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The proliferation of different weapons systems developed by the members of the North Atlantic Treaty Organization (NATO) has increased the cost of maintaining existing forces, limited the force levels, and reduced the overall potential combat effectiveness. Findings/Conclusions: NATO has voiced a new resolve to intensify its mutual efforts to achieve more defense for the resources expended. Current interoperability initiatives are attempting to overcome the results of the present nonstandardization. Achieving standardization for the long term, however, will require identification and resolution of significant economic and political problems. Recommendations: In fiscal year 1979, the Congress should require the military services and subsequent budget hearings to point out, when they propose a new procurement or justify an existing program, to what extent the weapons system is interoperable with those of our NATO allies and how the interoperability can be increased. Funding for systems should be restricted in those cases where the Congress is not satisfied with the extent of interoperability identified. The Secretary of Defense should formulate a policy which will emphasize, consistent with minimum needs, the preference for less sophistication in weapons systems to be developed to enhance their potential for wider acceptance in NATO. The Secretary of State should initiate discussions with the other allies to ascertain the feasibility of amending the NATO agreement to permit uniform selection of weapons and equipment

(Author/SC)

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REPORT TO THE CONGRESS

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

Standardization In NATO: Improving The Effectiveness And Economy Of Mutual Defense Efforts

The proliferation of different weapon systems developed by the members of the Atlantic Alliance has increased the cost of maintaining existing forces, limited the force levels, and reduced the overall potential combat effectiveness.

NATO has voiced a new resolve to intensify its mutal efforts to achieve more defense for the resources expended. Current interoperability initiatives are attempting to overcome the results of the present nonstandardization. Achieving standardization for the long term, however, will require identification and resolution of significant economic and political problems.

PSAD-78-2

JANUARY 19, 1978

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-163058

To the President of the Senate and the
Speaker of the House of Representatives

This report discusses some of the interrelated military, economic, and political problems which must be recognized and solved if NATO standardization is to be advanced. We examined these issues because they are important to NATO's mutual defense efforts.

We made our review pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

Copies of this report are being sent to the Acting Director, Office of Management and Budget, and to the Secretaries of State and Defense.

Comptroller General
of the United States

COMPTROLLER GENERAL'S REPORT TO THE CONGRESS

STANDARDIZATION IN NATO: IMPROVING THE EFFECTIVENESS AND ECONOMY OF MUTUAL DEFENSE EFFORTS

D I G E S T

The North Atlantic Treaty Organization, or NATO, consists of 15 chiefly Western European nations bound together primarily to deter aggression or to repel an attacker. There is growing conviction within the Alliance that the existing NATO defense forces need strengthening to accomplish these objectives.

If NATO were to achieve greater standardization, it would not only increase its military operating efficiency but could reduce weapon system costs, and possibly free funds to buy additional quantities of needed weapons, and reduce the existing imbalance in its weaponry.

In comparing the relative strength of the Warsaw Pact forces (eight Eastern European nations compose the Warsaw Pact group) and those of NATO, two advantages for the former are often cited--their considerably greater number of weapon systems and the standardization of their arsenal.

By way of contrast, there are deployed among the NATO military forces today at least 7 basic models of tanks; 23 types of combat aircraft; over 100 types of tactical missile systems; multiple guns of different calibers and a host of different types of radars--36 in NATO's navies alone. Some guns of the same caliber cannot fire the same ammunition; aircraft with diverse ordnance and fuel requirements can only rearm or refuel at certain airfields; and commanders have experienced difficulties in communications because their communications equipment is not compatible. (See p. 1.)

Military commanders agree that greater standardization in weapon systems would improve NATO's military capability in that:

--Operations of the separate forces could be better coordinated. (See pp. 6 and 7.)

--The forces could draw on each other's reserve stocks and use each other's repair services. (See pp. 7 to 9.)

--Some aspects of logistics management could be consolidated. (See pp. 9 and 10.)

Only a few studies thus far have attempted to quantify the savings that NATO could realize from developing standard weapon systems. Two estimated that from $6 billion to $11 billion could be saved annually by standardization. These potential savings would be made possible through:

--Elimination of redundant research and development.

--Greater economies of scale in production.

--Logistics efficiencies.

These estimates, however, are only applicable to the distant future.

Achieving substantial NATO standardization will be a slow, incremental, and complex process. It has not been possible to thoroughly explore all the relevant issues within the confines of a single report. Some should be dealt with which are not examined in this report. For example, conceptual differences between France and the other members of NATO must be reconciled if standardization is to achieve its maximum potential.

Overcoming the impediments to greater standardization in NATO will require significant departures from present practices in acquiring weapon systems--the principal one being the consideration of newly proposed systems in terms of multinational rather than national needs. Yet, it is logical that, if all countries are to agree to adopt common weapon systems, the military, economic, and political problems of each will have to be acknowledged

and accommodated. Thus standardization is not likely to be achieved without statesman-like compromises.

For standardization to succeed, vesting an organization in NATO with authority to plan and control the transition to greater commonality is required. It is highly unlikely that all NATO nations are ready to agree to such a control. Nevertheless the machinery for achieving this commonality should be given serious attention at the ministerial levels of government.

Given the real and substantial impediments to full standardization in the foreseeable future, NATO nations must look for other means of attaining improved combat capability In the opinion of most military personnel in Europe, there are many opportunities for such improvements through "the concept of inter-operability."

For example, without requiring each item of equipment to be the same, operational advantages can be achieved through

--standard ammunition sizes,

--standard fuels,

--communications compatibility,

--standardization of high usage repair parts such as tank tracks, and

--standardization of aircraft bomb racks.
(See pp. 17 to 22.)

As the largest military force in NATO, the United States should take the lead in promoting this "interoperability" concept. Interoperability, however, will not achieve cost savings in the same degree as is anticipated through standardizing on common systems. The concept of full standardization should remain a goal to be attained in the future.

The United States military establishment sets high operational requirements for its weapons systems. The other NATO countries, in GAO's opinion, lean toward systems of less sophistication and lower cost. Since it is generally agreed that standardization and interoperability offer significant gains in combat effectiveness, it may be appropriate for the United States to agree to somewhat less sophisticated and more affordable requirements in order to lead the way. (See pp. 23 to 25.)

RECOMMENDATIONS

The Congress should require the military services in fiscal year 1979 and subsequent budget hearings to point out, when they propose a new procurement or justify an existing program, to what extent the weapon system is interoperable with those of our NATO Allies, and how the interoperability can be increased. Funding for systems should be restricted in those cases where the Congress is not satisfied with the extent of interoperability identified.

The Secretary of Defense should formulate a policy that will emphasize, consistent with minimum needs, the preference for less sophistication in weapon systems to be developed to enhance their potential for wider acceptance in NATO.

Looking toward the long-term goal of achieving greater commonality of weapons in NATO, the Secretary of State should initiate discussions with the other Allies to ascertain the feasibility of amending the NATO agreement to permit uniform selection of weapons and equipment and to establish the organizational structure which could best achieve this commonality.

AGENCY COMMENTS

The Department of Defense believes this report does not give credit to progress which has been made in NATO toward

achieving greater standardization. Most of the initiatives cited by Defense seem to be aimed mainly at achieving more widespread interoperability and logistics efficiency, and occurred after GAO had completed its review. Defense did not accept the report's recommendations which GAO believes are needed to achieve wider system commonality in NATO. The unclassified portions of Defense's comments are included as appendix I. (See pp. 42 to 44 and app. I.)

Formal comments from the Department of State were evaluated, but since they were classified SECRET they could not be included or paraphrased. State judged the report a good overall summary of issues related to standardization.

Contents

FIGURES

ABBREVIATIONS

AMF	Allied Command Europe (ACE) Mobile Force
CNAD	Conference of National Armament Directors
DCP	Decision Coordinating Paper
DOD	Department of Defense
DSARC	Defense Systems Acquisition Review Council
EPG	European Program Group
GAO	General Accounting Office
MRCA	Multi-Role Combat Aircraft
NATO	North Atlantic Treaty Organization
R&D	research and development
SACEUR	Supreme Allied Commander, Europe

CHAPTER 1

INTRODUCTION

The North Atlantic Treaty Organization (NATO) consists of 15 nations bound together to achieve common objectives, primarily to either deter aggression or repel an attacker. There is growing conviction within the Alliance that the existing NATO defense forces need strengthening to accomplish these objectives.

This increase in effectiveness could take several forms. One which is receiving much attention is the idea of achieving a greater degree of homogeneity in NATO's weapons.

NATO nations have a wide variety of weapons in their inventories--so much so that one high ranking NATO officer has described the Alliance as a military museum. Presently, no single major weapons system is used by all the Allies. For example, the 14 armed NATO members (Iceland does not maintain a military force) are using at least 7 different types of tanks, 23 different combat aircraft (39 if one counts modified versions), 100 types of ships of destroyer class or larger, over 100 separate tactical missile systems, multiple guns of varying calibers, and a host of different types of radars--36 in NATO's navies alone.

Standardization of NATO's weapons, an objective which has been endorsed by the Congress in legislation, would achieve a twofold purpose:

--It would increase military operating efficiency. At present NATO forces use many weapons intended for similar purposes which cannot fire each other's ammunition; aircraft with diverse ordnance and fuel requirements that can only rearm or refuel at certain airfields; and communications systems which frequently preclude commanders from communicating with each other because their equipment is not compatible.

--It would help reduce defense costs if one weapons system were adopted to replace several that serve the same purpose.

Standardization, in the broadest sense, implies that all combatants agree on developing common military needs, tactics, and weapons to meet a threat. In the hardware area this contemplates, for example, that all NATO armies would eventually be equipped with the same tank, the same armored personnel carrier, or the same guns.

There are those in NATO who believe that standardization carried to this extreme is not achievable and may not be practical or necessary. They point to the difficulty NATO forces have securing agreement on common military requirements and the political difficulty governments have subordinating national interests to the transcendent interests of NATO. Furthermore, a high degree of standardization would seem to require an organization with the authority to make military judgments applicable to all members. No such organization has surfaced yet.

Short of attempting to achieve complete standardization, there have been some positive steps toward greater standardization than formerly existed. Through binational and multinational agreements, some common systems have been developed and adopted by several NATO forces. For other systems attempts have been made to introduce key common or interchangeable components.

Some measure of standardization has also been achieved through making diverse systems interoperable, with each system retaining its distinctive design characteristics, such as weapons firing standard ammunition sizes, engines using standard fuel, or communications systems decoding each other's signals.

This report addresses the benefits and problems associated with standardization and the prospects for increasing standardization within the Alliance. We examined these issues because they are vitally important to NATO's defense efforts and have potentially large political, economic, and military consequences for members of the Alliance.

SCOPE OF REVIEW

Our work was done primarily in Europe to obtain international viewpoints on these issues. We gathered information from U.S. representatives to NATO headquarters, U.S. personnel working with several subordinate NATO bodies, and some NATO international officials. We also met with military, foreign affairs, and economic officials representing the United Kingdom, France, the Federal Republic of Germany, Belgium, and the Netherlands.

We visited the major U.S. European military headquarters to identify problems caused by equipment diversities and officials' views on potential solutions. We also observed a U.S.-directed multinational exercise, during which variously equipped national forces were required to work together.

Our work relating to the NATO military command was somewhat limited because we were not given access to international military headquarters or personnel, including U.S. officers assigned to these commands. As a result, the specific views of these commands are included only to the extent to which they have been recorded in various documents and reports.

In the United States, we reviewed U.S. standardization policy and related procedures and discussed standardization issues with officials of the Departments of Defense (DOD), State, and Commerce. We also met with representatives of the U.S. defense industry to obtain their views on the impact that increased standardization might have on defense contractors.

In the last 2 years, there have been many writings on NATO standardization which document clearly the early attempts at standardization and the developments that identify it as a pressing issue. Because of this wide coverage, we have included only a minimum of background information considered necessary to understand the positions we have taken and the recommendations we have made in this report.

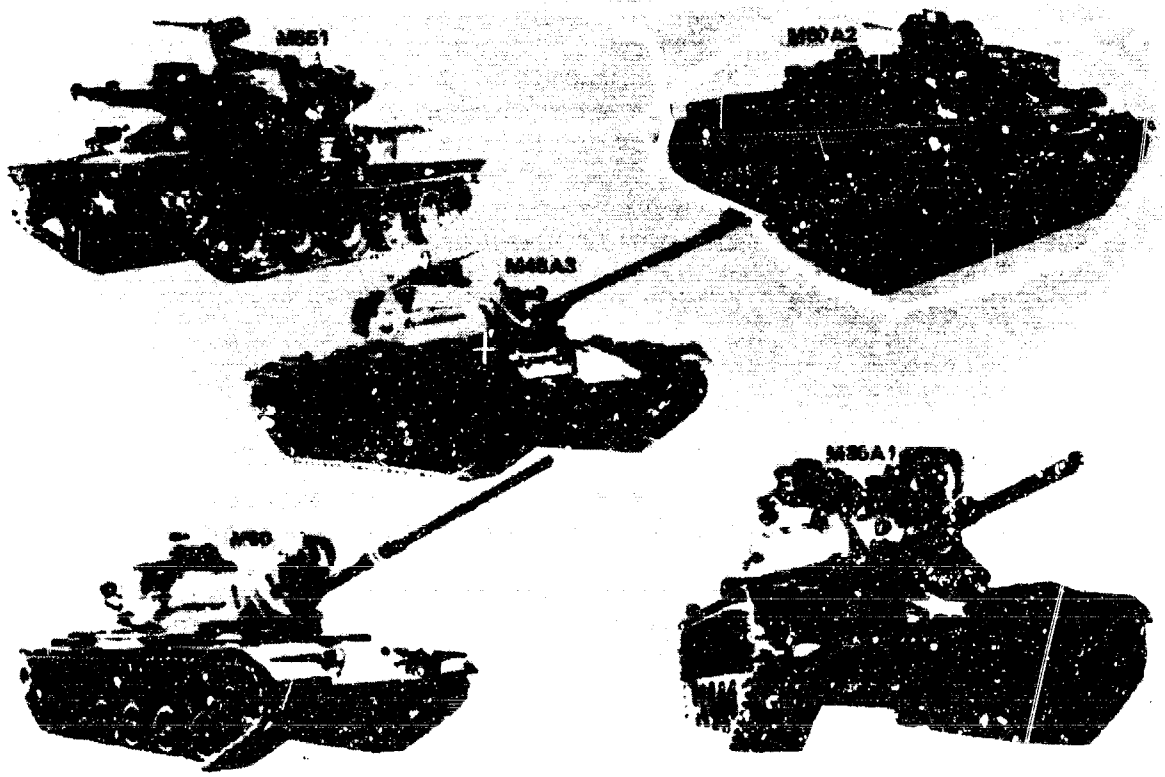
For additional information on NATO standardization, the readers are referred to a report issued last year by the Congressional Research Service of the Library of Congress with whom we coordinated our efforts in making this study and preparing our report. 1/

Early in July 1977, we requested the Department of State and DOD to comment on a draft of this report. The Department of State submitted comments bearing a security classification and, therefore, they are not included or paraphrased in this report. The unclassified portions of DOD's comments are included as appendix I. (See pp. 46 to 50.)

1/"NATO Standardization: Political, Economic, and Military Issues for Congress," dated March 29, 1977.

FIGURE 1

U.S. TANKS



ALLIED TANKS

BRITISH FRENCH GERMAN

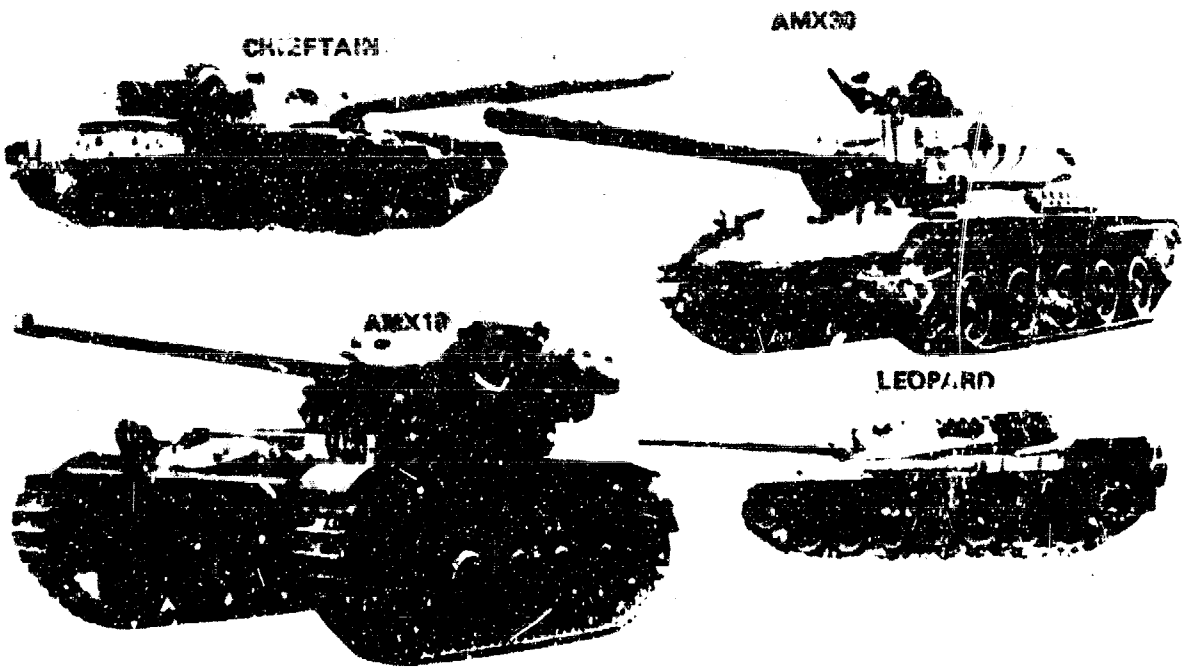
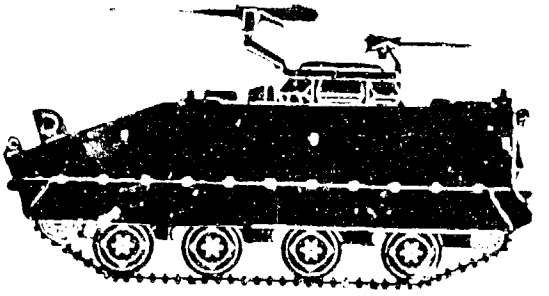


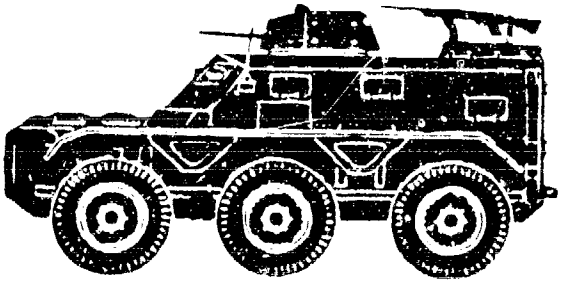
FIGURE 2

SOME ARMORED VEHICLES OF NATO NATIONS (NOT TO SCALE)

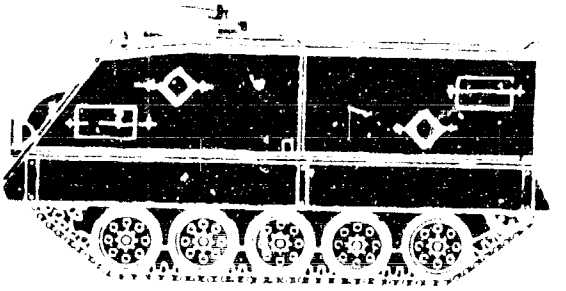
FR EBR—75mm



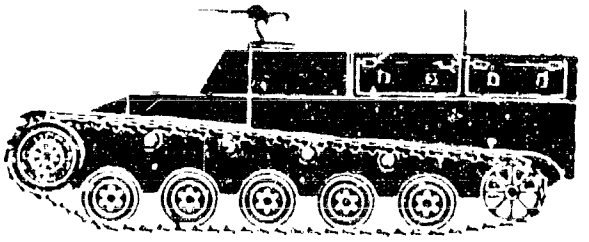
US M 114



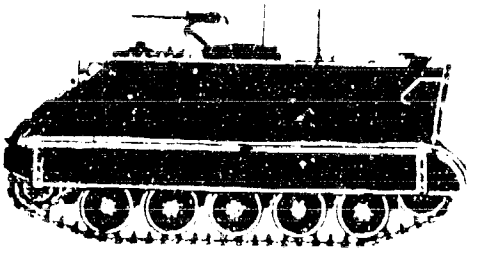
UK SARACEN



UK F.V. 432



FR AMX—VTP



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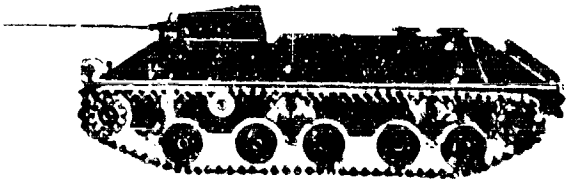
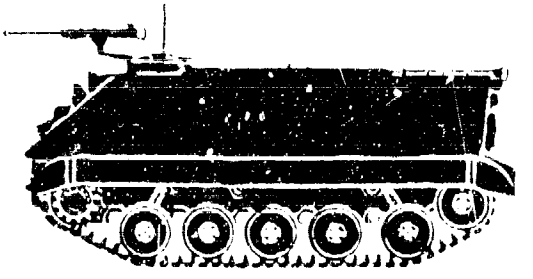


GE HS—30



US GE M--59

CHAPTER 2

THE ADVANTAGES OF STANDARDIZATION

Government officials and military commanders throughout the Alliance agree that standardization could improve NATO's combat capabilities and result in more efficient use of resources directed toward NATO's defense. Specifically:

--Operations and training of separate forces could be better coordinated.

--Forces of the Alliance could draw on each other's stocks and use each other's repair services.

--Some aspects of logistics management could be consolidated and logistics costs lowered.

--Costs now incurred because varieties of weapons serving the same or similar purposes are being produced could be eliminated.

STANDARDIZATION COULD IMPROVE COMBAT CAPABILITY

A NATO war would involve a coalition of Allied forces under international military command. These forces would be operating adjacent to one another; units of one nation's forces may be subordinate to, or merged with, those of another nation; and units of differing nationalities would be relying on each other for vital assistance, such as artillery or air support. It follows, then, that NATO's military success will depend, in some measure, on the ability of the various forces to operate together efficiently.

Operation of separate forces could be better coordinated

Military authorities in Europe cite numerous examples indicating that operational effectiveness would be enhanced by using similar equipment, training, tactical doctrine, and procedures.

For example, NATO commanders consider the existing communications system to have serious shortcomings that are based on a number of deficiencies. According to the Supreme Allied Commander, Europe (SACEUR), the most serious problem is that the communications systems of various nations have only limited capability to interoperate.

NATO's military communications systems are divided into two categories. In one category the communications network connects the NATO international military commands and is financed by NATO common funding. The system, however, covers only a portion of the total communications needed in wartime, going down only as far as the highest headquarters of the various national forces committed to the Alliance. The second category has communications systems provided by each national force from its own equipment inventories. These nationally developed systems often cannot intercommunicate with each other or with the NATO command system, because of differences in equipment specifications and design.

According to military authorities, compatible systems would provide more effective command control, speed the flow of wartime information necessary for combined operations, and enhance prospects of Allies mutually supporting each other.

Additional examples of operational problems that could be avoided with greater standardization are:

--The lack of a standard mechanism for identifying aircraft in-flight.

--Limited common training among NATO forces due to the Allies using different equipment. The Alliance is incurring costs maintaining separate national programs.

--Dissimilar tactical doctrine and procedures which account for many coordination problems a NATO commander must face. Several military officers in Europe believe the use of different equipment engenders, or reinforces, different national tactical doctrines and procedures and limits NATO's opportunity to specify common practices.

Forces could draw on each other's stocks and repair services

Standardization could reduce numerous logistics problems. NATO's forces would be able to rely on replenishment from each other's stocks in an emergency. Repair of equipment and weapons would also be possible by eliminating spare parts differences, using similar tools, and familiarizing maintenance personnel with other nations' hardware. As things now stand, the NATO forces are tied to their

individual logistics bases which restricts potential sources of support and complicates the tasks of wartime resupply.

Mutual support deficiencies affect NATO's ground, air, and sea capabilities. For ground forces, the main logistics concerns center on Allied forces' inability to exchange ammunition and repair each other's equipment and weapons. (Fuel commonality, another major requirement, has been substantially achieved.) The extent of the problems is suggested by a recent study of 208 items of equipment used by forces in a NATO Army group. Virtually none were common to all four national forces in that particular group; a handful were common to two or three; but the bulk were unique to individual forces.

Units removed from their regular support supply sources will, therefore, require either creation of these capabilities within, or attached to, the unit being deployed or extensive planning to keep normal support channels operating over greater distances. In this situation SACEUR concludes that each unit removed from its normal support base must be self-sufficient in all but a few items and services.

Similar problems exist for NATO air forces--except that the air forces have almost no possibility of carrying their own resupplies. NATO has 23 different combat aircraft, which use a wide variety of noninterchangeable munitions and require different spare parts. Additionally, servicing these aircraft requires properly trained personnel. Due to the differences in equipment and supplies, particularly in munitions, most aircraft can only be assured of full servicing and rearming at the assigned home base, or at best, a similar base in the same country. Several NATO sources estimate NATO's air capabilities would be increased substantially if Allied airbases could refuel, rearm, and otherwise service NATO aircraft of any nationality diverted from their home base due to enemy action, weather conditions, or range factors. This is particularly important considering the high probability of diversion.

NATO's navies also possess a bewildering array of equipment and weapons, limiting opportunities for effective resupply especially while ships are at sea. For example, NATO navies have over 40 different types of 30-mm guns or guns of larger caliber. Even guns of the same caliber cannot use interchangeable ammunition if built to dissimilar munitions specifications. Conditions such as these limit the extent to which one nation's supply vessels would be able to support another nation's ships. Navies, particluarly the U.S.

Navy, have substantial numbers of combat aircraft. When denied return to regular carriers or an appropriate naval base, these aircraft would be in the same position as their air force counterparts, i.e., full support would only be assured at the regular support base. The separate national support programs tax scarce transportation resources, are confronted with shortages and incompatibilities of material handling equipment, and require extensive communication realtime information exchanges to locate forces on the move. NATO and national military officials believe increased standardization of equipment, weapons, and supplies would substantially alleviate some of the Alliance's worst logistics problems.

Lower costs through consolidated logistics

Consolidating NATO logistics operations could potentially eliminate redundant support facilities and overhead, reduce manpower needed to support combat forces, and lower overall stock levels through merging supplies. Also, through increased standardization, unit costs for spare parts and supplies may decrease because volume production would be larger.

The potential savings are probably greatest in the logistics area. About 30 percent of the U.S. defense budget is devoted to some type of logistics operations, about half again as much as is spent on development and procurement of weapons and equipment. Additionally, it is widely accepted that costs of operating and maintaining weapons systems could more than double the direct acquisition costs. Also, logistics operations use a large amount of manpower, which is presently the largest single expense in major NATO nations' military budgets. The present NATO ratio of personnel in support functions to those in combat roles is 2:1 while the Warsaw Pact has a 1:1 ratio. One high ranking NATO military official has suggested the high degree of standardization in Warsaw Pact forces, based primarily on use of Soviet equipment, accounts for this disparity.

A 1974 study of NATO's quick reaction force, the Allied Command Europe (ACE) Mobile Force (AMF), suggests possible effects of logistics consolidation based on standardization. The AMF is a large ground force, plus supporting air units, drawn from seven NATO nations. The variety of equipment in this coalition force mirrors the picture prevalent throughout NATO. For example, AMF forces equipment includes several varieties of rifles, antitank weapons, mortars, machineguns, and so on. Thus, the participants in AMF could conceivably

experience difficulties supporting each other or relying on the stocks in the areas to which they may be deployed. And it is not possible to preposition equipment and supplies in every area of conflict. The lack of standardized weapons and supplies requires AMF to use more personnel in logistics operations than would be necessary if it used the same equipment. It also takes more time and lift capability to deploy this force because common items are not used.

STANDARDIZATION COULD RESULT IN CONSERVATION OF RESOURCES

A second major goal of standardization is more efficient use of Alliance defense resources. Published estimates of the amount standardization could save have ranged up to $11 billion annually.

Standardization offers possible economies in three major areas: armaments research and development, production, and logistics operations. The greatest savings are predicated on the adoption of common or substantially simliar equipment by NATO countries.

Standardization could eliminate or reduce the costs of duplicative research and development activities among the Allied Nations. The United States spends more than $5 billion annually on research and development, while European NATO governments spend about $3.6 billion. Several sources indicate much, if not all, of the research and development performed in Europe is similar to that done in the United States.

NATO nations spend about $27 billion each year on general-purpose procurements. This includes U.S. defense expenditures which are not related to NATO. Potential production savings primarily involve economies of scale. Currently, weapons are produced in small quantities for national markets. Producing weapons for the total NATO market would result in longer production runs which historically result in lowering unit costs.

Finally, the use of common systems also offers potentially large savings in keeping the systems operational throughout their useful life by reducing redundant supply, logistics, maintenance, and training.

The cost savings realizable through weapons standardization are, however, speculative. Such estimates as have appeared in print are not based on detailed analyses of

empirical data. Studies of this type do not exist either in the United States or in Europe.

That there would be a saving through standardizing on common weapon systems for NATO is widely accepted. There are difficult obstacles to overcome if a large degree of commonality is to be achieved. (See ch. 4.) Their resolution requires time. For this reason achieving commonality of systems in NATO is popularly regarded as a "long term" standardization objective, with interoperability being the more immediate goal.

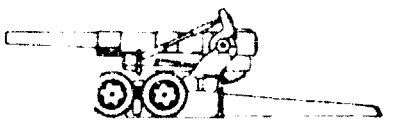
Interoperability would achieve a considerable measure of increased military operating capability and offers the advantage of avoiding many political and economic considerations standing in the way of more complete standardization. Interoperability, however, will not produce savings in defense expenditures of the magnitude anticipated from standardizing on common systems nor will it provide the same degree of improvement in combat capability.

FIGURE 3

SOME ANTI-TANK GUIDED MISSILES OF NATO NATIONS (NOT TO SCALE)

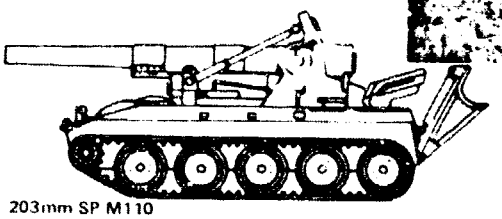
FIGURE 4

SOME FIELD ARTILLERY PIECES OF NATO NATIONS



8in HOWITZER M115

M110E1 8in SELF-PROPELLED HOWITZER



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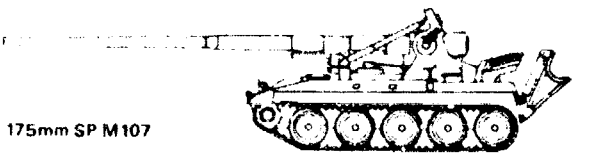
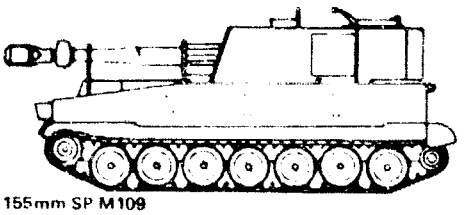
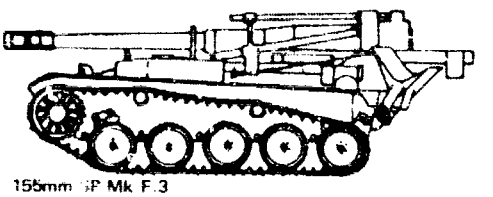


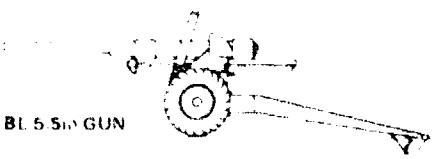
175mm SP M107



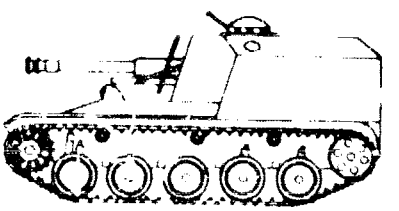
155mm SP M109



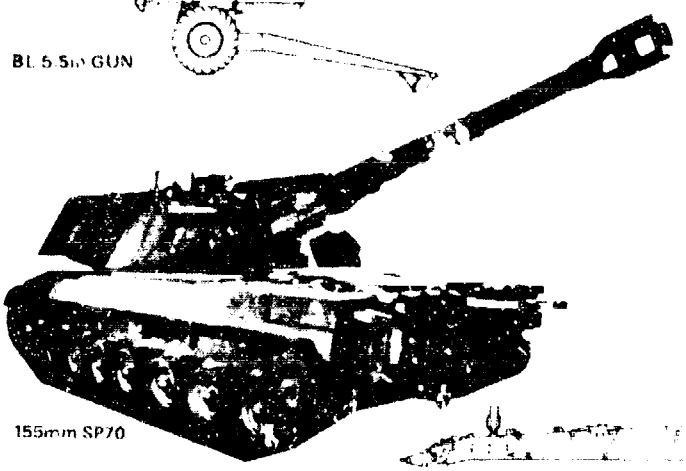
155mm SP Mk F3



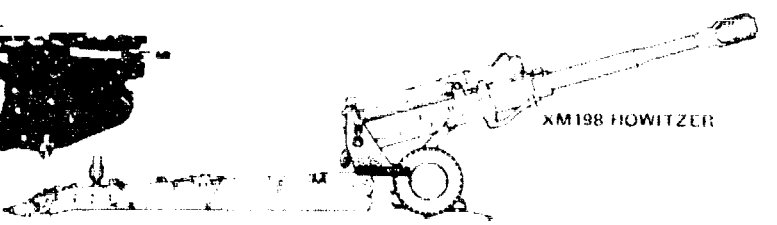
BL 5.5in GUN



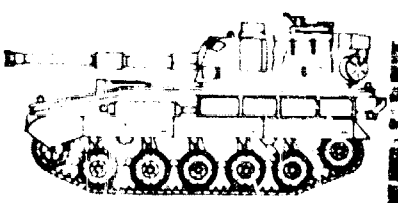
105mm SP HOWITZER AMX 105A



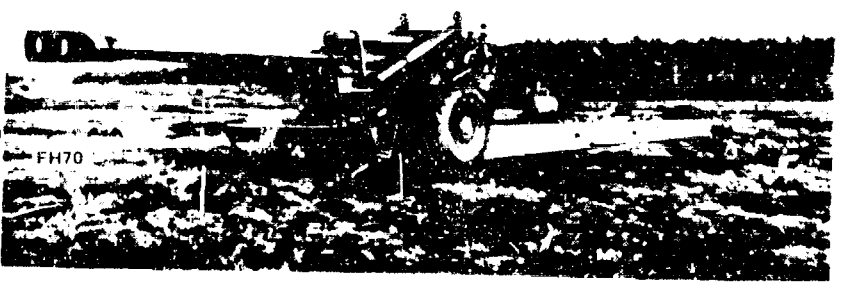
155mm SP70



XM198 HOWITZER



105mm SP ABBOT



FH70

CHAPTER 3

RECENT ACTIONS TO PROMOTE STANDARDIZATION

Although the advantages of weapon systems compatibility are well recognized in the Alliance it is only recently that political initiatives have emerged in the direction of greater standardization.

U.S. INITIATIVES ON BEHALF OF STANDARDIZATION

Since 1974 U.S. political leaders--executive as well as congressional--have increasingly supported Alliance standardization. President Carter, and President Ford before him, often cited standardization of weapons as one way of reducing the defense budget. The Congress, also, has progressively strengthened its support for NATO standardization. The strongest congressional statement on standardization is included in the 1977 Department of Defense Appropriations Act (Public Law 94-361), signed into law on July 14, 1976. Section 802 of the act declares:

> "It is the policy of the United States that equipment procured for the use of personnel of the Armed Forces of the United States stationed in Europe under the terms of the North Atlantic Treaty should be standardized or at least interoperable with equipment of other members of the North Atlantic Treaty Organization. In carrying out such policy the Secretary of Defense shall, to the maximum feasible extent, initiate and carry out procurement procedures that provide for the acquistion of equipment which is standardized or interoperable with equipment of other members of the North Atlantic Treaty Organization whenever such equipment is to be used by personnel of the Armed Forces of the United States stationed in Europe under the terms of the North Atlantic Treaty." (Underscoring supplied.)

This legislation also authorized the Secretary of Defense to waive the "buy American" provisions of the act of March 3, 1933 (47 Stat. 1520; 41 U.S.C. 10a (1970)), when it would achieve NATO standardization and be consistent with American interests.

The Army's recent acquisitions of the Roland II surface to air missile system and the MAG 58 machinegun, both developed in Europe, and agreements reached with the Federal

Republic of Germany (FRG) to explore adopting certain common components for the next generation of main battle tanks, are frequently cited as evidence of American support for standardization.

However, various shades of opinion remain both in and out of Government on the extent to which standardization can realistically be achieved.

EUROPEAN INITIATIVES

Like their U.S. counterparts, European officials base their support of standardization on its potential military and economic benefits. Additionally, European spokesmen see another advantage of standardization as providing an opportunity to raise the level of their industrial technology in areas where they now trail the United States. They would accomplish this by increasing the development of future NATO weapon systems in Europe, gaining broader acceptance for these systems (including American acceptance), and sharing in the production of systems developed in the United States. The overall economic health of the European members of the Alliance would benefit as well. This goal has strong support in U.S. Government circles, since a strong industrial Europe is seen as redounding to the benefit of the Alliance as a whole.

THE "TWO-WAY STREET"

To achieve this goal would require an intensification of current efforts on both sides of the Atlantic to promote a "two-way street" in armaments trade. European members of NATO favor increased multinational collaboration to reduce the burdens of weapons development and production and at the same time provide economically and technologically rewarding roles for participating nations. Few NATO European nations have the capabilities and resources to develop and produce the total range of weapons and equipment required for a modern defense, and increasingly even the most technologically advanced nations have turned to collaboration as an economic necessity.

Most NATO European partners advocate a more equitable balance of procurements between Europe and the United States. Essentially, they are saying that NATO standardization of American products alone is no longer politically or economically feasible. If the United States proves unwilling to standardize on an "acceptable" number of European weapons, the implied result will be European reluctance, let alone an

economic inability, to buy American armaments. U.S. interests recognize that the two-way traffic must increase for standardization to become a reality.

The trends in the European thinking are perhaps best indicated in the workings of the EUROGROUP and the more recently formed European Program Group (EPG). The United States and Canada are not members of these groups.

EUROGROUP

Formed in 1968, EUROGROUP is an informal association of the Defense Ministers of all European NATO countries, except France and Iceland. EUROGROUP's declared aim is to coordinate and strengthen the European contribution to the Alliance. One of EUROGROUP's major areas of interest has been promoting armaments collaboration among its members.

In seeking common weapons solutions, EUROGROUP has confronted many of the same problems which deter NATO-wide standardization. Different equipment schedules, varying requirements, conflicting national economic interests, and the lack of a formalized decision mechanism have impeded such attempts. Another major limitation on EUROGROUP's efforts has been the absence of French participation.

During 1975 EUROGROUP accelerated its efforts to promote standardization. In addition to calling for more equitable military trade between the United States and Europe, EUROGROUP proposed the establishment of an independent European forum to further its armaments collaboration. This forum, which France has joined, is known as EPG.

EUROPEAN PROGRAM GROUP

Formed in February 1976, EPG includes all European members of the Alliance except Iceland. In keeping with the demands of some members, the French in particular, EPG operates completely outside the NATO framework.

The EPG was established to address broad industrial, technological, and trade issues of armaments collaboration in a distinctly European context. Its primary aims are to:

--Increase European cooperation in the development, production, and procurement of armaments.

--Assure effective and efficient use of European capabilities and resources.

--Maintain a healthy European defense industrial and technological base.

--Increase equipment standardization and interoperability.

To accomplish these goals, EPG is working to harmonize members' equipment replacement schedules, eliminate duplicative efforts, and formulate joint development projects. EPG is also studying ways to make European industries more efficient and cost competitive and to lessen intra-European barriers to cooperation.

EPG met periodically during 1976 and 1977 and has had a significant effect on attempts to develop Alliance-wide solutions to standardization problems. Through EPG, European members of NATO hope to reach agreements on the broad aspects of a standardization policy before initiating discussions with NATO's North American partners. Apparently, this attitude reflects European concern that their continued fragmentation handicaps European efforts to deal effectively and successfully with the United States.

The formation of the EPG has prompted some speculation in the press and in some quarters of American industry that one of EPG's ultimate aims may be to gain the support of its members for adopting a "Buy European" stance. Although some European officials are more outspoken than others about the need to use more systems of European origin, there is general recognition that American technological superiority insures a leading role for the United States in equipping NATO forces with weapon systems.

IMPROVING EQUIPMENT INTEROPERABILITY

For the short term, there has been some progress toward making current systems interoperable. However, NATO's recent interoperability efforts indicate that, while some important gains can be made in the short term, even improving the interoperability of NATO's equipment will often require long-term planning.

Tactical communications

There are serious interoperability problems among the communications systems used by the national forces assigned

to NATO. However, because earlier system developments were not coordinated, major improvements to NATO's communications situation either demand innovative approaches or are not feasible in the near future.

Seven NATO nations plan to introduce six new tactical area communications systems between 1977 and 1985. These new systems, some of which will remain in service until the mid-1990s, have only limited interoperability potential with each other and the NATO command system. Apparently, national developments have passed the point where their respective backers believe major modifications to be practical, and the nations, having invested considerable funds in developing their own systems, are not willing to discard or delay their plans.

To provide a degree of interoperability, the NATO nations plan to use interface devices to connect their differing systems. These interfaces, along with the exchanges of communications equipment and personnel between forces, will remain the major means of communication interoperability between tactical systems until NATO nations replace these systems.

Fuels

Because fuel is one of the major bulk supply requirements for combat forces, designing equipment powered by common or interchangeable fuels is considered highly desirable. At this time, NATO has achieved a higher degree of fuel commonality for ground vehicles. Also, the nations have agreed on a standard fuel for naval vessels. According to SACEUR, ships remaining unconverted will pose no great problems since they will be operating in or near national waters close to appropriate supply sources.

A major fuel problem remains for Alliance air forces, primarily due to NATO's recent decision to adopt a new standard emergency fuel for land-based aircraft. It is assumed that this new fuel, which closely resembles commercial jet fuel, would be more available in times of crises than the currently used military variety. A major problem arises in that most NATO military aircraft, particularly those developed by the United States, are not designed to operate on the newly designated standard fuel. This not only affects aircraft in current Alliance inventories but also some, such as the F-16, which are about to be introduced. Unless U.S.-designed aircraft engines can be modified to use the new fuel, conversion could take decades, and in the interim could degrade NATO standardization.

The Air Force is studying the performance impact of using the newly designated fuel in U.S. engines, and identifying the modifications which may be necessary and the costs involved. Some estimates place the costs of modifying the total U.S. Air Force inventory as high as $340 million. DOD has also taken steps to assure that future land-based aircraft are designed to use both the commercial and military fuel types.

Ammunition interchangeability

Ammunition interchangeability has also received a large share of attention. This effort has focused on two major goals: assuring interchangeability between nationally designed ammunition of the same caliber and reducing the number of different calibers used in NATO forces. Regarding the former, in February 1976 NATO issued standardization agreements cataloging the existing types of national ammunitions used by land forces which can be used interchangeably and specifying markings for these interchangeable items. For future developments, many NATO and national officials see progress being made in nations agreeing to common specifications for ammunition manufacture. For example, the United Kingdom, France, Germany, and the United States have agreed on the internal ballistics for 155-mm ammunition--a caliber which is rapidly becoming common to all forces.

In 1977 the major gun/ammunition issue involved selecting the armament for the new main battle tanks. After considerable debate, the United States agreed to consider adopting a 120-mm caliber favored by the major European nations. However, ammunition interchangeability among the major Allies is not yet assured because the guns developed by the Europeans are different and use noninterchangeable ammunition. The Germans and French plan to use 120-mm smoothbore guns, while the gun being developed by the United Kingdom is a rifled bore version. The United States delayed its selection of a 120-mm gun until December 1977 in order to evaluate the United Kingdom armament. Prior to selection and production of the winning 120-mm gun, the U.S. XM-1 tanks will be fitted with the U.S. 105-mm armament. Thus, without some national compromises, tank ammunition interchangeability will not be fully achieved.

Rearming aircraft

NATO and national officials are more optimistic about prospects for increased interchangeability of munitions

FIGURE 5

SOME FIGHTER AIRCRAFT OF NATO NATIONS (NOT TO SCALE)

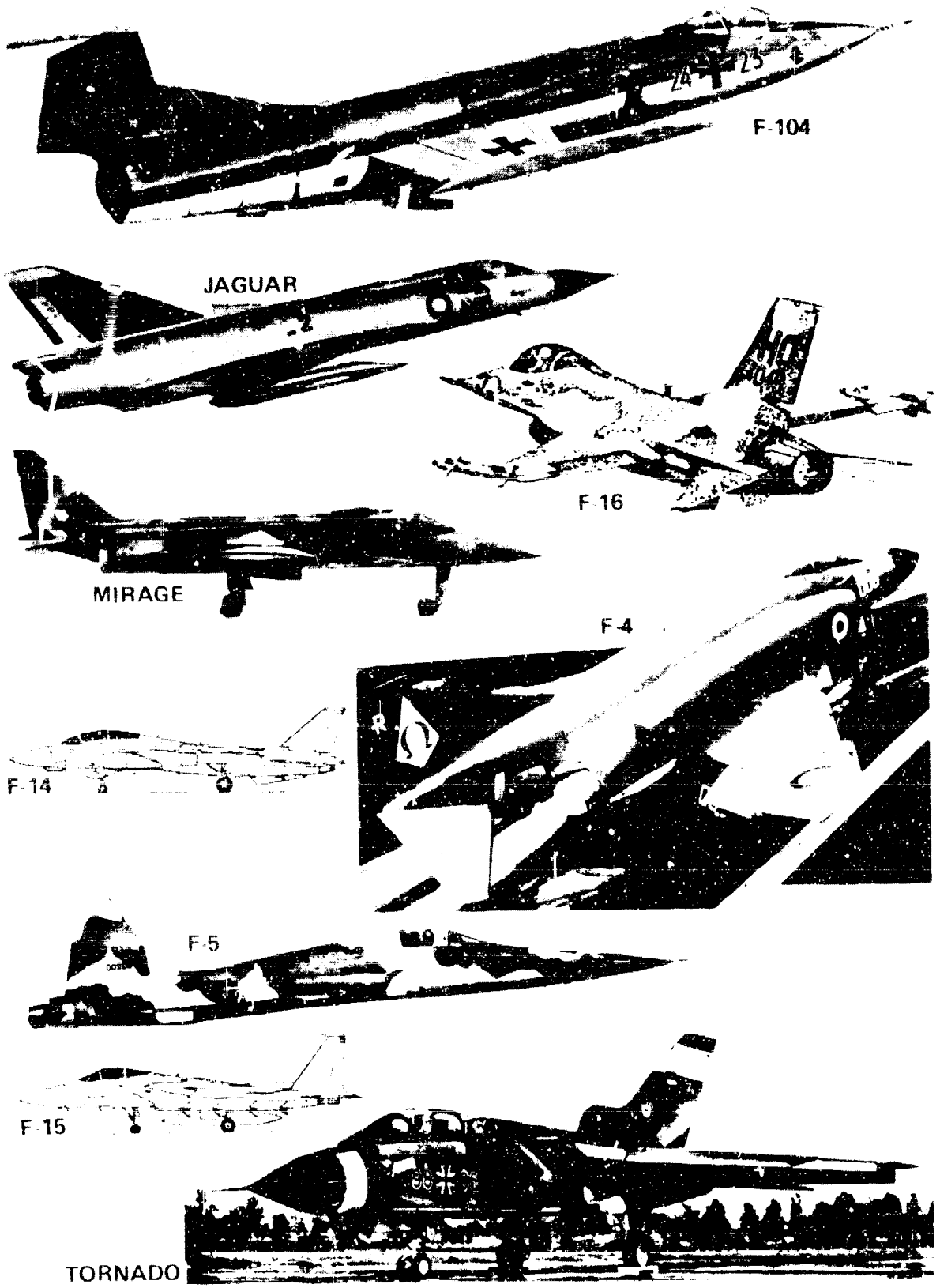
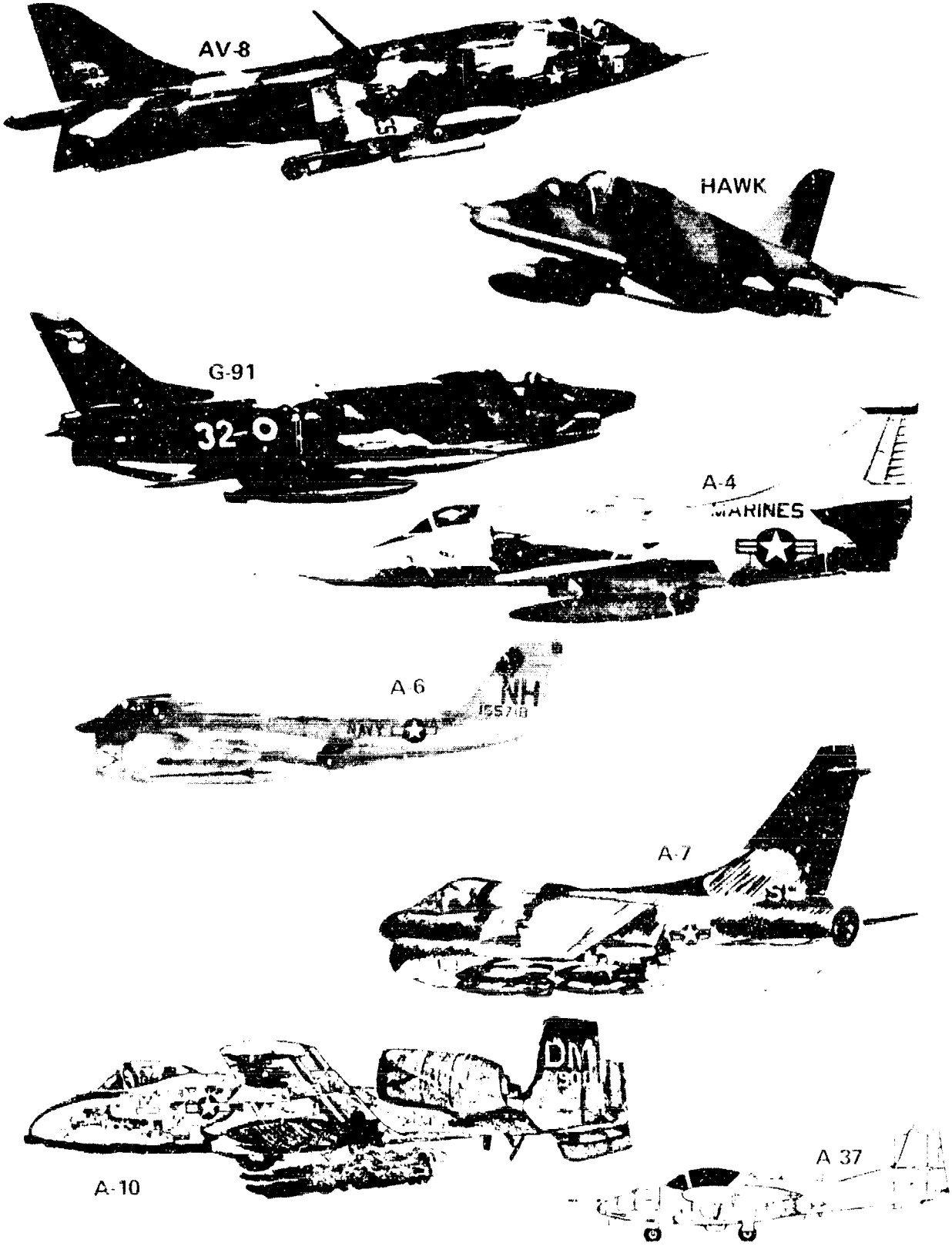


FIGURE 6

SOME ATTACK AIRCRAFT OF NATO NATIONS (NOT TO SCALE)



between allied Air Forces--particularly in the short term. Since late 1975, NATO air forces have been conducting loading trials to determine the compatibility of certain air-to-surface munitions with the different aircraft in the Alliance. As a result of these tests and other factors, NATO nations have been asked to certify various foreign munitions for use on their aircraft. For the United States, this may entail certification of seven foreign munitions on 10 types of U.S. aircraft at the estimated cost of at least $10.5 million. NATO authorities believe these actions will contribute greatly to improved NATO military capabilities in that aircraft diverted from their regular bases may be rearmed from the munitions stocks of another nation.

The major drawback to interoperability is its limited potential for reducing the acquisition and operating costs to arm NATO's forces. For this reason, interoperability and component standardization are, in our opinion, less to be preferred than total system commonality where it is practical to achieve the latter. However, given the very real and substantial impediments to full standardization in the near future, the best prospects for improving military operating capabilities in NATO at this time appear to lie in increasing weapons system interoperability.

CHAPTER 4

PRESENT IMPEDIMENTS TO GREATER STANDARDIZATION

Limited types of standardized weapons are deployed or slated for deployment among several NATO forces. Recent examples are the F-16 fighter, the LANCE missile, the Multi-Role Combat Aircraft (MRCA), and 7.62-mm machineguns.

While evidence is impressive that greater standardization could improve NATO's military operations, and although it is generally agreed that it would enable governments to reduce their weapons expenditures, there are difficult obstacles to overcome before substantial standardization can be achieved. The ability of the Alliance to solve these problems will determine to what degree the benefits of standardization will accrue.

The principal deterrents appear to be:

--Varying perceptions by the NATO forces of their military needs and equipment requirements.

--The primacy of national interests, particularly political and economic considerations.

--The absence of an organization in NATO, acceptable to all members, that can plan and direct its standardization efforts.

--Differences in cost effectiveness and competitiveness among NATO nations.

--Differences in equipment replacement schedules and budgetary cycles.

VARYING MILITARY NEEDS AND EQUIPMENT REQUIREMENTS

By common agreement, NATO countries are responsible for equipping their individual armed forces. How they choose to carry out this task has been a national, and not a NATO, decision. Military equipment programs and decisions are based on national perceptions of military requirements, balanced with factors of affordability and timing. Very often these differ from country to country.

NATO's members choose different equipment, in part, because of dissimilar assessments of the threat and use of

varying doctrines and tactics (based in large measure on each nation's military preferences, experience, and judgment). Additionally, the United States is said to sometimes require nonstandard equipment for missions which may occur outside the NATO area. At times a country will select its equipment based on nonmilitary concerns, such as the limits of its technological capabilities or resources, or the marketability of its products to non-NATO areas. It is very difficult to identify which factors actually motivate specific equipment decisions.

Military sources cite several cases where national perceptions have led to equipment diversity. For example, French military personnel see little opportunity to reconcile their basic main battle tank requirements with those of the Germans. The French consider a light, mobile tank essential to combat a potential multidirectional threat. Also, there is the need to design the tank to fit on rail flatbeds, and to be of acceptable weight and height for bridges and tunnels in France. The Germans, on the other hand, perceive a need for massive firepower and thus a much heavier tank to counter an armored attack. But, as far as we know, France is not privy to special armor technology which might lead it to heavier tanks.

Military sources often cite differences in U.S. requirements from those of others in the Alliance because of the worldwide role of U.S. forces. In the past, U.S. non-NATO missions have sometimes adversely affected NATO standardization. For example, NATO nations, including the United States, agreed to standardize on the 7.62-mm round for small arms. The United States was the first to digress from this size round by adopting the M-16 with 5.56-mm ammunition for use in Vietnam.

The differing equipment requirements perceived for the United States by virtue of its wider military role may be exaggerated. Almost always these could be accommodated by modifiying the equipment.

It is quite true, however, that U.S. requirements tend to be more sophisticated than other nations, in part, because in many instances the United States is capable of designing and producing more sophisticated equipment. Several European spokesmen, particularly from small nations, stress that they do not require the same level of sophistication in some equipment and do not want to pay for it. Representatives of one country have noted that standardizing on more expensive equipment tends to force reductions in the number procured and thus could have an adverse military effect.

There have been suggestions that nations should adopt "less-than-the-best," and presumably cheaper, equipment to achieve standardization. The Chairman of NATO's Military Committee has stated that NATO military commanders would prefer forces of all nations to be equipped with a 90-percent "perfect" but adequate weapon than to have some forces using highly sophisticated weapons not compatible with the rest. Other military officers believe that evaluation of the proposal for buying less-than-the-best should consider (1) the potential for increased quantities if quality is reduced, (2) the importance of capabilities which would be lost, and (3) perhaps the more rapid obsolescence of less technologically advanced weaponry.

Although differing equipment requirements do not necessarily preclude multinational cooperation in weapons development, they can have detrimental effects on collaborative projects and reduce the participation in such projects. In certain cases joint development projects result in more expensive equipment because of the need to accommodate multiple national preferences. The result may be a more complex piece of hardware than any single nation desired. Dutch spokesmen told us this was the reason the Netherlands withdrew from the MRCA currently being developed by the United Kingdom, Germany, and Italy. The Dutch did not believe they required the expensive and complex aircraft to perform their assigned missions.

It is obvious that, as a prerequisite to adopting common weapons, agreement would have to be reached on the assessment of the threat, the tactics for meeting the threat, and the attributes the weapon must have to cope with the threat. The advantages of trading off some sophistication in the interest of making a weapon that is affordable to all would have to be weighed.

Varying age of existing equipment

Closely tied to the requirements for weapon systems is the age of equipment currently deployed. Major systems frequently have a deployed useful life of at least 10 years. Very often only a few countries plan to replace specific systems in the same time frame either because some have just recently fielded a new version of the equipment or because the replacement has a lower priority than other projects in the national planning. This restricts standardization projects to a few countries and accounts for some of the partial standardization found in NATO today. The adverse effects of timing are further compounded by dynamic

technology. Nations replacing systems at a later date are likely to use more modern technology.

There are few acceptable ways to circumvent the equipment replacement problems. Obviously, with the sizable inventories that are on hand today, nations cannot discard large amounts of usable and expensive equipment. Also, it would be impossible operationally, industrially, or economically to replace all equipment at once. But, no one should expect instant standardization.

NATO's current efforts to select competitively a second common small arms caliber and possibly a standard rifle for the post-1980 period illustrate some of the problems. French officials indicated that they will need to replace their rifles before the NATO selection process is completed. They, therefore, intend to proceed with their own national development. Additionally, the United States has a large inventory of M-16s using 5.56-mm caliber ammunition, which it intends to offer as a candidate system. If NATO selects other than the 5.56-mm caliber, the U.S. Army may be faced with the difficult decision of whether to discard its M-16s in order to comply.

On the other hand, the Danish Government was able to alleviate its rifle replacement problem in a unique way. The Danes required new rifles immediately and could not wait until the 1980 NATO decision. The Danes are therefore renting some from the Germans.

Of course, this solution is workable only if sufficient quantities of excess equipment are available for redistribution.

For a long time, NATO has wanted to develop consolidated equipment replacement schedules which would show the time frames in which all nations intend to replace various weapons and equipment. While nations have yet to provide the complete data necessary for these schedules, some progress is being made. These schedules, once compiled, would be useful in identifying promising areas for armaments cooperation.

PRIMACY OF NATIONAL INTERESTS

For about a decade, domestic economic problems have been a critical concern of most NATO governments. These encompass such matters as inflation, unemployment, balance-of-payments, and the maintenance of a strong industrial capability. It is

fair to say that in many countries these issues have loomed at least as important as, and have sometimes overshadowed, issues involving NATO's mutual defense. It is not surprising, then, that decisions on the acquisition of weapon systems are usually made with an eye to their impact on the domestic economy. This is especially true in European countries where the ruling party has no fixed term, and an unhealthy economic picture could hasten a government's collapse. On the other hand, the maintenance of a strong economy contributes to a government's stability.

Maintaining a strong economy

The NATO countries can be put into two broad categories. There are the more industrialized countries capable of producing a variety of weapons--the United States, the United Kingdom, Canada, France, the Federal Republic of Germany, and Italy. The remaining countries have limited or no major defense production capability and acquire most of their weapons by purchase.

The countries with industrial capability have preferred to design, produce, and sell their own weapons. National armaments programs contribute important economic and political benefits. Governments look to armaments research, development, and production programs to provide technological discoveries and capabilities which can benefit the commercial sector and enhance the country's commercial standing. One high ranking NATO official believes the perceived need to use armaments programs to enhance competitive commercial advantage is probably the strongest motivator for Europeans in making their equipment decisions.

Arms industries are a boon to employment and, therefore, economic health and political stability. They enable governments to minimize arms purchases from foreign sources, thereby decreasing the negative impact of military spending on a country's balance-of-payments.

When domestic defense industries produce enough for export, additional national benefits accrue. External sales have a positive, and in some cases, significant impact on a nation's overall trade balance. Some nations use external sales as a means to advance foreign policy objectives.

Influence of arms exporting

Sales to countries outside of NATO are sometimes perceived as necessary to sustain national industries,

especially in those countries where national military requirements are not of sufficient volume to allow cost-effective production. Representatives of one country informed us that they would be unwilling to produce a "standard" NATO system if NATO placed restrictions on the nation's ability to sell the system to countries outside the Alliance.

This dependence on arms exports may be the largest impediment to standardization. To compete in the export market, the seller must have something different to offer so that the purchaser can make a selection. It is probably for this reason that France, a large exporter of arms, actively supports interoperability, but is not yet an enthusiastic supporter of weapon commonality.

Technological maturity

There are several important differences between U.S. arms activities and those of European nations. The United States is more technologically advanced in certain key defense fields and is oftentimes a more cost-effective producer of military hardware. These factors limit trans-atlantic arms cooperation.

The United States maintains a technological superiority over its most industrialized NATO partners in certain areas such as aerospace. The United States spends about twice as much on military research and development as all the European allies taken together. This extensive funding of research and development is credited with allowing the United States to often produce better and more cost-effective weapons systems than others are capable of doing.

European production costs also tend to be higher than those in the United States. Compared to the nationally splintered European markets, the United States has a huge internal market which allows for longer production runs and lower unit costs. Additionally, the much larger U.S. industrial complexes generally are able to produce items more efficiently than the smaller, fragmented European industries. European production costs are also comparatively higher for a number of other reasons, including more expensive labor, disparities in productivity rates, and differences in labor and management practices. For example, European industries generally adhere to one-shift operations and stretch production over longer periods of time to ensure employment and stability. In Europe, it is much more difficult and costly to lay off workers because of certain social practices.

Another advantage the United States has is its vast industrial capacity. U.S. industry has proven itself able to produce for both the U.S. and foreign markets. Despite statements identifying excess capacity in European firms, there is some question regarding European industries' ability to produce large volumes the United States usually requires. Lastly, some believe U.S. industry provides better maintenance and technical assistance services to customers than European firms are able to do.

In the past, certain advantages of "buying American" have been confirmed by frequent European purchases of U.S. equipment. Some European nations apparently chose American products (even though the United States was not buying theirs), because the U.S. equipment was more cost effective than available alternatives.

The basic dilemma

The advantages in weapons research, development, and production which the United States enjoys, and Europe's determination to produce more weapons of European origin, create a basic dilemma for the proponents of NATO standardization.

There are those who see the two-way street in terms of arms flow and the fielding of the most cost-effective weapons as being incompatible until such time as Europe can correct the imbalance in industrial capability.

We met European officials who were confident European industry will eventually be able to compete effectively with the United States. For the most part, they recognize that this goal requires them to operate as a coordinated group, as opposed to fragmented national entities. To that end, European governments, through organizations like EPG, are studying ways to consolidate European capabilities and markets to more adequately match the advantages of the United States.

This resolve does not ignore, or discount, the many problems which will complicate or otherwise delay achieving the goal. Within Europe itself there are differences in

--technological capabilities in given areas of research and engineering,

--industrial plant and production methods, and

--differing foreign policies toward the third world impacting non-NATO sales.

These problems, however, may be mitigated by the existence of organized groups like the European Economic Community and the participation of the members in other associations, such as the North Atlantic Assembly, the Western European Union, the European Free Trade Association, and the Organization for Economic Cooperation and Development.

European officials point out that improving European cost effectiveness and efficiency may depend on European industry's ability to sell directly to the United States in order to take advantage of economies of scale for volume production. Some Europeans are concerned that the apparent American preference for obtaining licenses to produce European systems in the United States will deprive them of these benefits. Obtaining licenses to produce is a favored means of upholding domestic production and employment.

From all this it is apparent that the economic situation in the various NATO countries will continue to weigh heavily in decisions affecting the selection, production, and marketablity of NATO's weapon systems for the future.

NATO standardization could advance and be more acceptable to the members, if the Alliance had at its disposal country-by-country economic data to permit an assessment of the options available for producing new weapons systems in a cost-effective manner. In this sense cost-benefit measurements would go beyond the usual evaluation of system life-cycle costs to include the development's economic impact on employment, the defense industry, and the balance-of-payments.

Coordination of weapon system development now resides in the Council's Conference of National Armament Directors (CNAD), while the interoperability of current equipment and standardization of doctrine, operations, and logistics is the concern of the Military Agency for Standardization of the Military Committee. The Military Committee defers to CNAD on the development of future weapon systems in recognition of factors outside the military sphere.

THERE IS NO ORGANIZATION TO PLAN AND DIRECT NATO'S STANDARDIZATION EFFORTS

When national interests conflict, there is no centralized mechanism in NATO to mandate compromise. NATO controls

neither the money nor the people which comprise its defense capabilities. In adhering to the Alliance, nations have not relinquished their authority over national programs and policies.

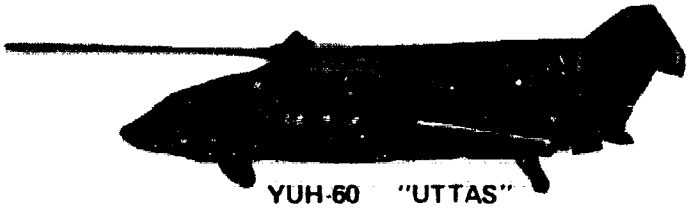
The existing decisionmaking apparatus of the Alliance reflects this reality. From the highest councils to the lowest working levels, NATO is organized to represent nations based on the principle of common consent. The committees, working parties, panels, and study groups assembled to carry out NATO business are composed of national delegates, oftentimes experts dispatched from national capitals. NATO does have international staff elements--that is, personnel assigned to NATO, as opposed to national organizations--but these staffs exist primarily to assist and coordinate activities of various representative groups. The international elements can propose NATO action, but they cannot direct unless approval is obtained from the nations.

Similarly, the international military command staffs, perhaps the most highly structured elements in NATO, can exert little control over national military programs and resource allocations. NATO's integrated military command staff is formed from personnel provided by nations to plan for NATO defense in peacetime and to prepare to assume command of the forces in a crisis. Even participation in these crucial functions is a matter of national choice. At the present time, neither France nor Greece participate. The integrated military commands do not control the national forces in peacetime (and in wartime would have no direct responsibility for logistic support). The NATO military commanders can make proposals relating to forces, equipment, and strengths, can promulgate criteria, and can evaluate consequences--but they cannot enforce these views on the governments, ministries of defense, or combat forces.

For standardization to succeed requires vesting an organization in NATO with the authority to plan and direct the transition to greater commonality. It is doubtful that all members of the Alliance are ready to take this step.

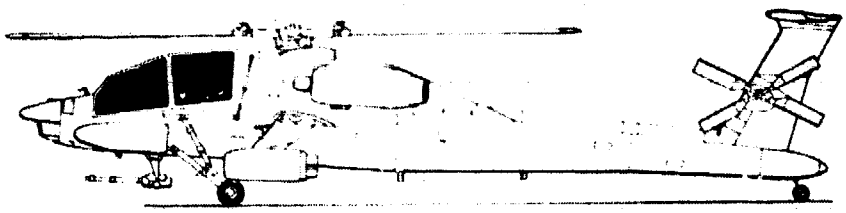
FIGURE 7

SOME HELICOPTERS OF NATO NATIONS (NOT TO SCALE)



YUH-60 "UTTAS"

LYNX



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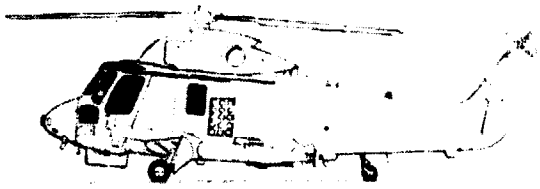

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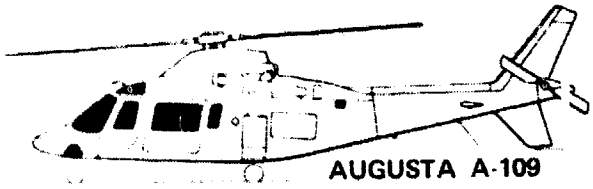

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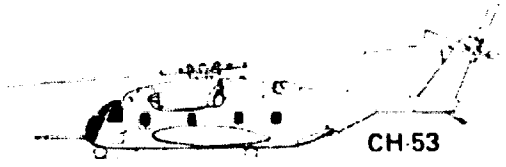
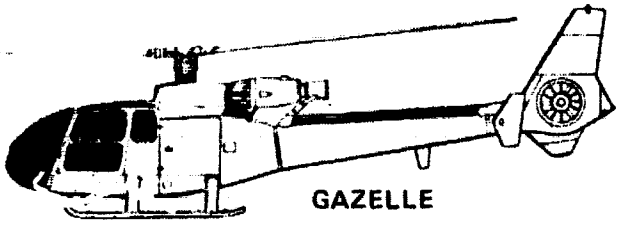


CH-53



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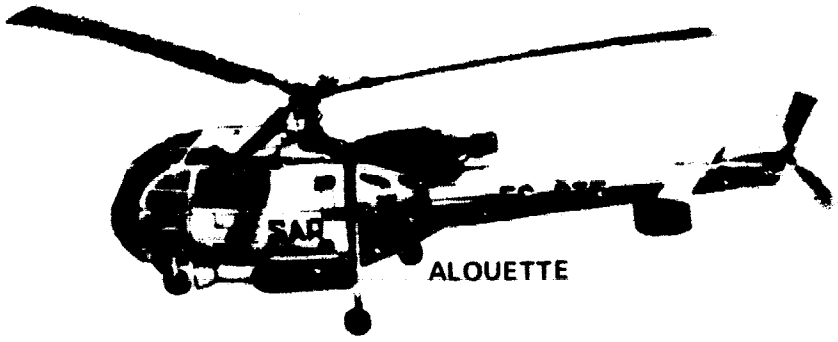
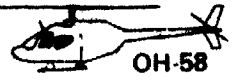


ALOUETTE



OH-58

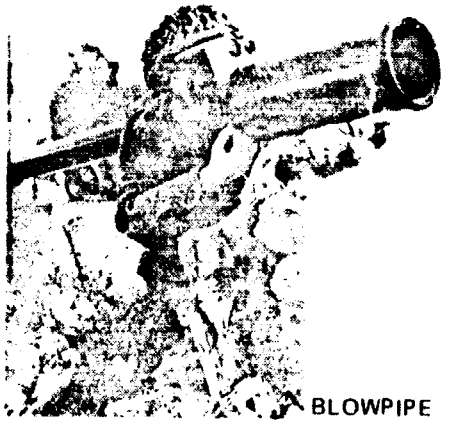
AH-1

FIGURE 8

SOME AIR DEFENSE WEAPONS OF NATO NATIONS (NOT TO SCALE)

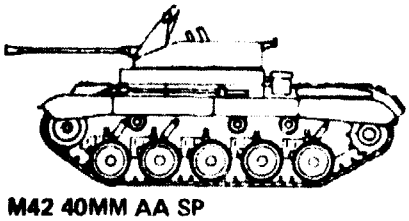
CROTALE

ROLAND



BLOWPIPE

HAWK



M42 40MM AA SP

RAPIER

CHAPTER 5

ACHIEVING GREATER SYSTEM COMMONALITY

Achieving the long-range objective of greater system commonality may necessitate significant departures from present practices in acquiring weapon systems, the principal one being the consideration of newly proposed systems in terms of multinational rather than national needs. The advantages of standardization are not likely to be achieved without some trade-offs or compromises.

Military versus economic trade-offs may be required in arranging for a system's production. In certain circumstances maximum cost savings would be achieved by having the system produced at a single source. Security or economic considerations, however, may dictate using more dispersed production sources, which normally adds to a system's acquisition cost.

Agreements on common weapon system requirements will likely require (1) some forces giving up certain system attributes they would prefer to have and (2) other forces accepting some features they consider to be of a lower priority.

Many governments may be prone to resist the changes we foresee as necessary in the acquisition process, accustomed as they are to examining national defense needs in isolation, that is, without considering the Alliance-wide potential for contributing to NATO's mutual defense.

If common weapons are to continue as the ultimate, long-range standardization objective, it is necessary to examine the implications for the system acquisition process from the standpoint of:

--What organizational changes might be required in NATO?

--What would be the potential impact on the budget process?

--What would be the potential impact on the national economy?

ORGANIZATIONAL CHANGES

The preliminary actions to acquiring new weapon systems are

--an assessment of the threat,

--a determination of the best way to meet the threat, and

--evaluation of existing weapon systems to determine where they fall short in meeting the threat.

The identified system shortcomings become the desired performance attributes sought in the new systems.

It follows that, if there are to be a larger number of future common weapon systems in NATO, the member nations would first have to agree on the nature and severity of the threat and, then, on the tactics to employ the most desirable force mix, and the weapon system performance requirements necessary to combat the threat. Failure to resolve differences in these areas would dim the prospects of NATO's adopting common systems.

Each of the three actions demand military judgments. Ad hoc groups composed of military branch specialists from each member country would appear to be the proper forums in which to establish NATO-wide military requirements to satisfy mission needs. The recommendations emanating from this group could be presented for approval and funding to the respective NATO parliaments as representing a military consensus.

A second NATO organization (nonmilitary), in which all member nations would again be represented, could plan the procurement of the new systems. This group would be concerned with matters, such as whether to have competitive development, codevelopment, coproduction, licensed production, sole source production, etcetera. It could also get involved in planning the system marketing after they are produced.

Some of these functions, such as inventorying NATO's current systems, are already being done by existing organizations in NATO. Whichever approach is selected will require the adoption of safeguards to assure that standards for controlling costs and quality and maintaining production schedules, presently observed by individual member nations producing their own weapons, are retained under the cooperative arrangements.

IMPACT ON THE BUDGET PROCESS

Despite the broader authority the suggested organizational proposal would vest in NATO, the Congress and other

legislatures of the member nations would exercise the same authority they now have with respect to authorizing expenditures for military equipment, but (1) with the added knowledge that the major weapon system proposed by their military establishment is one endorsed by the NATO integrated military command and (2) with information on the overall economic costs and benefits to their country of the NATO agreed weapon system, over and above the system's acquisition cost.

This concept is in keeping with the new approach to budget review being undertaken by the armed services and appropriations committees of the Congress, and the added scope provided by the international committees and the new budget committees. It seems a natural progression from considering individual weapons systems in their mission area context to their consideration in an international cost-effectiveness context.

It is conceivable that after studying the impact of a NATO recommended development and/or production allocation on their domestic employment, inflation, gross national product, balance of trade, and balance-of-payments some legislatures may not choose to accept the recommendation. There could be many reasons for such denial--a drastic change in economic status since the recommendation was issued, a change in government, conflicting schedules, sunk research and development costs, or a non-NATO-related international development. Whatever the reasons, it can be anticipated that there are likely to be occasions when one or more countries will not go along with the NATO recommendation and standardization will suffer--but not irreparably.

National sovereignty cannot be denied, but decisions impeding standardization will be made with the domestic and international economic and political implications exposed to public scrutiny.

STANDARDIZATION'S IMPACT ON THE NATIONAL ECONOMY

There are several ways to develop and produce standardized weapons for NATO. Each could affect the national economy in different ways. Basically, there are three options available. The table on the following page shows some of the possible impact of each on the countries developing a new system and the others (coproducers or purchasers).

IMPACT ON ACQUISITION AND OPERATING COSTS

OPTION	DEVELOPMENT COST	PRODUCTION COST	SUPPORT COSTS	FOREIGN SALES	TECHNOLOGICAL IMPACT	ECONOMIC IMPACT
1. Develop and produce the system in one country.	Same for developer as in multiple system environment, although some recoupment of cost via increased foreign sales.	Lower because of larger production run. Production cost savings passed on to foreign purchasers.	Lower spare part costs because of volume.	Increased for developer; lower for competitors.	Possibly some loss in research and development capability for competitors.	More jobs and plant utilization for producer. Reduced jobs and greater idle capacity for competitors.
2. Develop the system in one country and license others to coproduce.	Same for developer; no cost incurred by competitors other than license fees.	Probably not significantly different than in multiple system environment. (Not as low as with first option.)	Lower if supplied by one producer; otherwise, probably no effect.	Dependent on foreign sales rights and market allocations agreed to by developer and coproducers	Transfer of developer's technology to coproducer's. Developer retains research and development skills but competitors possibly lose some capability.	Probably same results as with multiple systems.
3. Joint development by two or more countries and coproduction in those countries.	Development costs shared by all participants.	Same as with second option.	Lower than in multiple system environment.	Same as with second option.	Each participant retains or improves research and development skills.	Same stability as with second option.

Codevelopment and coproduction

Codevelopment and coproduction provide only limited system acquisition cost savings, but probably offer the greatest overall economic benefits. They refer to the joint development and production of agreed systems by, and in two or more, NATO countries.

Codevelopment agreements can be initiated by governments or by industries. The consensus is that government to government agreements aid industry agreements, should precede them, and be general in nature, allowing industry to work out the details. Our contacts with U.S. defense industry disclose that American companies are establishing teaming arrangements with foreign industry in recognition of the consequence of the "two-way street"--reduced business unless they participate in future system developments jointly with European industry.

To prepare themselves for increased participation, European companies are themselves soliciting American industry to establish teaming. In the opinion of the personnel we talked to, the impetus for this European initiative is recognition of the advanced U.S. technological position in several key defense areas.

Other countries are also investigating teaming arrangements with U.S. engine and commercial aircraft companies. The commercial initiatives in civilian aerospace industry ventures, while delaying unification of the European Communities' industrial base, may facilitate codevelopment in a competitive environment and increase coproduction.

Technology transfer and sales competition

The Government's interest in the transfer of U.S. technology is tied mainly to protecting military equipment operating characteristics from potential enemies. Industry, on the other hand, views technology transfer as reducing its ability to compete with the NATO allies, among others, in world markets for both military and commercial development, and the spinoff value of military work is considerable.

For some industries the objection is pro forma, however, since the United States is felt to have a full generation of technological superiority over European competitors. Because of government and company funds infusing the research and development effort, this advantage could be maintained even

if European countries advanced their technological base while participating in codevelopment with the United States. Although companies are prone not to disclose their research and development (R&D) budgets, they have made it clear that their level of effort is tied to overall profits from their diversified activities. Government Independent Research and Development (IR&D) payments are directly affected by business success too, since these payments are related to the amount of the prior year's defense business.

These conditions also focus attention on the labor area which would be most immediately and seriously touched by NATO standardization--the scientists, engineers, designers, and other members of the R&D community. While coproduction is necessary to avoid increased unemployment in the manufacturing industries, codevelopment might lead to the temporary displacement of other personnel, particularly in the R&D community.

Social practices reduce the seriousness of this problem in Europe because people there are more likely to retrain or relocate. This type of assistance is not widely used in the United States. Therefore, a solution may be needed to maintain the productive employment of displaced engineers and scientists, if the anticipated savings from reduced duplicative development of weapon systems are not to be lost.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

In comparing the relative strength of the Warsaw Pact forces and those of NATO, two advantages are often cited for the former--their considerably greater number of weapon systems and the standardization of this arsenal.

If NATO were to achieve greater standardization, it would not only increase its military operating efficiency but could reduce weapon system costs, and possibly free funds to buy additionally needed quantities of weapons, and reduce the existing imbalance in weaponry.

Only a few studies thus far have attempted to quantify the savings NATO could realize from developing standard weapon systems. Two studies we reviewed estimated that from $6 billion to $11 billion could be saved annually by standardization. These potential savings would be made possible through (1) the elimination of redundant research and development, (2) greater economies of scale in production, and (3) logistics efficiencies. These estimates, however, are only applicable to the distant future when "maximum" standardization has become a reality.

Achieving substantial NATO standardization will be a slow, incremental process, and a complex one. It has not been possible to thoroughly explore all the relevant issues within the confines of a single report. There are some which should be dealt with that we have not mentioned. For example, conceptual differences between France and the other members of NATO will have to be reconciled if standardization is to achieve its maximum potential.

Some other issues that merit further consideration are the role of the less industrialized countries, working out equitable offsets, and joint funding of weapon systems development.

Overcoming the impediments to greater standardization in NATO will necessitate significant departures from present practices in acquiring weapon systems--the principal one being the consideration of newly proposed systems in terms of multinational rather than national needs. Yet, it is logical that, if all countries are to agree to adopt common weapon systems, the military, economic, and political problems of each will have to be acknowledged and

accommodated. Thus standardization is not likely to be achieved without major compromises.

For standardization to succeed requires vesting an organization within NATO with authority to plan and control the transition to greater commonality. In our opinion, it is highly unlikely that all NATO nations are ready to agree to such a move. Nevertheless, we believe that the machinery for ultimately achieving this commonality should be given serious attention at the ministerial levels of government.

Given the very real and substantial impediments to full standardization in the foreseeable future, it is incumbent on the NATO nations to look for other means of attaining improved combat capability. In the opinion of most military personnel in Europe, many opportunities exist for such improvements through the concept of interoperability.

In addition to proposals requiring consideration at the NATO level, there are some initiatives which the executive agencies can take unilaterally to support standardization.

DOD needs to consider more fully the standardization or interoperability potential of new weapons systems before these weapons are approved for development. Using and even developing commands in the United States are not very knowledgeable of foreign doctrine, tactics, inventory, or current system developments.

Significantly, until very recently, DOD had no directives requiring consideration of NATO standardization and interoperability when approving weapons for development. New procedures, issued in March 1977, stipulate these factors will be considered.

A dedication to the development of less sophisticated and more affordable weapons would enhance the prospects of their wider adoption by NATO. This might well be made a DOD policy and might indeed be a necessity, if the concept of the two-way street is to go forward.

DOD COMMENTS

DOD comments (see app. I), received when this report was in final processing, pointed to the omissions from this report of numerous initiatives taken by the United States to further standardization or interoperability, and their acceptance by the NATO Alliance. Some of the actions cited by DOD involve timely long- and short-term NATO action programs, cooperative development and production, a genuine two-way street in defense trade, and U.S. support of EPG efforts.

Most U.S. initiatives were not started until after we had finished our review and submitted the report to DOD and the State Department for comments. To the extent these foster greater cooperation in planning for a strong military defense, they should certainly be encouraged and supported. These initiatives seem mainly aimed at achieving more widespread interoperability and logistics efficiency.

DOD does not accept our recommendation that the Congress require justifications for weapon systems to provide information on their interoperability with similar NATO systems or face the risk of restricted funds. DOD believes the intent of this recommendation is satisfied by the Defense Systems Acquisition Review Council (DSARC) process and the annual DOD report to the Congress on Rationalization/Standardization.

The DSARC process, utilizing the Decision Coordinating Paper (DCP) as a major management tool, operates in accordance with Department of Defense Directives (DODD) 5000.1 and 5000.2. NATO standardization and interoperability considerations were included in the current versions dated January 18, 1977. DODD 5000.1, the basic major system acquisition directive, limits consideration of NATO standardization/interoperability to new developments or modifications, ignoring those currently in the process. DODD 5000.2, which outlines the major system acquisition process, also restricts consideration of NATO standardization/interoperability to modifications or new developments.

The DCP/DSARC process is aimed at informing DSARC principals to aid them in recommendations to the Secretary of Defense and neither they nor the Secretary are required to inform the Congress, as we recommend. Other formal information sources provided to various congressional entities (e.g., Congressional Data Sheets, Selected Acquisition Reports, P-1 Exhibits) do not give the desired information either.

The annual report to the Congress on Rationalization/Standardization in NATO provides only cursory comments for some systems, e.g., that a military service has evaluated or considered foreign systems or that decisions are to be made in the unspecified future. The report neither contains a Secretary of Defense commitment on these particular systems nor involves the Congress in considering a foreign system's merits.

DOD believes our recommendation to the Secretary of Defense, on developing more austere systems to promote wider acceptance in NATO, is also unnecessary and supports this contention by stating it prefers and seeks simplicity of

design and operation in new systems. In our opinion, this objective stands a better chance of realization if it were incorporated in a DOD policy directive.

DOD counters our recommendation to the Secretary of State, directed at achieving greater weapons commonality in NATO, by pointing out that efforts are already underway in NATO's Conference of National Armament Directors (CNAD) to develop a Periodic Armaments Planning System. The efforts are commendable, but it should also be noted that the CNAD has had responsibility for rationalizing NATO's weapon systems since its inception in 1966. The most difficult barrier to greater weapon systems commonality, in our opinion, is mustering greater political support for the concept in the Alliance. We believe this requires working to amend the NATO agreement at the ministerial levels of government.

RECOMMENDATIONS

We recommend that the Congress:

--Require the military services in fiscal year 1979 and subsequent budget hearings to point out, when they propose a new procurement or justify an existing program, to what extent the weapon system is interoperable with those of our NATO Allies, and how the interoperability can be increased. Funding for systems should be restricted if the Congress is not satisfied with the interoperability progress.

We also recommend that the Secretary of Defense:

--Formulate a policy that will emphasize, consistent with minimum needs, the preferences for less sophistication in weapon systems to be developed to enhance their potential for wider acceptance in NATO.

Looking toward the long-term goal of achieving greater commonality of weapons in NATO, we recommend that the Secretary of State:

--Initiate discussions with the other Allies to ascertain the feasibility of amending the NATO agreement to permit uniform selection of weapons and equipment and to establish the organizational structure which could best achieve this commonality.

APPENDIX I

DEFENSE SECURITY ASSISTANCE AGENCY
AND
DEPUTY ASSISTANT SECRETARY (SECURITY ASSISTANCE), OASD/ISA
WASHINGTON, D.C. 20301

8 NOV 1977

In reply refer to:
I-23123/77

Mr. R. W. Gutmann
Director, Procurement and Systems
Acquisition Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Gutmann:

This is in reply to your 8 July 1977 letter to the Secretary of Defense regarding GAO's draft report, "Standardization in NATO: Improving the Effectiveness and Economy of Mutual Defense Efforts". (OSD Case #4665) (MA 149). [sic]

We wish to express our appreciation for the opportunity to review the draft report and to submit our comments. In general, the DOD is in agreement with its emphasis on the value of standardization in permitting NATO forces to operate together efficiently.

Regrettably, however, many of the efforts underway in NATO under the aegis of the long-term defense program have not been addressed in the draft report. Therefore, we strongly suggest that the final report reflect the initiatives taken by President Carter at the NATO summit in London when he suggested that both long-term and short-term NATO action programs should get underway as soon as possible. He stressed Alliance exploration of ways to improve cooperation in the development, productions, and procurement of defense equipment. Other aspects of this initiative are that the U.S. would buy more European defense equipment to promote a more genuine two-way traffic in defense trade. Moreover, the President stated that the U.S. supports the Independent European Program Group (IEPG) efforts to rationalize European defense industries. Secretary Brown reaffirmed this commitment and took the lead in gaining Allied support for the long-term initiatives approved by the ministers at the May DPC, which is key to further progress toward standardization and interoperability of defense weapons systems and equipment.

Since NATO has already responded positively to the above U.S. initiatives, the GAO report also should acknowledge this progress. Regarding short-term measures, allies are moving now for early improvement--by the end of 1978--in the key areas of readiness and reinforcement, guided anti-tank munitions, and war reserve ammunition stocks. NATO defense ministers have agreed that the long-term program should focus on a limited number of high priority

APPENDIX I

measures in ten critical fields. Initial planning is now progressing under a Task Force Director in each of these fields: (1) readiness; (2) reinforcement; (3) reserve mobilization; (4) maritime; (5) air defense; (6) communications, command, and control; (7) electronic warfare; (8) rationalization (to include standardization, interoperability, and a periodic armaments planning system); and (9) consumer logistics. The NATO's Nuclear Planning Group (NPG) is considering theater nuclear force modernization. Each task force is reviewing modern technology and attempting to identify specific opportunities for standardization and other cooperative efforts. In a related move, the NATO Conference of National Armaments Directors (CNAD), through its AC-94 group, is studying ways to remove national legal and procedural impediments to NATO cooperation in coproduction and licensed production. CNAD is also considering "common allied families" of equipment and munitions in certain fields, which would be reciprocally purchased or licensed. We see all these measures as giving a substantial new impetus to standardization and interoperability.

The report could usefully point out that one of the impediments to standardization is the tendency of the members of the Alliance to judge a proposal for procuring a standard weapon on the basis of that project's consequences for business, employment, balance of payments, etc. We believe that this criterion chills standardization, since it is difficult to achieve the most economical production for any one system while at the same time accommodating all nations that might wish to adopt that weapon. Therefore, the members of NATO should -- to the extent feasible -- consider the consequences of a number of projects together, accepting losses in some to achieve gains in others.

In discussing the European view of the "two way street" (P. 15) the report points out that if the US is "unwilling to standardize on an 'acceptable' number of European weapons, the implied result will be European reluctance, let alone an economic inability, to buy American armaments". Since such a polarization would seriously reduce long-term prospects for achieving greater NATO standardization, should not the report urge the Congress to bear this "fact of life" in mind when it (the Congress) examines DOD's plans to adopt cost-effective Allied systems?

We do not believe that recommendation #1 is appropriate or necessary. The DOD does this already through the DSARC process and report as required by PL 94-361, Section 802. As regards recommendation #2, it should be noted that the DOD prefers and seeks simplicity of design and operation in new systems. With respect to recommendation #3, we would like to point out that efforts are already underway in NATO's Conference of National Armaments Directors to develop a Periodic Armaments Planning System. Our detailed comments will be found in the enclosure.

The requested security classification review has been conducted. Classified portions are bracketed in red on the attached draft report. You are

APPENDIX I

authorized to transmit the classified DOD information to appropriate Congressional committees, members of Congress, and other executive agencies.

Sincerely,

H. M. FISH
Lieutenant General, USAF
Director, Defense Security Assistance Agency
and
Deputy Assistant Secretary (ISA), Security Assistance

Attachment

DOD COMMENTS ON GAO DRAFT REPORT
"STANDARDIZATION IN NATO: IMPROVING THE
EFFECTIVENESS AND ECONOMY OF MUTUAL DEFENSE EFFORTS"

[See GAO note below.]

2. (U) Page ii of the digest and Page 24 of the report indicate there is no consensus within NATO on threat, doctrine, or tactics. It is to be noted that, due in large part to US efforts as a member of the NATO MAS land force tactical doctrine working party, ATP 35 "Land Force Tactical Doctrine" was published in final draft in Apr 77 and is currently being circulated within the Alliance with national ratification as STANAG 2868 expected in Nov/Dec 77. When ratified the ATP will provide NATO armies with standard tactical doctrine based upon agreed threat data. The US and FRG Armies, as major partners in NATO, under the auspices of the bilateral US/FRG Armies staff talks, have harmonized their capstone manuals -- US FM 100-5 "Operations" and FRG 100/100 "Command in Battle." Furthermore, as part of this on-going effort, the two armies have developed concept papers on mobility/countermobility, air defense and air-mobile operations which are scheduled for signature in the near future.

[See GAO note below.]

6. (U) Page 37. To meet the organizational shortcomings in order to determine and evaluate existing weapon systems, the report recommends establishment of "Ad Hoc groups composed of military branch specialists

GAO note: Classified National Security information deleted.

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from each member country," and "a second NATO organization (non-military)." These proposals, which were only sketched in the report, need to be elaborated; the manner in which the Alliance organizes itself so as to encourage the development and purchase of common (or at least interoperable) equipment is crucial. It is not clear how the organizational changes that the report suggests will do much to overcome the resistance to standardization that the report only describes. Some of the recommendations that are advanced, moreover, are not altogether sound. The report proposes that military officers be asked to specify the Alliance's requirements for weapons. While one may expect that the military forces of NATO's members will normally do so in the first instance, some provision will have to be made for the setting of such "requirements" by the Alliance's civilian officials. The latters' scrutiny will help to insure that proposals for new weapons are made with an understanding of the weapon's costs, of the effect of their purchase on NATO's ability to acquire other items of equipment or to develop other capabilities, and of their explicit place in the Alliance's plans.

7. (U) Page 45 and 46. As regards the statement concerning conceptual differences, the one thing NATO does not need in the foreseeable future is some big strategic debate with the French. It would be fruitless, as it was before, and could stymie the practical progress in small details now being made. Let us not forget that ROLAND is originally a French development.

8. (U) With respect to DOD policy and actions, there is only a mention of the DOD standardization directive on Page 47. To provide a better understanding of current DOD actions, attached is a copy of SecDef's 3 Aug 1977 statement and DepSecDef's 21 Jul 1977 statement.

9. (U) With the increasing dependence on ADP systems for logistics, personnel, intelligence, command and control, and other functional systems, NATO standardization efforts should also include consideration of automated systems. The same reasons given in the report against true standardization probably apply to ADP hardware and software as well. However, interoperability efforts offer potential benefits.

10. (U) In view of the Congress's often decisive role in deciding the fate of proposals to purchase European weapons, the report might draw attention to that role and urge a more consistently favorable attitude toward such proposals.

APPENDIX II

PRINCIPAL OFFICIALS RESPONSIBLE FOR ADMINISTERING ACTIVITIES DISCUSSED IN THIS REPORT

	Tenure of office	
	From	To
SECRETARY OF STATE (AND U.S. MEMBER, NATO NORTH ATLANTIC COUNCIL):		
Cyrus Vance	Jan. 1977	Present
Henry Kissinger	Sept. 1973	Jan. 1977
SECRETARY OF DEFENSE (AND U.S. MEMBER, NATO DEFENSE PLANNING COMMITTEE):		
Harold Brown	Jan. 1977	Present
Donald Rumsfeld	Nov. 1975	Jan. 1977
James Schlesinger	July 1973	Nov. 1975
CHAIRMAN, JOINT CHIEFS OF STAFF (AND U.S. MEMBER, NATO MILITARY COMMITTEE)		
Gen. George Brown, USAF	July 1974	Present
Adm. Thomas H. Moorer, USN	July 1970	June 1974
UNDERSECRETARY OF DEFENSE RESEARCH AND ENGINEERING [FORMERLY DIRECTOR, DEFENSE RESEARCH AND ENGINEERING] (AND U.S. MEMBER, NATO CONFERENCE OF NATIONAL ARMAMENT DIRECTORS):		
William J. Perry	Jan. 1977	Present
Malcolm R. Currie	June 1973	Jan. 1977

(951243)