

REPORT TO THE CONGRESS

*BY THE COMPTROLLER GENERAL
OF THE UNITED STATES*



Department Of Defense Con-
sideration Of West Germany's
Leopard As The Army's New
Main Battle Tank

The evaluation of a weapon system command-
ing so much international interest warranted
greater involvement by the Office of the
Secretary of Defense to dispel concern that
the Leopard might not receive fair considera-
tion.



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 events surrounding the agreement between the United States and the Federal Republic of Germany to comparatively evaluate their new main battle tank candidates. The aborted effort was originally aimed at furthering weapons standardization in NATO.

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).

The Department of Defense failed to respond to our several attempts to obtain its comments on a draft of this report.

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

A handwritten signature in cursive script, reading "Luther B. Starks".

Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

DEPARTMENT OF DEFENSE CON-
SIDERATION OF WEST GERMANY'S
LEOPARD AS THE ARMY'S NEW
MAIN BATTLE TANK

D I G E S T

To replace M-60 series tanks, the Army began in 1972 the XM-1 Main Battle Tank program; the new tank is slated to be in the field by the 1980s. (See pages 1 and 4.) Two original candidates, built by the Chrysler and General Motors Corporations, were soon joined by a third, alternative version of the Leopard 2, developed by West Germany. (See page 1.)

Former Secretary of Defense James Schlesinger recommended that the Leopard be a contender to increase weapons standardization in NATO. Military experts generally agreed that NATO forces could interact and operate more effectively if common or at least interoperable weapons were used. Standardization is, at the present, limited. (See page 1.)

In 1974 the United States signed a somewhat vague Memorandum of Understanding with West Germany; both countries affirmed the intention to make all reasonable efforts to standardize their tank programs. Neither nation was bound to selecting one of the tanks. However, the popular belief, reinforced from time to time by official statements of both Governments, was that both the XM-1 and the Leopard were bidding to become the Army's next main battle tank. (See pages 3 and 4.) West Germany was not committed to considering the XM-1 for her forces.

At that time many European members of NATO were calling for a reversal of the trend in which the United States sells up to 10 times as much military equipment to Europe as the Europeans sell to the United

PSAD-78-1

States. The Department of Defense endorsed the call for a more equitable "two-way street," and the new tank program presented an opportunity to demonstrate United States support for it.

Many Europeans, NATO officials, and others watched the developing tank competition with great interest, regarding it as a test case which could indicate the future course of weapons standardization.

Recognizing the importance of assuring our NATO allies that the evaluation would be conducted objectively, Senator Thomas F. Eagleton asked GAO to monitor the tests and analyze the results.

In January 1977, only 3 weeks after the Leopard's tests were complete, the United States announced that, by agreement with West Germany, the Leopard and Chrysler XM-1 would not be comparatively evaluated. Instead, certain subsystems of each tank would be evaluated for possible inclusion in both. (See page 1.)

This abrupt change came after West Germany had spent the equivalent of about \$25 million to modify the Leopard and had kept about 60 people at Aberdeen Proving Ground to support the 4-month testing. Why the evaluation was abandoned has not been made public. (See page 2.)

Test preparations and actual testing of the Leopard were objective. GAO had planned, until the Leopard dropped from contention, to review the Army analysis of the test results while the Leopard was still being considered. (See page 6.)

Performed by the Army Material Systems Analysis Agency, the analysis was released in May 1977. This organization comes as close as any group in the Army to providing independent analyses of weapon systems. (See page 9.)

The report showed the two tanks to be about equal in mobility and firepower,

but the XM-1's armor protection was judged markedly better. The report also stated that this difference was likely attributable to the haste with which the Leopard's original armor was redesigned to U.S. requirements; with more time, the differences could have been narrowed and perhaps eliminated. (See page 8.)

However, Army officials closely associated with the XM-1 program for several years told GAO that they interpreted the tests as showing that the Leopard failed to meet most specified performance requirements. They also believed that the Leopard

--could not meet the Army's scheduled deployment and

--would cost about \$50,000 more for each tank than the cost projected for each XM-1. (See pages 9 and 10.)

Army officials said that the XM-1 will meet its projected cost and deployment schedule, but the experience of many weapon systems acquisitions shows large variations from earlier estimates, suggesting the uncertainty of such predictions. (See page 10.)

Army officials were skeptical from the outset that West Germany could successfully upgrade the Leopard to meet U.S. requirements in the short time available before scheduled tests. On the other hand they regarded the XM-1 program as a major achievement proceeding on schedule with no indications of any serious problems. The introduction of a foreign weapon into the competition and the international interest that this engendered created additional pressures on the Army normally not present in selecting a weapon system. (See page 14.)

The Army publicly said several times that it was prepared to accept the Leopard if it proved clearly superior to the XM-1. Nevertheless, these statements could not dispel the feelings in many quarters that Army personnel who had seen the XM-1 program come so

far would find choosing anything other than the XM-1 difficult. (See page 3.)

Under these circumstances, GAO believes that it might have been wiser to have placed testing and evaluation of the Leopard under the Secretary of Defense's direct control, to assuage concerns of unfair consideration of the Leopard because of Army attachment to the XM-1. (See page 15.)

A key unanswered question remains: How will withdrawal of the Leopard from contention affect efforts toward greater weapons standardization in NATO? Aborting the evaluation may reinforce some European thinking that the United States is not as committed to standardization as its verbal endorsements indicate. (See pages 14 and 15.)

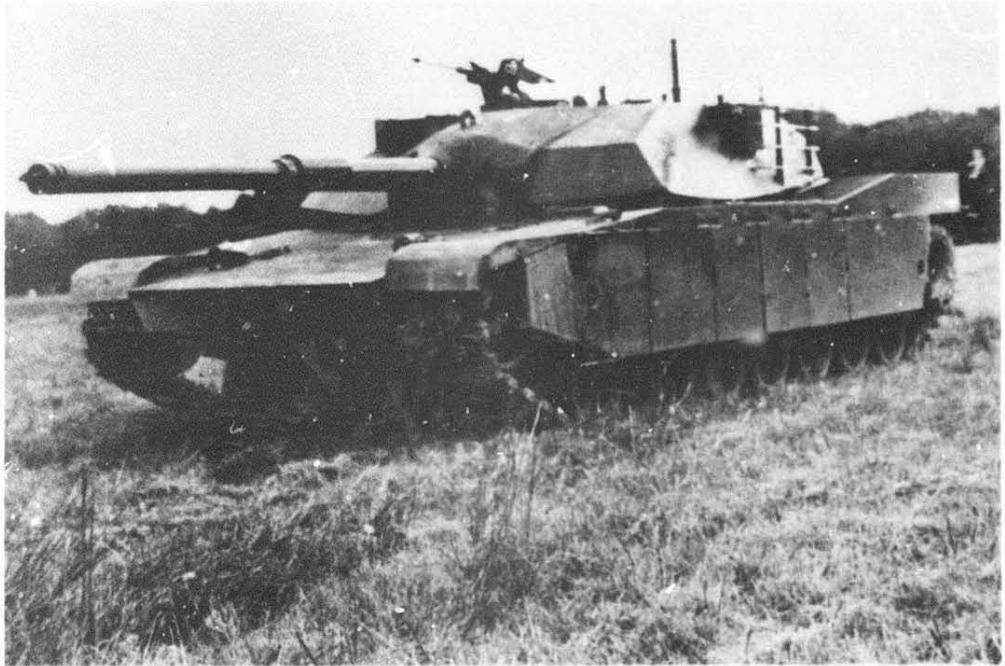
Public dialogue on the evaluation of the two tanks was muted by another joint agreement in May 1977; the two Governments decided to maximize standardization of their tanks' components. However, a review of the Army study on the potential for standardizing some subsystems reveals that few can readily be standardized. (See pages 12 and 13.)

RECOMMENDATION AND AGENCY COMMENTS

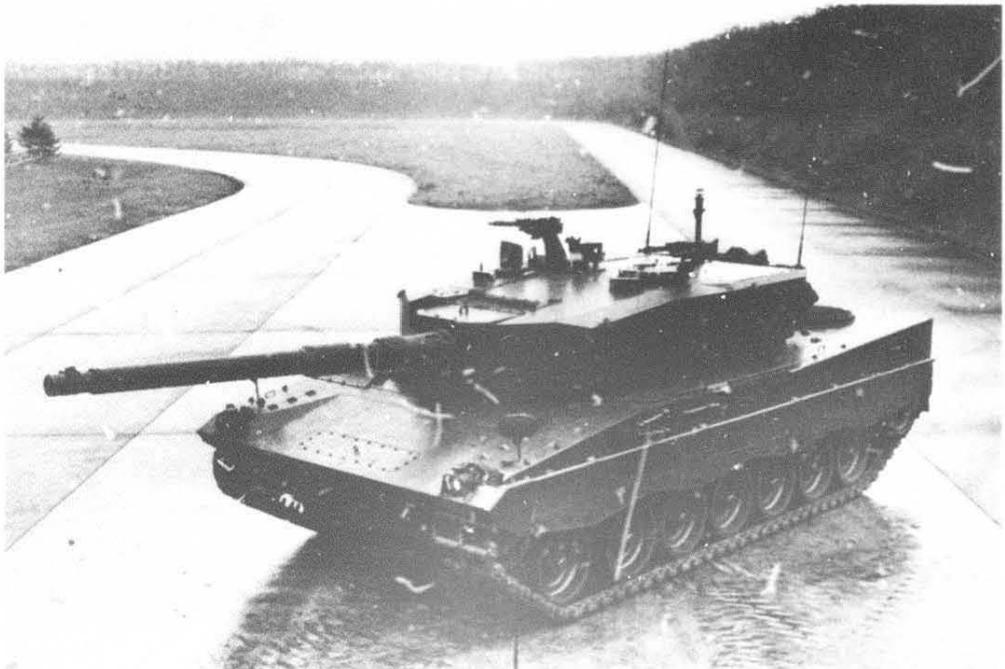
In proposing new major weapon systems for development or production, the Secretary of Defense should inform appropriate committees of the Congress of actions taken by his office to evaluate potential candidates developed or being developed by foreign countries. (See page 15.)

The Department of Defense has provided some informal comments on this report but, to date, has declined to comment on the substantive matters. The Department of State suggested that disclosure of some facts could harm other standardization efforts. State also questioned the report's classification but the Department of Defense assured GAO that the report does not contain any classified information.

ALTERNATIVE NEW MAIN BATTLE TANKS



CHRYSLER XM-1 PROTOTYPE



KRAUSS-MAFFEI LEOPARD 2 AV PROTOTYPE

BLANK

C o n t e n t s

	<u>Page</u>
DIGEST	i
CHAPTER	
1 INTRODUCTION	1
NATO standardization	1
Scope of review	2
2 MEMORANDUM OF UNDERSTANDING TO TEST AND EVALUATE ALTERNATIVE TANKS	3
Germany expresses concern	4
3 TEST AND EVALUATION OF THE LEOPARD AFTER CHANGE TO THE MEMORANDUM OF UNDERSTANDING	6
Testing the Leopard	6
Evaluation of test results	7
Overall Army conclusions	9
Schedule availability of the tanks	9
Cost	10
Army posture on tank competition	10
4 SUBSYSTEM STANDARDIZATION IS STILL NOT CERTAIN	12
5 CONCLUSIONS AND RECOMMENDATION	14
APPENDIX	
I Comments from the Department of State dated October 3, 1977	17
II Principal Department of Defense officials responsible for administering activities discussed in this report	20

ABBREVIATIONS

AMSAA	Army Materiel Systems Analysis Agency
AV	austere version
DOD	Department of Defense

GAO	General Accounting Office
MBT	main battle tank
NATO	North Atlantic Treaty Organization
XM	experimental model

CHAPTER 1

INTRODUCTION

In 1972 the Army began developing the XM-1 main battle tank to replace the M-60 tank. Two earlier efforts to develop a new tank were terminated because of cost and complexity problems. The first, the MBT-70, was also a bilateral effort of the United States and the Federal Republic of Germany (West Germany). Afterward, the Army began developing its XM-803 tank. Meanwhile, West Germany completed its Leopard 2 tank in 1974.

Interest in the Army's development of its new tank was heightened by the emergence of an issue which increasingly commanded the attention of the Western Alliance--that of weapons standardization.

NATO STANDARDIZATION

Since 1972 defense ministers and others on both sides of the Atlantic have discussed considerably the advantages of increasing the standardization of weapons used by North Atlantic Treaty Organization (NATO) nations. Standardization was viewed as essential to improving the interaction of NATO forces and thereby military effectiveness. Standardization was also seen as a means of reducing defense expenditures by curtailing duplicative research, development, and proliferation of various weapons which served similar purposes and complicated training and logistics.

The standardization issue was accompanied by the concern of major European members of the Alliance that the trend of the United States selling up to 10 times as much military equipment to Europe as the Europeans were selling to the United States should be reversed. The Department of Defense (DOD) endorsed the concept of a more balanced market. If it compared favorably with the XM-1, coproduction of the Leopard in the United States presented an opportunity to demonstrate such support.

Interest in Leopard in 1972 was sufficient to prompt the Army to purchase a Leopard 2 automotive chassis for testing. These tests and subsequent Army analyses showed that the original Leopard 2 fell short of Army requirements. In response to German overtures and the intervention of Secretary of Defense James Schlesinger, however, in 1973 an improved version of the Leopard 2 became a contender, along with two XM-1 competitive prototypes produced by the Chrysler

and General Motors Corporations, for selection as the Army's new tank. The program commanded wide attention in Europe and the United States.

In a January 1977 announcement, the Army revealed the agreement with West Germany that some subsystems would be evaluated for possible incorporation into the XM-1, but the Leopard would be withdrawn from competition.

This abrupt change to the agreement followed West German Government expenditure of the equivalent of \$25 million to modify its Leopard to U.S. requirements, as well as costs to maintain a task force of about 60 people to support 4 months' testing at Aberdeen Proving Ground. The withdrawal of the Leopard at this critical stage, just before the Army was to begin evaluating its performance, gave rise to much speculation about how the Leopard fared in testing, whether testing was sufficiently objective, and whether NATO standardization was permanently set back.

We sought to determine answers to these questions.

SCOPE OF REVIEW

We reviewed (1) Army plans for testing the Leopard 2 AV, (2) comparative information on the two tanks provided by the Army Materiel Systems Analysis Agency (AMSAA), and (3) information provided by the XM-1 Project Management Office on the comparison of the XM-1 and Leopard prototypes. In addition, we observed portions of the operational test and evaluation at Aberdeen Proving Ground and discussed the conduct of the tests with the senior German observer at the site.

CHAPTER 2

MEMORANDUM OF UNDERSTANDING TO TEST

AND EVALUATE ALTERNATIVE TANKS

Attending the June 1973 meeting of the Defense Planning Committee as Secretary of Defense designate, James Schlesinger was approached by German Minister of Defense Herr Georg Leber with the suggestion that both countries standardize the main guns of their new tanks. Subsequent meetings and correspondence led to a counterproposal by Dr. Schlesinger that West Germany "study how the Leopard 2 could be modified, with minimum design impact, to meet U.S. performance and cost constraints." (Underscoring supplied.) He concluded his September 28, 1973, letter stating "I feel that the efforts I have discussed should lead toward greater standardization, especially in the main armament, and even possibly toward a final evaluation that one of the tanks could meet the needs of both of our armies." West Germany agreed, and the U.S. Army was assigned responsibility for negotiating a Memorandum of Understanding and then managing the project.

This 1974 agreement with West Germany described the plan to evaluate the Leopard as a possible candidate for the next generation U.S. main battle tank. West Germany was given the project manager's evaluation of the Leopard 2 chassis, which the Army had tested earlier, and desired performance characteristics for the XM-1, including ballistic protection goals. With this information, Krauss-Maffei, the developer of Leopard 2, set out to modify its tank into an Americanized version now known as Leopard 2 AV. Modification to the Leopard 2 would include special armor, a new turret, and a simpler, less expensive fire control system.

The agreement with West Germany was somewhat vague as to whether one of the tanks would be selected after evaluation. The agreement referred to "all reasonable efforts to achieve maximum standardization" of the XM-1 and the Leopard. In any event the popular belief, reinforced from time to time by statements from the two Governments, was that both tanks were bidding to become the Army's next main battle tank. West Germany was not committed to considering the XM-1 for its forces.

Leopard 2 was the outgrowth of Germany's continuance of the aborted United States/West Germany Main Battle Tank-1970 program. By December 1974, when both Governments had finalized the Memorandum of Understanding, Germany had built and

was testing 17 prototypes of the Leopard 2 with both 105mm and 120mm main guns. The German research and development effort suffered one serious shortcoming--the tank was designed to the less stringent vulnerability specifications of the MBT-70.

Before 1972 a new type of armor offering greatly improved protection over conventional armor was being perfected. The United States had become aware of the theory of chobham armor developed in the United Kingdom but elected not to attempt to incorporate it into either the MBT-70 or XM-803 because of transfer restrictions and other reasons. Approval for commencement of the XM-1 program in January 1973 made it economically and technologically feasible to incorporate this advance into the new tank design.

The modified Leopard was desired for testing at the same time as the U.S. prototypes and was to be evaluated against the same performance and cost constraints. It soon became apparent that constructing a new prototype, incorporating all the required changes, would take longer than estimated and that the Leopard would not be available in time for side-by-side testing with the XM-1 prototypes. Germany wanted side-by-side testing of the three candidates to be delayed until September 1976 when the modified Leopard would be available.

In discussions between the two countries, however, the United States said that it could not wait 7 months to initiate the first phase of XM-1 development and operational testing. It was decided that Germany would deliver the Leopard to Aberdeen in September for testing through December 1976, and the Memorandum of Understanding so indicates.

Meanwhile, the Army proceeded with plans to put the XM-1 into full-scale development leading to initial production in 1979. The Army was subsequently supported in two different congressional conference committees when proposals by some Members to defer full-scale development until after side-by-side testing with the Leopard were defeated.

GERMANY EXPRESSES CONCERN

While West Germany was modifying the Leopard 2, the Army's XM-1 program proceeded on schedule. Prototypes developed by Chrysler and General Motors were tested in early 1976 at Aberdeen Proving Ground, with announcement of the winner scheduled for July 1976.

On November 6, 1975, German Minister of Research, Hans L. Eberhard, 1/ wrote to DOD expressing concern that the Army was requesting authority to select an XM-1 prototype and enter it into full-scale development 3 months before the Leopard would even begin testing. A year earlier Germany was informed that the tanks could not be tested simultaneously. Apparently, it did not realize that the Army intended to commit funds to the development of the winning U.S. tank.

The international implications of this misunderstanding were outlined by Senator Thomas F. Eagleton on the floor of the Senate and in a letter to the Secretary of Defense on December 18, 1975. In his February 24, 1976, reply the Secretary stated, "There is no commitment on the part of either government to adopt the tank of the other country based upon those tests and evaluation, although this is a possibility." He also said, "In the event the Leopard 2 [AV] proves to be a clearly superior design and of comparable cost considering all factors, 2/ the U.S. would be prepared to recommend adoption of that design for completion of development and production in the U.S. in keeping with our overall objective of providing our soldiers with the most cost-effective equipment possible." (Underscoring supplied.)

1/Counterpart to the U.S. Director of Defense Research and Engineering.

2/"All factors" have never been identified.

CHAPTER 3

TEST AND EVALUATION OF THE LEOPARD AFTER CHANGE

TO THE MEMORANDUM OF UNDERSTANDING

The winner of the XM-1 competition was not announced in July 1976 as scheduled. That month the 1974 Memorandum of Understanding was amended to include efforts to standardize tank components. Selected components were the engine, transmission, gunner's telescope, night vision device, fire control system, track, and main gun. Chrysler and General Motors were awarded contracts to prepare proposals for incorporating these components (also planned for the Leopard) and to redesign the tank turret to accommodate a 120mm gun. In November the Army selected the Chrysler prototype for full-scale development as the Leopard, which had arrived in September, was being tested at Aberdeen.

TESTING THE LEOPARD

Three Leopard test units were delivered to Aberdeen Proving Ground on schedule and formally accepted on September 9, 1976. Although the importance of simultaneous testing is not measurable, tank specialists and experienced testing personnel we interviewed generally agreed that the test data obtained from simultaneous testing of the two XM-1 prototypes and the Leopard would be more reliable than data obtained from testing the Leopard alone, months after the U.S. prototypes were tested. The Army maintained, however, that by using the same baseline comparison vehicle and making instrumentation compensations, the test data was sufficiently reliable for comparative purposes.

We examined the test plans and monitored the closing stages of the operational testing, including debriefing of the tank crews, conducted at Aberdeen by the Operational Test and Evaluation Agency, a separate testing organization representing the Army user. Operational testing provides data on the system's operational suitability and needed modifications. Development testing, designed to demonstrate that the engineering design and development were complete and that the system would meet specifications, had been completed earlier in December.

We believe that the test preparations and those portions of the actual testing we observed were objective.

The West German observers at the test site appeared generally satisfied with how the tests were carried out. The chief of the German Observer Team at Aberdeen Proving Ground told us in a brief initial contact that overall, he believed the testing of the Leopard to be fair and equitable.

EVALUATION OF THE TEST RESULTS

When the Leopard's tests were complete, the results were evaluated and included in a report released in May 1977 by AMSAA. Better than any other Army group, this organization provides independent evaluations of Army weapon systems based on test results.

The tank's overall combat effectiveness or performance is a function of its three major characteristics--firepower, mobility, and protection. Military experts disagree on their relative importance; many would rate firepower as most important, not only for the ability to cause the enemy damage, but for the contribution to survivability. Most of the simulations or models used in cost and operational effectiveness analyses are firepower sensitive. Mobility helps a tank to avoid a hit, and protection helps it to avoid a kill, if hit.

The Army's plan for evaluating the relative effectiveness of the XM-1 and the Leopard gave considerably more weight to protection than to firepower and slightly more to firepower than to mobility. We were informed that this was consistent with the user's stated priorities. Thus, a difference between the two tanks' armor protection would have influenced rated effectiveness much more than would, for example, a difference in mobility.

The United States and the British have long emphasized armor protection as the best insurance for survivability, contrary to, say, the French view which presently stresses more mobility for its tanks. As far as we know, however, the French are not privy to chobham armor technology. This discussion illustrates how national military requirements differences can complicate standardization for NATO.

Protection

For its new tank the Army's highest priority is crew survivability. Relative contributions of armor protection, mobility, and firepower to survivability have not been conclusively determined and are debatable, but from the outset it was clear that the Army was mainly seeking the protection afforded by the special armor to enhance crew survivability.

The Army evaluation showed that special armor protects a larger area of the XM-1 than of the present Leopard and that the XM-1 is currently capable of sustaining more types of hits without serious damage. The security classification of the armor protection test results precludes further details. However, the crucial difference between the two tanks seems to be the relative vulnerability of the respective armors.

The protection offered by the present-generation German chobham armor is not, according to the AMSAA findings, equal to that of the XM-1. AMSAA's report offered two possible reasons:

- Differences in how the two countries perceive the threat.
- The haste with which the type of armor used on earlier versions of Leopard was modified to the special armor.

According to the Army, the technology of the special armor is such that through trial and error, it can be progressively improved to protect against increasing threats.

AMSAA's report complimented the West German armor technology and inferred that with more time the difference in armor protection could have been narrowed and perhaps eliminated.

In any case, if the XM-1 has better ballistic protection than the Leopard, it is appropriate to ask why the two countries with the largest tank forces in NATO should produce dissimilar tanks. Common interests of the NATO alliance would be better served if all U.S. and German tanks had the best available armor.

We were told that the German Government was given the U.S. analysis of the Leopard's ballistics protection, but the armor technology itself, we understand, is proprietary to the United Kingdom.

Firepower

In testing the sighting system, laying and tracking, gun stabilizer performance, main gun ammunition firing characteristics, and hit probability, 2,532 main gun rounds were fired from the Leopard. Test results showed that both tanks were about equal; one or the other excelled at various distances and at firing certain types of rounds.

Mobility

Mobility varies with a tank's weight. The Army has consistently maintained that the 58-ton upper weight limit was unbreachable by U.S. contractors. The Leopard, designed from the outset to carry a 120mm gun, was always above 58 tons but less than 60 tons. The XM-1 contractors achieved the 58-ton limit with the lighter 105mm gun. They foresaw that if they had originally designed the prototypes to accommodate the larger 120mm gun, spoken of as a gun for the future, the 58-ton limit would be exceeded. The Army presently estimates the weight of a combat-loaded XM-1 with a 120mm gun at 59.9 tons and believes that the Leopard can also meet the weight requirement.

OVERALL ARMY CONCLUSIONS

AMSAA reported that the Leopard met all U.S. mobility requirements. Essentially, the difference between the two tanks seems to be the XM-1's better armor protection. AMSAA's conclusion was that the Leopard met or could meet, with major modifications, nearly all of the Army's critical survivability, mobility, and firepower requirements. The XM-1, too, failed to meet all requirements.

AMSAA's conclusion contrasts markedly with that provided us earlier by Army officials closely associated with the XM-1 program for several years. These officials interpreted the tests as showing that the Leopard failed to meet the majority of the specified requirements--an interpretation contrary to the test results.

SCHEDULE AVAILABILITY OF THE TANKS

A major Army criticism of the Leopard is the delay in the initial operational capability date which would have accrued had the German tank been selected and required to undergo the 36-month, full-scale development phase, including the production of 11 more prototype vehicles. (Prototypes of the earlier version of Leopard, without modifications to meet U.S. requirements, were previously developed by West Germany.) Germany maintained that its experience in developing and modifying the Leopard already demonstrated the Leopard's performance sufficiently so as not to require the full-scale development phase again. The Army disputed this claim, considering the full-scale development phase essential to demonstrating that the modified Leopard had overcome shortcomings of the earlier version.

The concept of phased acquisition with adequate testing was instituted to correct some of the evils of concurrency which accompanied major acquisitions in the 1960s. The Army was complying with policy in applying the existing rules to the Leopard.

On the other hand, the Army maintains that, except for the 4 months used in responding to the revised request for proposal, the XM-1 program will be kept on schedule. In this the Army may be optimistic considering the redesign or reengineering of the turret to accept a 105mm or 120mm main gun, resulting impacts on ancillary items such as fire control, incorporation of a turbine engine still not fully demonstrated, and adoption of other yet to be determined standard components or subsystems.

Additional testing and evaluation will be performed to insure that technical risks have been identified and overcome--that there is no reemergence of a concurrency problem. The Army's optimism contrasts with its views that Leopard cannot be readied for deployment in time to meet Army needs. In our opinion it is at least questionable that the Leopard should have been handicapped in evaluation because the XM-1 might possibly be available sooner. The history of many weapon systems acquisitions suggests the high degree of uncertainty inherent in making predictions, long before the production contract is signed, as to when they will become available. The same holds for cost predictions.

COST

In 1972, in accordance with the design-to-cost concept being introduced in DOD, the Army set an average unit hardware cost goal of \$507,800 for the XM-1. This design-to-cost constraint was a recognized objective for the Leopard to meet.

We have not been provided comparable costs in comparable dollars for each tank, but the Army places the unit cost of the XM-1, using a 30-per-month-production rate, at \$728,000 in 1976 dollars. This is \$56,000 less than the Leopard's cost as estimated by FMC. We did not verify these estimates.

ARMY POSTURE ON TANK COMPETITION

Since the Memorandum of Understanding was signed in 1974 and through the period of the hearings conducted by the House Committee on Armed Services in September 1976,

all official statements on the attempts to achieve NATO weapons standardization by selecting the XM-1 or the Leopard created the perception, or permitted the interpretation, that in March 1977 a tank evaluation would in fact take place.

FMC, the American licensee for the Leopard, felt that realistically the Leopard stood little chance of acceptance and, therefore, it was unwilling to incur the considerable cost involved in preparing a proposal. The project manager said that appropriated funds to pay for a proposal from FMC were not available. FMC's views reflected a feeling persistent in some quarters that, despite Army statements that it would choose the Leopard if it proved clearly superior to the XM-1, the Army would not select such a prestigious weapon as a tank which was not developed in the United States.

On January 5, 1977, the then XM-1 project manager reiterated to us that DOD and the Army were still prepared to select the Leopard as its new main battle tank if it proved the more cost effective as the result of the comparative evaluation. The project manager and other Army personnel pointed out that West Germany had made no similar commitment with respect to the XM-1 if it proved superior to the Leopard.

On January 26, 1977, we met with the Assistant Secretary of the Army for Research and Development who participated in the Army's negotiation of a further amendment to the Memorandum of Understanding which terminated the plan to evaluate the Leopard. He said the termination of the tank-on-tank competition was by German initiative, but that the United States was still prepared to compete the tanks intact if Germany so desired and would agree to support with its own resources all that this involved.

CHAPTER 4

SUBSYSTEM STANDARDIZATION IS STILL NOT CERTAIN

Army personnel organized a Cost and Technical Evaluation Board which reported in April 1977 to the Assistant Secretary of the Army for Research and Development recommendations on which items, other than the main gun, should be selected for standardization on the XM-1 tank. Many, if not all, of the personnel were originally to have constituted the board designated earlier to evaluate the Leopard intact.

The board's report optimistically commented on the potential for several items to be standardized, but its remarks on specific major subsystems indicate that few are likely to be adopted for both tanks, and those that are will present some hurdles.

Some of the board's pertinent observations follow:

Turbine engine and transmission - The Leopard's requirements for the turbine engine and transmission are exceptionally stringent and, in a number of areas, impossible to meet in any reasonable time frame. This may preclude standardizing a common engine/transmission.

Gunner's telescope - Impractical to standardize unless either tank's basic design were altered. The report recommends that the United States pursue the West German telescope design.

Fire control system - Leopard's performance was superior to XM-1's, but if both countries adopted the same system, it would require major turret redesign and component substitution. It appears more practical to try for interoperability between the two systems.

Night vision devices - About 95-percent commonality can be achieved through the use of common modules.

Track - Good possibility of commonality if both countries agree on standardized track width and pitch.

Main gun - Decision must await completion of tests. No impact on tank design no matter which is selected. Use of common gun mount, in addition to gun, should be investigated. Leopard's

deployment schedule might be affected if the West German 120mm gun is not selected.

Metric fasteners - Slight difference in national standards need to be aligned.

The board concluded that consideration given to standardizing major systems should be limited to those enumerated above.

The first XM-1s are to be produced with 105mm main guns in a redesigned turret which will also accommodate a 120mm main gun. The Army is conducting tests at Aberdeen to evaluate a British-designed 120mm rifled bore gun, the German 120mm smooth bore, as well as the Army's 105mm gun with improved ammunition. A decision on which one may eventually be incorporated into later production tanks is planned by December 30, 1977.

In addition to redesigning the Chrysler turret to accommodate a 120mm gun, the United States and Germany have agreed to use standard diesel fuel for the two tanks and metric fasteners on parts of the XM-1.

- - - -

DOD and the State Department were given drafts of this report on April 27, 1977. DOD made some informal comments but has so far declined to comment on the substantive matters of this report. The State Department suggested that disclosure of some of the facts surrounding this case could adversely affect other standardization efforts. State also questioned the report's classification but DOD assured us that the report does not contain any classified information.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATION

The XM-1 acquisition, which began as a typical weapon system program to develop a successor to the M-60 tank, underwent several transformations in a short time.

In rapid succession it saw these developments, most unexpected, over 6 months:

- An announcement as to the winner of the Chrysler/General Motors competition, scheduled for July 1976, was postponed at the last moment.
- The Memorandum of Understanding with West Germany was amended, and the two Governments agreed to strive for standardization of certain key components as well as for a standard tank. The Leopard was still to undergo testing at Aberdeen. The choice of either the XM-1 or the Leopard was apparently still open.
- The Army, which had first resisted use of a 120mm gun, announced that it would have its contractors redesign the XM-1 turrets to accommodate the larger gun.
- Chrysler and General Motors submitted proposals for redesigning their prototypes, and Chrysler was declared the winner.
- FMC Corporation, which had just completed a year-long Leopard cost and producibility study and had acquired licenses to produce the Leopard in the United States if selected, declined to submit a technical proposal for production of the Leopard.
- The two Governments agreed that the evaluation of the Leopard's performance would not take place and that, instead, certain Leopard components would be evaluated along with Chrysler's to identify which might be made standard for both the XM-1 and the Leopard.

CONCLUSIONS

A key question remaining concerns the impact that the withdrawal of the Leopard from contention will have on

present efforts to achieve greater weapons standardization for NATO. Army officials were skeptical that, in the short time permitted, the Leopard could be modified to meet U.S. requirements. On the other hand they regarded the XM-1 program as a major achievement proceeding on schedule with no indications of any serious problems. The introduction of a foreign weapon into the competition and the international interest that this engendered created additional pressures on the Army normally not present in selecting a weapon system. The aborting of the comparative evaluation of the two tanks may reinforce some European thinking that the United States is not as committed to NATO standardization as its verbal endorsements indicate.

Although the United States and West Germany had hoped to at least standardize many of the major subsystems, our reading of the report of the Cost and Technical Evaluation Board indicates that few subsystems will qualify.

We believe that had the Army's evaluation of the two tanks gone forward, the status of the XM-1 program would have probably been as it is today--that is, considering their close comparability the Army would have selected the XM-1. In retrospect, however, it is probable that in view of the international interest surrounding this acquisition and the Army's long attachment to the XM-1, it might have been wiser to limit the Army's role by placing the Leopard's testing and its comparative evaluation with the XM-1 under the direct control of the Office of the Secretary of Defense. In our opinion, this would have assuaged much of the concern that the Leopard would not receive fair consideration.

Moreover, when foreign weapon systems are being considered by a military service, it may be not only appropriate but necessary for the Office of the Secretary of Defense to be involved in the evaluation process. There are considerations beyond which a single military service cannot cope. This view is reinforced by statements from West German officials that the decision on the Leopard could have a bearing on the Government's financial capability to purchase the Airborne Warning and Control System from the United States. The sale of this system is outside the Army's responsibility.

RECOMMENDATION

We recommend that in proposing new major weapon systems for development or production, the Secretary of Defense

should inform appropriate committees of the Congress of the actions taken by his office to evaluate potential candidates developed or being developed by foreign countries.



DEPARTMENT OF STATE

Washington, D.C. 20520

October 3, 1977

Mr. J. K. Fasick
Director
International Division
U.S. General Accounting Office
Washington, D. C.

Dear Mr. Fasick:

I am replying to your letter of April 29, 1977, which forwarded copies of the draft report: "Consideration Given to the Federal Republic of Germany's Leopard as the Army's New Main Battle Tank."

The enclosed comments were prepared by the Deputy Assistant Secretary for the Bureau of European Affairs.

We appreciate having had the opportunity to review and comment on the draft report. If I may be of further assistance, I trust you will let me know.

Sincerely,

A handwritten signature in cursive script, appearing to read "D. L. Williamson, Jr.", written in dark ink.

Daniel L. Williamson, Jr.
Deputy Assistant Secretary
for Budget and Finance

Enclosure:
As stated

GAO DRAFT REPORT: CONSIDERATION GIVEN TO
THE FEDERAL REPUBLIC OF GERMANY'S LEOPARD
AS THE ARMY'S NEW MAIN BATTLE TANK

Subsequent to Mr. Fasick's April 29 letter and prior to submission of State comments on the first draft report, we were advised to await a revised draft which we received in August. The following comments are provided on the revision:

-- We assume the technical details remain faithful to the various sources and do not question the validity of the data provided. We do, however, make the following specific observations:

--- One of the cited findings - (pp. iv, 11) . . . with "some major modifications" the Leopard could meet nearly all XM-1 requirements . . . leaves the reader without a clear impression of whether the Army should have retested a modified Leopard. The report should assess the cost and time needed to make such modifications and the consequences of the extra cost and the delays.

--- The report does not reflect the impact of an agreement signed on 19 May 1977 -- following distribution of the report -- between the US Army and the FRG which commits both countries to the standardization of Leopard 2 and XM-1 components rather than to the adoption of one or the other of the tanks by both countries. The agreement should be addressed.

-- We note the report is unclassified. While we would leave the question of classification to DOD, which holds the majority of the source documents, it occurs to us that the references to certain * capabilities may remain sensitive to both the U.S. and the United Kingdom. Further, while the purpose and objectivity of the report are understood and supported, we question in this instance the utility and timeliness of a public discourse on past

*Non-Security Exemption material deleted.

- 2 -

difficulties.

*

We appreciate the opportunity to review such reports and would be interested to see subsequent drafts or other agencies' comments.


James E. Goodby
Deputy Assistant Secretary
for European Affairs

*Non-Security Exemption material deleted.

PRINCIPAL DEPARTMENT OF DEFENSE OFFICIALS
RESPONSIBLE FOR ADMINISTERING ACTIVITIES
DISCUSSED IN THIS REPORT

	<u>Tenure of office</u>	
	<u>From</u>	<u>To</u>
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
SECRETARY OF THE ARMY:		
Clifford L. Alexander	Jan. 1977	Present
Martin R. Hoffman	Aug. 1975	Jan. 1977
Howard H. Callaway	May 1973	July 1975
ASSISTANT SECRETARY OF THE ARMY; RESEARCH, DEVELOPMENT, AND ACQUISITION: (FORMERLY RESEARCH AND DEVELOPMENT)		
Percy A. Pierre	May 1977	Present
Edward A. Miller	Nov. 1975	May 1977
Vacant	June 1975	Oct. 1975
Norman R. Augustine	Sept. 1973	May 1975
XM-1 PROJECT MANAGER:		
Brig. General Donald M. Babers	July 1977	Present
Major General Robert J. Baer	Sept. 1972	June 1977

(951336)