammunition for infantry carried weapons, the 7.62 mm. NATO basic round, was the product of a 1954 STANAG.

Limited as they were to components and procedures these agreements had little effect on major equipment purchases, especially as the contribution of national weapons industries became dominant. Some 650 STANAGS have been completed, two-thirds involving doctrine and procedures and one-third involving equipment. The STANAG is still employed as a means of encouraging equipment compatibility, but the measure of its effectiveness is reflected in the fact that an estimated 600 have gone partially or completely unimplemented. By the mid 1960s MAS's efforts at equipment standardization had been deflected by failure and frustration to the more tractable problems associated with procedural and doctrinal standardization.

A new effort to formalize procedures to agree on common requirements came in 1959 with the adoption of the NATO Basic Military
Requirement (NBMR). The lack of progress in procurement collaboration was ascribed to the absence of precise and fully defined military requirements among the member states. If each were aware of the alliance's future military needs, so the reasoning went, each could plan national force structure in accord with overall NATO requirements. A NATO Armaments Committee was established to deal with weapons planning in the research and development stage; it was now recognized that if joint action were to produce results it would have to precede the production phase.4

Reaching a formal NATO military consensus in weapon systems design was an arduous, and makeshift process in which the major output was made by NATO's military staff. Inevitably, each contributed to some extent a national military viewpoint, and wherever possible tried to influence NBMRs to meet national, research, development and industrial capabilities. If national and NATO interest coincided, agreement was reached. If they did not, agreement might have been reached but was not implemented. In effect, the process in NATO has been to agree upon what is agreeable, with the overall result that agreement has been reached on marginal components or systems. In theory, NBMRs were to be mandatory, but few were actually turned into equipment.5 Strictly national requirements continued to be generated and national projects to be set in motion without due regard to NBMRs. In 1962 an official appraisal of the process concluded that NBMRs were not "developed in a systematic manner" and were not "based on a common NATO strategic and tactical doctrine."6 The NBMR experience demonstrated that common requirements were a necessary, but not a sufficient, condition for generating collaborative projects.

By the mid-1960s, NATO's failure to expand collaboration was evident. Major joint acquisition projects to date had been industrial cooperation agreements among two to five NATO states, achieved for the most part outside of the formal alliance framework. They were testament to the inability of 15 NATO countries to agree upon common military requirements. The NBMR concept was abolished and in its place new and more flexible procedures were established. The effort to establish NATO-wide agreement on military requirements was relinquished,
a realistic bow to national particularism. It was agreed that procurement collaboration could begin on the basis of proposals from any country or from the NATO military authorities. If at least two countries expressed an interest in (or submitted) a proposal, a NATO group of potential participants was formed to discuss it. As talks progressed, those countries deciding against participation would drop out. The remainder could agree on specifications, and plan research, development and production of the equipment, including timing and cost estimates.7

When final commitments to proceed are ready to be made, a joint report is presented requesting NATO's formal imprimatur that the undertaking be designated a NATO project. From that point on the partner countries formulate their own management and production arrangements.8 A project management agency comprised of the participants is formed under NATO's nominal aegis; in the case of the MRCA the NATO Agency for the Management of the Multi-Role aircraft, or NAMMA, was established and based in Munich. But the relationship between NATO authorities and project participants appears to be purely formal. NATO monitors the progress through an annual report submitted by the collaborating states. The latter also promise to permit other NATO states to join the project at a later stage on reasonable and equitable terms. In fact, this is the concern of the governments themselves; NATO has no authority to influence or intervene. Participant nations also reserve the right to withdraw from projects, not an uncommon occurrence given a normal development period of eight to ten years. Among those factors which have prompted withdrawal have been changes in national military requirements, financial difficulties due to unpredictable increases in development or unit costs, and technical difficulties which have delayed production schedules. Better known cancelled projects include a French-British variable geometry wing fighter aircraft, the US-PRC VSTOL fighter aircraft and MBT-70 tank, and Belgian, Dutch and Canadian withdrawal from the MRCA project.9

NATO's role has been limited but not unimportant. It does not initiate or manage collaboration projects, but it can provide a forum for the cooperation of member states. Since 1966 that forum has been the Conference of National Armaments Directors (CNAD). CNAD acts as a
clearing-house for equipment proposals and has the capability to evaluate their technological feasibility, something which NBMR procedures failed to do sufficiently because proposals were generated and evaluated largely by military personnel. The Conference meets bi-annually to discuss military needs and technical solutions, and to develop plans with the goal of encouraging multilateral acquisition. In 1968, to propitiate conditions for multilateral contacts between government and industry, CNAD established the NATO Industrial Advisory Group (NIAG), representatives of national defense industry associations or members of individual firms who represent their national defense industries as a whole.

Although CNAD is in a position to outline future weapons requirements from the standpoint of collective defense, the projects undertaken between 1966 and 1971 involved very few nations, and contributed only marginally to standardization and interoperability. Beginning in 1972 CNAD began to single out weapon systems and to prepare specific proposals for multilateral cooperation, but without major success. The obstacles continue to be preeminent national economic, military and political considerations. In reality, national procurement planning and decisions continue to by-pass NATO. From an institutional standpoint, the lack of success may have been due also to the ambiguity in the roles of CNAD national representatives, simultaneously assigned to encourage multilateral acquisition and, at least tacitly, to represent national military and industrial interests. Only when those two converge has there been progress.

CNAD has a counterpart in the Eurogroup, an informal association of ten European members of NATO established in 1967 to increase the effectiveness and cohesiveness of the European contribution to the alliance. In 1972 Eurogroup ministers adopted a set of principles designed to avoid unnecessary duplication of effort in acquisitions and to extend collaboration. They undertook to keep one another informed of replacement schedules and plans for future military equipment with a view to identifying areas of cooperation. National military requirements for new equipment are discussed during the planning stage within the Eurogroup, providing the opportunity for interested states
to harmonize requirements and explore joint acquisition.\textsuperscript{13} To date, however, the Eurogroup has had little specific effect on the initiation of new projects.

One obvious gap in this effort to provide a more effective organizational framework has been the absence of French institutional participation. France's advanced weapons technologies and its relevant industrial capacities make the country an important, even essential, element in European collaborative procurement efforts. In practice, refusal to participate in joint military planning bodies has not prevented successful French weapons acquisition cooperation with a variety of European partners, above all Great Britain and Germany. Indeed, France could hardly be a more active or integral participant. Moreover, as budgetary pressures have increased, and as technological and sales competition has stiffened, in particular from the United States, the French government has altered its almost doctrinal view that ad hoc procedures provide a sufficient framework for acquisitions collaboration. In late 1975 France decided to join the so-called "Independent European Program Group" (IEPG), a spin-off of the Eurogroup but--a French precondition--entirely independent of NATO. The IEPG expands the Eurogroup's efforts to facilitate and encourage joint acquisitions. In view of the studied independence of French defense policies, it is a departure which acknowledges the utility of a permanent multinational coordination agency.\textsuperscript{14}

Work within the IEPG has focused on the problems of collaboration in a much more detailed and serious-minded fashion than has been the case in NATO. In the effort to establish a successful formula, committees within the IEPG have addressed such questions as work and cost sharing, the transfer of technological know-how, arms export policy issues, and the procedures to be followed within joint projects from the concept through the production stages.
III. THE NATIONAL MOTIVES AND PRESSURES BEHIND EUROPEAN COLLABORATION

UTILIZATION AND PRESERVATION OF EXISTING CAPACITY

The impulse to utilize and to preserve existing capacity is a strong determinant in national weapons acquisition, and is no less important in collaborative acquisition. Those countries which have significant research, development and production capabilities often feel compelled to choose a national product if feasible, or to ensure that national industries are utilized to the maximum extent in collaborative projects. Since the overriding factor governing the prospects for joint acquisitions is the interest of the major European countries in the health and competitiveness of domestic defense industries, collaboration could be defined as the pursuit of national ends through international means. Thus collaboration has involved integration of specific equipment markets, but not the long-term integration of R and D or production capabilities based on national specialization.

Specific national motives for collaboration have varied from project to project. In all cases, however, they appear to have been as much the product of economic and industrial considerations as of strategic and military objectives. Furthermore, production costs and production efficiency have been important, but secondary, concerns. For Britain and France collaboration has proved to be the means to maintain existing capacity which might otherwise have succumbed to rising resource restraints. For the FRG collaboration was and is a way of establishing new defense industrial capacity, and developing technology and design capabilities. The MRCA project is representative of these objectives.

Since the mid-1960s the European defense industry as a whole has adapted to intense American competition, as well as to higher R and D costs, through increased concentration. This trend has seen the disappearance of smaller firms through a process of amalgamation. The most important mergers have included Dassault and Breguet (1971) in France, and BAC and Hawker-Siddely (1974) in Britain; in Germany all indications are that VFW-Fokker and Messerschmitt-Boelkow-Blohm will be merged in the near future. The relatively smaller national demand
for military aircraft and other advanced weapon systems in Europe as compared with the US is another pressure which has argued for the amalgamation of aerospace and other high technology defense markets.\textsuperscript{17}

**DISTRIBUTION OF HIGH R AND D COSTS THROUGH EXPANDED EXPORTS**

The central problem for Britain, France and Germany is that of rising unit costs due in large part to the higher development costs of advanced technology. One way to hold down unit costs of new systems is to amortize the costs of R and D and tooling over longer production runs. Further industrial contraction or production stretch-outs are not attractive options. Decreasing production does not decrease R and D costs which remain constant or grow, but are more difficult to support at existing levels because of decreased production. Indeed, "to survive at all," in the words of a French official, "[the European armaments industry] must keep up its present level of output."\textsuperscript{18} A steady, uninterrupted effort to continue technological progress, is regarded as possible only if current capacity is preserved. That capacity, in the view of policy level officials, can only be maintained on the basis of exports.\textsuperscript{19} The attraction of collaboration as a means of distributing R and D costs and of ensuring the expansion of exports is obvious.

International collaboration does derive from the desire to economize. But rationalization across national boundaries is supported only to the extent that it does not compromise preservation of extant defense industrial facilities and related national objectives associated with maintaining an advanced, comprehensive defense-industrial base. There is advocacy of greater commonality of weapons produced, as well as larger production runs of individual series, but scant support for further rationalization which might involve long-term national specialization or the relinquishing of national capacity. It appears to be established practice that considerations of cost effectiveness and industrial efficiency must avoid creating disequilibria in the socio-economic environment, which is one effect that sectoral optimization in defense industries would have.\textsuperscript{20}
MAINTENANCE OF A DIVERSE NATIONAL TECHNOLOGY BASE

One reason for the absence of a more integrated, specialized, and comprehensive approach to defense R and D is the strong national reluctance to become technologically dependent upon allies by relinquishing national capabilities. High R and D costs and insufficient national markets constrain European governments to collaborate. (Indeed, in the case of some high cost, complex systems it may be a question of collaborating or doing without.) Obviously, some form of dependence ensues. The process of collaboration, however, has been governed by the desire to limit dependence as much as possible, to ensure that technological progress deriving from collaborative efforts results in the maintenance of national technological diversity, not in rationalization and specialization. Each of the three major European powers wants at the least to maintain its own aerospace, electronics, and communications industries, and, what is directly related, an advanced defense industrial base. These objectives militate against technological integration.

Specialization in R and D has also been difficult to achieve for political reasons. The national technology policies of Britain, France and Germany in the defense sector transcend economic motives of national profit and employment, and of ensuring a proportionate "just return" from collaborative efforts. Their competition for power and influence within Europe, as well as national political and economic ambitions which extend beyond Europe, are also important determinants. Genuine interdependence (that is, specialization) has its political preconditions, which do not necessarily involve the surrender of national sovereignty, but which would oblige a level of political trust and certainty with respect to future patterns of cooperation in Europe which does not now exist and which is unlikely to be achieved in the foreseeable future. It is a reflection of such basic attitudes that until now national governments have shown a willingness to pay a premium in order to avoid dependence of a permanent sort within the framework of collaborative European defense projects.

The effort to limit dependence is evident in the insistence by each participant that it retain access to all technologies, and in the case of the three major countries, national production capability for
The weapon systems as a whole. (French, British and West German defense officials have claimed that each country retains the technology and production know-how derived from collaborative projects which would enable domestic production of all jointly developed weapon systems. This is something which could hardly be achieved, however, without incurring large penalties in both cost and time.) One visible result of the national objectives to avoid technological integration is that—at least until now—no international industrial mergers have resulted from the collaborative process. Another is the reluctance of European governments to assign exclusive prime contract responsibility or full design leadership for total system development to other European firms in important part because of the potential technological dependence which such division of labor implies. For example, five firms from three countries share responsibility for the MRCA airframe.\(^{21}\) One possible result of this process is the international spread of R and D capabilities (each country benefiting from joint developments) accompanied by the greater national concentration of R and D resources into the larger and technologically strong firms which have collaborated in the projects.

**PRESERVATION OF NATIONAL DEFENSE CAPABILITIES**

The practical possibilities of greater defense specialization, of limiting national military industrial capacities and relinquishing balanced national forces, are circumscribed by a host of considerations central to national sovereignty and economic well-being and by political uncertainties which could alter national defense needs in future. Such specialization, even of a limited sort, presupposes political decisions which would embody a qualitatively enhanced political commitment to the alliance. Failing such a commitment, could a state which had relinquished its navy to depend upon that of a neighboring state rely on its ally in crises now unforeseen and unpredictable? Would that ally submit to prior pledges of military support which could involve it in crises in which it had less than a vital interest? Are not apprehensions justified that defense collaboration which breeds specialization would relegate a nation to second class technological status in certain critical areas in comparison with its defense partners—with disadvantages for its advanced industries as a whole?
A certain amount of de facto specialization in force structures has taken place over the past two decades: few European armies have comprehensive military capabilities or are equipped or trained to fight anywhere but in their immediate national neighborhood. If operational limitations have been imposed upon national forces, however, they have been the result of national decisions calculated on the basis of national strategy or resources, and the reduction of expenditures and the scaling down of national defense postures. Nowhere has the issue been addressed of relinquishing national capabilities in favor of surrendering them to allies. Few collective efficiencies, military or economic, have resulted.

Reservations about depending on weapons imports, and misgivings about the political dependence this may breed, have encouraged most European states to maintain and develop indigenous weapons industries, however limited. The procurement policies of Britain and France have been the most comprehensive. In the first two decades following World War II a broad defense base was considered necessary to support foreign policies which might have obliged military action far from Europe, and independent of allies. These ambitions have been less important during the last fifteen years. But both in size and capabilities their force structures and industries still reflect military strategies that dictated preparedness for a wide variety of conflicts, and a need for unhindered domestic weapons sources. Furthermore, the impulse is still strong to ensure unrestricted national access to and use of military hardware. Since the early 1960s, however, the pressures of rising defense costs and shrinking resources have forced both Britain and France to moderate a strong preference for unilateral weapons acquisition. But collaborative projects continue to be guided by the objective of minimizing encumbrances of any sort on the use or supply of jointly acquired hardware.

Since West Germany entered NATO procurement policy has been politically determined in large part by its security dependence on the United States. Bonn's heavy dependence on American supplies, however, permitted the rapid outfitting of the Bundeswehr with a broad range of weapons, and reinforced Germany's political/security dependence. In the mid-1960s German purchases of US defense equipment were used by
agreement to offset United States troop costs. Military purchases from
Britain served the same purpose. Germany's second largest supplier has
been France, a policy also politically motivated, at least in the 1960s,
by Germany's view of weapons purchases as part of the general policy
of Franco-German reconciliation.23

BUDGET RESTRAINTS AND SAVINGS THROUGH COLLABORATION

A prevailing political climate of detente, European expenditure
commitments in the social sector, economic malaise and inflationary
crises have combined to make major increases in European defense bud-
gets unlikely. Equally as significant as the prospect of limited
growth in European defense budgets is the change in their structure.
As a proportion of total defense expenditures manpower and operating
costs have risen over the past decade while allocations for equipment
have generally fallen. The key question is the extent to which research,
development and procurement budgets in particular have fallen victim to
reduced GNP growth rates and to increases in social costs. Specific
and detailed analyses or comparisons are difficult to make. But one
thing is clear: when cuts come in European defense budgets they tend
to come in equipment expenditures. The trend is likely to continue.
Moreover, the cost of replacement systems has been considerably greater
than the cost of the systems they are designed to replace.24 While it
is subject to qualification, the choice, simply put, is to accept a
qualitative decay of force structures or to modernize at the cost of a
reduction of numbers.

This brings us to the issue of the presumed savings associated
with collaboration. There seems to be a common assumption that collabor-
ative procurement can produce considerable savings. But there is
ever reason to question the extent of possible savings. At a West
European Union symposium held to address problems of armaments coopera-
tion, officials and industrialists questioned whether collaborative
programs and the way in which they have been organized thus far had
proved to be more cost efficient than the proliferation of individual
national programs.25
Many estimates of potential savings through collaboration are based on assumptions that alliance-wide specialization can be achieved and duplication eliminated, especially in R and D. Aggregate estimates of R and D duplication in Europe and within the alliance as a whole, and possible collective alliance efficiencies (such as appeared a few years ago in the so-called Callaghan Report) are macroeconomic appraisals which only make plain that egregious diseconomies exist. One of the weaknesses of such analyses is that they have done little to point the way toward practical means of savings. Estimates of possible savings have varied from one to in excess of ten billion dollars per year in comparison with existing aggregate expenditures. But such savings could be achieved only if NATO were a more, if not fully, integrated alliance and acquisition could be fully rationalized. This would call for each country's acceptance of the principle of international comparative advantage in regulating its defense acquisition, and probably its role in NATO strategy as well. In short, it would mean the acceptance of specialized and limited roles, a politically unrealistic prospect.26

Despite the acknowledged diseconomies in weapons acquisition, much suggests that the difficulty of verifying economy of scale savings accruing from joint acquisition is itself an obstacle to achieving those savings. This is due in part to the fact that no precise analysis of the structure and capacities of European defense industries has been available. No broader, let alone comprehensive, view of rationalization has ever been realistically possible.27 Furthermore, to the best of the writer's knowledge, no successful efforts have been made thus far to quantify specific losses of efficiency or potential savings in areas realistically amenable to collaborative policies or, for that matter, to specify actual savings derived from past or current European collaborative programs. The paucity of detailed comparative cost data means that it is difficult, if not impossible, to verify the economies which might result from greater collaboration.28 More systematic, detailed, quantitative analyses could enable calculation of potentially high pay-off collaborative acquisition opportunities.29 The shortage
of data is to blame not only for the failure to initiate more collaborative projects, but probably also for the cancellation of a number of projects already under way in which rising costs, delays, and market shrinkage were more difficult to anticipate.

It is unlikely that a general rule can be established for savings or cost increase in collaborative weapon systems programs. Potential savings and cost increases will probably vary with each case. For one thing, it is difficult to verify the exact increase in the cost ratio because there is never an identical project to which the collaborative one can be compared. For another, because the typical weapon system involves procurement of at least a few hundred items, costs depend heavily on factors such as how development and production work is distributed among participants, their relative efficiencies, the availability of supplies, local labor supply, industrial capacity and backlog, and the extent to which national requirements can be harmonized in a single product, i.e., how many versions of the same basic system must be produced to satisfy all the nations involved. In this connection it should be noted that there are more factors involved in cost reduction than simply producing a greater number of units. The relationship between cost reduction and units produced tends to be a direct one when those units are produced by a single production line and when they are identical. Multiple production lines and variations of a basic design tend to diminish the cost-reducing effects of larger production runs. All of this suggests that each weapon system which is a candidate for collaboration must be examined separately and in detail to determine the economic effect of an increased production rate.

STANDARDIZATION

Another motive for collaboration is presumably the standardization of military equipment. But here motives differ on either side of the Atlantic. To oversimplify, we in the United States have endorsed collaborative procurement as a means of achieving standardization—compatibility in military equipment, as well as in logistics, doctrine, and procedures, which may extend from their complete identity to their simple "interoperability"—and we tend to emphasize the collective
benefits in military efficiency which, it is assumed, will accrue. On the whole, the Europeans acknowledge the military benefits of at least a degree of standardization but, reflecting economic priorities, have rather endorsed it as a means for achieving collaborative acquisition. The priorities are reversed. It is less the pursuit of collective military efficiencies which motivates the Europeans, than the perceived economic necessity of collaboration. One indication of the European attitude is that although the military benefits conferred by standardization through joint acquisition may be acknowledged, such approval has been insufficient to persuade European nations to collaborate where technological and financial pressures have not been overriding. Thus far, joint acquisition projects like the British-German-Italian Multi-Role Combat Aircraft (MRCA) represent ad hoc responses to economic pressures, limited budgets, the spiraling costs of advanced technology, and the need for larger markets to offset costs and distribute the investment burden. Such problems are not unimportant or unfamiliar to American defense planners, but their magnitude and immediacy are considerably greater in Europe.

Standardization and collaborative acquisition, all too often regarded as one and the same, are in fact quite separate issues. Given the wide variety of existing weapons, even partial standardization (i.e., different national forces deploying the same weapons) can only be an incremental process. Furthermore, in the past collaborative acquisition has not necessarily resulted in wholly standardized equipment. Such weapons are intended for incorporation into national forces under national command; different national versions have been produced and—for example, in the case of the Jaguar and MRCA—they have been subject to national modification. Even where existing systems have been produced under license in Europe, the product has often differed significantly from the original design. Because there were no provisions for standardization and interoperability with US aircraft, the F-104G produced in Germany, for example, was considerably different from its US counterpart.

The postulate that standardization of equipment translates directly into greater military effectiveness is not universally accepted either
among students of the problem or professional officers. Despite commonly held assumptions about the military value of standardization, putative gains in military effectiveness are often difficult to demonstrate. This may account for the dearth of quantitative, as opposed to qualitative, appraisals, even in the specialized literature. Pentagon officials responsible for standardization have acknowledged the difficulties thus far in devising convincing quantitative measures. Precisely because standardization questions have only been addressed hypothetically, questions remain. For example, should one nation forego a better weapon, or one which conforms precisely with its own military requirements, for the uncertain military benefits of standardization? If national commands retain the responsibility for providing logistics support, why would standardization of equipment necessarily confer significant military advantage, apart from emergency interoperability? Standardized equipment would enable the joint procurement of support items like spare parts. But if there were no central planning or administration of logistics, not only would life-cycle economies be limited, but military effectiveness could be curtailed, standardized equipment notwithstanding. National armies would still be restricted to their own defense sectors, to their own logistic "tails." In other words, standardization of equipment without more genuine military integration might contribute only marginally to military effectiveness.
IV. THE SHAPE OF COLLABORATION

CONCENTRATION IN HIGH TECHNOLOGY AREAS

Those forces which both encourage and restrict collaboration also shape the collaborative effort. European projects have been concentrated in what national participants evidently see as seminal military technologies, above all in aerospace and electronics. This is probably because:

a) these technologies are regarded as strategic to maintaining advanced national defense industries and competitiveness positions in third markets, even if they are to be shared;

b) they would require unacceptably high R and D budgets to support strictly national programs;

c) they are perceived as having a high "spillover" value for related civilian industries.

As the relatively small number of major projects (some ten to twelve) thus far suggest, the UK, France and the FRG have shown themselves willing to collaborate primarily when the national quantity required is too small to justify the development costs, or if a single nation does not have the technology or the development capabilities available. This also helps to explain the concentration on major weapon systems: if the weapon can be developed and produced within national means at acceptable cost and the national market is sufficient, the preference appears to be not to collaborate.

The relatively greater distribution of collaborative projects in the more advanced equipment—combat and other fixed-wing aircraft, helicopters and guided weapons—reveals where the economic and technological incentives to collaborate are strongest. The more technologically advanced a weapons project is, the greater is the prospect of escalating costs, inadequate research and development capabilities and ultimate failure, and the more compelling is the logic of risk-sharing and joint investment. More conventional systems and technologies such as armored vehicles either require proportionately less R and D expenditures, or the UK, France and the FRG have sufficiently large national
production runs to obviate the need for collaboration. There is little reason to expect that this pattern of selective European collaboration in aircraft and missiles will change in the future.

LACK OF LONGER-TERM INDUSTRIAL INTEGRATION

Another characteristic of collaboration has been the lack of long-term industrial integration. Thus far, each co-development project has been ad hoc and self-contained: each has been negotiated on the basis of the principles that each participating country receive a share of the benefits proportional to its costs (or the number of units to be procured), and that this be achieved within the framework of that particular project. There has been little equalization of costs over several projects, (although some inter-project balancing has occurred.) There has been no overall planning which would permit the disproportionate allocation of tasks among different projects to exploit specific national advantages, and the determination of equity by systematically extending the costs and credits derived from one project to another, a process which could imply continuing industrial integration. Achieving equity has often involved constant renegotiation during the life of a project against a background of cost escalation and changing currency parities to insure the agreed distribution of benefits. Notwithstanding the separate character of each collaborative project, the cumulative effect of a number of them may adumbrate a form of industrial integration, a subject which will be addressed later.

RESTRICTED NUMBER OF NATIONAL PARTICIPANTS

The advantages of distributing high-risk development costs and creating larger markets to reduce unit costs argue for increasing the number of collaborative participants. But inherent in the collaborative pursuit of national defense industrial capabilities and commercial competitiveness is the apparent tendency and the incentive to restrict the number of countries in any one project. The complexities of managing a collaborative project increase with the number of participants, as, apparently, do the costs and schedule delays. This has made officials in all three countries apprehensive that collaboration will
"deteriorate" as the number of nations involved in a particular project grows. While there are advantages to collaboration, there are also disadvantages and inefficiencies, and the latter tend to grow at a faster rate than the former in proportion to the number of participants. For these reasons, the main European collaborative development projects have consisted of two or three participants. Indeed, the MRCA project stands out as one of the few major development undertakings to integrate the work of three nations. Other major efforts have generally been Franco-British or Franco-German in composition.

Even where collaboration is longer-term and successful, participant nations remain reticent about expanding industrial consortia. Euromissile, the Franco-German consortium that has successfully developed and produced three tactical missile systems since 1963, will presumably be expanded to include the British Aerospace Corporation for the joint development of an anti-ship missile (under the tentative rubric of Anti-Ship Euromissile--ASEM). The inclusion of Italy as a fourth participant, however, has evidently been resisted. The tendency to limit the number of national participants in individual projects suggests that it is unlikely that future collaboration in development of total systems, especially in the aircraft field, will come to include more than three participants, let alone grow into more inclusive European endeavors.

**COLLABORATION AS A POLITICAL PROCESS**

It should be apparent that by its very nature collaboration is bound to be intensely political. Participants in collaborative acquisition programs seek a common product, but they also seek a comprehensive return--in technology acquisition, employment benefits, allocation of production and sales, and other outputs--proportionate to their share of program inputs. This can be a very different thing from simply obtaining a fixed number of aircraft or missile systems which corresponds to a percentage of program equity. Those pressures and interests which influence national acquisition policies quite naturally seek to influence international programs to ensure optimal national or sectoral outcomes. Furthermore, in order to reach agreement on collaboration, efficiencies must often be traded off to assure equity.
European experience in international industrial projects generally has shown that in negotiating agreements governments are prone to advocate the cause of national suppliers. Given the strong official interest in supporting the progress of national industries, the tendency is for government support to be shifted into international negotiations on collaboration. A national requirement, industrial capability or design may be put forth as the model for international acceptance. Or compromises might be sought in the interest of compatibility and reaching agreement, but to the maximum degree possible they will accommodate all national objectives. The degree to which these objectives will influence individual collaborative efforts will vary. The point to be emphasized is that the dynamics of collaboration may subordinate objective consideration of performance standards or cost effectiveness considerations. In the language of one analysis, "the setting of a technical specification to fill [a] performance requirement may derive rather from the relative (bargaining) power of the participating [firms or governments] than from technical and cost considerations."

Other outcomes are also possible. Rather than expressing genuine single or unitary requirements, the requirements of collaborative systems are liable to be an amalgamation of various national requirements, reflecting compromises made in the program formulation phase (compromises which may continue), and suggesting that the participants have not given absolute priority to overall program requirements over certain national demands such as the incorporation of certain specifications. Furthermore, in order to reach agreement on a basic design individual nations may be obliged to purchase capabilities they do not necessarily need. One view of collaboration as a highly politicized process is set forth by Mr. Allen Greenwood, Chairman of the British Aerospace Corporation. The past few collaborative projects (the reference apparently includes the MRCA) have been governed more by political than strategic considerations, according to Greenwood. Companies have frequently been chosen for reasons "which are based on criteria neither of industrial efficiency nor technical quality. The management of these enterprises is often bedeviled by political pressures."
Renegotiation appears to be a continuing process and problem. Changes in specifications or other project areas, depending on their magnitude, can often be negotiated within the international program management organization. But program changes (especially equipment specifications) often have to be ratified by authorities within the national defense establishments. Decision authority at the program level, in other words, has been typically diluted by the need to consult with and to coordinate the positions of authorities in two or more governments. Vital decisions may therefore be as much the product of political-social-industrial considerations in individual countries as those limited to the program itself. 36 Strictly national programs are not immune to such pressures. But the nature and number of pressures in international programs often differs. For example, maintaining originally agreed national equities obligates the redistribution of work between nations once the project is underway in response, for instance, to changed currency parities. This introduces a dimension of complexity into the management of collaborative programs which does not obtain on a national basis. The need for continuing compromise over a collaborative program's life is obvious, although the extent of the penalties which a program might incur as a result (in delays, for example) is not clear.

It is probably a safe generalization that the newer and more sophisticated the technology of a collaborative weapon system is, the more difficult program management problems are likely to be. The prediction of technological and cost risks are rendered more difficult. Establishing and maintaining a common international requirement naturally gives rise to more debate within the national services. As a result, the number and complexity of program decision points increases.
V. GENERATING COMMON MILITARY REQUIREMENTS

The existence of similar, if not identical, operational concepts clearly facilitates collaboration in weapons acquisition. But within NATO operational concepts have been established, by and large, according to national rather than collective criteria, and by national defense ministries and services. The result is that national military concepts, and therefore operational requirements, differ markedly. The lengthy and ultimately unsuccessful efforts of Britain and Germany to reconcile contrary tactical concepts of tank mobility in order to collaborate on tank design and production provide an example of differing national concepts. The British emphasize the tank's role as the focus around which cluster ground combat units; the Germans stress high mobility, speed, and the tank's capacity as a basic fire unit. Technical problems encountered in the MRCA project, to cite another example, arose in large part from the fact that the aircraft's initial requirement fused the divergent operational needs of Britain, Germany and Italy in a way that forced designers against technical boundaries. Such examples are numerous. The point is that in the absence of a common concept, achieving coherent, feasible military requirements is difficult. The most recent German White Paper singled out a "unanimously agreed analysis of the threat and a common (operational) concept [as a] prerequisite to harmonizing military requirements."37

Commonly agreed operational concepts can facilitate actual collaboration in acquisition, but as NATO's history in this area shows, they do not assure it. If nations cannot agree on how a weapon will be used, this is if they cannot define common operational requirements, either they cannot build it cooperatively or must modify it once built. The failure of the joint German-American MBT-70 development was due, among other factors, to such typical differences over requirements as the US Army's insistence that maximum engine horse-power be available at a temperature of 125°F. That specification incorporated a need for potential world-wide deployment of the tank, and the army was willing to bear the additional expense in achieving such a performance level.
The FRG, its threat environment limited to the European theater, had little interest in such a level of performance. Similarly, the US withdrew from the four-party Field Howitzer-70 project to begin its own development program because the US army insisted that any major howitzer be air-transportable, a requirement which arose from the need in Vietnam for air-mobile artillery.

Even when similar operational concepts permit the launching of a collaborative project, participating nations may still disagree on technical problems of development, that is on operational requirements. In adapting the Franco-German surface-to-air Roland missile system for use by the US army one fundamental alteration was the adoption of a more powerful radar tracking unit, the result of differing estimates of operational needs. The US estimate of the potential Soviet ECM threat was greater than that of France and Germany. Furthermore, the French and German versions were planned for integration into a dense radar network in Europe, whereas the US version had to be capable of being deployed by itself. The US requirement was therefore for a more powerful unit. Such changes have lessened the compatibility of national systems and forced production costs higher.

Driven by economic imperatives toward greater collaboration, European nations have been willing to bend national military requirements in the interests of getting a project off the ground. A question remains, however, about the extent to which operational requirements can be genuinely harmonized at the outset and retained intact over the life of a project. To the maximum degree possible there should exist both a clear national and an international consensus on user requirements to minimize the necessity for renegotiation. Some renegotiation of the original requirement will be inevitable, due to the impossibility of anticipating the technical problems which normally attend the development of new and complex systems. Examples abound of projects interrupted or cancelled because of diverging national needs. The Mallard program, a joint UK-Australian-Canadian-US effort to develop a secure tactical communications system, foundered on the continuous need to negotiate common user requirements. This resulted in program delays, cost escalation, and the tendency of participants to reassess their
commitment to the project. In this case the United States dropped out. Both American and European experience points to the need for effective machinery for agreeing on common requirements between military service staffs at the senior level in the early concept phase of acquisitions planning. And throughout program life the need is to identify and to coordinate tactical concepts and staff requirements as early as possible, and to ensure that they continue to be monitored in a spirit of compromise at the same senior level.
VI. ISSUES IN US-EUROPEAN COLLABORATION

We now turn to some of the issues associated with transatlantic collaboration. As much of the discussion has indicated, Europe is anything but monolithic with respect to weapons acquisition interests and policies. Even generalizations about the three largest states are subject to numerous qualifications. Now as in the past, however, there is general interest in Europe in defense equipment collaboration with the United States. Interests differ as a consequence of national priorities.

Similarities in economic and technological scale and motives between Britain, France and Germany confer similarities of interest. On the whole, these differentiate them from smaller states and directly affect their perceptions of and approaches to collaboration with the US. Each of the three large states has attempted to keep pace with advances in military technology; each sustains relatively comprehensive, sophisticated defense industries, as well as substantial markets in Europe, and in the case of Britain and France, beyond. Each is in a position of having both to compete and to cooperate with the United States, and each seeks forms of transatlantic collaboration which protect the ability of their defense industries to do both. One result, is an expressed preference for co-development—as opposed to production under US license—which they view as the optimum means for acquiring new technology in a cooperative framework and for assuring its subsequent commercial application.

This section briefly recalls past US-European collaborative experience—in which European nations were the junior partners—as well as its legacies. The continuing American advantage in military technology, it suggests, augurs for more rather than less cooperation with Europe. But future partnership—whatever forms it may take—will be shaped by an attraction/repulsion syndrome in the attitudes of European countries. Some of the more important issues associated with the "two-way street" trade in defense equipment are also addressed, including European preferences with respect to its implementation, and the impediments to collaboration which derive from American third-country sales policies.
Much as been written about the "technology gap" between the US and Europe, the relatively greater rate of American technological advance. Though the phrase may have lost its currency, an American advantage in advanced weapons technology still exists, the product of larger annual R and D expenditures, a larger home market in which unit costs are usually lower, and normally shorter development times.\textsuperscript{40} The United States produces more sophisticated weapons over a wider range than any European competitor. But the European capacity and potential are considerable and, on the whole, European industry's ability to satisfy European defense requirements has increased over the past two decades. This is due in part to the diffusion of technology which began with the licensed production of American weapon systems in the late 1950s and early 1960s and also to the independent advance of European industry itself.\textsuperscript{41} Precisely where and by how much US defense-related technological capabilities exceed Europe's--collectively or nationally--are questions which have not been answered satisfactorily. Accurate estimates are difficult, and often impossible. A recent DoD study cited as a fundamental problem the lack of information available on European systems development work, on production and engineering capabilities, and even on newer systems in production.

What the US lead means in practice is that the possibilities for "Europeanizing" the acquisition of advanced weapons are limited. The level of dependence on US technology is already high and pressures for continued transatlantic cooperation are strong. For the Europeans this is in some areas a partnership born of necessity. The degree of specialization in electronics equipment, for example, is such that parts required for modern weapon systems may have only one or two sources and these are often in the United States or controlled by US patents. Furthermore, a large share of the European electronics industry is US owned. One IISS study estimated that "every advanced aircraft produced in Europe (civil as well as military) contains a number of components of American origin for which there is no European source."\textsuperscript{42} The MRCA has
an avionics package much of which is of American origin.\textsuperscript{43} In sum, the growth of European defense technology industries, and their ability to develop and produce complete weapon systems, depends upon some form of cooperation with the United States. A strategy whereby European governments would seek to fashion their own unity in opposition to the United States, at least in the crucial field of advanced weapons technology, would be highly improvident, and is unlikely. In practice, there is every effort on the part of the Europeans to encourage collaboration with the United States but to channel it in high technology areas where the US lead is considerable, and where the technological payoff to the Europeans is greatest.\textsuperscript{44}

Earlier coproduction of US systems in Europe under license—among the more important were the Hawk surface-to-air missile, the Sidewinder air-to-air missile, the Bullpup air-to-surface missile, and the F-104G combat aircraft—were separate intergovernmental agreements involving the export of US equipment and technology. In some cases, European nations lacked the technology to produce similar items. In other cases they did not: Britain and France were producing independently designed weapons with equivalent functions and therefore participated, respectively, only in the Bullpup and Hawk programs.\textsuperscript{45} In each case the Europeans adopted an American model to satisfy a military requirement, and then produced it under license. Consortia were formed, each participant receiving contracts proportionate to its share of the collaborative program. A management organization was established for each project under a formal NATO umbrella, but was staffed only by people from the participating countries. The advantages for the Europeans were that equipment could be rapidly incorporated into their forces; each country's expenditures remained mostly in its domestic economy; cost advantages were achieved as a result of large-scale production (albeit at greater cost than direct purchase); and new missile and aircraft technology, as well as American management techniques, were learned. Furthermore, new industrial capacities were created for each of the participants: for the Germans the F-104 was the first production of a major advanced weapon system. The project was seminal in enabling the growth of an advanced domestic aircraft industry.\textsuperscript{46}
There were considerable disadvantages as well for the Europeans in these four collaborative production projects. Above all, the United States reaped the commercial benefit, and gained a sure place in the European market. One result was that in the decade of the 1960s the United States sold ten times as much military equipment to Europe as it imported from the Continent. These early collaborative efforts demonstrated to European governments the extent to which they could become the hostage of US technology, but--equally as important—the feasibility of carrying through such large-scale and complicated projects. The F-104C program was in fact the most ambitious collaborative program ever implemented within the alliance, and it served as an impetus for the Anglo-French Jaguar fighter aircraft project begun in 1965. This and the bilateral Martel air-to-surface missile involved the two European countries for the first time in a degree of complimentary military industrial specialization. The Jaguar project was among the first in which decisionmaking in the development of a major advanced weapon system for national forces had to take into consideration the defense requirements of another country. This was the first case, in other words, in which operational requirements were made to coincide. It was a political departure for the participants, necessitating a reciprocal scrutiny of tactical concepts, compromise on requirements, and reconciliation of vested service and defense industrial interests.

In sum what the larger European states collectively fear is not cooperation with the United States, which all recognize as essential, but an over-reliance on American weapons technology which might vitiate European R and D capacities and future commercial competitiveness. This extends to nonmilitary industries as well. Generally speaking, the perception seems to hold sway in Britain, France and Germany that it is only the growth of indigenous capacity which can attenuate what is often regarded as American "technological colonialism." The desire to limit dependence creates a strong impulse, if not a preference for collaborative acquisition projects on a European basis. The perception is that direct imports of finished American weapons will do little to maintain indigenous European R and D capacities, or to sustain a competitive European sales position in third markets. Coproduction under US license,
each country building a portion of a system for European assembly, is economically advantageous inasmuch as it preserves or creates jobs in Europe. But because such collaboration does not do enough to maintain or stimulate independent European R and D capacities, the apprehension is that in the longer run coproduction is a solution to the "two-way street" problem which would transform European advanced weapons industries into the stepchild of US technology.

THE TWO WAY STREET

Between 1971 and 1976, NATO countries purchased military equipment from the US in the amount of $4.5 billion; US purchases of military equipment in Europe amounted to $846 million, a 5:1 ratio. While reciprocal purchases of defense equipment in the alliance have been skewed heavily in favor of the US, total dollar expenditures by the US DoD in NATO countries during the same period were well in excess of $4.5 billion, almost three times as much according to one DoD estimate. In addition, five US division equivalents in Europe save the European states from additional large military expenditures. Yet another consideration is the US deficit in the bilateral balance of payments with some European states, above all Germany. It is, in any case, difficult to establish a generally accepted definition of equity in the transatlantic defense account. But is it equitable to characterize the defense trade balance simply in terms of equipment purchases?

It appears that what some European governments desire is an equivalent of the bilateral US-Canadian Defense Equalization Act, which provides Canadian manufacturers with non-discriminatory access to the US defense market in competition with US industry. Canadian firms which offer competitive price, delivery, and quality can obtain substantial US contracts. Legislative provisions remain, however, which restrict the scope of Canadian participation in US defense programs. Nevertheless, the result has been an approximate balance in dollars spent by each country in the other for defense equipment. It was argued earlier, however, that Britain, France, Germany and other European nations seek more than a simple financial balance in a two-way street. Through the expansion of markets they seek also to maintain a high
technology defense base, and the vitality and competitiveness of their own defense industries. The extent to which the Defense Equalization Act helps Canada maintain such a defense base is doubtful, for, with some exceptions, Canada sells low technology items to the US. All the same, the IEPC is examining the US-Canadian agreement to decide if it or a similar system of reciprocal purchases provides a model for similar European-American arrangements. 

One hypothetical arrangement that has been suggested would have Europe buy the F-15 and the F-16 off-the-shelf from the United States for the air superiority mission. The US and other allies would in turn buy the MRCA and the Alpha Jet from Germany, Britain, Italy and France for the interdiction and training missions. CNAD would maintain a system of "NATO purchase accounts," under which domestic and foreign purchases of defense equipment would be recorded, and a record of national credits and debits established. Parties to the agreement would oblige themselves to compensate one another and to redress an imbalance after a period of five years, perhaps through non-military purchases.

These particular systems aside, for an arrangement of this sort to be practicable a host of political and economic obstacles would have to be overcome in the US. The suggestion, however, reflects the attitude of many officials in Britain, France and Germany that a system of large-scale reciprocal purchases of major finished systems must be established if the transatlantic financial imbalance is to be offset. There is considerably less interest in a two-way-street in licenses because the smaller financial return on license purchases is unlikely to affect the present imbalance substantially. American production under license of Roland is an example. According to some senior French MoD officials, had the US bought the Franco-German produced Roland, the sale would have amounted to some 7.5 billion francs in export orders. As it is, the return to France from the sale of the license is only some 150 million francs.

From the British, French and German standpoints, collaboration is preferable from the outset, that is, from the development phase of acquisition. This is because co-development is seen as a means of fostering indigenous technological capabilities over the longer-term.
Co-production does not exclude this, but it often involves unwelcome restrictions on the use of US technology. Senior European government and industry officials have repeatedly stressed that proposals for improving the efficiency of acquisition in the alliance through collaboration will not succeed if that is to be done on the basis of United States equipment, either through off-the-shelf purchases or through co-production. 52

The preference for co-development of certain weapon systems has an even more fundamental reason. It is increasingly the case that FGM weapons are organically integrated with their delivery platforms. This is becoming especially true for air-launched weapons, which are interwoven into spaces on the aircraft itself. 53 There is, therefore, some apprehension in Europe that in future sub-components of US technology will be difficult to integrate into European designed and produced platforms, and as a consequence Europe will be less able to buy selectively from the United States. The fear is that, at worst, a buy all-or-nothing situation might develop. At the least, greater dependence upon US air weapon systems means potential economic penalties for the European aircraft industry. Co-development—as interpreted in Europe—means that European firms will have an unencumbered share of the technological benefits of collaboration, and not just a more equitable financial balance achieved either through offsets or through production under license.

Yet another reason for the British, French and German stress on co-development is the importance attached to beginning collaboration early in system development, before entrenched national and service interests become involved which can frustrate international programs. Transatlantic ab initio collaboration has not been the practice in the past. Once national requirements have been separately generated (or development begun on two or more similar national projects), experience shows that coordinating them is more difficult. 54

Central to any expansion of US-European collaboration will be the policies which govern third country sales of collaboratively produced weapons. The preeminent question is how greater collaboration with the United States will influence the European ability to export freely; the
answer is to be found partly in the degree to which the attraction of incorporating advanced American technologies into European weapon systems or in developing technologies in collaboration with the US will in future be offset by US restrictions which impede the export of that equipment.

Those restrictions will have two sources. The first derives from a natural American predisposition to protect the competitive advantage of US firms in third markets. The source of the second will be the Carter administration's enunciated policy of seeking to reduce arms exports. Although the transfer of weapons and related technologies to NATO has been declared exempt from such restrictions, the right of NATO nations to re-export such items has not. We have noted the importance which Britain and France, in particular, attach to weapons exports as a means of sustaining advanced defense industries. There may be a contradiction, therefore, between a US policy which seeks to foster greater collaboration with the Europeans on the one hand, and which seeks to restrict their third country arms sales on the other. "Third country sales," according to one senior European defense industry executive, "are absolutely vital to any continuing arrangement in licensing and co-production between US and European manufacturers. [They are] the 'swing factor' between a profitable and an unprofitable arrangement." The view of this executive, widely held in Europe, is that implementation of the administration's arms sales policy will lead inevitably to a reduction of US-European weapons collaboration. Furthermore, Machiavellian though it may seem, suspicions exist in Europe at the official level (expressed to this writer) that through greater collaboration the US seeks to encourage dependence in high technology defense industries on American-controlled sources of supply as a means for influencing European export policies. The hypothesis that by expanding collaborative arms acquisition, thereby expanding markets for European weapons, the US can reduce existing incentives to export to non-NATO states and reduce inter-allied arms competition is regarded with some skepticism in Europe. Generally speaking, one can postulate that to the extent the US imposes third-country export restrictions, the effect may be to discourage the Europeans from collaboration. But obviously there are bound to be many exceptions where restrictions are accepted because of the decisive importance of a specific weapons technology.
VII. PROSPECTS

National acquisition policy can be said to have essentially four driving forces: the satisfaction of operational requirements; the desire to make technological progress; the maintenance of broad defense technological and industrial capabilities and skilled labor; and the satisfaction of national economic imperatives (for example, maintaining employment levels or a satisfactory trade balance). These last three mean that defense decisions on collaborative procurement are usually industrial policy decisions as well. A central factor determining the future of collaborative acquisitions is therefore the extent to which these desiderata are subject to international solutions in collaborative programs. The problem is one of reconciling national acquisition policy and processes and national defense policy with international collaboration.

This may be more probable now than in the past because the national acquisitions choices have been narrowed by resource constraints. Joint European undertakings over the last 15 years must be viewed within the changing context of the economic and industrial situation. Against the background of presently strained economies and defense budgets, the interest in and the prospects for a more sustained effort at collaboration in Europe are encouraging. At the same time, while collaborative effort may be more necessary than ever, the following points deserve emphasis. First, the degree to which economies of scale can be achieved solely on the basis of the European market is probably limited. Second, even if the political will is present, the scope for the expansion of joint acquisition programs will be restricted by budget limitations. (The MRCA program, for example, has reportedly absorbed some 25 percent of the FRG's military R and D funds annually.) Collaboration is likely to expand selectively, future joint acquisition of major systems limited for the most part to a small number of high technology projects in the aerospace and electronics industries. These will conform essentially to national military requirements. Obviously, the possibilities for collaboration will be limited further by the number of types of systems
to be built. Third, in addition to simple defense resource limitations, the proliferation of collaborative procurement projects is excluded by national politico-military objectives and economic considerations discussed earlier. Fourth, it is unlikely that future collaboration in development of total systems, especially in the aircraft field, will come to include more than three full participants, let alone grow into more inclusive European endeavors. For the general pattern of collaborative acquisition in Europe to change considerably, more extensive dovetailing of national defense planning and budgetary processes— which now take place independently of one another—would have to be initiated.

Within these limitations, however, European collaboration may have a cumulative effect. The processes of choosing and managing collaborative projects may become more routine and the programs less easy to dissolve. Certain industrial, economic, and technological interests and objectives may begin to transcend the demands of individual projects and lead to de facto defense industrial integration, or at least to new degrees of mutual dependence. Some present programs may presage the development of quasi-permanent international industrial consortia which preserve the national integrity of participating firms, but in which a strong mutual interest and rationale prevails in continuing the arrangement. Euromissile, the German MBB and French Aerospatiale consortium, may be an example. A similar tendency toward the continuation of collaboration may be evident in the Airbus venture with possible follow-on development of new transport aircraft. Such signs suggest that interdependence, regardless of how governments try to limit it, may impose itself as an increasingly necessary goal of national policy. A decisive factor is whether or not existing industries will continue to exist as nationally viable industries. This deserves a more thorough analysis than is possible here. In sum, however, it seems safe to suggest that collaboration has not progressed to the point where structural change or the division of development and production work in or among the British, French or German aerospace or electronics industries are not irrevocable, albeit at considerable expense to the partners.

Finally, it should be clear from the discussion that "success" with respect to collaboration can only be defined in terms of a variety
of national objectives. These may or may not encompass cost savings. (Here one would have to distinguish in each case between original motives and expectations, and actual program outcomes.) Collaborative programs have proved advantageous in some respects: they have provided the vehicle for the acquisition of a limited number of advanced systems and the meeting of national mission needs; on the face of it, certain programs have enabled savings to be achieved which would have been unlikely, if not impossible, in comparable national programs; they have permitted national technological capability and momentum to be maintained in some areas of advanced weapons development which might otherwise have been impossible because of insufficient national resources; except for trade-offs in requirements, collaboration has not restricted the peace-time military choices of individual nations.

This said, however, collaboration is unlikely to offer the means for maintaining comprehensive national defense R and D and production capabilities or weapons inventories at lower cost. This is, first, because its scope will continue to be determined by available resources which will limit the number and types of projects which states can acquire concurrently, and second, because the overall savings to be achieved are problematic, calling into question any assumption that more systematic collaboration would permit savings sufficient to sustain national defense-industrial and force structure capabilities otherwise impossible on a national basis. Finally, as suggested earlier, in itself collaboration does not promise to alleviate the need for fairly comprehensive national capabilities because it has not constituted (and it is improbable that it will come to constitute) military or broad defense-industrial integration.
FOOTNOTES


2 Ibid.

3 Rhodes James, op. cit., p. 2.

4 Ibid., pp. 6.

5 Ibid., Out of 49 NRMR's promulgated up to the end of 1966, 19 had achieved no result and had been allowed to lapse, 7 had been met or partially met, and 23 were under study.


8 Ibid.


18 Address by General Marc Cauchie, Assembly of Western European Union Committee on Defence Questions and Armaments, A European Armaments Policy Symposium, March 1977, p. 23.

19 Ibid.

20 The attitude of one leading Italian industrialist is typical of those who advocate greater commonality of weapons produced, as well as larger production runs of individual series, but who shy from further rationalization. Greater commonality and larger production runs are viewed as, "the limit which should be imposed on cost reduction; to go beyond this, reducing the number of production lines and concentrating them in a few production areas, chosen on grounds of maximum economy of production and technical reliability, would lead to a disturbance of the European human environment similar to the ecological disturbance caused by the pollution of a sea. Optimization must therefore observe the existence of present production lines..." The views of Gustavo Stefanini, president of Oto Melara. Assembly of WEU, op. cit., Emphasis Added. See also, North Atlantic Assembly, Military Committee, Report on the Activities of the Sub-committee on European Defence Cooperation, presented by Mr. Klaus G. deVries (Netherlands), Rapporteur, International Secretariat, November 1976 (T 166, MC/EF [76]).


24 Although these figures may not be representative, one estimate of the increase in unit cost between generations (based on an average of 13 US systems) identified a general increase in R and D costs of 5.4:1, and in production costs of 4.2:1. Roger Facer, *The Alliance and Europe: Part III, Weapon Procurement in Europe - Capabilities and Choices*, Adelphi Paper No. 108, International Institute for Strategic Studies, London, 1975, p. 4.

25 *Assembly of WEU*, op. cit., p. 23.


28 A recent US DoD report concluded that "no precise formula to determine savings has been found." A Rand Report (R-1637-ARPA) cites the inadequacy of comparative cost data as a primary obstacle to joint acquisition planning, noting that only 60 percent of NATO's 600 five year force proposals for 1973 were able to be even crudely costed.


30 Ibid., pp. 5-6.


34 Assembly of WEU, op. cit., p. 88.

35 Greenwood continues, "...the quality of the product is usually excellent but...the cost is often higher than had been forecast...when [a] particular program is completed the partnership ceases and the process starts all over again with a fresh piece of defense equipment, new partners, new management and the educational sequences are repeated." Assembly of WEU, op. cit., pp. 24-27.


38 North Atlantic Assembly, Military Committee, op. cit.

39 Vitetta, op. cit.


43 Walker, op. cit.


Rhodes James, op. cit., pp. 11-19.


North Atlantic Assembly, op. cit., p. 8. A similar Memorandum of Understanding was concluded between the US and the UK in 1975.


See, for example, the address by George R. Jefferson, Chairman and Chief Executive, British Aerospace Dynamics Group, in Meeting Report, *International Symposium on NATO Standardization and Interoperability*, American Defense Preparedness Association, March 1978, pp. 39-42.


Assembly of WEU, op. cit., p. 23; North Atlantic Assembly, op. cit., p. 3.

According to recently articulated US policy, if an American firm is not denied permission for a third country sale, the same treatment will be accorded to a European licensee. Speech by V. Garber in Meeting Report, *International Symposium on NATO Standardization and Interoperability*, American Defense Preparedness Association, March 1978, op. cit., pp. 127-133.


"The two firms concerned," according to Guenther Kuhlo, Head of the MBB Dynamics Division, "have gradually achieved a kind of integration and neither could envisage an end to cooperation which for both firms, as for their employees, would be disastrous." Assembly of WEU, op. cit., p. 87.
