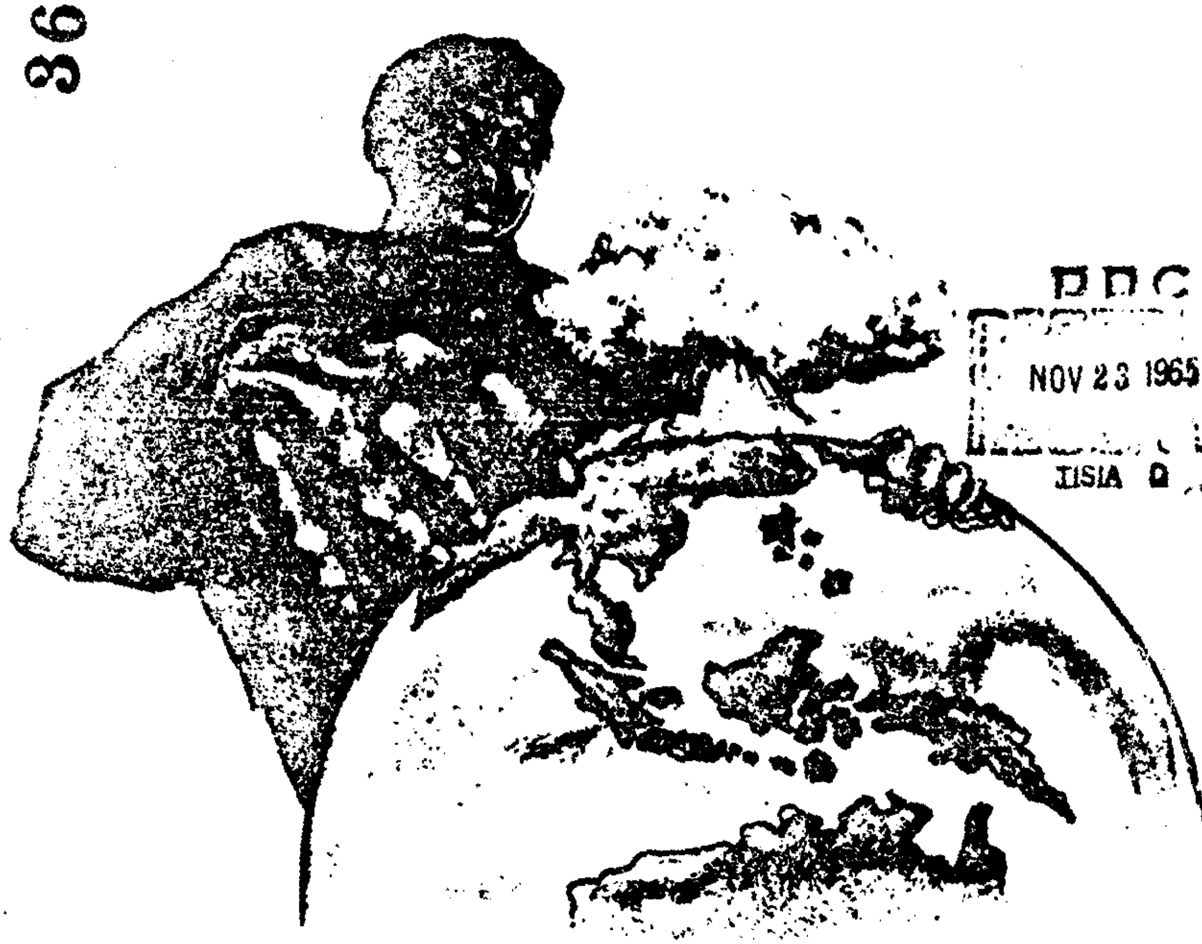
MRBM'S IN THE PACIFIC



SUMMARY

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(U) MRBM's IN THE PACIFIC

15 June 1965

AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE

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(U) MRBM's IN THE PACIFIC

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SECTION 1

SUMMARY

1.1 INTRODUCTION (U)

On 14 April 1965, via TWX message AFXPD 63376, the Chief of Staff of the Air Force directed the Air Force Systems Command, and in turn the Ballistic Systems Division, to conduct an "MMRBM Redefinition Study." The primary purposes of this study were to reassess the over-all feasibility of employing a land-based MRBM in the Pacific Theater, to define candidate weapon systems and operational concepts best suited for that theater, and to compare the effectiveness, costs and development schedules of the various candidates.

The approach taken for this study was to re-examine a broad range of weapon systems that bound the scope of potential solutions for providing an all-weather, quick-reaction, nuclear strike capability for use in countering the identified Chi-Com threat. This approach was selected as a means of facilitating a better insight into the ramifications of alternative programs. Systems were considered ranging from inventory surplus missiles through new system developments with growth options. A summary of the candidate weapon systems considered is shown in Table 8-I.

1.3 THEATER CONSIDERATIONS AND DEPLOYMENT (U)

The political instability which characterizes the majority of the nations of Southeast Asia dictates that a missile system suitable for deployment in this theater have the capability and flexibility of being deployed or re-deployed in a wide number of areas in order to respond to changes in political alignments and/or military strategy. Such a system is needed to provide a VISIBLE and CREDIBLE DETERRENT.

The ability of any weapon system to provide a show of force was considered to be highly desirable, as well as the ability to rapidly redeploy a system into other countries.

The majority of the Southeast Asian nations have relatively restricted transportation networks and generally have predominantly monsoonal climate.

Railroad mileage is somewhat more extensive than that of roads; however, it consists of a multitude of gauges and much of it is in need of modernization. The very wet climate and agricultural practice, i.e., flooded rice paddies, make the off-road mobile mode of deployment impractical.

1.4 WEAPON SYSTEMS EVALUATED (U)

The family of candidate MRBM's includes the Thor, Polaris A1 and A3, 2/3 Minuteman LGM-30B and LGM-30F, and a Flexible Theater Missile. Factors of interest were evaluated parametrically where they were amenable to mathematical treatment, and where factors could not be quantitized, a qualitative assessment of variances was made. The basic configurations evaluated for each of these systems, as well as their growth potential (missile, basing and weapon control configurations) and the fundamental considerations deemed to be of primary importance for selecting a system are discussed in Sections 6, 7 and 8.

1.5 SYSTEMS AVAILABILITY (U)

The availability schedules for each of the candidate MRBM's, for the earliest Initial Operational Capability (IOC) configurations, are delineated in Section 9. The time required to achieve IOC from Phase II go-ahead for these systems was determined to be 12 months for the Thor, 13 and 20 months for the A1 and A3 Polaris respectively, 23 and 31 months for the 2/3 Minuteman LGM-30B and -30F respectively, and 36 months for the Flexible Theater Missile, each deployed in a soft-fixed mode. The time required to implement growth options for the 2/3 Minuteman and Flexible Theater Missile systems was also determined. In addition, it was estimated that the time required for the various basing mode options would range from about eight to nine days for a mobile system to approximately 27 months for a hard-fixed silo deployed system (independent of such considerations as the time required for State Department negotiations for access into the candidate deployment countries, preliminary site surveys, etc.).

Relative to a Program Definition Phase requirement, it was assumed that a Phase 1A and Phase 1B, consisting of such functions as preparation of work statements and negotiation of contracts, would require approximately 90 days for each of the systems except Thor which should only require about 60 days.

1.6 SYSTEMS COSTS (U)

(U) The cost data for the candidate MRBM and comparison weapon systems were derived from the MMRBM program definition, the TMRBM study, the Minuteman program and Golden Arrow cost estimates. Research, development, test and engineering (RDT&E), investment, operations and maintenance (O&M), and total five-year costs were estimated for each system in their earliest IOC configuration and for various basing options.

Relatively low RDT&E cost estimates for Polaris A1 and the 2/3 Minuteman LGM-30B resulted primarily from the cost of refurbishing the missiles and modifying the OGE. The RDT&E costs for the candidate systems vary directly with the degree of modification/new subsystems required for a given candidate, since more flight testing is required to prove the performance adequacy of modifications and/or new subsystems.

The investment costs are lowest for the Polaris A1 and the 2/3 Minuteman LGM-30B, since it was assumed that the missiles for these weapon systems would be GFE as a result of their being retired from the operational inventory. Beyond this consideration, investment costs for the other systems are approximately the same for equivalent basing configurations.

O&M costs do not vary extensively for the candidate systems in a common basing mode; however, such considerations as the number of security personnel, etc., required for the different basing modes can increase O&M costs extensively. The over-all cost estimates for the candidate and comparison systems are presented in Section 9.

1.7 COST EFFECTIVENESS ANALYSIS (U)

The road mobile mode would also provide good survivability given sufficient road mileage. Enemy aircraft armed with conventional munitions were found to be ineffective against the candidate missile systems in all of the basing modes considered, except for the Thor system. However, nuclear armed aircraft would present a threat comparable to the nuclear warhead missiles.

Candidate systems based on inventory surplus missiles (Polaris A1 and 2/3 Minuteman LGM-30B) were found to be more cost effective in the early time frame. The 2/3 Minuteman LGM-30F and the Flexible Theater Missile are superior in later time periods from the standpoint of both cost effectiveness and kill effectiveness due to their added capability with growth performance.

1.8 CONCLUSIONS (U)

It is concluded that the Flexible Theater Missile provides the optimum capability to satisfy both the political and military requirements. If political considerations dictate an early deterrent and show of force, the A-1 missile system could be used as an interim capability.

SEC ION 2

STUDY DIRECTION

P 1323297 | 14 April 1965

FM CSAF

TO RUEBBAA/AFSC
RUEBBRA/TAC
RUHKLM/CINCPACAF
INFO RUWJABA/BSD NORTON AFB CALIF
BT

SUBJECT: (U) MMRBM REDEFINITION STUDY.

THIS MESSAGE IN 4 PARTS.

PART I. THE SECRETARY OF DEFENSE HAS DISPLAYED RENEWED INTEREST IN THE UTILITY OF MMRBMS IN THE PACIFIC THEATER AND HAS REQUESTED THAT AIR FORCE AND NAVY PURSUE APPROPRIATE ANALYSES. AS A RESULT OF PRELIMINARY REVIEW, THE CHIEF OF STAFF HAS DIRECTED A STUDY TO DETERMINE OPTIMUM CHARACTERISTICS AND EMPLOYMENT OF MMRBM-TYPE WEAPON SYSTEMS FOR MAXIMUM EFFECTIVENESS IN THE PACIFIC THEATER. THIS STUDY IS TO DEFINE OPTIMUM AND ALTERNATIVE WEAPON SYSTEM CHARACTERISTICS, OPERATIONAL CONCEPTS, FORCE SIZES, DEPLOYMENT SCHEMES AND DEVELOPMENT SCHEDULES AND COSTS. IMPACTS UPON OVERALL DOD AND AIR FORCE BUDGETS AND FORCE STRUCTURES MUST BE CONSIDERED. STUDY WILL BE USED IN DEVELOPING AIR FORCE POSITION ON MOST EFFECTIVE MIX OF WEAPONS AND FORCES TO COUNTER INCREASING CHINESE COMMUNIST THREAT TO U.S. AND FRIENDLY NATIONS IN THE PACIFIC AND SOUTHEAST ASIA AREAS. STUDY MAY BECOME BASIS FOR DEFINITIVE PRESENTATION TO THE OSD.

PART II. OVERALL RESPONSIBILITY FOR ACCOMPLISHMENT OF THIS IN-HOUSE STUDY IS ASSIGNED TO AFSC. RESPONSIBILITY FOR DEFINING ALTERNATIVE OPERATIONAL CONCEPTS AND DEVELOPING AN

APPROPRIATE OPERATIONAL PLAN IS ASSIGNED TO TAC. TAC AND PACAF WILL PROVIDE NECESSARY SUPPORT TO AFSC AND TAC, RESPECTIVELY. TIMELY COMPLETION OF THE ACCURATE, COMPREHENSIVE STUDY REQUIRED WILL DICTATE CLOSE AND DIRECT COORDINATION BETWEEN ACTION AGENCIES OF TAC, PACAF AND AFSC. FINAL STUDY REPORT MUST REACH THIS HEADQUARTERS NOT LATER THAN 15 JUNE 1965. ALTHOUGH DELAY SHOULD NOT BE ANTICIPATED, THIS HEADQUARTERS SHOULD BE ADVISED IMMEDIATELY IF THIS SCHEDULE IS NOT FEASIBLE.

PART III. IN VIEW OF EXTENSIVE, DETAILED DATA READILY AVAILABLE, MMRBM AND TMRBM SHOULD BE CONSIDERED BASIC WEAPON SYSTEMS FOR ANALYSIS, BUT SHOULD BE REDEFINED AS NECESSARY TO ACHIEVE MAXIMUM EFFECTIVENESS IN THE PACIFIC AREA. VARIATIONS IN SYSTEM CHARACTERISTICS AND COMPLEXITY TO ACHIEVE THE MOST DESIRABLE TRADE-OFFS BETWEEN MILITARY EFFECTIVENESS, POLITICAL DETERRENT VALUE, DEVELOPMENT TIME AND COST AND OPERATIONAL COSTS ARE ESSENTIAL. CONSIDERATION SHOULD BE GIVEN TO USING AVAILABLE COMPONENTS, IF PRACTICABLE, TO REDUCE DEVELOPMENT TIME AND COSTS.

IN ADDITION TO THE ORIGINAL OPERATIONAL CONCEPT AND ONE BASED PRIMARILY UPON CASF OPERATIONS FROM THE CONUS, OTHERS SHOULD BE DEFINED, EVALUATED AND COSTED. THE MMRBM COMMAND AND CONTROL SUBSYSTEM OR MODIFICATIONS OF IT MAY BE CONSIDERED FOR USE IN THE REDEFINED WEAPON SYSTEM DESPITE ITS CURRENT STATUS. INSOFAR AS POSSIBLE, FEASIBLE MMRBM VARIATIONS DEVELOPED FOR CONSIDERATION SHOULD BE COMPARED ON A MILITARY AND COST EFFECTIVENESS BASIS WITH OTHER WEAPON SYSTEMS.

DUE CONSIDERATION MUST BE GIVEN THROUGHOUT TO INTERNATIONAL POLITICAL FACTORS, POSSIBLE CHANGES IN IDEOLOGICAL ALIGNMENT AND THE ACCEPTABILITY, DETERRENT VALUE AND ESCALATORY EFFECTS OF THE INTRODUCTION OF NEW WEAPONS INTO THE PACIFIC AREA. COUNTERING THE CHINESE COMMUNIST THREAT MUST BE OF PRIMARY EMPHASIS. POTENTIAL UTILITY OF THE SYSTEM IN OTHER AREAS OF THE WORLD MAY BE CONSIDERED BUT SHOULD NOT DETRACT FROM THE PRIMARY STUDY AREA.

PART IV. IN SUMMARY, THE PRIMARY PURPOSES OF THE STUDY ARE TO DETERMINE THE OVERALL FEASIBILITY OF A LAND-BASED MRBM IN THE PACIFIC, TO DEFINE A WEAPON SYSTEM AND OPERATIONAL CONCEPT OPTIMIZED FOR THAT THEATER AND TO COMPARE ITS EFFECTIVENESS, COST AND DEVELOPMENT SCHEDULE WITH REALISTIC ALTERNATIVES. THE MAGNITUDE OF THE TASK AND THE EARLY SUSPENSE DATE ARE RECOGNIZED, BUT ARE DICTATED BY THE SEC DEF'S INTEREST AND THE SUSPENSE ESTABLISHED BY THE CSAF. THIS HEADQUARTERS WILL ASSIST IN EVERY WAY POSSIBLE TO FACILITATE THE REQUIRED STUDY EFFORT. REPRESENTATIVES WILL VISIT THE AFSC ACTION AGENCY DURING THE WEEK OF 19 APRIL AND WILL BE PREPARED TO BRIEF COMMAND REPRESENTATIVES UPON REQUEST.

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SECTION 3

APPROACH (U)

(U) In order to accomplish the assigned task in the relatively short time period allocated to this study, a Task Force was assembled and collocated at BSD. Essentially, continuous representation was provided by BSD/Aerospace in conjunction with representatives from Headquarters USAF, AFSC, TAC and PACAF. Each of these participating representatives has contributed substantially to the preparation of the basic report material in the areas of his specialty and has, in addition, participated in the composition and review of the over-all report material.

The initiating direction for this study required the address of political factors as well as technical factors. Inasmuch as the assessment and evaluation of political factors falls beyond the scope of expertise organizally a part of the Ballistic Systems Division, support in this area was solicited from HQ USAF, Rand and PACAF. Material provided by these agencies has constituted the basis for the political discussions that appear in the subsequent text. On the main, the ephemeral character of the political structure of the PACOM Theater has dictated the need for flexibility in deployment concepts. It has been an objective to recognize that the long term political alignments in the theater are susceptible to radical change from the current posture and could potentially influence the hardware configurations selected. Conversely, the introduction of such weapons would probably affect future political alignments.

Particular recognition has been given to the fact that the net value of deploying MRBM's in the Pacific may derive from political assets as opposed to purely military need or capability. As a consequence, the endeavor has been to provide a broad spectrum of alternatives which could be evaluated from various points of view in order to establish a basis for trading off political, military and cost factors. These alternatives range from missile systems which are, or will be, made available as surplus from the inventory and provide an early IOC at low initial cost for potential political advantage; through new designs tailored more specifically to the

PACOM long-term military as well as political requirements.

The threat and the target model have been examined in order to explore the influence of strike survivability on basing and the influence of target structure and employment doctrine on force size options. Missile forces from 50 through 300 UE have been presented and evaluated for both cost and effectiveness in order to provide a flexible basis of determining desirable over-all theater force structure.

(U) Liberal use has been made of prior experience gained at BSD on the TMRBM Study Program and the MMRBM Program Definition Phase. However, particular effort has been devoted to prohibit constraining the alternative solutions presented, to these configurations.

The classical techniques of cost effectiveness evaluation have been applied to the various candidate weapon systems in order to extract indications that might be useful in the over-all evaluation. But, it has been recognized from the outset that these evaluations provide an even lesser basis for final system selection than is usually the case, principally because of the imponderable but crucial quality of the political connotations.

(U) The study was culminated in a treatment of the various candidate weapon systems where the fundamental considerations judged to have primary importance in arriving at the selection of a specific solution are displayed and discussed. Each of the factors of interest, that are amenable to such a treatment, have been quantified and the substantive variances of the major considerations have been highlighted. In this manner, it has been the endeavor to provide those agencies responsible for making a final determination a framework within which they may assign figures of merit to such qualities as political value and the importance of collateral theater use in order to arrive at a judgment.

SECTION 4

GROUND RULES AND ASSUMPTIONS (U)

(U) To guide the study and bound the scope, the following broad ground rules and assumptions were made. Other assumptions of limited impact appear elsewhere in this report where appropriate.

4.1 GROUND RULES (U)

Liberal use was made of the results of previous efforts, in particular, the MMRBM PDP results and the TMRBM study material. Specifically the deployment area evaluations performed in these other studies were utilized to the extent they were appropriate.

The deployment area under study is the Pacific Theater. Potential use of such a weapon system in other theaters was considered but did not detract from maximizing the effectiveness for the principal deployment.

In consonance with the initial directive to emphasize the Chi-Com threat, and avoid the appearance of confronting the Soviet Union with this force, only a Chi-Com capability for counterforce attack was considered in the force element survivability analysis. Escalation of the threat to include the Soviet capability for offense or defense based in China or a Soviet attack launched from Soviet territory was not presumed.

(U) The impact upon overall DOD and Air Force budgets and force structures is not considered.

4.2 ASSUMPTIONS (U)

Volatile political conditions in the Pacific make flexibility of deployment and the capability for rapid redeployment by air highly desirable.

Although political considerations could make some countries in the Pacific Theater unsuitable for near time deployment of MRBM's, changes in the future may alter such a conclusion. Therefore, all countries in the theater were considered as potential deployment areas for the purpose of determining weapon system characteristics and operational requirements.

Although the Tactical Air Force mission does not normally include countervalue targets, optional force sizes were included to accommodate such targets if desired.

(U) Cost estimating was accomplished using MMRBM, TMRBM, Minuteman and Golden Arrow and contractor estimates as a data base. No real estate costs were included in the results. For the Polaris systems considered, it was assumed that Navy training facilities would be available for use as required. Base support facilities were assumed available.

(U) A January 1966 Phase II go-ahead was assumed to time phase capabilities and requirements with the threat projections, and to evaluate utility of operational hardware available through retirement from the operational forces or from production. No time was included for political deployment negotiations with host countries or for site surveys.

(U) A limited Phase I Program Definition was assumed to be required for the purpose of defining work statements and negotiating contracts. It was further assumed that Phase I-A and B would not exceed ninety (90) days.

Emphasis was placed on countering the Chi-Com political and military threat. In view of the projected ability of the Chi-Coms to field nuclear weapons in the near future (1967-68), and the resultant impact on neighboring countries, it was assumed that early availability of a U.S. counterforce would be of considerable interest. However, without specific IOC requirements, system options extending over a range of time were identified.

(U) The MRBM force under study was considered an additive element to the presently programmed force structure and not a replacement for forces in being or programmed. The optimum force mix was not considered.

In view of the questionable residual service life available from Polaris A-1 and Minuteman LGM-30B hardware retired from the operational inventory, a service life of 2 - 3 years after IOC was arbitrarily assumed for candidate systems employing AVE hardware from those systems.

SECTION 5

THEATER CONSIDERATIONS (U)

5.1 THREAT AND MISSION (U)

Since their takeover of the Chinese mainland in 1949, the basic twofold objective of the Communist leaders has been the extension of the world Communist movement and the creation of a strong, unified, and thoroughly communized China capable of achieving an independent great-power status and a position of leadership in Asia. Their progress toward these ends was interrupted in the 1959-1962 time period by mounting economic problems and bitter idealogical disputes with the USSR which left them without Soviet technical assistance in industrial and military development. The Communist regime, however, is still firmly in control and actively maintaining national policies in support of their basic objectives.

Chinese Communist foreign policy reflects both the Chinese and Communist aspects of the regime. As a Chinese regime, it seeks to assert its control over areas which have traditionally been claimed by China. As a Communist regime, it seeks to weaken and eliminate U.S. and Western influence and power in Asia and to expand the power and influence of the Communist bloc. Unlike the proclaimed Soviet doctrine of "peaceful co-existence" with the U.S., the Chi-Coms have continued to view the U.S. with great hostility and to charge that it is planning war. The Chinese government appears dubious about the possibility or advisability of a detente with the West and seems to be less optimistic than Moscow about the possibility of averting war.

Chinese military strategy has historically been based upon use of their massive manpower reserve in a protracted land war or in support of guerrilla warfare or local insurgencies. Despite their defiant oratory, the Chi-Com military actions since Korea have avoided direct military conflict with the U.S. and have reflected an awareness of the weaknesses of their strategic forces. They have considered it a matter of first importance to develop a nuclear capability of their own as rapidly as possible, even when they were facing a general economic disaster. Their success in detonating a nuclear device has had obvious psychological and political effects, especially in Asia and Africa and in the context of the Sino-Soviet rivalry; it is a strong stimulus to Chinese national pride and support for Chinese pretensions to great power status.

U.S. objectives in Southeast Asia are centered around containing the expansion of Communist China, preventing the loss of additional territory to Communist control or influence, maintaining U.S. influence, and maintaining strong allies with a community of interest oriented towards U.S. objectives. While the current Chi-Com nuclear capability has not materially affected the existing balance of military power between the U.S. and Communist China, the expected expansion and exploitation of this capability will pose difficult problems in the forseeable future. In the face of this growing Chi-Com military threat, it is essential that the U.S. maintain an effective and credible deterrent in the Southeast Asia theater. Throughout the stages of Chi-Com nuclear development, the U.S. must have a visible, quick reacting capability to deter employment of the Chi-Com nuclear forces, and should deterrence fail, a capability to destroy or neutralize, on a selective basis, that portion (or all) of the Chi-Com force which threatens the U.S. or its allies.

5.2 NATURE OF THE DETERRENT (U)

5.2.1 Unique Deterrent Requirements (U)

The nature of the political conditions in the Southeast Asia theater combined with the emerging Chi-Com nuclear capability result in unique requirements for the characteristics of a theater deterrent which could have a strong influence on weapon system characteristics.

The persistent social, economic, and political instability of much of Southeast Asia, together with the aggressive expanionist policies of the Chinese Communists produce an environment in which continuing conflict can be expected over a broad spectrum of degrees of violence, ranging from local insurgencies to organized military operations. These conditions create increasing pressures on the non-Communist, but highly vulnerable, nations of Southeast Asia. Unlike Europe, where long standing cultural and military ties, combined with closely interrelated economies have created an atmosphere of mutual standing and confidence in U.S. defense objectives, the nations of Southeast Asia, with only recent experience with U.S. policies and major cultural and economic differences with the West, require continual reassurance of the determination of U.S. Southeast Asia defense policies. With the emergence of a Chi-Com nuclear capability, even of limited size, it can be expected that the Chinese would step-up the pressure of subversion and local military actions. As a political propaganda instrument, this new capability would be exploited to discredit U.S. superiority in the area, intimidate local governments, and encourage and stimulate indigenous Communist organizations in the neighboring Southeast Asian nations. With a capability for nuclear threat or nuclear blackmail, China may be more prone to engage in probing low level military operations, such as border conflicts or open support of local Communist uprisings, to test the U.S. resolve and "provocation threshold," thereby undermining the confidence of the Southeast Asian nations in U.S. defense policy. The continued support of U.S. policy by these nations, while under the increasing pressures brought to bear by Communist China, will depend to a large degree on convincing demonstration of U.S. defense commitments in the area. This then establishes the first requirement for the deterrent: it should be a visible and credible theater deterrent, based so as to give indication of U.S. long-term support and willingness to share the risks of Communist attack. The visible presence of U.S. forces in the Pacific serves more than any other single factor to deter Communist China's military actions. The maintenance of credible forces in close proximity to China implies a high degree of willingness on the part of the U.S. to take the risks involved in defending non-Communist Asia against aggression. For the Communist adversary as well as the friendly nations of Asia, such a force posture remains the most convincing evidence the U.S. can offer regarding its continued commitment to the defense of the Far East thereby further deterring Chi-Com military action at all levels.

A second fundamental requirement imposed on a deterrent in the Southeast Asia theater is the need to distinguish between the Soviet and Chinese threats. While it can be argued that the current U.S. strategic capability covers Communist China, this force is primarily designed to deter the Soviet. Clearly, the Chi-Com recognize that even with a nuclear capability, they will not achieve strategic parity with the U.S. However, they may not attach as much credence to the CONUS based threat since its use against China would leave the U.S. in a weakened position relative to the Soviets and might invite Soviet miscalculation of U.S. objectives, as for example, in the case of overflying Russia with missiles in order to reach China. Introduction of a deterrent force, restricted by its capability to Communist China, would further demonstrate

U.S. willingness to prevent Chi-Com aggression. In addition, this would allow U.S. political relationships with the USSR and Communist China to be pursued independently, possibly softening one while hardening the other.

5.2.2 Role of the Tactical MRBM as a Deterrent

The tactical MRBM can serve to fill many of the requirements for a deterrent discussed in the preceding paragraphs. Consideration of the optimum force mix for the Southeast Asia theater is beyond the scope of this study. However, in examining the unique capabilities of an MRBM as a deterrent, it is necessary to consider the MRBM in relation to the other force elements.

The total deterrent posture of the U.S. is made up of both strategic and tactical forces. Today in the Pacific, tactical nuclear strike capability is limited to manned fighter aircraft and subsonic air breathing missiles. Of necessity the aircraft must be committed in an alert posture against fixed targets located in heavily defended areas. Reaction time, range, survivability, and all weather delivery capability are for the most part, a function of the limitations inherent in the characteristics of manned fighter systems. The tactical strike capability is reinforced by the strategic forces, primarily CONUS based ICBM's, Polaris missiles, and B52's based on Guam. These strategic forces must, however, retain a posture which provides a capability against both the Soviets and the Chinese Communists.

In examining each of these force elements in the light of required deterrent characteristics discussed previously, it can be seen that the theater-based tactical fighter not only provides a visible and credible deterrent, restricted to the Chi-Com, but also can function flexibly in a wide variety of conflicts, thereby providing increased deterrence at less than the nuclear level of conflict. These advantages, however, are counterbalanced by the limitations of tactical aircraft, including restricted range, flight times which are not suitable for attacking time urgent targets, limited all weather capability, and vulnerability to attack while on the ground, particularly important as the Chinese Communists gain a nuclear missile capability.

Long-range strategic aircraft, based on Guam, provide an effective force for deep penetrating attacks on the Chinese mainland, have excellent target coverage, and are particularly suitable for the accurate delivery attacks necessary to destroy hard targets, such as runways and hardened command centers. However, because of the capability of these forces to provide significant coverage of the Soviet Union, as well as China, they would not be interpreted as a restrictive threat. Further, since they would not be based within the theater, they would not provide as strong a reassurance to the non-Communist countries of our willingness to share the risk of Communist attack and provide a long-term defense commitment.

CONUS based ICBM's represent an effective, relatively invulnerable, quick reaction, all weather strike capability particularly suited to the destruction of time-urgent targets. Since this threat is obviously not restricted to the Chinese Communists, however, it would not represent as effective a deterrent, since the Chi-Com would doubt our willingness to risk the provocation of overflying Russia or leaving the CONUS in a weakened position relative to Soviet forces. The CONUS based ICBM's would also not be an effective deterrent against lower level conflicts since the Chi-Com would probably dismiss them as an illogical response under those conditions. These same factors would be recognized by the non-Communist nations and would reduce, in their eyes, the credibility of U.S. defense commitments in the area.

Polaris based missiles, while not creating an overflight problem, still could not be identified as a restrictive counter to the Chi-Com or a longstanding defense commitment because of their mobility and the absence of any visual evidence of their continuing presence in the theater.

In examining the strengths and weaknesses of each of these force elements, it is obvious that no one element can accomplish the total deterrent job by itself. It is also apparent, in examining both the political and military aspects, that the U.S. over-all deterrent capability in the Southeast Asia theater has several major gaps which could be filled effectively by a theater based MRBM. The military gap to be filled is the need for a quick reaction, survivable, all-weather nuclear strike capability suitable for deep penetration attacks on Chi-Com time urgent targets. The corresponding gap in the political deterrent is the need for a theater based force to demonstrate our willingness to share the risk of Chi-Com aggression and thereby convincingly demonstrate our determination to execute our defense commitments in the theater. The introduction of an MRBM supplies the required military capability, and further, releases a larger fraction of the tactical aircraft force in the theater for use in lower level conflicts increasing our deterrent capability at all levels. Basing an MRBM in the host countries of the Southeast Asia theater provides U.S. forces in the area to share the risk of a Chi-Com attack, demonstrating the firmness of our commitment. This action also identifies our intention of dealing separately with the Chi-Com threat. These factors would be recognized both by the non-Communist nations, providing reassurance as to our long-term objectives, and by the Chinese Communists, providing increased credibility to the deterrent.

5.2.3 Potential Escalatory Effects (U)

Even though the Chinese Communist public pronouncements have been both belligerent and reckless appearing, their military actions have been carefully calculated and have recognized the weaknesses (and strengths) of their military capability. In particular, the Chi-Com have recognized the weakness of their strategic offensive and defensive forces and have been careful not to provoke incidents which would call for a strategic response. Rather, they have limited actions to levels where they could make the most advantageous use of their subversive forces or land armies, where they recognize they have the advantage. In this light, it is highly improbable that the Chi-Com would, in the future, intentionally escalate any conflict beyond a level where they believe they have control and an advantage. Under these conditions, and with the alternative of totally withdrawing U.S. forces from the Southeast Asia theater summarily rejected, the U.S. can minimize the long-term potential of escalation of local conflicts by taking the military and political measures necessary to insure that the Chi-Com fully understand both our military potential and political objectives in the area. This, then, would avoid escalation of a low level conflict into a major conflict as a result of Chinese miscalculation of U.S. determination. Further, the introduction of a theater based MRBM should decrease the potential for escalation at all levels of conflict since it would provide a more flexible over-all force structure in a theater to which we are already deeply commited by declaratory policy, treaty commitments, and military forces, and would also provide a deterrent force clearly restricted to the Chi-Com thereby reducing potential Soviet involvement.

5.3 DEPLOYMENT AREA CONSIDERATIONS (U)

Consideration of the long-term political acceptability of theater MRBM's to the governments of these nations, discussed in the following paragraphs, reduced the list to ten, including potential future deployment areas as well as those where MRBM's would be currently acceptable. Deployment constraints imposed by topography and range/target coverage requirements are established for all ten to provide an estimate of requirements for future growth as well as required near-term capability.

5.3.1 Idealogical Alignments and Acceptability (U)

As opposed to Western Europe, where nations have a tradition of strong, popularly supported central governments; relatively well defined and homogeneous national goals; and a long history of cultural, political, economic, and military ties and understanding with the U.S.; the nations of the Southeast Asia theater are characterized by a wide spectrum of national objectives: political, economic, and military goals which are not well established; and central governments which, in many cases, are divided into factional interests and do not have the confidence of the local populace. Introduction of a theater deployed MRBM into this already unstable environment would create a variety of new considerations, both political and military.

5.3.2 Geographic Considerations (U)

5.3.2.1 Topography of Candidate Countries (U)

The relatively undeveloped transportation network, characteristic of the majority of Southeast Asia nations, combined with a predominantly monsoonal climate tend to restrict mobility of a weapon system deployed in the Southeast Asia theater.

Rail track mileage, while somewhat more extensive than good roads, is of mixed gauges and in need of modernization. The monsoonal climate, combined with the agricultural practice of flooded rice paddies, combine to limit off-road mobility. A summary of the topographic characteristics of each of the candidate countries is given in Table 5.3.2.1-1.

5.3.2.2 Deployment Concepts (U)

The deployment concepts which could be utilized effectively in the candidate deployment areas are significantly restricted by the topographic characteristics. Further, the potential for insurgency, which exists to varying degrees in each of these countries, introduces additional security problems for the more exposed or dispersed deployment concepts. While these problems are by no means insurmountable, they tend to make the fixed or hardened transportable deployment schemes, which can be deployed in a more limited area, much more attractive.

The size of the U.S. force which could be deployed in any country is limited by the available area or road network and these spacing requirements. The maximum U.S. force size which could be deployed in the politically acceptable countries was estimated, utilizing the previous data on available area and road networks, and is shown in Table 5.3.2.2-I. It should be carefully pointed out that the force sizes indicated in the table do not consider that portion of the total area or road network which would not be available due to residential, agricultural, and industrial usage or other military utilization, and therefore represents an outside limit on the maximum force size which could be deployed.

Consideration of other factors, such as the problems of providing logistic support and security for a force dispersed with such a large spacing reinforces this conclusion.

The road mobile deployment mode is greatly restricted by the available road networks as shown in Table 5.3.2.2-L. It should be recognized, however, that the road mobile system can be used effectively in the fixed and hardened park-move modes, and has the additional flexibility for potential use in collateral theaters. The potential for eventual growth to a full-road mobile capability is also desirable for other reasons, as follows:

b. In the event of an improvement in the delivery accuracy of the Chi-Com missile the road mobile system would retain survivability, since road mobile survivability is essentially independent of CEP, while fixed basing survivability is rapidly degraded.

c. The road mobile system would retain survivability in the event of an increasing Soviet threat for the reason described above.

5.3.3 Range/Target Coverage (U)

The requirements for range and target coverage are normally concerned with the combination of geographic distribution of the target structure, missile range capability, and deployment area location. The unique requirement for a restrictive threat to the Chi-Com imposes additional considerations for a theater MRBM in Southeast Asia, however. These considerations tend to modify the usual desire for maximum range capability, and in some cases make increased range capability a liability rather than an advantage.

5.5 GEODETIC AND GEOPHYSICAL INFORMATION

The Geodetic and Geophysical information supplied for this study by the Aeronautical Chart and Information Center, USAF, for possible Pacific theater launch sites and targets (China Mainland) are based on the following assumptions:

a. That the presurveyed launch sites connected to primary triangulation networks would be utilized. Because of this assumption the estimates differ considerably from previous estimates provided by ACIC for MMRBM (European deployment) studies which considered the use of cartographic materials for launch site selection.

b. That the primary triangulation nets in the respective areas of concern would be connected to the World Geodetic System.

c. That current programmed geodetic surveys and revision of the world geodetic system during 1968 to 1970 will be completed as planned. Survey programs of a significant nature for this area include the HIRAN SECOR and optical geodetic satellite projects.

SECTION 6
CANDIDATE MISSILE SYSTEMS

6.1 MISSILE SYSTEMS CONSIDERED (U)

Missiles considered for this requirement and their major performance characteristics are shown in Table 6.1-I.

The systems shown cover a broad range of concepts from "off-the-shelf" hardware to new developments. However, particularly in the case of the new missile and somewhat in the case of the 2/3 Minuteman missile, these missile systems are largely representative configurations rather than specific recommendations. Other combinations of subsystems, particularly guidance and re-entry vehicles, may be employed depending upon more specific ground rules or requirements. Typical subsystem alternatives are described in detail in Appendix B.

6.2 BASIS FOR SELECTION (U)

The missile system configurations in Table 6.1-I were chosen in part for their apparent early availability. This applies to the new missile configuration as well as those configured from existing weapon systems such as Minuteman or Polaris. In the case of the Polaris and Minuteman hardware, the decision to include or exclude a particular configuration was based on the understanding of the phase-out schedules shown in Table 6.2-I. This data does not necessarily reflect an official DOD plan. In the event that the information conflicts with DOD planning, the availability of the affected system or hardware indicated in Table 6.2-I would have to be altered accordingly.

A further consideration relating to the Polaris A-1, Thor, and Minuteman LGM-30B configurations was to illustrate what might be afforded for this requirement by the use of hardware being phased out of

Table 6.2-I

Cumulative Availability of Existing Hardware

	CY 66	CY 67	CY 68	CY 69	CY 70	CY 71	CY 72
MINUTEMAN							
LGM 30A	—	18	58	58	58	58	58
LGM 30B	—	70	80	200	330	479	479
LGM 30F		IN PRODUCTION — BUILD TO SCHEDULE					
POLARIS							
A-1	91	91	91	91	91	91	91
A-2		COMMITTED TO FBM FLEET REQUIREMENTS					
A-3		IN PRODUCTION — BUILD TO SCHEDULE					
THOR (LESS GUIDANCE)	28	28	28	28	28	28	28

the operational inventory. It should be noted, however, that the use of phased-out hardware carries with it the implication of limited, residual service life. A total life of 5 years can be predicted with a high degree of confidence to date, but the remaining life is a matter of conjecture.

The Flexible Theater Missile configuration in Table 6.2-VI is a combination of subsystems which could be developed for operational deployment with minimum elapsed time assuming appropriate funding. Growth options to provide improved performance or flexibility at a later date are identified for this missile as well as the other candidates in the summary characteristics for each missile (Table 6.2-II through 6.2-' as appropriate.

Other broad considerations in the selection of the candidate missile systems include their range coverage of Chi-Com targets from potential deployment areas, their suitability for air transport, and their compatibility with the operational and basing concepts projected as most suitable for the deployment areas.

6.3 SUMMARY CHARACTERISTICS OF CANDIDATE MISSILE SYSTEMS (U)

6.3.1 Polaris A-1 (U)

The Polaris A-1 characteristics and performance for a land based system are shown in Table 6.2-II. Because of the limited and questionable residual service life afforded by these missiles, no growth options are considered for this vehicle. Its launch weight precludes any other basing option but fixed.

(U) In support of this missile, operational ground equipment requirements include environmental control, guidance alignment equipment, MK 80 fire control or equivalent, launch control equipment or equivalent, and appropriate power equipment.

6.3.2 Polaris A-3 (U)

The Polaris A-3 characteristics and performance in a land based configuration are shown in Table 6.2-III. The weight of this vehicle precludes basing other than fixed. Because of this limited basing flexibility, it lacks the capability for rapid redeployment and CASF operations. Hence, the only growth option recommended is hardened basing.

(U) In support of this missile, operational ground equipment requirements include environmental control, guidance alignment equipment, MK 84 fire control or equivalent, launch control equipment or equivalent, and appropriate power equipment.

6.3.3 2/3 Minuteman (U)

Two versions of 2/3 Minuteman have been considered, one using LGM-30B (Wing II-V) hardware, and one using LGM-30F (Wing VI) hardware.

The characteristics and performance of 2/3 LGM-30B are shown in Table 6.2-IV. As in the case of Polaris A-1, the limited and questionable residual service life precludes the consideration of growth options with the possible exception of the use of the Mk 12 reentry vehicle in place of the Mk 11A to obtain greater range. Although its weight does not preclude basing in a transportable mode, the limited utility (because of limited life and short range) intuitively limits its basing suitability to fixed sites only.

(U) Operational ground equipment (Wind VI modified) required to support this weapon includes environment control equipment, power equipment, guidance alignment equipment and appropriate launch control equipment.

The 2/3 LGM-30F is suitable for fixed basing, and over-the-road transportable basing with launch from presurveyed launch sites. With the guidance modification noted above, it would also be suitable for full road mobile basing with launch from any location as desired.

Operational ground equipment is common with Wing VI.

6.3.4 Flexible Theater Missile (U)

The Flexible Theater Missile characteristics and performance are shown in Table 6.2-VI. This missile in its early IOC configuration combines proven guidance and reentry system hardware with a new propulsion subsystem optimized for the medium range requirement and sized for ultimate mobile basing to afford maximum operational utility and flexibility.

Guidance options include converting the N-17 to the Omega configuration, if a gyrocompassing alignment system with its attendant reaction time limitations are acceptable; or converting an interim "low cost" inertial guidance system, which might be adequate for fixed or park and move basing, to the stellar-inertial guidance system considered for MMRBM which affords fast reaction capability from a mobile status. An alternate guidance improvement might be the SABRE system if its improved nuclear hardness is desirable and if the gyrocompassing reaction time limitation is acceptable.

The Flexible Theater Missile is suitable for all basing modes, including fixed, park and move, and road mobile.

(U) Operational ground equipment required includes environmental control, launch control equipment, and appropriate power supplies.

6.3.5 Thor (U)

(U) The characteristics and performance of the Thor missile, (shown in Table 6.2-VII support equipment requirements, etc., preclude its use as a flexible air transportable theater weapon. Hence no growth options were considered for this weapon. It is suitable only for fixed basing above ground.

Operational ground equipment (OGE) required for the system is rather extensive, due primarily to the liquid fuel operation. To support the fuel loading requirement large trailers loaded with high pressure air bottles are required. Liquid oxygen storage is accomplished in a large vacuum bottle, RP-1 fuel is stored in a cylindrical tank. Other pressurization equipment includes a high pressure tank and control for the reentry system, and a high pressure air supply and control for checking out the hydropneumatic systems on board. Numerous, large pieces of filtering equipment are also required in conjunction with the above.

Electrical power is provided by large diesel generator units, each located on a trailer. Power distribution is accomplished through trailer mounted distribution equipment. Checkout equipment is required for the entire missile system.

Launch control equipment includes a missile launch countdown trailer in addition to a trailer housing the launch control equipment and personnel. An erector is also required and serves in addition as a transporter when combined with a tractor vehicle.

Squadron launch control equipment and personnel are housed in a trailer; communication and launch command messages are carried by a wire network.

6.4 SUMMARY CHARACTERISTICS OF COMPARISON SYSTEMS (U)

.he weight of these vehicles restricts primary consideration for basing the fixed concept. Consequently, they lack capability for rapid deployment and CASF operations.

(U) Operational ground equipment required is the Wing VI OGE (modified for LGM-30B) currently utilized by the CONUS forces.

6.4.2 Polaris A3 at Sea (U)

(U) The summary characteristics for the Polaris FBM Weapon Sytem in its sea mode deployment are shown in Table 6.4-III.

6.4.3 Poseidon At Sea (U)

(U) The suminary characteristics for the Poseidon Fleet Ballistic Missile System are shown in Table 6.4-IV.

SECTION 7

BASING AND OPERATIONAL CONCEPTS (U)

7.1 BASING CONCEPTS (U)

(U) Basing considerations applicable tothe weapon systems and the deployment modes studied include launch capability in fixed soft and hard,transportable park and move, and pure mobile configurations. These concepts are described below.

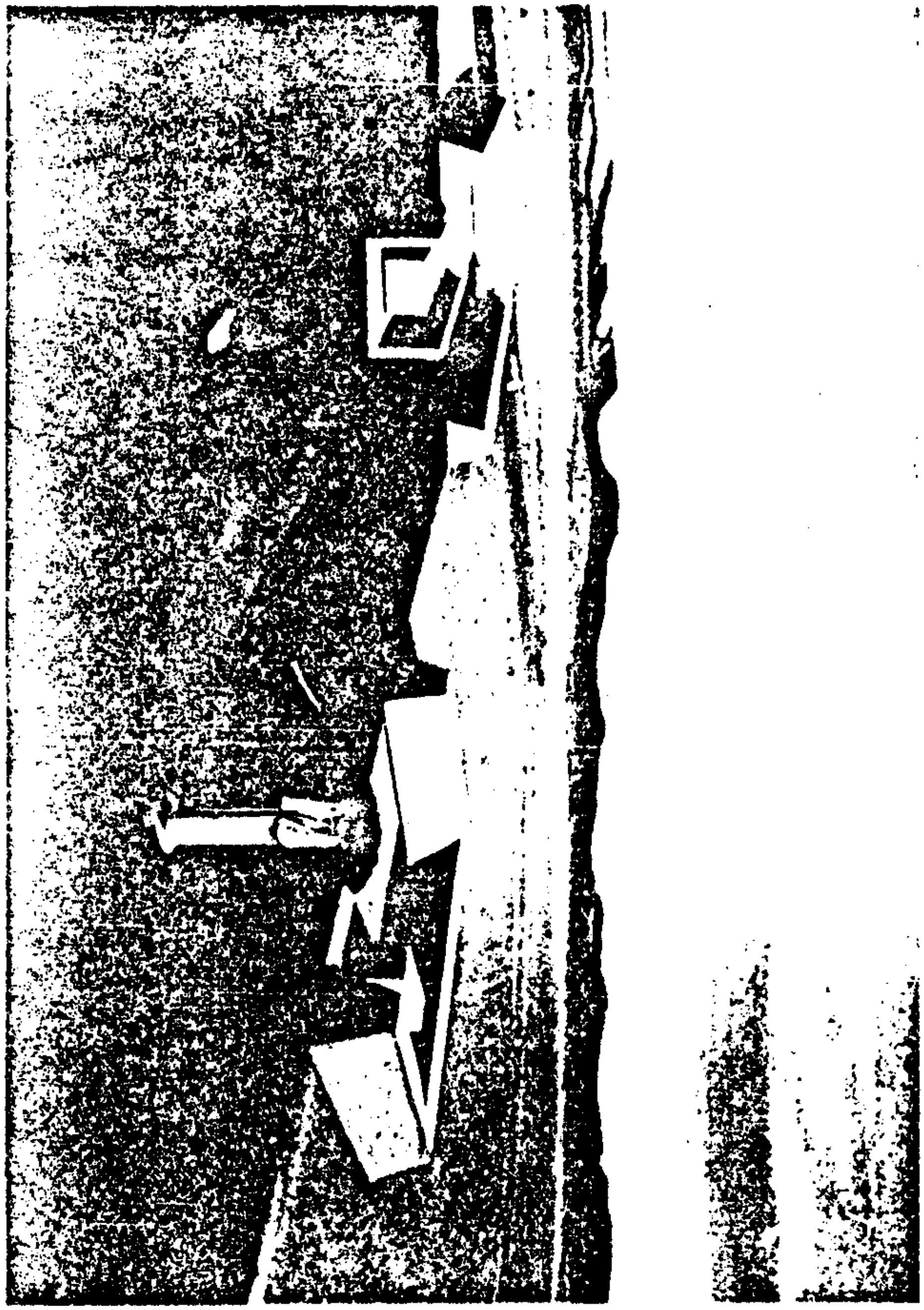
7.1.1 Fixed Soft Basing (U)

A major threat to the fixed soft type of basing is from insurgency action. Protection of the system from small arms fire therefore becomes a desirable feature. The fixed soft concept which provides the maximum protection against this type of threat is a silo-type hole. When comparing the silo-type hole with other soft basing concepts, it was determined that all of the concepts considered were essentially equal in terms of cost and schedule. Therefore, underground silo was selected as the fixed soft basing concept.

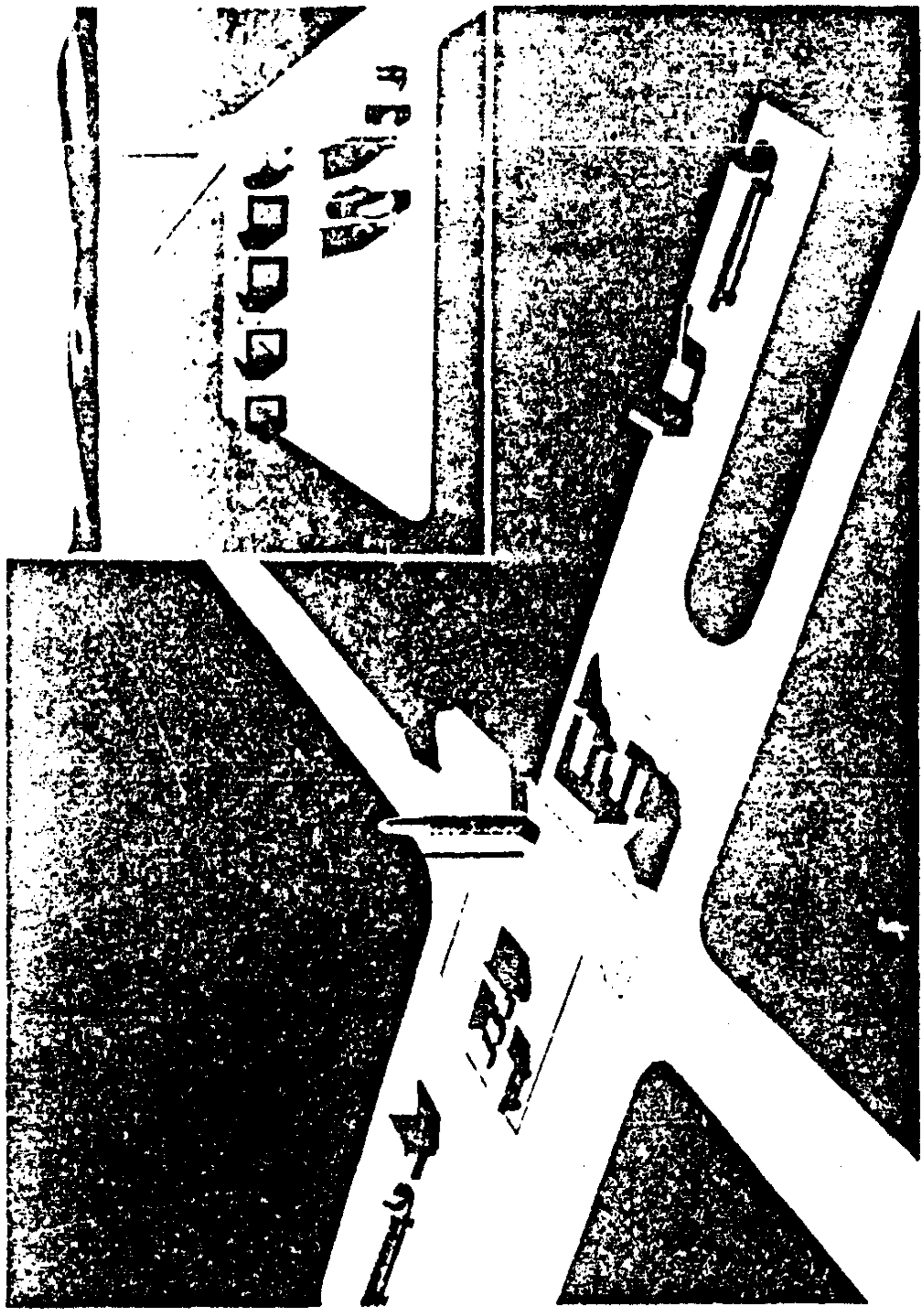
The silo would be of sufficient diameter and length to accommodate the missile and launch tube and any additional dimensional space required for cabling, ducting, or access to the AVE or launcher components. The bottom of the silo would contain a concrete or other structural pad with necessary attachments to mount and support the launcher. The walls of the silo could be supported through use of a prefab liner or firmed with webbing and a "gunite" material. The top of the silo or launcher would be enclosed by an environmental protective structure which could be removed easily for maintenance access or opened just prior to launch to allow exit of the missile. An illustration of a typical fixed soft basing is presented in Figure 7.1.1-1.

An exception to the fixed soft basing installation described above is the THOR missile system. This fixed soft system is essentially based on a concrete pad above ground. A pictorial illustration of a THOR launch facility is presented in Figure 7.1.1-2.

7.1.2 Fixed Hard Basing (U)



Fixed Soft Basing
Figure 7.1.1-1



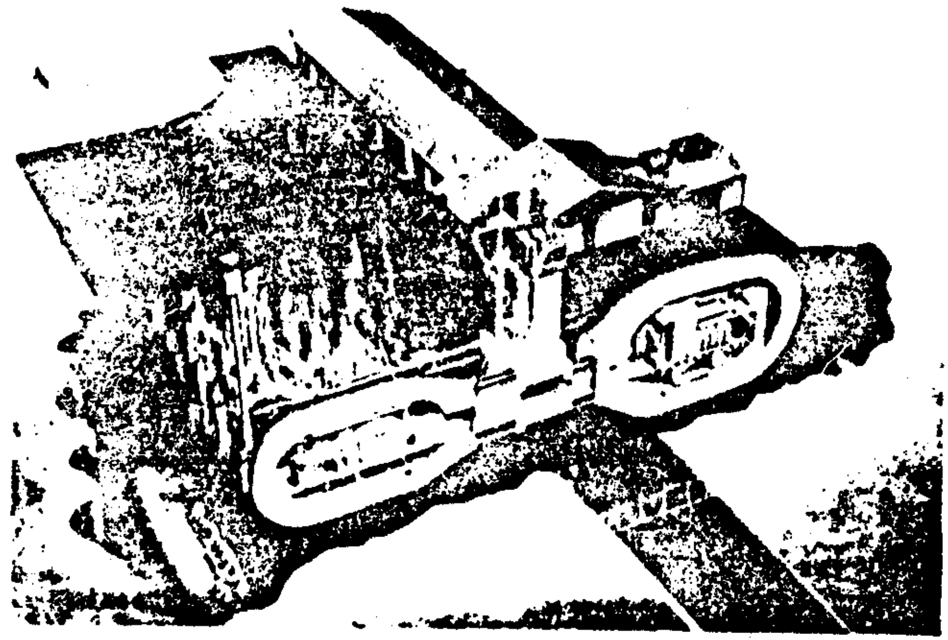
Thor Basing

Figure 2.1.1-2

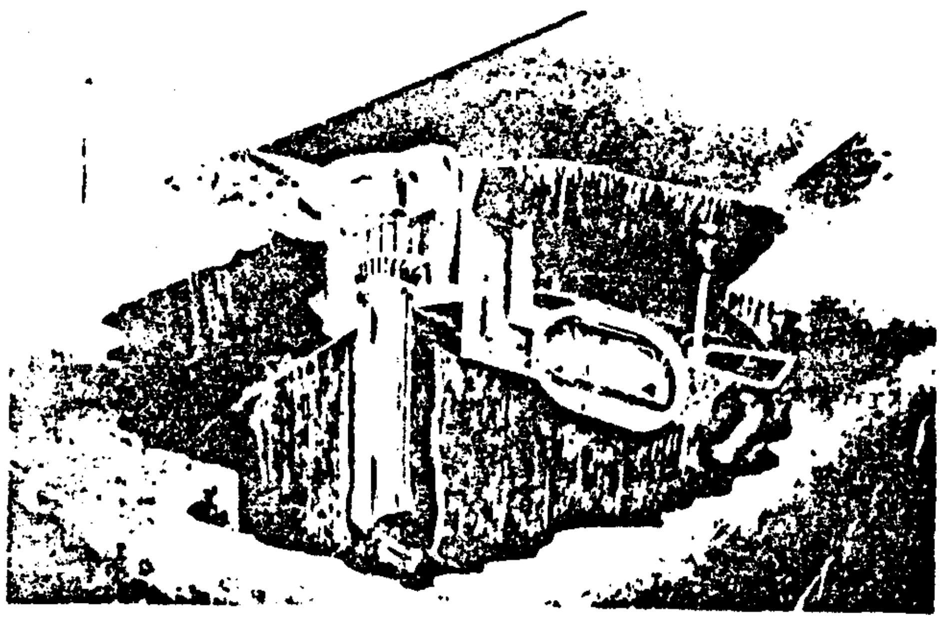
7.1.3 Soft Park and Move Basing (U)

Based upon earlier studies on TMRBM, two types of soft park and move launch sites have been postulated, namely primary and secondary. Primary launch sites are preselected during the development phase of the program and accurately located by first order land surveying and/or photogrammetry as to terrestrial position carried forward from known terrestrial position and azimuth of the theater base. Exact parking location for the LET is defined by line of sight bearings from predetermined topographic features or ground markings. The mission essential power, environmental control and launch OGE are carried on the transporter launcher.

(U) Three different primary launch site configurations were considered. These were; (1) open area, (2) open area with revetments and (3) soft shelter. In evaluating the merits of these configurations, a major consideration was given to the protection afforded the system to small arms fire. The open area configuration obviously affords no protection against this threat. The open area with revetments provides maximum protection against direct fire but is vulnerable to lobbing attacks. The soft shelter provides some protection against small caliber arms but virtually none against a weapon of approximately 50 caliber size. All primary launch sites have fencing, lights, graded positions and either fixed or portable



Launch Control Facility



Fixed Hard Basing

Figure 7.1.2-1

power units for local needs. All three configuations were virtually equal in regard to cost and schedule. It was determined that, for the most probable type of insurgency action the open area with revetment configuration was the most desirable primary launch site.

(U) A typical park and move launch site is shown in Figure 7.1.3-1.

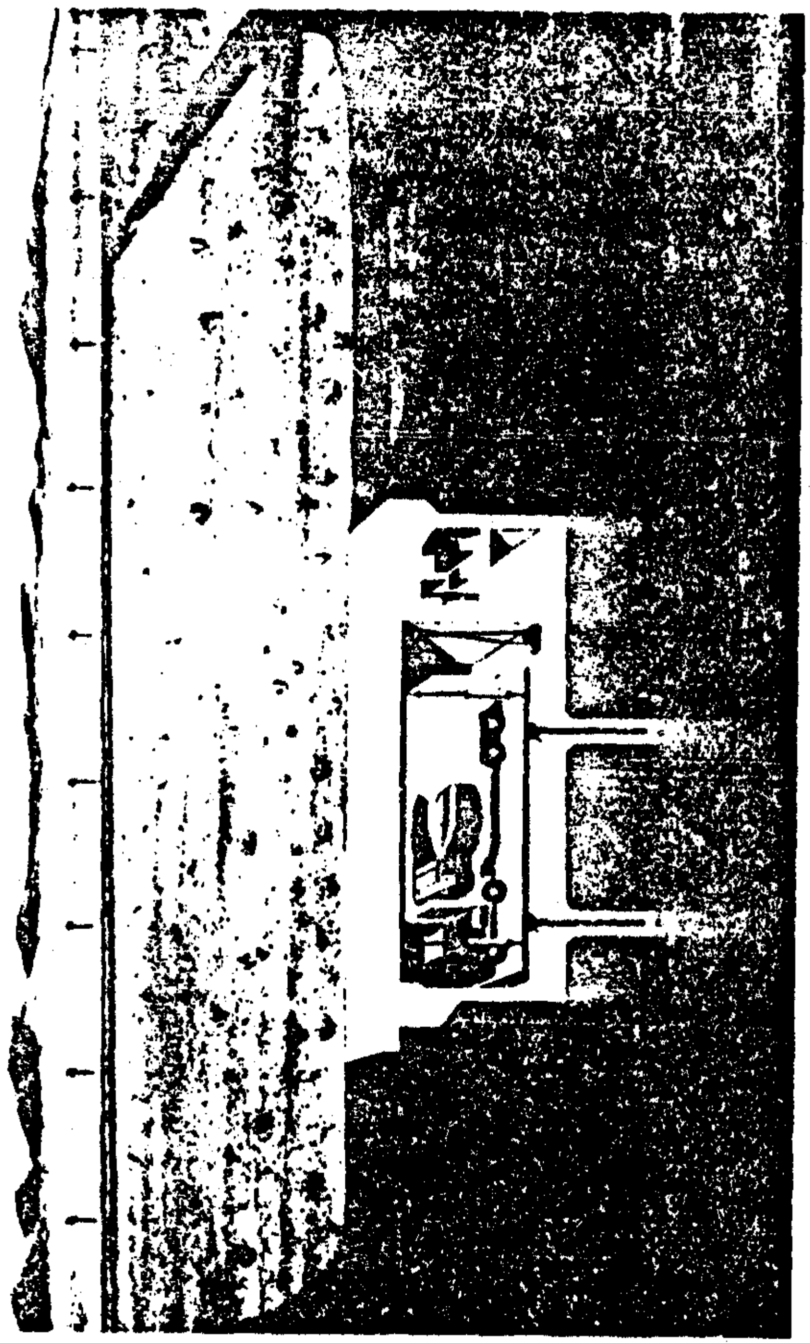
Secondary launch sites are located and determined from military maps of the area. They are identified by local land marks and topographic features. Terrestrial positions are also obtained from large scale military maps. Secondary launch sites are not used except in emergencies and would, therefore, not need to be U. S. or friendly government based. Such areas as highway intersections and open fields adjacent to highways are examples of secondary type launch sites.

Park and Move - Soft Basing

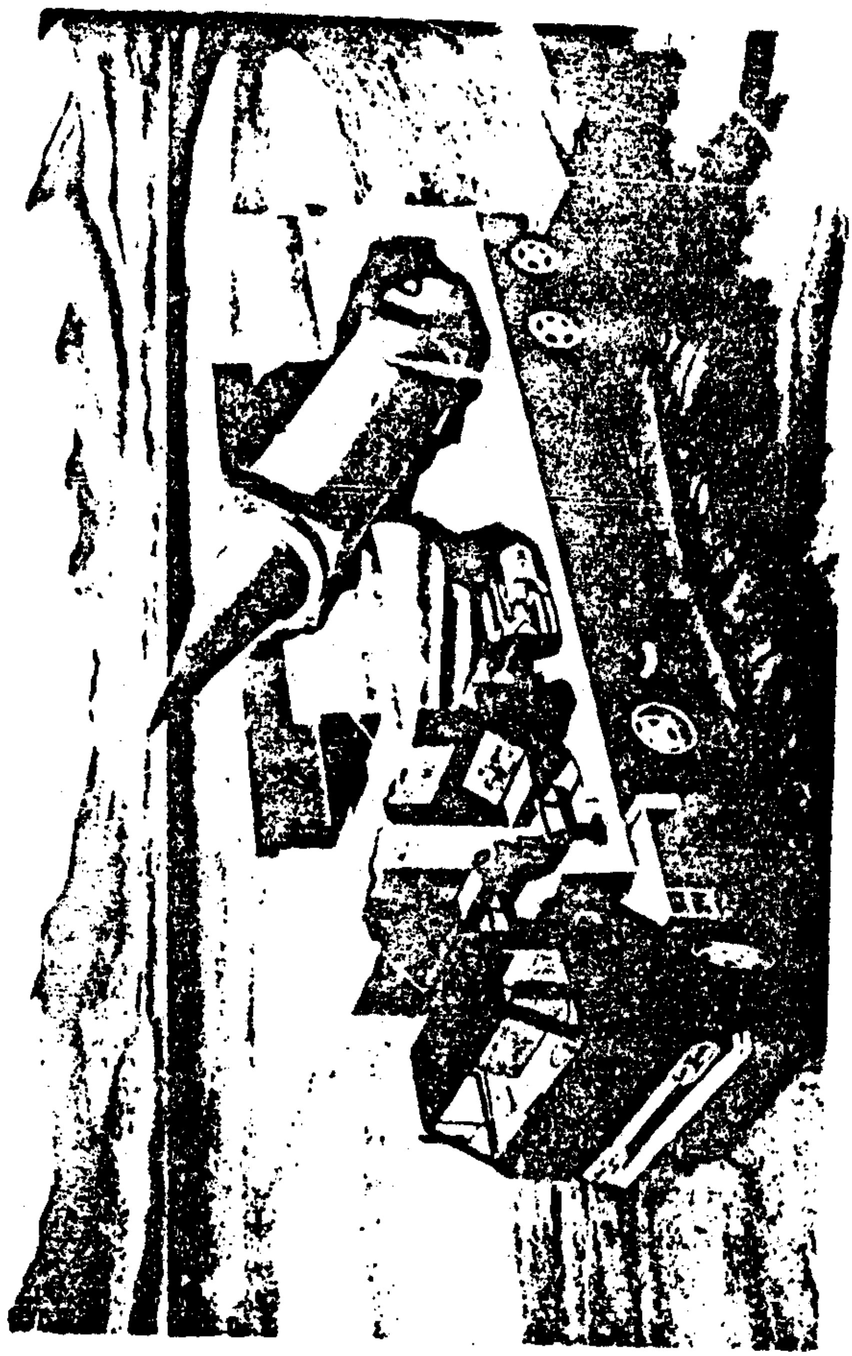
Figure [illegible]

7.1.5 Mobile Basing (U)

(U) The mobile basing considered for this study is identical to the concept developed for MMRBM. The extent to which full mobility is achieved is controlled by the size of the geographical area, usable road net, personnel resources, logistics and location of existing facilities within the operating areas. Depending on the threat, the mobile systems can park at random, preplanned locations such as motor pools, garages, barns, police stations, barracks, warehouses, remote radio and/or radar stations, in forests, tunnels and any small dispersed military outpost that does not, itself, present a high priority target. An illustration of a mobile system is presented in Figure 7.1.5-1.



Park and Move - Hard Basing
Figure 7.1.4-1



Mobile Basing
Figure 7.1.5-7

7.2 CONCEPTS OF OPERATION (U)

7.2.1 General (U)

The mission of a selected MRBM system is to provide a visible, credible deterrent to communist China. The deterrence failing, then the system will provide CINCPACAF with an effective nuclear, all-weather combat capability. The selected system should also possess flexibility for rapid re-deployment within, or outside of, the PACAF area. The flexibility for re-deployment of the MRBM candidate systems is discussed in Section 8.

The concepts of operation for the various candidates are considered in the following paragraphs. The modes of employment are the fixed, or transportable, and hardened and mobile.

Essentially, any of the candidate systems could be employed in the fixed mode; however, systems which are constrained to this mode are the Thor, Polaris A1 and A3, and the 2/3 Minuteman LGM-30B. The Thor and Polaris family, while moveable, have weight and size constraints which require that missiles and launch equipment be assembled in a semi-permanent installation on a launch site. Furthermore, the A1 and the LGM-30B deployment mode must be in an earlier IOC posture since the remaining motor life of these systems is considered limited.

The 2/3 Wing VI Minuteman (LGM-30F), and the new proposed Flexible Theater Missile (FTM) are the two candidate systems which are typical of the types of systems which could be employed in the transportable mode--a system similar to the TMRBM--a roadable missile and launch unit, with the missile being launched from pre-selected sites of known location.

The logical candidate system capable of being employed in the mobile mode is the Flexible Theater Missile (FTM) configured with OMEGA or STINGS guidance, and an accurate land navigation system. This weapon system is similar to the MMRBM--a roadable missile and launch unit containing a position fixing capability which obviates the need for launching from pre-selected or surveyed sites.

7.2.2 Fixed Mode of Employment - Soft (U)

Under this mode of employment the weapon systems are emplaced in a soft configuration on dispersed off-base sites and are controlled and launched from remote Launch Control Centers (LCCs).

7.2.2.1 Launch Sites/Launch Control Centers (U)

Dispersed, off-base launch sites are in a 2X 25 configuration (Two LCCs per each 25 missile squadron. The LCCs are separated from each other with one having 13 missile sites assigned and the other 12 sites. In the case of the Thor system, a 1 x 5 configuration is used. For Polaris a 1 x 16 configuration is used.

7.2.2.2 Command Control (U)

Command control of the missile force is effected within the World Wide Military Command Control System (WWMCCS). Authorized launch execution is only possible when warhead enable has been permitted by the release authority and when the execute order has been issued by the launch authority. Warhead enable and launch execute orders will be transmitted directly from the Air Division, or comparable COC, directly to each LCC. An alternate channel runs from the Air Division COC through the missile squadron "Missile Status Center" (MSC) to each LCC. The alert ready missiles are interlocked to the LCC in such a configuration that warhead enable and missile launch can only be accomplished by the two-man launch crew in the LCC.

In order to achieve positive control of the force, a two-way wire or wireless link is required between the missile launch site, LCC, and COC. Also, a two-way voice circuit or net is required between launch sites and LCC and between each LCC and the missile squadron MSC for missile maintenance, system checkout, and security.

7.2.3 Transportable Mode of Employment (U)

A Transportable Mid-Range Ballistic Missile (TMRBM) is assumed for this discussion. This system consists of the complete missile mounted on a transporter/launcher and integral command control and launch capability. Operation of the TMRBM under this mode assumes its utilization in a park-and-move mode, rotating through fixed, soft pre-surveyed launch points.

7.2.3.1 Employment (U)

In the primary employment mode, the weapon system is driven from theater support bases to pre-surveyed launch sites where a portion of the force parks and assumes a quick reaction alert posture. The remainder of the force continues in a maneuvering mode changing with the parked QRA force as a function of the threat and period of the enemy intelligence cycle.

Each missile squadron possesses 25 unit equipment (UE) missiles, of which a minimum of 80 per cent (20 missiles) is maintained operationally ready in a dispersed, off-base posture.

The ratio of missiles on QRA to those in a maneuvering status is determined by the threat, the degree of confidence in the estimate of the enemy intelligence cycle, the projected length of the cycle, and the prevailing tactical situation. The QRA missiles have a launch reaction time measurable in seconds, achievable after set-up. Maneuvering units shall have no more than a one-hour launch reaction time after arrival at a pre-surveyed launch site.

7.2.3.2 Command Control (U)

Command Control of the deployed force is essentially the same as for the fixed mode except the COC at Air Division, or other comparable level, is the facility utilized by the launch authority for over-all command control over the deployed TMRBM force. Warhead enable and launch execute codes are transmitted directly from the COC, by an electronic link, to each transporter-launcher. The TMRBM launch crew manually inserts the enable and launch codes when authorized and received by whatever means available.

7.2.4 Mobile Mode of Deployment (U)

7.2.4.1 Employment (U)

In the primary employment mode, the weapon system is dispatched from theater operating/support bases over the available road network in a continuous movement posture. The extent to which continuous movement of the deployed systems can be optimized is controlled by the size of the geographical area, usable road net, personnel resources, logistics, and location of existing facilities within the operating areas.

Each missile squadron will possess 25 unit equipment (UE) missiles, of which a minimum of eighty per cent (80%) of UE systems will move over roads throughout the entire geographical area on a random time and route schedule. Although these units are capable of constant movement, the rate will be dependent upon the local tactical situation.

7.2.4.2 Command Control (U)

Command Control of the mobile force is the same as it was for MMRBM. Warhead enable and launch execute codes are transmitted automatically and directly to the warhead and launch control equipment. As a backup, the launch crew has the capability to manually insert the enable and launch codes when authorized and received by whatever means available.

7.2.5 Hardened Mode of Employment (U)

7.2.5.1 Employment (U)

This mode of employment provides for emplacement of 100 per cent of the fixed soft UE missiles, and 80 per cent of the transportable or mobile units in hardened facilities. The specific hardness required of the facilities will be determined by the threat analysis and dispersal parameters established at the time that hardening is determined necessary.

7.2.5.2 Command Control (U)

Command control of the hardened force would be the same as outlined in Paragraphs 7.2.2.2 or 7.2.3.2 depending on whether the system was hardened in a fixed or transportable mode of employment.

7.2.6 CASF Concept of Operations (U)

7.2.6.1 General (U)

CONUS-based CASF MRBM units are organized, equipped, manned, and trained to deploy as a transportable self-sufficient strike force, or to function as an integral part of a larger force composed of Air Force, Army and Navy components. CASF-assigned missile units are maintained in a high state of preparedness for world-wide air deployment and use in cold war situations, contingencies, limited war, or general war.

The CONUS units are to be airlifted to the operational area with the equipment, personnel, spares, mainenance and supply support necessary to sustain itself and to operate effectively for the desired period of time. External security support is limited to that which is organic to the squadron/wing. If the missile requires "spotting" on a presurveyed location, the launch sites will not normally have been prepared in advance of arrival. No geodetic data for the launch sites other than that provided on the available military maps of the area can be expected to be available, and the unit must be equipped to perform its own essential geodetic surveys.

7.2.6.2 Command Control (U)

Tactical MRBM units deployed in a CASF are under the same nuclear restraints and controls as overseas assigned units. Command control of the CASF missile units will be exercised by a specific COC. Command control of operations in remote areas that are outside the sphere of an established COC is provided by means of a portable (Van type) command post. A communications relay van provides entry into the World-Wide Military Command and Control System (WWMCCS).

7.2.6.3 Employment (U)

Fundamental employment tactics and techniques correspond to those described for the mobile, transportable, and fixed mode of operations. In relatively unimproved areas, the initial capability consists of emplacing the MRBM units in a fixed posture within the perimeter of the debarkation air base. Subsequent phases of activity would then be devoted to improvement of the posture by progressive dispersement of missile units along suitable road networks or to selected and surveyed launch sites.

7.2.6.4 Facilities (U)

CASF units are capable of self-sufficient field operations. Dependence on fixed facilities is held to the absolute minimum. Temparary structures such as inflatable tents are included in the deployment package.

7.2.7 CONUS - Based Deployable Force (U)

Consideration may be given to the development solely of a CONUS-based tactical missile force. In this concept, the force would not be additive to already deployed MRBM forces. Rather, it would be constituted and maintained in the CONUS at a lower state of readiness for Pacific deployment at a later date in recognition of a particular need growing out of the general and increasing political strife in the area. This concept differs from the typical CASF operation in that it is addressed more to future political ramifications than it is to providing the flexibility and rapid reaction inherent in CASF operations. As an example, it might be considered in the national interest to delay Pacific deployment of MRBMs until emergence of a Chi-Com MRBM capability, on the premise that earlier introduction by the U.S. would appear to threaten Communist China. This idea would hold that the U.S. could be viewed as the aggressor in international political opinion, whereupon the Chi-Coms would be "authorized" to field a countering "defensive" weapon system. Under this philosophy, any suitable weapon system capable of later deployment in order to follow and counter a Chi-Com MRBM capability might appear acceptable.

For this reason, a non-CASF CONUS-based force might appear to be a means of utilizing one or more of the candidate weapon systems postulated in this study but which cannot be employed effectively in a CASF operation. Flexibility and rapidity in deployment and responsiveness in military applications could be considered secondary to the apparent feature that such a system would possess adequate utility to serve the political requirement.

SECTION 8

CANDIDATE WEAPON SYSTEMS (U)

(U) Preceding sections have outlined the characteristics and potential of various missiles and basing options. In this section, missile and basing alternatives are considered together and briefly described as representative candidate weapon systems. Appendix A describes the candidate systems in more detail.

(U) The weapon system configuration alternatives available depend in part upon the time allotted for development. In consonance with the approach employed in the preceding discussions, the candidate weapon systems are identified in an early IOC configuration followed by the growth options considered. Table 8-1 summarizes the configurations of the candidate weapon systems. It must be remembered that these configurations are only representative; other alternatives are possible and may be more appropriate under more definitive ground rules and requirements.

8.1 POLARIS A-1 (U)

8.1.1 Early IOC Configuration (U)

The Polaris A-1 weapon system considered for this requirement consists of the A-1 missile which has been retired from the operational inventory; and the MK 80 Fire Control equipment, the MK 6 Missile Test and Readiness Equipment (MTRE), the Launch Control Panel (LCP), and the Integrated Monitoring Panel (IMP), which are also retired from the operational inventory; and the MK 21 Mod I launching system available from production. The launching system and guidance alignment equipment would be installed in a soft "hole" below ground to afford small arms (0.50 caliber) protection. The launch site (LS) OGE, i.e., auxiliary power equipment, environmental control equipment, and launch control terminal equipment, identical, insofar as possible, to that employed in the submarines, would be installed in appropriate shelters adjacent to the missile installation. Launch control and monitoring equipment at the launch sites is connected to the remote central launch control center (LCC) by means of buried cable so installed as to provide redundant circuit paths between the LS's and the LCC.

Up to sixteen missiles can be controlled from each LCC. At the LCC, a two-man launch crew monitors the status and effects the launch and targeting of each of the missiles connected to the facility. Release and launch orders are received by the launch crew from the Combat Operations Center (COC) and manually authenticated and processed as described for the Basic Command-Control System in Appendix B4. Figure 8. 1. 1-1 illustrates the concept of the land-based installation.

8. 1. 2 Targeting (U)

The MK 80 Fire Control system can target eight missiles at a time via the eight Target Data Input Units. Targeting data for each target is stored on IBM cards which are inserted into the Target Data Input Units. Any number of target cards can be prepared and stored at the LCC.

6. 1. 3 ([illegible] Options (U)

In view of the [illegible]onable residual service life available from these retired missiles, n[illegible]wth options have been considered for either the missile or the basing.

8. 1. 4 Redeployment Lead Time (U)

Redeployment of the A-1 in the soft fixed configuration utilizes equipments removed from the existing basing area installed in new facilities constructed in the redeployment area. The equipments removed are the launcher, AVE, C[illegible]E, APU and ECU, leaving only the silo itself and the buried cables. This redeployment can be accomplished in nine months and is paced by the construction of the new facilities in the redeployment area. Although the construction and installation/check-out times are the same as for the initial deployment, time savings can be realized in the areas of design criteria preparation and in the design itself since only modification of the initial design is required. An additional time saving results from the elimination of the contract award period.

8.2 POLARIS A-3 (U)

8.2.1 Early IOC Configuration (U)

The Polaris A-3 weapon system deployed on land consists of the A-3 missile; the MK 84 Fire Control equipment; the MK 6 Missile Test and Readiness Equipment (MTRE); the Launch Control Panel (LCP) and Integrated Monitoring Panel (IMP); and the MK 21 Mod I Launcher System. The launching system and guidance alignment equipment would be installed, as for the A-1, in a soft "hole" below ground to afford small arms protection. The launch site (LS) OGE, i.e., auxiliary power equipment, environmental control equipment, and launch control terminal equipment would be installed in appropriate shelters, adjacent to the missile installation. Launch control and monitoring equipment at the LS's is connected to the remote central launch control center (LCC) by means of buried cable so installed as to provide redundant circuit paths between the LS's and LCC.

Up to sixteen missiles can be controlled from each LCC. At the LCC a two-man launch crew monitors the status and effects the launch and targeting of each of the missiles connected to the facility. Release and launch orders are received by the launch crew from the COC and manually authenticated and processed as described for the Basic Command-Control System in Appendix B4. Figure 8.1.1-1 illustrates the soft land-based installation for this missile as well. Performance of this weapon is outlined in Section 6.

8.2.2 Targeting (U)

The MK 84 Fire Control system can target 16 missiles at a time. Two hundred (200) target assignments are stored in the Fire Control Computer. New assignments not in the target library can be entered manually if the target latitude, longitude, and elevation are known.

8.2.3 Growth Options (U)

The launch weight of the Polaris A-3, 35,800 pounds, casts doubt on the suitability of this missile for more flexible basing options. Therefore, in this study, no AVE growth options have been considered for this missile. However, the longer service life available from this weapon may make it desirable, in some deployment areas, to upgrade the hardness of the launch sites as the offensive threat increases.

The eject launch system would continue to be used in this basing mode as well. Figure 8.2.3-1 illustrates the A-3 in a hardened fixed installation with launch control radio overlay added to the Basic Command-Control System.

In addition, in the command-control system PAL devices may be introduced in each missile to afford more positive control of the weapon than provided by the simple Basic system.

8.2.4 Redeployment Lead Time (U)

Redeployment lead time for the A-3 in the soft-fixed configuration is essentially the same as for the A-1, i.e., 9 months. Redeployment of the hard-fixed configuration would require 27 months or essentially the same amount of time as is required for the initial hard-fixed installation. As in the case of the soft-fixed configuration, the installed equipment, including the launcher and other OGE, is removed from the LF's and LCF's, abandoning the empty silos, cables, and other underground facilities.

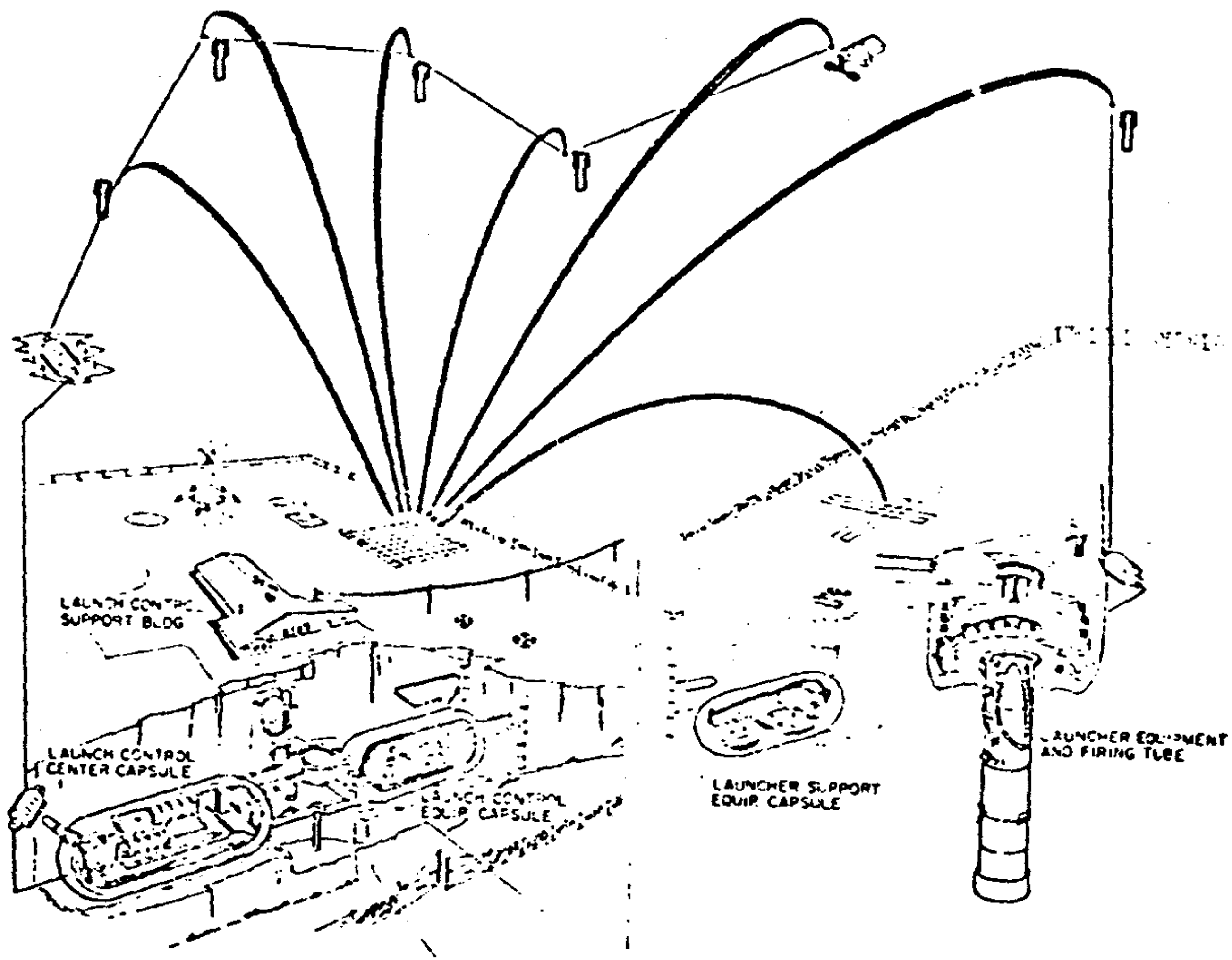


Figure 8.2.3-1 Polaris A-3 deployed in the fixed-hard basing mode with a launch complex radio overlay

8.3 2/3 MINUTEMAN - LGM-30B (U)

8.3.1 Early IOC Configuration (U)

This 2/3 Minuteman Weapon System consists of the upper two propulsion stages, the N-10 guidance and control system, and the MK IIA re-entry system from the LGM-30B missiles which will be phased-out of the operational inventory; supported by Minuteman II (Wing VI) OGE appropriately modified to interface with the Minuteman I AVE. The missile, an environmental conditioning shroud, and guidance alignment equipment would be installed in a soft "hole" below ground to afford small arms protection. The launch site (LS) OGE, i.e., auxiliary power equipment, environmental control equipment, and launch control terminal equipment would be installed in appropriate shelters adjacent to the missile installation. Launch control and monitoring equipment at the launch sites is connected to the remote central launch control center (LCC) by means of buried cable so installed as to provide redundant circuit paths between the LS's and the LCC. Two LCC's will be interconnected to cooperatively control and monitor 25 missiles. At the LCC's, two-man launch crews monitor the status and effect the launch and targeting of the missiles. Interconnecting the LCC's permits either LCC to control the whole squadron in the event the other LCC is disabled. Release and launch orders are received by the launch crews from the COC and manually authenticated and processed as described for the Basic Command-Control System in Appendix B4. As in the CONUS-based Minuteman system, two LCC's acting cooperatively are required to launch a missile, unless one is disabled. The soft-fixed installation would be similar to that for the Polaris A1, illustrated in Figure 8.1.1-1, except that Minuteman OGE would be used instead of Polaris OGE.

(U) Performance of this weapon is outlined in Section 6.

8.3.2. Targeting (U)

Two stored targets are available in the guidance computer of the N-10 guidance system. Re-targeting for other targets requires that the stored constants in the computer be changed by inserting a new targeting tape at the LS.

8.3.4 Redeployment Lead Time (U)

The same comments and redeployment lead time, i.e., 9 months, apply to the 2/3 Minuteman in the soft fixed installation as for the Polaris A-1 discussed in paragraph 8.1.4.

8.4 2/3 MINUTEMAN LGM-30F (U)

8.4.1 Early IOC Configuration (U)

This 2/3 Minuteman weapon system consists of the upper two propulsion stages, N-17 Guidance and Control System, and the MK 12 Re-entry System from the LGM-30F Minuteman II missiles currently in production for the operational inventory; supported, insofar as possible, by Minuteman II (Wing VI) OGE.

This missile can be deployed in the following basing modes on essentially the same schedule: fixed, either soft or hard; and park and move, either soft or hard. The fixed-soft installation is, in essence, identical to that for the 2/3 Minuteman LGM-30B described in Section 8.3.1. The fixed-hard installation for this missile would be largely identical to that of the full size LGM-30F with the exception that the depth of the silo could be reduced at least 16 feet since only the second and third stages are used for the total propulsion subsystem. Additionally, consideration would be given in both the soft and hard-fixed installations to using the launching system employed in the transportable basing mode to provide an eject launch so as to maximize the standardization of OGE for this missile. Figure 8.2.3-1 illustrates the fixed-hard basing installation applicable to this weapon as well as Polaris A-3.

For the soft-park and move basing, the missile and its OGE, including the launch control equipment, would be mounted on a roadable Launcher-Erector-Transporter (LET). The two-man launch crew in the LET would monitor the status and effect the launch and targeting of the missile. Release and launch orders are received by the launch crew from the COC via a radio link and manually authenticated and processed as described for the Intermediate Command-Control System in Appendix B4. Figure 8.4.1-1 illustrates the transportable (or mobile) basing mode for this missile.

(U) Performance of this weapon is outlined in Section 6.

8.4.2 Targeting (U)

Eight stored targets are available in the guidance computer of the N-17 Guidance System when based in the fixed mode. Re-targeting for other targets in this mode requires that the stored constants in the computer be changed by inserting a new targeting tape at the LS.

In the transportable mode, a number of stored targets will also be available; but, in addition, the use of explicit guidance equations in this mode permits the manual insertion by the launch crew of new target coordinates as required.

8.4.3 Growth Options (U)

(U) A number of growth options have been considered for this weapon system including AVE, weapon control, and basing improvements.

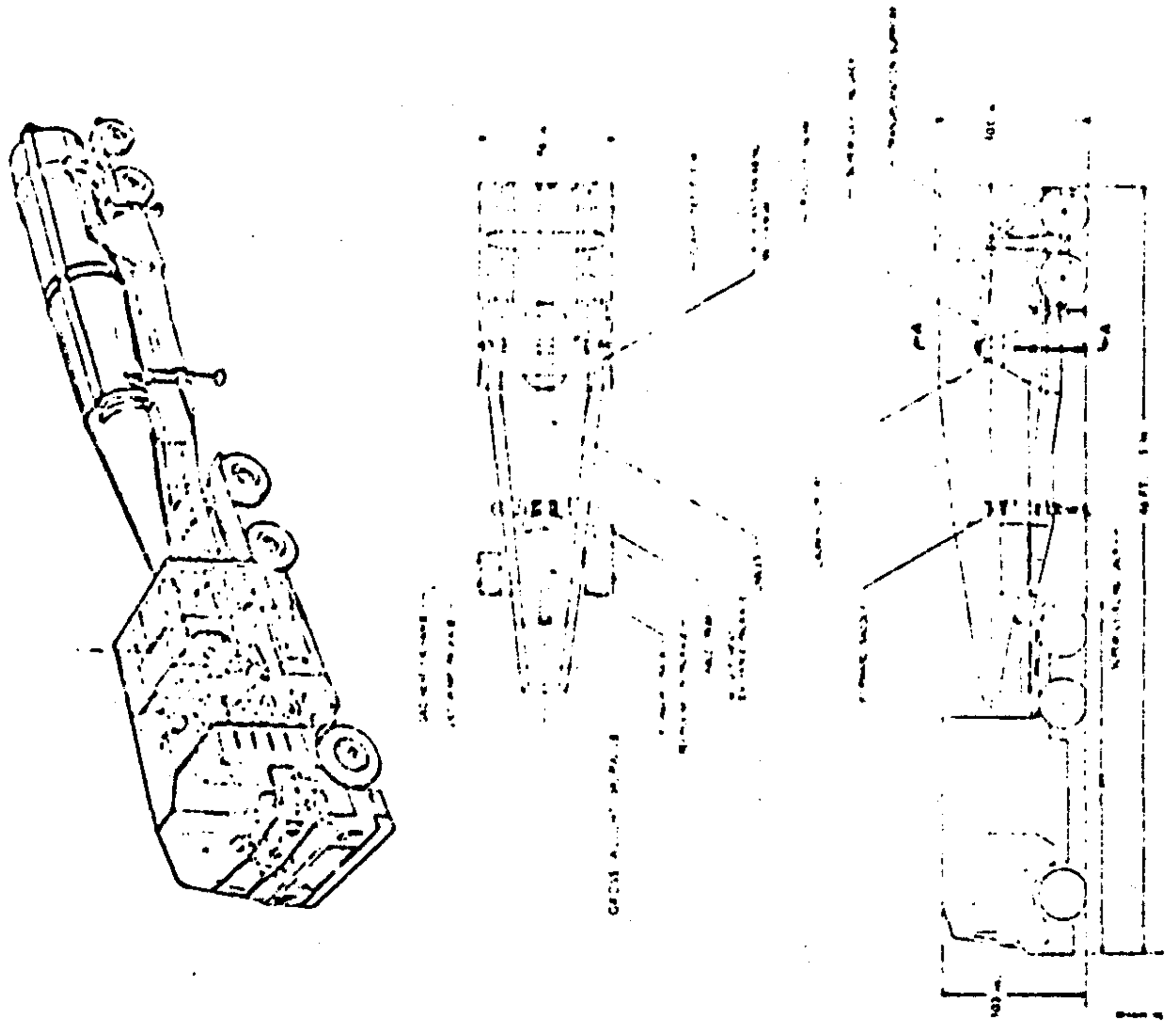


Figure 8.4.1-1 2/3 Minuteman Transportable or Mobile Basing Configuration

The re-entry options afford both a smaller and larger yield and a multiple target capability. The guidance option would permit full mobile operation with land navigation by the guidance system. The propulsion option would afford a smaller and lighter weight missile or, in effect, the Flexible Theater Missile described in Section 6.

In the command-control area, the growth options include the addition of a radio overlay (Minuteman Wing VI medium frequency system) and PAL to the basic command-control system for the fixed installations to improve launch control survivability and positive control of the weapons. For the transportable system, the Advanced "Simulcast" Command-Control System, described in Appendix B4, and PAPS could be added to afford positive weapon control in a mobile environment subject to enemy electronic counter measures.

A Trajectory Accuracy Prediction System (TAPS) may be incorporated as a growth option intrinsic to the Advanced "Simulcast" Command-Control System. A signal would be broadcast from the missile signifying successful inertion of the RV into a proper trajectory. The signal would be received at the Air Division Headquarters COC and would afford the commander with indirect bomb damage assessment information useful to the effective employment of remaining missiles.

(U) A fully mobile basing mode can be deployed if the appropriate guidance and command-control options are implemented.

8.4.4 Redeployment Lead Time (U)

The lead time for redeployment of the fixed basing modes for this weapon would be identical to that for the weapons previously described in similar configurations, i.e., 9 months for soft and fixed, 27 months for hard and fixed.

The soft park and move configuration can be redeployed to a primary or secondary launch site (as described in Section 7). In either case, only the LET and power units are removed from the existing site, leaving the Squadron Operating Location (SOL) facility and launch site lights, fencing, etc., behind.

Normally the system would be redeployed to a primary launch site requiring accurate surveying followed by construction, installation, and checkout. Since this effort is identical to that performed in the initial deployment, the redeployment time is the same as the initial deployment time.

In an emergency, the system can be redeployed to a secondary launch site requiring only relocation of the equipment from the initial deployment area. The time required for such a relocation and the associated system checkout is 8 1/ [illegible] ys.

Redeployment in the hardened garage configuration consists of constructing new g[illegible]s and transporting the LET and the ECU, APU and personnel support equipment removed from the existing garages to the redeployment area. Only the garage itself and the SOL facility is left behind. This redeployment can be accomplished in 21 months as compared to 24 months for initial deployment. As was the case for the soft fixed configuration, time savings are realized in the criteria preparation, design and contract award areas.

The fully mobile configuration being air transportable and not dependent upon presurveyed launch sites can be completely redeployed in 8 1/2 days.

8.5 FLEXIBLE THEATER MISSILE (U)

The Flexible Theater Missile is a two-stage solid propellant vehicle especially designed as a flexible air transportable theater weapon. This missile can be deployed to fixed sites, in a transportable park and move operation, or ultimately in a mobile mode.

8.5.1 Early IOC Configuration (U)

This configuration of the Flexible Theater Missile consists of the MK 12 re-entry system, the Minuteman N-17 inertial guidance system (or alternatively a "low cost" inertial guidance system as described in Appendix B2) and a propulsion system consisting of two new light weight motors. Ground support equipment, including environmental control equipment, power equipment, and launch control equipment may vary depending upon the particular basing mode although maximum standardization of OGE from one basing mode to another will be employed. The early IOC configuration can be deployed in a number of ways: fixed, both hard and soft, and transportable or park and move, both hard and soft. These configurations are in general similar to those described for 2/3 Minuteman LGM-30F in the preceding section. However, because of the smaller light weight missile, the transportable (and mobile) configuration is smaller and lighter than that of 2/3 Minuteman. Figure 8.5.1-1 is an illustration of the transportable (or mobile) version of this weapon system.

(U) The performance of this weapon is outlined in Section 6.

8.5.2 Targeting (U)

A number of stored targets will be provided in the guidance computer for this weapon system. In addition, use of explicit guidance equations will permit the launch crew to introduce new targets by inserting target coordinates into the guidance computer.

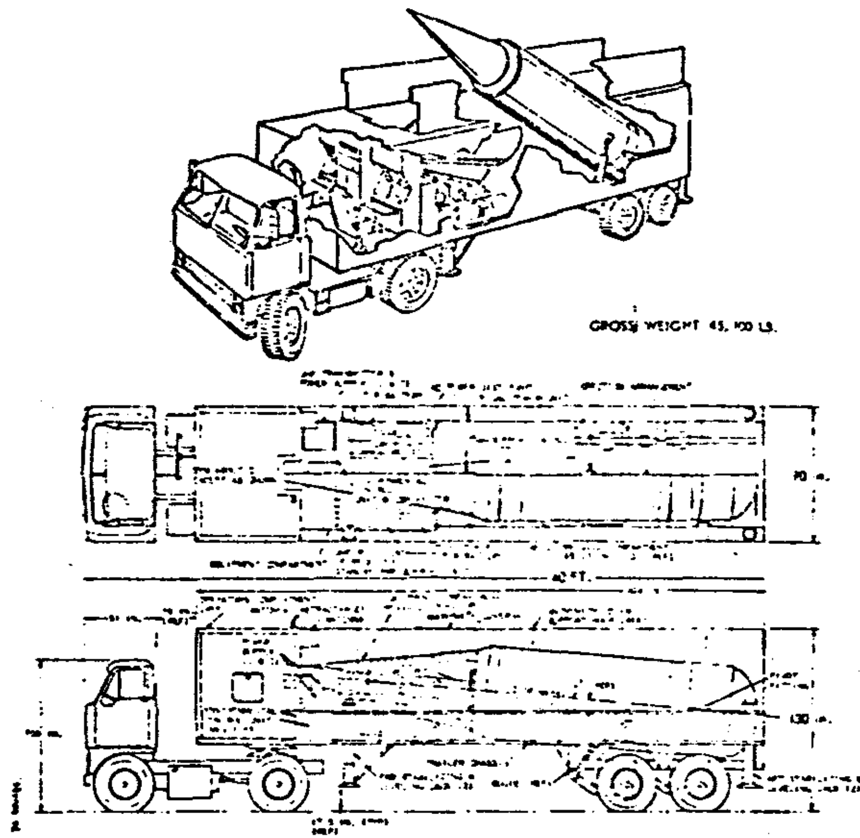


Figure 8.5.1-1 Flexible Theater Missile Transportable or Mobile Basing Configuration

8.5.3 Growth Options (U)

In general, the same growth options described for 2/3 Minuteman LGM-30F in the preceding section are suitable for the Flexible Theater Missile.

In addition, further guidance system options are available and should be considered in determining the guidance system to be employed in the early IOC configuration. In the event that the size, weight, nuclear hardness, accuracy, and reaction time of the N-17 guidance system are compatible with the ultimate performance requirements for the missile, this system would be employed in the early IOC configuration to be followed at a later date by the OMEGA guidance system which is simply a platform gimbal modification to the N-17. This guidance option would afford a fully mobile capability with land navigation performed by the missile guidance system. In the event that the N-17 system is not compatible with the ultimate requirements, an interim "low cost" inertial guidance system could be employed for the early IOC configuration to be followed later by a guidance improvement compatible with the system and mission requirements. Typical guidance improvements that might be considered are SABRE and the MMRBM stellar inertial guidance system.

(U) The performance afforded by these various growth options is outlined in Section 6.

8.5.4 Redeployment Lead Time (U)

(U) Redeployment lead time of a Flexible Theater Missile is the same as for the 2/3 Minuteman LGM-30F in comparable basing modes.

8.6 THOR (U)

8.6.1 Early IOC Configuration (U)

The THOR weapon system presently in storage consists of a single stage liquid propellant booster with inertial guidance, and a nuclear warhead, and a rather extensive OGE complex due primarily to the liquid fuel operation. To support the fuel loading requirement, large trailers loaded with light pressure air bottles are required. Liquid oxygen storage is accomplished in a large vacuum bottle; RP-1 fuel is stored in a cylindrical tank. Other pressurization equipment includes a high pressure tank and control for the re-entry system, and a high pressure air supply and control for checking out the hydropneumatic systems on board. Numerous, large pieces of filtering equipment are also required in conjunction with the above.

(U) Electrical power is provided by large diesel-generator units, each located on a trailer. Power distribution is accomplished through trailer mounted distribution equipment. Checkout equipment is required for the entire missile system.

Launch control equipment serving five missile launch pads, includes a missile launch countdown trailer in addition to a trailer housing the launch control equipment and personnel. An erector is also required and serves in addition as a transporter when combined with a tractor vehicle.

Squadron launch control equipment and personnel are housed in a trailer; communication and launch command messages are carried by a wire network similar to the Basic Command-Control system described in Appendix B4.

(U) The performance of this weapon is outlined in Section 6.

8.6.2 Growth Options (U)

(U) No growth options have been considered for the THOR weapon system.

8.6.3 Redeployment Lead Time (U)

Redeployment lead time for the THOR weapon system is estimated to be of the order of nine months.

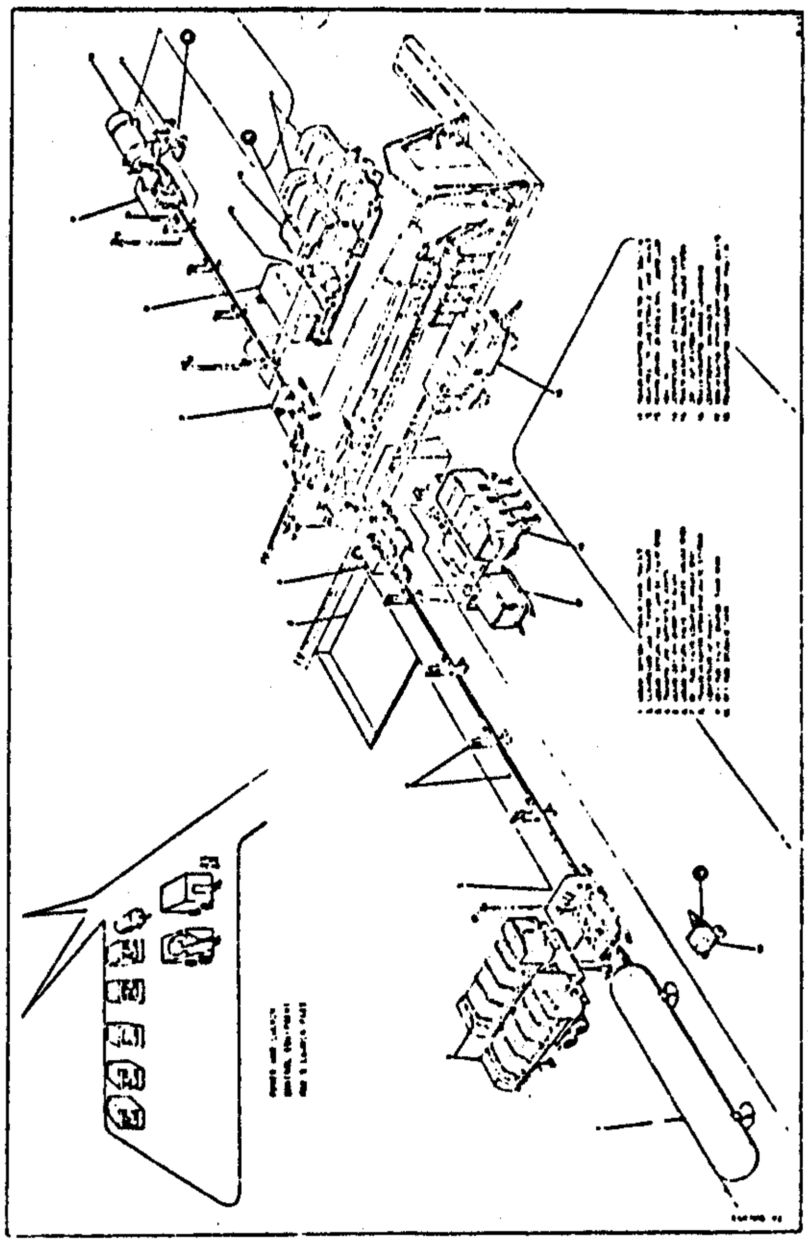


Figure 8.6.1-1 Thor Weapon System Basing Configuration

SECTION 9

SYSTEMS SCHEDULE AND COST

(U) This section presents the schedules and cost associated with the alternative systems under consideration.

9.1 SCHEDULES (U)

(U) Schedules for candidate weapon systems are shown in Figure 9.1-1. A tabulation of the achievable Initial Operational Capability (IOC) for the earliest available candidate configurations in a soft-fixed mode based on a January 1966 go-ahead, follows:

	Calendar Date	Months From Go-Ahead
Polaris A-1	Jan 1967	13 Mo.
Polaris A-3	Aug 1967	20 Mo.
Thor	Dec 1966	12 Mo.
2/3 Minuteman LGM-30B	Nov 1967	23 Mo.
2/3 Minuteman LGM-30F	Jul 1968	31 Mo.
Flexible Theater Missile	Dec 1968	36 Mo.

(U) The IOC dates shown are for the earliest Airborne Vehicle Equipment (AVE) configuration that can be deployed in a soft-fixed mode; which in each case is the most economical. As [illegible]ted by the basing lead times, other deployment modes could be accommodated within the same time period fo[illegible] two of the candidates (i.e., 2/3 Minuteman LGM-30F and Flexible Theater Missile).

(U) Selection of deployment other than soft-fixed would, of course, dictate an increase in required funding.

(U) IOC dates for "growth options" on applicable systems are separately treated in Appendix A. In all cases, where growth is available, IOC dates are downstream from the earliest possible IOC's shown in Figure 9.1-1.

(U) Other comments pertinent to displayed information are summarized in the following:

9.1.1 Definition of IOC (U)

The Initial Operational Capability is that point in time when there are the appropriate number of missiles fielded that would be supported by one Launch Control Complex. For Polaris, this is 16; for Thor, it is 5; for the 2/3 Minuteman and the Flexible Theater Missiles, it is 10.

9.1.2 Pacing Elements (U)

For each candidate, the pacing element which dictates IOC is indicated. These are:

Polaris A-1	Site Preparation
Polaris A-3	Reorder Build Time
Thor	Site Preparation (One month sooner than A-1 since installation is above ground)
2/3 LGM-30B	Availability of Surplus Missiles
2/3 LGM-30F	Availability of MK 12 R/V
Flexible Theater Missile	Normal RDT&E Lead Time

9.1.3 Soft and Fixed Definition (U)

For all candidates except Thor, soft-fixed installation is silo type construction for the missiles and revetments for the LCC's as a protection against small arms fire (50 caliber or less). For the Thor, it would be an above ground installation with partial protection through the use of revetments.

9.1.4 Force Size (U)

For those candidates which utilize existing inventory missiles which are not available in large quantities, a force size of 50 has been assumed. All other candidates are depicted with 150 missile force size. It is noted that in the case of Polaris A-1 and Thor, a further limitation on force sizing is the lack of growth capability.

9.1.5 Category I and Category II Tests (U)

It has been assumed, in the case of Polaris A-1, Polaris A-3, and Thor, that Category I or Category II testing would not be required since there would be no modification to the existing systems for proposed deployment. To allow for some "Category II type" testing, the Demonstration and Shakedown Operations (DASO) are planned to start just prior to IOC for these three candidates.

(U) The Category I and Category II tests for the other candidates with quantities required are shown on the schedule and are predicated on the amount and/or mix of existing and new hardware.

9.1.6 DASO, OT AND FOOT (U)

For all candidates, except the small force size Polaris A-1 and Thor, these quantities were arrived at in the following manner:

a. DASO - For fixed deployment, 15 required.

b. OT - 4 missiles per squadron once.

c. FOOT - 2 missiles per squadron per year.

(U) For Polaris A-1 and Thor, it was assumed 4 missiles for DASO and 20 missiles for OT and FOOT.

9.1.7 Aging Index (U)

(U) July 1968 was arbitrarily chosen as a point in time of indicating average age of boosters for each candidate system. These are depicted on the chart. In the case of Thor (which is a liquid), the age is shown as 0; however, there certainly are aging problems associated with 0-rings, seals, etc.

9.1.8 Squadron Implementation (U)

Based strictly on availability of inventory hardware and reasonable anticipated production rates, the formation of the squadrons, as shown, were evolved. Excepting Polaris A-1, Thor, and 2/3 Minuteman B, the rates are well below what could be realized under similar production programs. Polaris A-1 and Thor are dictated merely by existing capability coupled with availability of hardware while the rates for 2/3 Minuteman B is based strictly on surplus missile availability from force modernization program.

9.1.9 Phase I (U)

Phase I activities have not been shown on the schedule and the go-ahead indicated is for Phase II in January 1966. It is assumed that Phase IA and Phase IB will encompass 60 to 90 days (depending upon the candidate) and Phase IC (DOD approval cycle) cannot be estimated. The current assumption is that Phase I, with a high priority ground rule, could be performed prior to January 1966.

9.1.10 Basing (U)

The schedule shown for basing does not include the schedule times that would be required for negotiation for access to countries or for preliminary site survey.

(U) Note: Detailed backup schedules for all candidates are included in Appendix A.

9.2 SYSTEM COSTS (U)

9.2.1 Introduction (U)

Cost estimates were developed for the basic systems and basing growth options defined in the applicable system description sections. This resulted in cost estimates being made for six families of weapon systems. i.e., Thor, Polaris A-1, Polaris A-3, Minuteman LGM 30B derivatives, Minuteman LGM 30F derivatives, and a Flexible Theater Missile.

(U) Cost estimates were developed for the three standard cost areas, i.e., RDT&E, Investment, and Operations and Maintenance. Source data included prior BSD estimates on the MMRBM and TMRBM Weapon Systems, Golden Arrow cost estimates, BSCC data on the Minuteman force, cost information derived from DOD and contractor documents relating to the Polaris weapon system, and estimates based on actual experience on the Thor weapon system. Although the sources were multifold and unrelated, a concerted effort was made to establish parity among the final results. In each instance, the various elements in each cost heading were compared on the basis of system size, complexity, state-of-the-art, degree of development, and application, and the results tested for reasonableness. In certain instances, adjustments were made to bring the data into proper relationship.

9.2.2 Approach and Methodology (U)

9.2.2.1 RDT&E Costs (U)

9.2.2.1.1 Thor (U)

Under the assumption that the Thor would be reactivated in the same configuration in which it was deployed in England, no RDT&E funding was assigned to the weapon. However, certain real considerations may require a re-evaluation of this assumption if an indepth analysis of this weapon system is undertaken. First, only 28 airframes are available in the inventory and none of these contain guidance systems. Secondly, the Mark II reentry vehicle has a very low ballistic coefficient; hence, the combined CEP due to guidance and reentry vehicle is very high. With the payload capability of the vehicle, it may be desirable to retrofit the basic airframe with a more accurate guidance system, and single or multiple reentry vehicles. Under these conditions, costs would be incurred in the RDT&E area.

9.2.2.1.2 Polaris A-1 (U)

Under the assumption that only a repackaging of the fire control unit would be required, no flight testing was assumed for the A-1 configuration. RDT&E costs are then related only to the engineering and integration of the fire control and checkout equipment. Additional RDT&E funds are assigned to the development of a basic command/control system to interface with the weapon system.

9.2.2.1.3 Polaris A-3 (U)

(U) The ground rule of maximum utilization of Polaris A-3 AVE and AGE again minimizes the RDT&E effort in this weapon system. Costs incurred were for engineering and prototype hardware procurement. Additional costs were estimated for the command and control elements.

9.2.2.1.4 Minuteman LGM 30B Derivatives (U)

The LGM 30B derivative assumed the second and third stages of surplus inventory missiles, the N-10 guidance system, and the MK 11A reentry vehicle. TMRBM RDT&E cost estimates were modified to develop the costs for the 30B development. Major changes were to account for the following considerations:

a. Shorter Schedule - 23 vs 41 months

b. GFE AVE Hardware - Refurbish costs only for Guidance

c. Minimum Stage I Mods - Retrofit surplus boosters with new aft skirt.

d. Lesser Integration Costs - This weapon is considered only in the fixed soft deployment.

e. No Launcher Erector Transporter Cost - Fixed Soft Installation.

This was estimated as an austere program to achieve early IOC with the attendant risk.

9.2.2.1 5 Minuteman LGM 30F Derivatives (U)

The RDT&E costs for this configuration were derived directly from the TMRBM data. In each subsystem area the costs were modified to account for the shorter schedule and reduced Category I and Category II flight tests. In addition, the deletion of PAPS and the associated reentry vehicle redesign afforded an additional cost reduction in this subsystem. Advantage was taken of the guidance redesign presently under way for the Minuteman force, hence, additional cost reductions were assumed in the guidance area. Furthermore, for the early deployment, the basic and intermediate command and control systems were assumed for the soft-fixed and soft-parked and move systems, respectively, with the attendant cost reduction. The final results were then compared with the previous TMRBM estimates, and Spartan II estimates as a test for validity.

9.2.2.2 Investment Costs (U)

9.2.2.2.1 General (U)

(U) The basic elements comprising investment costs are as follows:

AVE - Reentry
Guidance
Propulsion
Integration

AGE - Subsystem AGE
Command & Control
Transporter Launchers (where applicable)
Training Equipment

Initial Spares - AVE & AGE

Military Construction - Brick and Mortar Plus RPIE

Site Activation - Installation and Checkout

Cable Plants - For Fixed Base Systems

Update - Mods to AVE and AGE

Data - Manuals and Procedures

The following general ground rules were adopted in developing the investment costs:

a. 15 DASO launches will be conducted for fixed base systems.

b. 20 DASO launches will be conducted for mobile or transportable systems.

c. 4 OT launches will be conducted for each squadron of 25 UE missiles.

d. 2 FOOT launches per year will be conducted for each squadron of 25 UE missiles.

e. Initial spares will be estimated on the basis of AFLC requirements.

f. Training equipment costs will be developed for each system by ATC.

(U) Specific exceptions were made to certain of these ground rules as a result of system considerations. In particular, the force size and operational experience associated with the Thor and Polaris A-1 indicated the desirability of reducing the number of DASO launches. The initial spares for the inventory surplus missile derivatives, i.e., LGM 30B and Polaris A-1, were reduced under the assumption that some spares would already be available and other surplus missiles could be stripped for additional spares.

9.2.2.2.2 AVE Investment Costs (U)

(U) An AVE cost matrix was developed for the subsystem unit costs of all LGM 30F and FTM at a specified force level. Each unit average cost per subsystem was then compared to TMRBM and MMRBM estimates, and current Minuteman data. Unit average cost adjustments were then made to achieve consistency among the new systems with prior data. The system AVE costs were then estimated based on the total subsystem cost plus a factor for integration.

(U) The LGM 30B costs were estimated based on refurbishment costs for the applicable subsystems, plus modification costs to the airframe and first stage propulsion to achieve the desired aerodynamic stability and in-atmosphere performance for the second two stages.

(U) Polaris A-1 investment costs were based on refurbishment of the AVE.

(U) Thor investment costs were based on refurbishment of those elements available in the inventory plus a new buy of those subsystems not available.

(U) Polaris A-3 costs were based on DOD data available on the A-3 missile system costs and an assumed learning curve to estimate the various force sizes.

9.2.2.2.3 AGE Investment Costs (U)

(U) The same rationale and methodology was applied to the AGE as for the AVE. For the Minuteman derivatives and the Flexible Theater Missile, Wing VI AGE was assumed. Polaris A-1 AGE was assumed available in the inventory and required only repackaging. Polaris A-3 AGE was assumed as a new buy plus modification to adopt it to the land based configurations. Thor AGE was estimated based on the availability of this equipment in the inventory.

(U) Two versions of transporters were estimated for this study. For the 2/3 LGM 30F, the TMRBM type launcher erector transporter (LET) was assumed. For the FTM, the MMRBM transporter launcher (T/L) was assumed.

(U) In the command and control area, three degrees of C&C capability were assumed. These are basic, intermediate, and advanced. Detailed discussion of the capabilities of these systems are contained in the report and appendix. In the cost development, the basic system was assumed for all fixed systems while the intermediate system was assumed for the transportable versions. Thor was assumed to use the C&C system used in England.

9.2.2.2.4 Initial Spare (U)

(U) Initial spares estimates were developed by Hq AFLC using experience factors against hardware investment costs.

9.2.2.2.5 Military Construction (U)

Four basing modes were identified in the study. These were soft fixed, soft park and move, hard fixed, and hard garage. Military construction costs for each of these basing modes were developed and applied to the appropriate weapon system. These costs were consistent with Minuteman experience and estimates made in earlier MMRBM studies.

9.2.2.2.6 Site Activation (U)

(U) Site activation costs were developed based on Minuteman data and experience with other weapon systems.

9.2.2.2.7 Cable Plants (U)

(U) Cable plant costs for the fixed based systems were estimated by applying the Minuteman costs per mile to the basing configurations established for each weapon system.

9.2.2.2.8 Update (U)

(U) Update costs were estimated considering the fact that major elements of the weapon systems were derived from existing programs.

9.2.2.2.9 Data (U)

(U) Data costs are based on prior BSD weapon system experience.

9.2.2.3 Operations and Maintenance (U)

9.2.2.3.1 General (U)

(U) All systems costs were estimated on the basis of a five year operation with the exception of Polaris A-1 and Thor which are based on 3 years operation. The cost elements used in the derivation of O&M costs were the same as those used in TMRBM. These were:

- Modifications
- Replenishment Spares
- Depot & Base Maintenance
- Miscellaneous Logistics Support
- POL
- Pay and Allowances
- Replacement Training
- Base Support

(U) The first five items listed above were primarily functions of AVE and AGE hardware investment costs. The remaining three O&M cost elements, i.e., pay, training, and base support, are functions of the manning level; hence, they are influenced by the basing concept.

9.2.2.3.2 Logistics Support Factors (U)

(U) Logistics Support Factors were developed by Headquarters AFLC using experience factors against hardware investment costs.

9.2.2.3.3 Pay and Allowances (U)

(U) The pay and allowances factor in O&M costs is a function of the basing option associated with the weapon system. The Tactical Air

Command established operational manning and security force requirements for each of the four basing options and the CASF operation. Funding estimates were based on $11,100 per year for officers, and $4,200 per year for airmen.

9.2.2.3.4 Replacement Training (U)

(U) Replacement training costs were developed by the Air Training Command for each basing manning established in the previous section.

9.2.2.3.5 Base Support (U)

(U) Base support costs were estimated at a flat rate per man for each basing option.

9.2.3 Credibility of Results (U)

(U) Every attempt was made to achieve consistency of approach among the various systems. In the RDT&E and Investment areas, TMRBM, MMRBM, and Minuteman data were used extensively to achieve uniformity and consistency among the subsystem costs. Cost estimates submitted by various elements of the study group were reviewed in matrix form with these baseline systems and minor adjustments made in areas where obvious discrepancies existed. For those systems where less complete data was available, comparisons were made at the next higher indenture level. Within the constraints of the study ground rules and the time restrictions, the results are consistent within the systems being compared.

SECTION 10

COST EFFECTIVENSS (U)

10.1 COST EFFECTIVENESS APPROACH (U)

The over-all effectiveness of a theater ballistic missile defined for deployment in the Southeast Asia area is dependent upon a number of factors, not all of which are amenable to quantitative evaluation. This section will develop the more conventional measures of effectiveness which, when combined with the political and psychological factors, will provide some guidance in the decision to develop a particular weapon system. The detail cost effectiveness analysis is presented in Appendix D for reference.

10.2 THREAT (U)

Consideration was also given to a conventional munitions aircraft attack threat. For targets of known location, bombardment aircraft of the TU-16 type armed with 500 lb HE bombs were assumed. Where target location is not known, strike reconnaissance aircraft of the MIG-19 type armed with either 500 lb HE bombs, 23 mm guns, or 2.75 rockets were assumed.

10.3 CANDIDATE SYSTEMS AND BASING OPTIONS (U)

The candidate weapon systems considered in the effectiveness analysis are described in some detail in Section 6.0 The characteristics of the candidate systems and growth options which are germane to the effectiveness analysis are given in Table 10.3-I for reference. The basing options and basing growth capabilities are also shown for each of the missiles considered. In all cases, it is possible to initially deploy the weapon systems in a soft based configuration. Soft basing is feasible until the Chi-Com gain the follow-on thermonuclear capability and a larger missile force. At this time, the survivability of the soft based system rapidly degrades and a basing growth capability is desirable.

10.5 SURVIVABILITY (U)

The survivability analysis has examined the vulnerabilit of U. S. systems to a coordinated pre-emptive nuclear armed bal'istic missile or aircraft strike by the Chi-Com. The possibility that the enemy may reserve his nuclear weapons and utilize aircraft to deliver conventional munitions against the U. S. missile force was also examined briefly. The analysis of aircraft delivery did not consider any attrition of the attacking force by U. S. air and ground aircraft defenses. The attacking aircraft threat level is always interpreted as the number successfully penetrating U. S. defenses and reaching the target.

10.5.2 Deployment Considerations and Restrictions (U)

A road mobile system based in the Pacific Theater, which has a predominantly linear-type road network, requires a greater length of available road per unit to achieve the same survivability as a road mobile weapon based in the European Theater, where a grid road network predominates.

10.6 TIME PHASED EFFECTIVENESS (U)

From the foregoing discussions a number of conclusions can be drawn.

a. The early Chi-Com nuclear capability for the 1967-1972 time span will have very limited capability, both in terms of numbers and kill effectiveness, thereby making a soft-fixed U.S. missile deployment mode quite practical.

b. For the same force size, the basic weapon systems which could be deployed to counter this early threat have comparable kill effectiveness.

c. As the follow-on Chi-Com nuclear capability is introduced, starting in 1972, the survivability of the fixed soft force is inadequate.

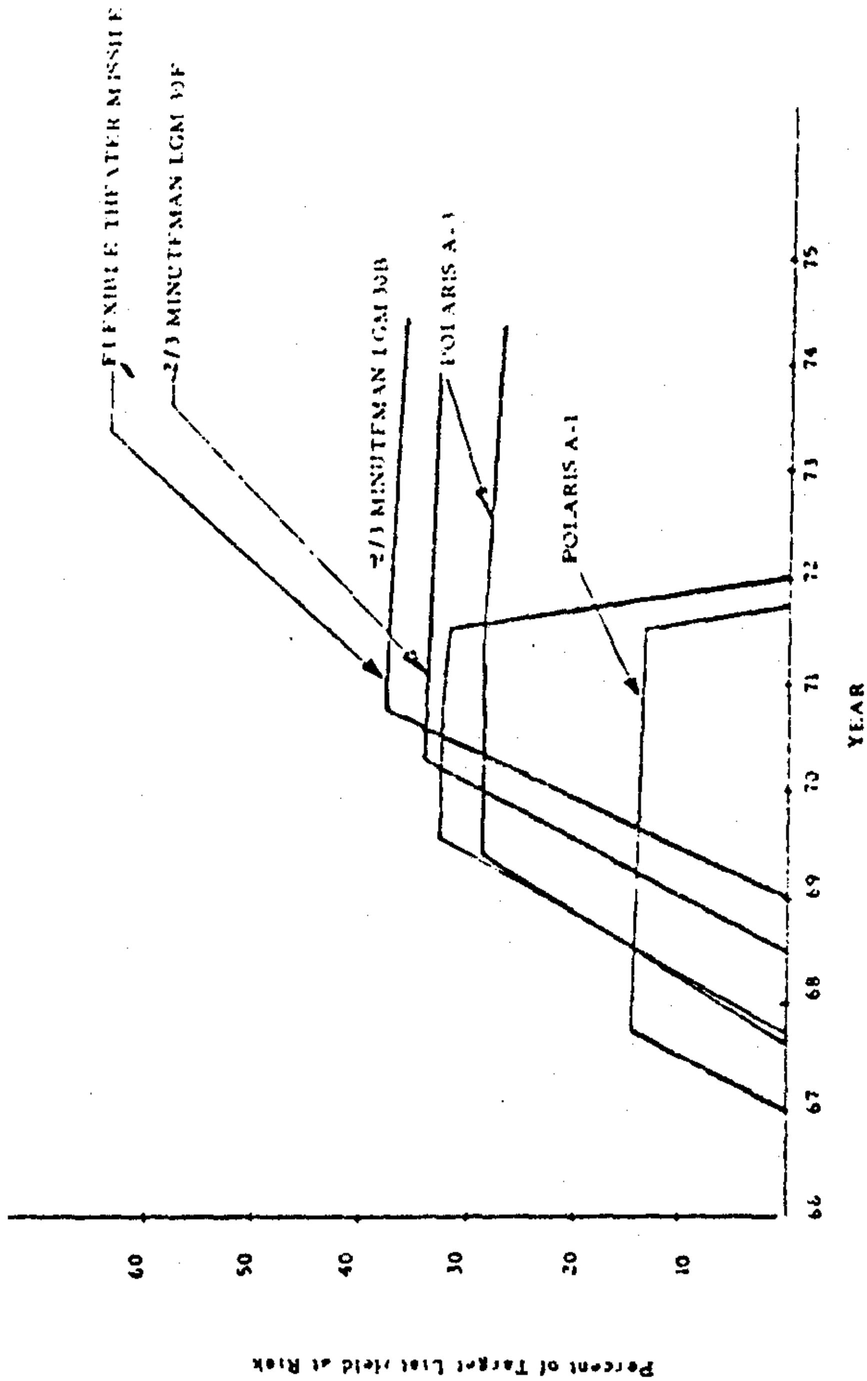
e. In addition to growth options to achieve increased survivability, several weapon systems have growth options which would also significantly improve kill effectiveness.

The results of this analysis are shown in Figure 10.6-1 for the 2/3 Minuteman LGM 30F system. Corresponding information for the other candidate systems is included in Appendix D. The envelopes of the basic missile/growth basing option combinations (where basing growth is possible) are superimposed for all candidate systems in Figure 10.6-2 Similarly the envelopes of the growth missile/growth basing combinations are superimposed in Figure 10.6-3.

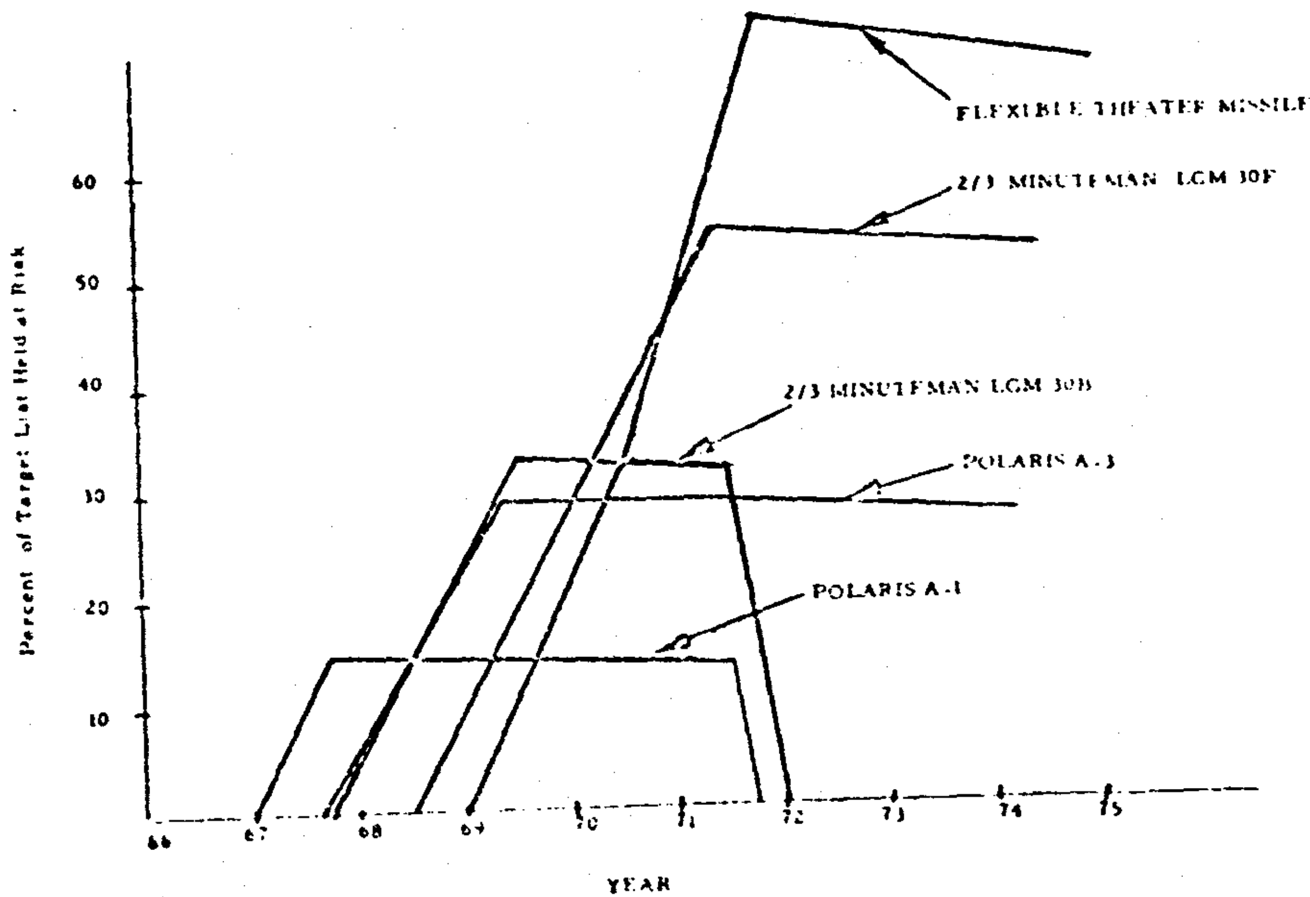
It is concluded that the earliest capability is achieved with the Polaris A-1. However, this capability is somewhat limited and disappears entirely following introduction of the follow-on Chi-Com nuclear weapon. The Polaris A-3 and 2/3 Minuteman LGM-30B can be introduced approximately eight months later. While the Polaris A-3 effectiveness can be maintained by the addition of hard basing, its maximum effectiveness is limited by a lack of growth capability. The 2/3 Minuteman LGM-30F and Flexible Theater Missile both have significant growth capability, in terms of survivability and effectiveness, but are the latest to be introduced into the theater.

10.7 COST EFFECTIVENESS (U)

The cost effectiveness of the candidate weapon systems and



Basic Configuration Comparison (U)
Figure 10.f-2



Maximum Growth Capability Comparison (U)

Figure 10.6-3

growth options in the no attack case measured in terms of cost per target killed, is presented in Table 10.7-1. The cost per target killed subsequent to attack is shown in Figures 10.7-2 and 10.7-3 for the basic missile/growth basing and growth missile/growth basing configurations respectively. These last two figures are derived from the time phased effectiveness curves presented previously. Review of this data leads to the following conclusions:

a. The Polaris A-1 and 2/3 Minuteman LGM-30B systems, which are based on reuse of existing hardware, are most cost effective for small force sizes but have limited kill effectiveness and no hard basing growth potential, limiting their cost effectiveness to the early threat.

b. The Polaris A-3 system is competitive from a cost effectiveness standpoint but has limited kill effectiveness.

c. The cost effectiveness of the 2/3 Minuteman LGM 30F and Flexible Theater Missile, while not competitive in the basic deployment option, have growth potential that make them superior from the standpoint of both cost effectiveness and kill effectiveness in the end condition.

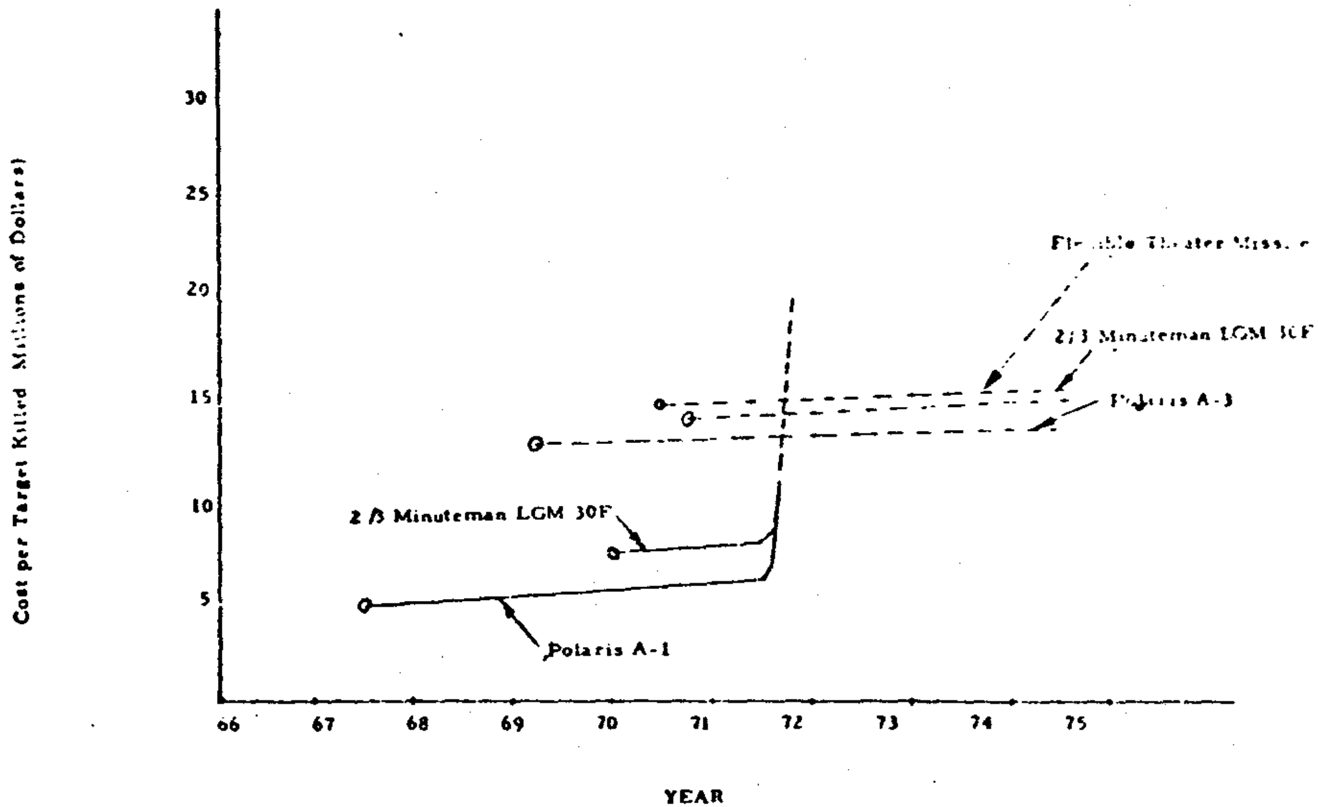


Figure 10.7-2 Comparative Cost Effectiveness Basic Configurations
(150 Missile Force Except Polaris A-1)

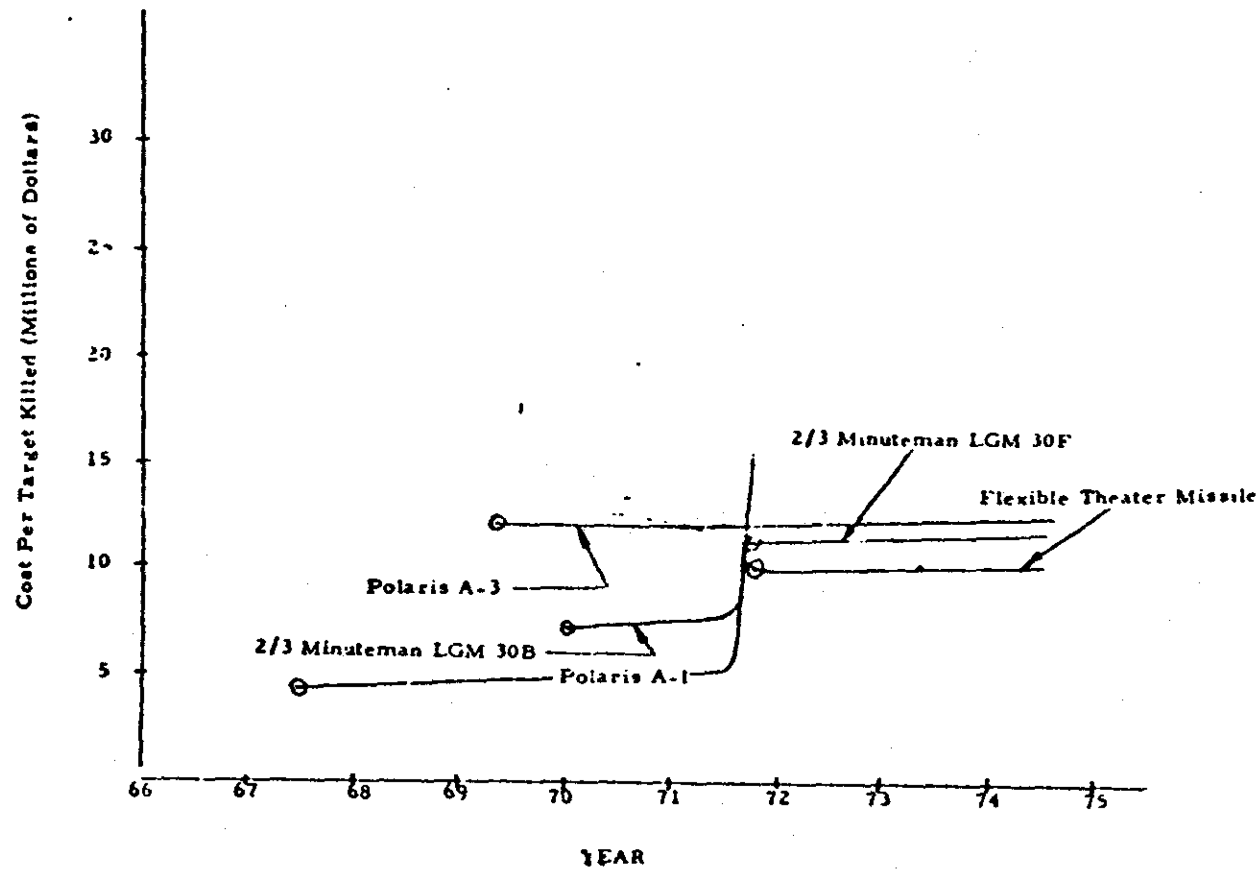


Figure 10.7-3 Comparative Cost Effectiveness Including Growth Capability
(150 Missile Force Except Polaris A1)

10.8.1 Effectiveness Comparison (U)

The comparison systems are considered to be invulnerable; Minuteman because of the hard silo basing and range, and Polaris/Poseidon because of the invulnerability of the submarine. Therefore, an evaluation of these comparison systems resolves to consideration of kill effectiveness and cost. The comparison systems are evaluated and compared with the candidate systems in Table 10.8.1-I in terms of kill effectiveness and cost per target. It is concluded that the Minuteman LGM-30F with a MK 12 MIRV payload is the superior system in terms of cost effectiveness. The Poseidon C-3 is competitive with the growth versions of the 2/3 Minuteman LGM-30F and the Flexible Theater Missile but is inferior to the LGM-30F with the MK 12 MIRV. Neither the Minuteman LGM-30B nor the LGM-30F with the MK 11A payload are competitive with the candidate systems.

SECTION 11

FUNDAMENTAL CONSIDERATIONS AFFECTING SYSTEMS SELECTION (U)

(U) The foregoing material separately treated each of the weapon system characteristics that have been considered to be of importance to the selection of a particular weapon system. It has been indicated that certain of the criteria of fundamental importance are not amenable to quantitative definition. On the main, these latter items fall principally within the domain of political values. In this section the comparison systems will be treated and then a generic comparison of the other candidate weapon systems will be presented with the objective of identifying the fundamental criteria of primary importance and identifying the variance of these criteria as they are applied to the various weapon system candidates. Subsequently, these variances will be quantified to the extent appropriate and employed in a display which is intended to highlight the principal tradeoffs that require assessment in order to reach a judgement on the weapon system or systems more suitable to accomplish the assigned mission.

11.1 FLEET BALLISTIC MISSILES

Neither of these systems provide the many potential candidate host countries with a visible local show of force nor do they provide a threat restricted to the Chi-Coms.

11.2 COMPARISON OF INVENTORY SURPLUS AND NEW PROCUREMENT MISSILES (U)

(U) In the initial comparison, the candidate weapon systems will be divided into two families; inventory surplus weapons, namely Thor, Polaris A-1 and 2/3 Minuteman LGM-30B; and new procurement missiles, namely Polaris A-3, 2/3 Minuteman LGM-30F and the Flexible Theater Missile.

Figure 11.2.1 displays this comparison. The convention has been adopted to indicate superiority of one family over another with a plus and, inversely, to identify a deficiency with a minus. Where there is parity for a given comparative element, both families will be given a plus. Checks in the variance column indicate lack of parity for a given element. The ensuing discussion relates to Figure 11.2-1.

	INVENTORY SURPLUS	NEW PROCUREMENT	VARIANCE
LOCAL SHOW OF FORCE	+	+	
IOC	+	-	✓
LIFE	-	+	✓
RELIABILITY	-	+	✓
FOLLOW-ON REQUIREMENT	-	+	✓
REDEPLOYMENT LEADTIME	-	+	✓
CASF SUITABILITY	-	+	✓
FLEXIBLE COLLATERAL THEATER USE	-	+	✓
GROWTH	-	+	✓
RANGE	-	+	✓
RESTRICTED THREAT	+	+	
COST	±	±	
COST EFFECTIVENESS	-	±	✓

Figure 11.2-1 Fundamental Considerations Affecting System Selection
(Comparison of Inventory Surplus and New Procurement Missiles)

11.2.1 Local Show of Force (U)

Any of the candidate missile systems in any of the optional basing modes displays visible evidence of their presence to the local population. Thus, each family achieves parity for this item.

11.2.2 IOC (U)

The IOC defines the earliest time at which a given missile system can have a nominal force in place ready to fire in anger. To the extent that it is displayed as an evaluation criterion, it is presumed that merit can be associated with the IOC primarily through the political advantages that can be achieved in the early time period. At the outset of the threat-time spectrum, the forces currently based in the Pacific have a sufficient military capability to address the nominal threat, however, political advantages are presumed to potentially attend the early emplacement of missiles in various host countries.

11.2.3 Life and Reliability (U)

On the main, the inventory surplus missiles will suffer from a restricted life and a corresponding lower reliability. The life that can be expected from the older solid propulsion missiles is somewhat a matter of conjecture. It has been estimated that the Polaris A-1 and the Minuteman LGM-30B would have a life not exceeding three years, while the Thor might enjoy a life of up to five years after deployment. Naturally the new procurement missiles would have a considerably longer life.

11.2.5 Redeployment Leadtime (U)

Inventory surplus missiles are constrained to soft and fixed basing because of the lack of suitability for growth through their restricted life. On the other hand, certain of the new procurement missiles would be amenable to a road transportable or fully road mobile deployment concept, with an attendant redeployment leadtime of about eight days in a comparable redeployment circumstance. This is considered to be of significance because of the volatile political character of the area. Were the political merits of a given situation to dictate the desirability of deploying a missile system into a host country under political or military duress, there would be a potential advantage of having the capability of providing such a deployment in a matter of a few days rather than a 9 months interval.

11.2.6 CASF Suitability and Flexible Collateral Theater Use (U)

Each of the candidate missile systems could, of course, be deployed in other theaters of operation. However, one of the principal findings resulting from the definition of the MMRBM and TMRBM was the considerable advantage of road transportability and mobility in the European theater. Each of these concepts is amenable to a CASF type deployment.

11.2.7 Growth (U)

(U) The short life of inventory surplus missiles negates the adviseability of enhancing the weapon system capability through growth.

11.2.8 Restricted Threat (U)

Each of the weapon systems families achieve parity in regard to restricted threat inasmuch as the limited range of each of the missiles would not require the overfly of Russia from the candidate host countries in order to strike the Chi-Com target complex.

11.2.9 Cost (U)

While it would appear that the inventory surplus missiles would enjoy an apriori lower cost through their surplus status, the escalated threat which necessitates the follow-on requirement to this family of missiles makes it necessary to consider the additional cost of the follow-on missile in conjunction with the initial cost of surplus missile deployment in order to provide a capability through 1974.

11.2.10 Cost Effectiveness (U)

The surplus missiles suffer from a degraded cost effectiveness principally because of the need for the follow-on missile required in the post 1972 time period mentioned above.

11.3 COMPARISON OF INVENTORY SURPLUS MISSILES (U)

From the above generic treatment, it can be seen that the inventory surplus missiles do provide the political advantages that might be ascribed to the early IOC with the attendant low initial cost through 1972, but suffer from lack of a viable use through 1974. To the extent that these advantages are sufficient to warrant further consideration of the inventory surplus missiles, each of the missiles in this family was examined generically in the comparison displayed in Figure 11.3-1. Only the characteristics that exhibit variance in Figure 11.3-1 will be discussed.

The IOC of the 2/3 Minuteman LGM-30B is later than either the Thor or Polaris A-1 due to its later retirement from the inventory. Because the Thor missile incorporates a liquid propulsion system compared to the solid propellant of the Polaris A-1 and 2/3 Minuteman LGM-30B, it would have a somewhat higher life and reliability. Utilization of the inventory Mk 11A R/V on the 2/3 Minuteman LGM-30B provides a somewhat shorter range than either of the two alternative candidates. The complete availability of weapon system hardware for the Polaris A-1 compared to either Thor or the 2/3 Minuteman LGM-30B and the lower cost due to the absence of a flight test requirement of the Polaris A-1 in comparison with the 2/3

	THOR	POLARIS A-1	2/3 LGM 30B	VARIANCE
LOCAL SHOW OF FORCE	+	+	+	
IOC	+	+	-	✓
LIFE	+	-	-	✓
RELIABILITY	+	-	+	✓
FOLLOW-ON REQUIREMENT	+	+	+	
REDEPLOYMENT LEADTIME	+	+	+	
CASF SUITABILITY	+	+	+	
FLEXIBLE COLLATERAL THEATER USE	+	+	+	
GROWTH	+	+	+	
RANGE	+	+	-	✓
RESTRICTED THREAT	+	+	+	
COST	-	+	-	✓
COST EFFECTIVENESS	-	+	-	✓

Figure 11.3-1 Fundamental Considerations Affecting System Selection (Comparison of Inventory Surplus Missiles)

Minuteman LGM-30B dictate that the Polaris A-1 can be made available at a substantially lower cost and corresponding increased cost effectiveness. There are other problems that can be associated with the deployment of a large cryogenic liquid propellant missile, such as Thor in the Pacific which do not appear in the evaluation matrix, such as the above surface basing and exposure to sabotage. The essential comparative difference appears to be the lower cost and improved cost effectiveness of the Polaris A-1 but with its attendant relatively lower reliability, to the longer life Thor with its attendant deployment limitations.

11.4 COMPARISON OF NEW PROCUREMENT MISSILES (U)

Figure 11.4-1 displays the generic comparison of the new procurement missiles. The Polaris A-3 can achieve an earlier IOC because of the absence of a development flight test program which would be necessary on either the 2/3 Minuteman LGM-30F or the Flexible Theater Missile. However, the transportable and mobile basing capabilities of both the 2/3 Minuteman LGM-30F and the FTM provide a considerable advantage in redeployment lead time and CASF suitability. The Flexible Theater Missile enjoys a broader and more flexible collateral theater use through its growth to a pure mobile system and can readily achieve a capability directly comparable to the MMRBM. The Polaris A-3 would enjoy a cost advantage but would suffer in cost effectiveness because of the growth readily achievable in the 2/3 Minuteman LGM-30F and the FTM, through the incorporation of a MIRV capability and improved guidance accuracy.

11.5 CONCLUSIONS (U)

It is evident that the foregoing generic analysis does not provide an indication of a clearly superior MRBM for the Pacific. To the extent that the comparative indices can be further quantitized, this has been done on Figure 11.5-1. On this figure each of the variances indicated on the foregoing charts in this section has been quantitatively defined where appropriate. Even then, certain of the trade-offs entail considerable

	POLARIS A-3	2/3 LGM 30B	FTM	VARIANCE
LOCAL SHOW OF FORCE	+	+	+	
IOC	+	-	-	✓
LIFE	+	+	+	
RELIABILITY	+	+	+	
FOLLOW-ON REQUIREMENT	+	+	+	
REDEPLOYMENT LEADTIME	-	+	+	✓
CASF SUITABILITY	-	+	+	✓
FLEXIBLE COLLATERAL THEATER USE	-	-	+	✓
GROWTH	-	-	+	✓
RANGE	+	+	+	
RESTRICTED THREAT	+	+	+	
COST	+	-	-	✓
COST EFFECTIVENESS	-	+	+	✓

Figure 11.4-1 Fundamental Considerations Affecting System Selection (Comparison of New Procurement Missiles)

judgment. The potential political values associated with an early IOC cannot be transformed into dollars. As was mentioned in the approach, certain of the factors affecting decisions have been displayed for enlightenment, but judgments have been avoided where this division lacks expertise (i.e., political). However, the following conclusion is offered:

> It is concluded that the Flexible Theater Missile provides the optimum capability to satisfy both the political and military requirements. If political considerations dictate an early deterrent and show of force, the A-1 missile system could be used as an interim capability.