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UNITED STATES ARMY COMBAT DEVELOPMENTS COMMAND

STUDY

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Evaluation Of The Army's Plan For Tailoring Its Forces For Air Movement.

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HEADQUARTERS
UNITED STATES ARMY COMBAT DEVELOPMENTS COMMAND
FORT BELVOIR, VIRGINIA

CDCCD-F

29 November 1963

SUBJECT: Change to CD Study: "Evaluation of the Army's Plan for Tailoring its Forces for Air Movement (U)"

TO: Assistant Chief of Staff for Force Development
Department of the Army
ATTN: DOT DO 3
Washington, D. C. 20310

1. Inclosed are changes to CD Study: "Evaluation of the Army's Plan for Tailoring its Forces for Air Movement (U)", 22 November 1963.

a. The following pages are substituted:

- ✓ Page 10
- ✓ Page 21
- ✓ Page C-1-1
- ✓ Page C-1-A-1
- ✓ Page C-3-1
- ✓ Page C-3-2

b. Page C-1-A-2 is rescinded.

2. Substituted pages supersede those pages contained in the original study. Original pages should be destroyed in accordance with current regulations.

FOR THE COMMANDER:

6 Incl
as

Lewis V. Edner
LEWIS V. EDNER
Major, QMC
Asst Dir, Pers & Admin

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**HEADQUARTERS
UNITED STATES ARMY COMBAT DEVELOPMENTS COMMAND
FORT BELVOIR, VIRGINIA**

CDCCD-F

22 November 1963

SUBJECT: CD Study: "Evaluation of the Army's Plan for Tailoring its Forces for Air Movement (U)"

**TO: Assistant Chief of Staff for Force Development
Department of the Army
ATTN: DOT DO 3
Washington, D. C. 20310**

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1. (U) References (Annex G): a. Letter, OACSFOR DOT DO 3, 29 May 1963, subj: Army's Plan for Tailoring its Forces for Movement by Air (U).
b. Letter, HQ USACDC, CDCCD-F, 4 June 1963, subject: CD Study: Army's Plan for Tailoring its Forces for Movement by Air (U).
c. Letter, HQ USACDC, CDCCD-F, 29 August 1963, subject: CD Study: Army's Plan for Tailoring its Forces for Movement by Air (U).
d. Letter, ACSFOR, DOT DO 3, 22 October 1963, subject: Army's Plan for Tailoring its Forces for Movement by Air (U).
2. (U) There follows the study, "Evaluation of the Army's Plan for Tailoring Its Forces for Air Movement (U)," prepared in response to reference 1d, above. The title of the study has been changed from "Army's Plan for Tailoring its Forces for Movement by Air (U)" to more appropriately describe the contents therein.
3. (U) Recommend the conclusions stated in paragraph 7 of the study be utilized to state the Army's position with respect to the questions posed by the Secretary of Defense.

FOR THE COMMANDER:

TC Gresham

**T. C. GRESHAM
CWO, W4, US Army
Asst Dir, Pers & Admin**

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EVALUATION OF THE ARMY'S PLAN FOR
TAILORING ITS FORCES FOR AIR MOVEMENT (U)

STUDY CONTENT

<u>Paragraph</u>	<u>Page</u>
TABLE OF CONTENTS	i
1. PURPOSE	1
2. SCOPE	1-2
3. AUTHORITY	2
4. FACTS	2
5. ASSUMPTIONS	2-3
6. DISCUSSION	3-19
7. CONCLUSIONS	19-21
ANNEX A, Guidance to Plan for Tailoring Forces for Movement by Air	A-1
ANNEX B, Doctrine and Concepts for Air Move- ment	B-1
Appendix 1, Relative Firepower of Type Divisions	B-1-1
ANNEX C, Comparative Analysis of Air Movement Capabilities	C-1
Appendix 1, Equipment Weight Per Man of Type Divisions	C-1-1
TAB A, Recapitulation of Total Weights - Type Divisions	C-1-A-1

STUDY CONTENT (Cont)

<u>Paragraph</u>	<u>Page</u>
TAB B, Equipment Weight - ROAD Airborne Division	C-1-B-1
TAB C, Equipment Weight - ROAD Infantry Division	C-1-C-1
TAB D, Equipment Weight - ROAD Armored Division	C-1-D-1
TAB E, Equipment Weight - ROAD Mech- anized Division	C-1-E-1
TAB F, Equipment Weight - ROAD Maneuver Elements	C-1-F-1
Appendix 2, Weight Changes in Ordnance and Signal Items of Equipment	C-2-1
Appendix 3, Non-Air Transportable Equipment of Type Divisions	C-3-1
Appendix 4, Army Aircraft	C-4-1
TAB A, Transportability of Army Aircraft for Strategic Deployment	C-4-A-1
Appendix 5, Airlift for Type Units	C-5-1
ANNEX D, Current Procedures for Consideration of Air Transportability Requirements	D-1
Appendix 1, Studies and Troop Tests Pertinent to Air Transportability	D-1-1

STUDY CONTENT (Cont)

<u>Paragraph</u>	<u>Page</u>
ANNEX E, Future Research and Development	
Plans	E-1
Appendix 1, Representative Major Items of	
Equipment, RODAC-70	E-1-1
ANNEX F, Bibliography	F-1
ANNEX G, Study Directives	G-1

(S) EVALUATION OF THE ARMY'S PLAN FOR TAILORING ITS FORCES FOR AIR MOVEMENT (U)

1. (S) PURPOSE. To provide a comprehensive study that is responsive to the following requirements:

- a. Evaluate the Army's plan for tailoring its forces for movement by air.
- b. What amounts of equipment per man have to be moved?
- c. Have these amounts increased in recent years?
- d. What steps are being taken to assure that where Tables of Equipment are changed, the effect on airlift requirements is explicitly considered?

2. (S) SCOPE. *✓* This study will *analyze* and *evaluate*:

a. *✓* The Army's objective of strategic mobility of its forces and its resultant implementation in the tailoring of its forces and equipment for movement by air;)

b. *✓* Documents which state, or directly contribute to, the overall Army objective for strategic mobility and the tailoring of its forces to achieve this mobility; *and*

c. *✓* The Army's position, to include *ing* doctrine and concepts, for the air movement of airborne, infantry, mechanized, armored and air assault divisions to an overseas objective area; *and* include method of employment, and relative combat effectiveness when movement is by airlift solely or in conjunction with prestocking or surface movement of heavy equipment. *↑*

d. The air movement capabilities of type divisions to include the unit weight per man, airlift requirements for strategic movement, and limiting factors in this capability from standpoint of both equipment and organizational structures.

e. Qualitative improvements that have been realized during recent years to permit more efficient tailoring of division size units for air movement and whether these improvements result in an overall increase or decrease in airlift requirements.

f. The procedures and techniques inherent in the development of TOE and the combat and materiel development cycle whereby the effect on airlift requirements is considered in developing new weapons systems, materiel, and organizational structures.

✓g. The Army's plans for the future research and development of materiel, and organizational structures as they relate to improvements of air movement capabilities.

3. (U) AUTHORITY. ANNEX G.

4. (S) FACTS.

a. The primary Army objective is to defeat the enemy through prompt and sustained combat in any area in the world, and at any level across the entire spectrum of war.

b. TOE heavy weapons and equipment and repair parts for division and smaller size units are currently pre-positioned throughout the world.

5. (S) ASSUMPTIONS.

✓a. There will be no significant change in the roles of the services through 1980.

✓ b. The necessity of being prepared to provide tailored forces promptly and capable of sustained combat in varying geographical areas and levels of conflict will remain a part of the Army's basic mission.

c. Qualitative improvements in dimensions and weights of equipment consistent with a retention of an essential sustained combat capability will continue to be of primary interest to the Army.

6. (S) DISCUSSION.

a. Background. The Secretary of Defense assigned primary and collateral responsibility to the Army for certain CY 1963 study projects covering areas of particular interest to the Department of Defense. The requirement for the conduct of this study was included in this program (paragraph II of reference 4a, above.)

✓ b. Army Objectives.

✓ (1) The ultimate aim of the US Army throughout its history has been to provide an effective military response in any situation that may arise. In recent years, national objectives have broadened to the point where a prime requirement now exists for the Army to be responsive in any situation and in any area of the world. To meet this requirement, the Army's objective of strategic mobility was created.

✓ (2) A strategically mobile Army is required by United States worldwide commitments and by the need for prompt, selective reaction in situations which require rapid deployment of the Army forces.

✓ (3) The concept for developing forces and equipment on a "building block" basis with smaller maneuver elements capable of rapid attachment to, or detachment from a basic semi-permanent force was

specifically designed to enable the Army to fulfill these two functions of the deployment mission: speed and selectivity.

(4) Although this study concerns itself with the concept of tailoring Army forces to fulfill the objective of strategic mobility, it must be borne in mind throughout the discussion herein that strategic mobility is not an end in itself. It is a means by which to accomplish the Army's basic objective of defeating an enemy by prompt and sustained land combat. Complete submergence of the consideration of other criteria to that of air transportability could eventually lead to the development of a combat unit so light and equipped so austerely that it would be 100% capable of air movement but incapable of sustaining itself in ground combat in an objective area.

(5) A balance must be maintained in the structuring of forces and design of equipment between the requirements for air transportability and those for effective operations in the sustained land combat role. One must be weighed against the other.

c. The Army's Plan for Tailoring it's Forces for Movement by Air.

The Army's plan for tailoring it's forces for movement by air may be described as a summation of the plans, policies, and directives, and the implementation thereof, designed to assure accomplishment of the Army's primary objective through strategic deployment. The basic criterion in this plan emphasizes the necessity for constant evaluation of the requirement for an airlift capability in the development of forces and equipment balanced against the requirement to place a force in an objective area, sufficiently capable, in terms of fire power, survivability, and

d. Guidance. The initial guidance for the development of Army plans for supporting the national objectives is contained in the "Basic Army Strategic Estimate (BASE), approved 3 October 1963 by the Army Chief of Staff. This basic planning document is further amplified and expanded in documents and directives published throughout the Army structure. (Detailed discussion is contained in ANNEX A.)

✓ (1) Basic Army Strategic Estimate (BASE). The purpose of this plan is to make strategic appraisal of the threat to the national security of the US for a twenty year period in the future and to develop strategic concept for all Army plans. The need for a rapidly deployable Army force is evident throughout this document. The BASE, although its guidance is stated in the broadest terms, emphasizes the necessity for this nation to have a flexible and controlled response based on forward deployment backed by forces having high strategic and tactical mobility.

✓ (2) Army Strategic Plan (ASP). This document amplifies the guidance contained in the BASE and is directed toward determining the Army objectives for the implementation of the strategic concept. It is this plan that provides the realistic objectives level planning direction with which to implement the strategy contained in the BASE. At this writing, the first Army Strategic Plan published in support of the BASE is being prepared for staffing at Dept of Army. This plan when approved, must provide a continuity between the BASE and other implementing documents with respect to Army objectives in support of strategic mobility.

✓ (3) Army Force Development Plan (AFPD). This plan further supports the BASE within the framework established by the ASP. The

objective of this plan is to develop the best possible Army, considering the strategic need, within projected resources. The AFDP, though it provides broad reference to the need for a strategically mobile Army, lacks clear or definitive statements of objective relative to the design of force structures capable of strategic mobility without degradation of essential combat effectiveness.

✓(4) Combat Development Objectives Guide (CDOG). The broad guidance contained in the above plans is transformed into a stated requirement by those objectives contained in the Combat Development Objectives Guide (CDOG). This stated objective clearly defines the Army's require- ✓
ment for providing a force tailored to meet any threat across the spectrum of war. CDOG contains definitive guidance with respect to an air transport capability in the development of forces and equipment while emphasizing the necessity of weighing this capability against the requirement for combat effectiveness in sustained operations.

(5) Army Regulations. Those regulations providing primary guidance concerning the tailoring of Army forces for air movement are discussed in detail in ANNEX A.

e. Concepts and Doctrine. To achieve global mobility, the Army may employ airlift, sealift, prepositioning of equipment, or forward deployment of its forces. Of these four means of strategic deployment, airlift or airlift combined with sealift or prepositioning will provide the rapid response required. The means selected must place an element of the Army force capable of sustained combat into the objective area with maximum speed. A discussion of concepts and doctrine with respect to the tailoring

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of forces for air movement will include examination of the use of sealift, prepositioning, and forward deployment, for these last three bear directly upon consideration of the use of airlift. These will be discussed as they relate to the use of airlift. The tailoring of Army forces for movement by air must, necessarily, consider the capability for tactical movement of air mobile teams of smaller combat elements within the combat zone. At the same time, however, the design of these forces and their organic equipment must, to the extent practicable, point initially to strategic airlift into the area of operations.

(1) Existing plans provide for deployment of all or any portion of STRAC in support of US treaty obligations or in furtherance of US Foreign Policy. Initially, one division is to deploy by air with required equipment, followed by, if necessary, the remainder of STRAC moving by a combination of air and sealift. Forces are tactically tailored based on the threat, area of operations, and airlift available.

(2) At the outbreak of general war, US Forces in Europe are to be reinforced by an infantry and an armored division deployed by air. Equipment is prepositioned in Europe, and each division will deploy with personnel, individual equipment, and organizational records only. The equipment presently in Germany and France consists of complete TOE equipment for one infantry and one armored division and ten supporting units.

(3) In addition to the condition stated in (2) above, the Army must be prepared to provide an effective military response to a variety of contingencies of a scope short of general war. To this end and with the concept of a specifically tailored force consistent with the

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mission requirements in mind, equipment prepositioning similar to that in Europe exists in other areas of the world:

(a) Italy. Selected heavy TOE equipment and repair parts for one airborne or infantry division and two medium tank companies and 15 days resupply of Class II.

(b) Okinawa. Selected heavy TOE items and repair parts for an airborne or infantry division, plus basic load and 15 days intense rates of ammunition for one division (One brigade set of equipment located in Thailand).

(c) Thailand. (Same equipment shown above for Okinawa for one brigade.)

(d) Subic Bay, Philippines. TOE equipment (less individual equipment) for an infantry brigade task force plus various levels of supply by class.

(4) The concept of prepositioned equipment must be considered an essential part of the overall plan for tailoring Army forces for movement by air. The principal advantage of this concept allows the option of rapidly placing an infantry, mechanized, or armored division into an overseas objective area prepared to fight within a relatively short period of time. A reflection on the initial days of the Korean War will reveal the possibilities inherent in the prepositioning concept. The prepositioning of this equipment, however, presents disadvantages such as:

(a) Increased maintenance problems. The great number of heavy items of equipment, if placed in a limited storage environment for any length of time, must receive periodic maintenance to keep them in

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operable condition. The maintenance load for this equipment will fall on either organizations currently stationed in the overseas area or on a detached element of the CONUS-based organization scheduled to receive the equipment.

(b) Vulnerability of equipment storage points. Due to the size of the items stored, much of it must be placed in uncovered locations characterized by large areas containing row upon row of items of heavy weapons and equipment. These areas are, for the most part, easily identifiable as to their purpose. Enemy air or missile strikes directed against these targets at an early time after initiation of hostilities can be expected.

f. Air Movement Capabilities. In an evaluation of the plan for tailoring forces for movement by air, a primary consideration is a unit's current capability for air movement. The air movement capability of the Army divisions may be determined by an examination of a number of factors. These include the equipment weight per man to be moved, the combat effectiveness of the unit after its arrival in the objective area, those factors that limit total air movement of the division, and the impact of aircraft requirements to accomplish the above.

(1) Equipment weight per man. (Figure 1, Page 10).

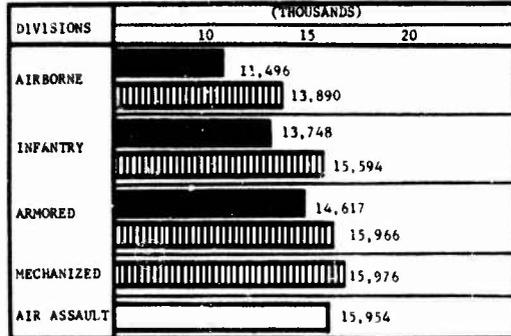
(a) A method of analyzing the air movement capability of a division from an equipment point of view is to determine the equipment weight per man that must be air transported. This equipment weight per man was computed for each type division in terms of short tons. Figure 1 is a recapitulation of this equipment weight per man for each type

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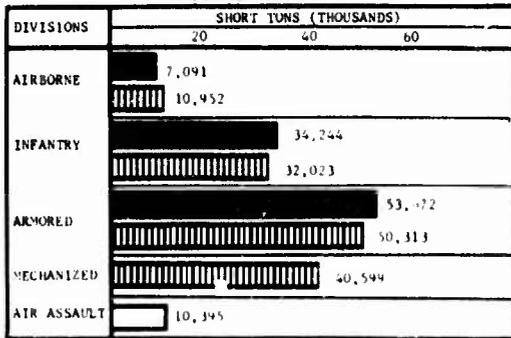
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(S) A COMPARATIVE ANALYSIS
EQUIPMENT WEIGHT PER MAN-ARMY DIVISIONS (U)

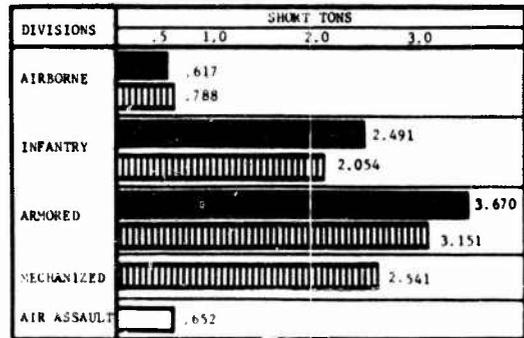
FIGURE 1
PERSONNEL



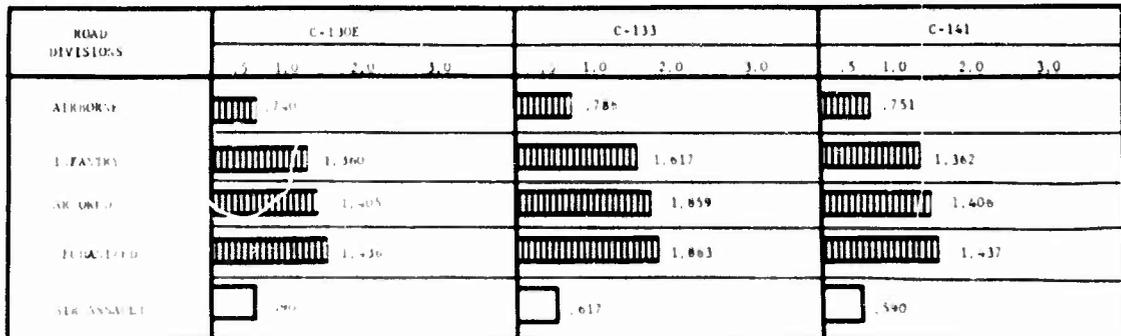
TOTAL TONNAGE



TOTAL EQUIPMENT WEIGHT PER MAN



AIR TRANSPORTABLE EQUIPMENT WEIGHT PER MAN (SHORT TONS)



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Pentomic and ROAD division. This weight figure is depicted as that amount moved by air, and the total equipment weight per man to be moved, regardless of the mode.

(b) From Figure 1, it can be seen that in terms of equipment weight per man:

1. The air assault division compares favorably with the Pentomic airborne division and is the lightest of the recently developed divisions.

2. The ROAD airborne division increased by approximately one-fifth of a ton over the Pentomic airborne division. However, this is not a valid comparison, because the Pentomic division lacked staying power. If the support necessary (primarily general purpose vehicles and an increase in artillery which would add .355 short tons per man) to equate the mobility and the sustainability of the Pentomic to that of the ROAD division were added to the weight of the Pentomic division, the latter would be the heavier of the two divisions. (.970 short tons per man for the ROAD). Then, the ROAD division, designed to incorporate more mobility and staying power, would show a decrease in equipment weight per man and thus an improvement over its Pentomic predecessor.

3. The ROAD infantry division decreased by almost one half ton per man over the Pentomic infantry division. This decrease demonstrates an improvement in the air movement capability of this division from an equipment standpoint.

4. The ROAD armored division decreased almost one half ton per man over its Pentomic counterpart. Again this shows a definite

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improvement in the air movement capability of this division by conversion to the ROAD concept.

5. In terms of the equipment weight per man to be moved by air the mechanized division is the heaviest of the ROAD divisions due primarily to the weights of greater numbers of armored personnel carriers and artillery.

(c) In summary, the recently developed divisions (ROAD and air assault) show a definite trend toward developing lighter weight equipment to improve their air movement capability, considered so vital for the Army to meet its future, global requirements. It should be noted from Figure 1 that the reduction in equipment weight per man from the Pentomic to the ROAD divisions is not only due to lighter weight equipment but is also due to an increase in the personnel strength of these newly developed divisions. For additional details, see ANNEX C.

(2) Combat effectiveness. The assessment of combat effectiveness requires application of sound professional judgment in the evaluation of the enemy capabilities, terrain, and weather against all the capabilities and resources of friendly forces. Since each type division is organized to perform complimentary but differing missions, the only valid comparison is between Pentomic and successor ROAD divisions. No valid comparisons can be made among ROAD divisions, i.e., airborne versus the infantry or air assault versus the airborne.

(a) A method of measuring this combat effectiveness is firepower. Each weapon in each type division was assigned a firepower value based on FM 105-5, Maneuver Control. The firepower score for each

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division is the total of each weapon's firepower value times the number of such weapons within a particular division. For further details, see ANNEX B. The following chart is a recapitulation of the firepower scores by division before strategic airlift and the firepower effectiveness immediately after arrival in the overseas objective area. The divisions are listed in order of decreasing firepower effectiveness.

FIREPOWER SCORES

<u>DIVISION</u>	<u>TOTAL</u>	<u>AIR TRANSPORTED</u>	<u>NOT AIR TRANSPORTED</u>	<u>EFFECTIVENESS IMMEDIATELY AFTER AIR MOVEMENT</u>
Pentomic Abn	28,911	28,911		100%
ROAD Abn	36,351	36,351		100%
-----	-----	-----	-----	-----
Air Assault	40,661	40,661		100%
-----	-----	-----	-----	-----
Pentomic Inf	32,063	29,303	2,760	91.4%
ROAD Inf	51,317	47,861	3,456	93.3%
-----	-----	-----	-----	-----
ROAD Mech	54,907	49,723	5,184	90.6%
-----	-----	-----	-----	-----
Pentomic Armd	41,441	30,581	10,860	73.8%
ROAD Armd	56,031	45,663	10,368	81.5%

(b) Another method of measuring combat effectiveness is the comparison of the total number of maneuver platoons to the number of maneuver platoons that can be airlifted. For further details, see ANNEX E. the following chart is a recapitulation of this comparison.

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MANEUVER PLATOONS

<u>DIVISION</u>	<u>INF PLAT</u>	<u>TK PLAT</u>	<u>RECON PLAT</u>	<u>TOTAL MANEUVER PLATOONS</u>	<u>TOTAL AIR- TRANS</u>	<u>PER CENT AIR- TRANS</u>
Pentomic	100	0	10	110	110	100%
ROAD Abn	81	9**	18	108	108	100%
-----	-----	-----	-----	-----	-----	-----
Air Assault	72	0	20	92	92	100%
-----	-----	-----	-----	-----	-----	-----
Pentomic Inf	75	15*	14	104	89	85.6%
ROAD Inf	72	18*	21	111	93	83.8%

*Not air transportable

**Equipped with Gun, 90mm, M56

(c) These measures of evaluating combat effectiveness apply only to movement by air. The air assault and airborne divisions are 100% combat effective immediately upon arrival in the objective area. However, an infantry, mechanized, or armored division may airlift its personnel, individual equipment, and organizational records, sealift or prestock its TOE equipment and may become 100% combat effective in the objective area after a given period of time to make up and place its equipment in a combat ready status.

(3) Limiting factors.

(a) The major organic limiting factor in the air movement capability of the divisions from an equipment point of view is the non-air transportability of several major items of equipment, primarily tanks and aircraft. This restriction does not affect either the air assault division or the ROAD airborne division since all of their organic equipment is either air transportable or self-deployable. These non-air transportable items impose certain restrictions on the air movement capability of the ROAD

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infantry, mechanized, and armored divisions. However, this factor is overcome by the current concept of either prepositioning equipment or sealift of the heavier items, or a combination of both.

(b) The flexible organizational structure of the ROAD divisions is particularly well suited for rapid deployment by air of a tailored force to meet any requirements anywhere on the globe. There are no limiting factors from the organizational structure point of view. For additional details, see ANNEX C.

(4) Airlift requirements. Airlift required to strategically move a division to an overseas objective area is one other method of analyzing the air movement capability of a given unit. Appendix 5, ANNEX C contains a table of aircraft sorties required to move the major items of equipment and the personnel of the various ROAD and Pentomic divisions. The figures are compiled only to assist in the overall objectives of the study from a strategic standpoint, and are not intended to indicate the numbers of aircraft required for a specific force, tactically tailored for employment in any particular area of the world. (Appendix 5, ANNEX C).

g. Qualitative Improvements.

(1) Another method of analyzing the air movement capability of a division from an equipment point of view is to determine recent changes in equipment that would affect air transportability. The principal change that has been determined to be a qualitative improvement is the reduction in weight in the new models of major items of ordnance and signal equipment.

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(2) In newly adopted items, there has also been a small reduction in size or cubage. This is considered to be a minor qualitative improvement.

(3) The increase in the number of Army aircraft in the newly developed divisions warrants an appraisal of the trend of equipment in this area. The new family of aircraft being introduced into the inventory generally reflects a qualitative improvement in the ability of these aircraft for deployment by air. All of these new Army aircraft are either air transportable in current Air Force aircraft with or without disassembly or are self-deployable along established ferry routes. For additional details, see ANNEX C.

h. Current Procedures for Consideration of Air Transportability Requirements.

(1) Procedures in the combat development cycle applicable to establishing and considering air transportability are:

(a) Lateral and vertical coordination of studies, QMDO's, QMR's, SDR's, and troop test plans within the Combat Developments Command. This coordination permits ascertaining the validity of stated air transportability requirements and their compatibility with Army long range guidance and objectives. It could also result in initiating air transportability as a consideration.

(b) Informal and formal coordination between USACDC and USAMC to exchange information and make joint decisions (AMCR 705-2). This coordination with regard to air transportability permits:

1. Obtaining technical information essential in

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stating realistic air transportability requirements in the development of QMDO's, QMR's, and SDR's.

2. Assuring that equipment under development meets the desired air transportability requirements as stated in QMR's and SDR's.

(c) USACDC Regulation 310-2, 27 June 1963, states that all draft proposed, proposed, and approved QMDO's, QMR's, and SDR's are coordinated by USACDC with the Tactical Air Command. The Air Force is specifically asked to comment on:

1. Similar or related requirements.
2. Information on developmental items that meet stated requirements.
3. Additional capabilities required to provide a more suitable item for the Air Force.
4. Degree of interest to include desired participation of the Air Force in the development of the proposed item. In addition, the Air Force is requested to make any comments or recommendations that it may desire on each QMDO, QMR, or SDR so coordinated.

(d) The preparation of broad organizational studies to bridge the gap between very broad guidance contained in long range Army plans and development and revision of specific TOE's, i.e., ROAD-65.

(e) Lateral and vertical coordination of TOE's within the Combat Developments Command prior to submission to DA for approval. This coordination with respect to air transportability permits:

1. Attaining consistency with respect to associated TOE's.

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2. Assuring compatibility with long range objectives and the overall organizational concept.

(f) Troop testing of new organizations and equipment which permits the evaluation of air transportability and determines requirements for improving air transportability.

(2) There are several Army Regulations and directives that specifically require consideration of air transportability in the development of new materiel. For a listing and details of these, see ANNEX D.

✓ 1. Future Research and Development.

✓ (1) The guidance contained in Army long range plans and the Combat Development Objectives Guide pertinent to air transportability requirements include:

✓ (a) The US will retain the requirement for a strategically mobile Army to fulfill worldwide commitments.

✓ (b) Strategic mobility will remain a function of the transportability of forces; airlift and sealift capabilities; forward deployment; and the prestocking of reserve supplies.

✓ (c) Major factors considered in the development of new organizational concepts include:

✓ 1. The requirement for tactical and strategic mobility and combat power to conduct sustained operations against a variety of forces in various geographical areas.

✓ 2. The requirement for flexibility and versatility to permit the tailoring of forces to have the minimum essential men and equipment to accomplish the mission.

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✓(d) Major guidance to be considered in the development of materiel include;

✓1. The materiel to equip the Army must be as simple to operate and maintain and as light weight as possible, without sacrificing its capability to perform its primary mission.

✓2. Air transportability will be a major consideration in the development of Army materiel in order to provide an ever-increasing capability for tactical and strategic deployment of forces by air.

✓3. The capabilities of Army materiel and Air Force aircraft will be weighed, one against the other, to achieve the best overall balance between fighting capability and lift capability.

✓(2) The Army's broad plan which includes implementing the above guidance is contained in the following studies. The organizational concepts advanced in the studies are similar but permit the progressive introduction of new equipment as it becomes available.

✓(a) Reorganization Objectives, Army Divisions, 1965 (ROAD-65).

✓(b) Reorganization Objectives, Division, Army, and Corps, 1970 (RODAC-70).

✓(c) Very Long Range Army Forces Concept (Army-80).

7. (E) CONCLUSIONS.

a. The Army's plan for tailoring its forces provides for a range of capabilities from a completely airlifted movement to a movement using maximum airlift in conjunction with prepositioning and/or sealift, as

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necessary. This represents the optimum plan which will enable rapid deployment of forces while retaining a capability to accomplish any assigned mission. This may range from a show of force to sustained combat. The ROAD divisions are designed to permit rapid tailoring for any type movement.

(1) The requirement for an air lift capability in terms of forces and equipment, though essential for consideration, must be subordinate to the requirement for a capability to accomplish the mission.

(2) The ROAD divisions, due to the tailoring permitted by their flexible organizational structures and qualitative equipment improvement, lend themselves to more rapid deployment to an overseas objective area than their Pentomic predecessors.

(a) The tailoring of force structure and equipment for the ¹ROAD ²airborne, the envisioned ²air ³assault division and the ³infantry ⁴division in that order makes them the most suitable for air deployment in terms of immediate response.

(b) The non-air transportable equipment of the ROAD mechanized and armored divisions make these organizations unsuitable for air deployment. However, the Army visualizes the air movement of these divisions to an overseas objective area in conjunction with the repositioning and/or sealift of this heavy equipment.

b. The following amounts of equipment weight per man in short tons have to be moved.

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(U) EQUIPMENT WEIGHT PER MAN (U)

	<u>TOTAL EQUIP WT PER MAN (ST)</u>	<u>EQUIP WT PER MAN AIR TRANSP (C-130)</u>	<u>EQUIP WT PER MAN AIR TRANSP (C-133)</u>	<u>EQUIP WT PER MAN AIR TRANSP (C-141)</u>
Pentomic Abn Div	.617	.596	.615	.596
ROAD Abn Div	.788	.740	.786	.751
Pentomic Inf Div	2.491	1.871	2.062	1.873
ROAD Inf Div	2.054	1.360	1.617	1.362
Pentomic Armd Div	3.670	1.980	2.295	1.983
ROAD Armd Div	3.155	1.405	1.859	1.406
ROAD Mech Div	2.541	1.436	1.863	1.437
Air Aslt	.652	.590	.617	.590

c. In recent years the equipment weight per man of the infantry and armored divisions has decreased by conversion from the Pentomic to the ROAD concept due to an overall increase in personnel strength as well as a decrease in weight of certain major items of equipment. The weight per man of the airborne division has increased as a result of the addition of equipment and personnel to the TOE to provide greater mobility, fire-power, and an increased sustained combat capability.

d. The following measures are taken to assure consideration of air lift requirements in the preparation or change of TOE:

(1) Specific requirements to weigh the need for an air transportability characteristic in development of forces and materiel are stated in the Combat Development Objectives Guide and Army Regulations.

(2) Coordination of QMR, QMDO, and SDR with major Army commands and other services. This coordination permits ascertaining the

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validity of stated air transportability requirements and their compatibility with Army long range guidance and objectives.

(3) Special guidance is provided for Army organizational studies with respect to air transportable capability in the preparation or change of TOE.

(4) Consideration of air transportability in troop tests and the development of materiel is ultimately reflected in TOE's.

(5) Consideration of the strategic deployment mission and employment of specific units when their TOE's are prepared or changed.

(6) Consideration of the air transportability requirement, where appropriate, in the organization and equipment of units during the review stage of the TOE within the Combat Developments Command.

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ANNEX A(S)(Guidance to Plan for Tailoring Forces for Movement
by Air.)(U)

1. (U) PURPOSE.

To identify documents which state, or directly contribute to, the overall Army objective of strategic mobility and the tailoring of its forces to achieve this mobility.

2. (S) DISCUSSION.

In evaluating the Army's plan for tailoring it's forces for movement by air, it is necessary to fully understand just what constitutes this plan. One method of exploring the rationale behind it is to identify those documents and directives which go together to present a clear picture of the plan. The initial guidance for the development of plans for supporting the national objectives is contained in the Basic Army Strategic Estimate (1964-1983) (BASE), approved 3 October 1963 by the Army Chief of Staff. This basic planning document is further amplified and expanded in documents and directives published throughout the Army structure.

(1) Basic Army Strategic Estimate (BASE). The purpose of the Basic Army Strategic Estimate is to make strategic appraisal of the threat to the national security of the United States for a twenty year period in the future and to develop an Army strategic concept for all Army plans. The need for a rapidly deployable Army force is evident throughout this document. This planning guide discusses this need, in part, as follows:

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(a) (S) Paragraph 5e, Part II, states that an analysis of world trends, considered in light of their unpredictability, emphasizes the need for a national policy of controlled and flexible response based on forward deployments and backed by forces with high strategic and tactical mobility. This paragraph goes on to say that: "It also indicates the necessity to increase the Army's capability to perform its role within such strategy by producing qualitatively, the best materiel within the state of the art to improve the strategic and tactical mobility and combat potential of its forces."

(b) (S) Paragraph 2, Part IV, states that: "US Forces must have a quick-reaction capability in order to prevent fast take overs by aggressors, to reduce the complexities of subsequent military operations, to reduce the total military resources needed, to keep the conflict at its lowest level of intensity, and to secure in limited war, quickly and decisively, objectives which may be useful in any political negotiations. In addition to predeployments, this reaction time increasingly will depend on airlift, high speed sealift, and a marked improvement in tactical mobility."

(c) (S) Paragraph 4a(3)(b), of Part IV further states: "Prepositioning of equipment also demonstrates US commitments and enhances the mobility of military units not otherwise air transportable."

(d) (S) Paragraph 7 of this part concludes that the Army must provide:

b(2)(a): "Forces capable of sustained military cold, limited, and general war operations."

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b(2)(e): "Definitive sea and airlift requirements which will insure the capability for rapid deployment of Army forces to any area of the world."

(2) Army Strategic Plan (ASP). This document amplifies the guidance contained in the BASE and is directed toward determining the Army objectives for the implementation of the strategic concept by providing realistic objectives level planning. At this writing, the first Army Strategic Plan to be published in support of the BASE is being prepared for staffing at Department of Army. This document is an essential link in the chain that ties together the broad guidance of the strategic concept and its translation into implementation at the operating level. The ASP must be monitored during its preparation to assure inclusion of definitive objective statements with respect to tailoring of forces in support of strategic mobility. These statements should be aimed at assisting in a smooth transition from the objectives planning level to implementation.

(3) Army Force Development Plan (1964-1983) (AFDP). This plan further supports the BASE within the framework established by the ASP. The objective of this plan is to develop the best possible Army, considering the strategic need, within projected resources. In the discussion of objectives contained in paragraph 4 of this document, there is a lack of a clear or definitive statement relative to designing force structures and equipment capable of strategic mobility without degradation of sustained combat capability. This intent is evident however, in the various stated objectives:

(a) Paragraph 4, objectives, (Chapter 1):

1. Paragraph 4a(1)(a): "Achieve the capability of

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defeating an enemy by the selective application of varying degrees of force responsive to the threat."

2. Paragraph 4a(1)(c): "Achieve and maintain a capability for prompt offensive action as the primary means for supporting national objectives."

3. Paragraph 4a(2)(a): "Develop organizational structures which will give the Army the capability of tailoring its forces to meet any threat within the spectrum of war."

(4) Combat Development Objectives Guide (CDOG). The broad guidance contained in the above plans, which are designed to provide the general basis for Army planning, is transformed into a stated requirement by those objectives contained in the Department of Army publication, Combat Development Objectives Guide (CDOG). This stated objective clearly defines the Army's requirement for providing a force tailored to meet any threat within the spectrum of war. CDOG states the objectives for development of forces and materiel as follows:

(a) Paragraph 111a(2): "Major factors which affect organizational planning include, but are not limited to, the requirements for: tactical and strategic mobility, combat power to conduct sustained operations against forces ranging from unsophisticated guerrilla type units to modern forces, operations in varied geographical areas, economical use of resources, and the conduct of nuclear and non-nuclear operations in accordance with any given situation."

(b) Paragraph 112a(2): "Air transportability will be a major consideration in the development of Army materiel in order to

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provide an ever increasing capability for tactical and strategic deployment of forces by air. The capabilities of Army materiel and air transport vehicles (Army and other services) will be weighed one against the other to achieve the best overall balance of fighting capability versus lift capacity."

(5) Army Regulations. The requirement for the consideration of an air transportability capability in the design of equipment appears in numerous Army Regulations. These include:

(a) AR 705-8 (Dept of Defense Engineering for Transportability Program).

1. This document does not deal specifically with the criteria for consideration of air transport capability, but considers the requirement for an end item to be transportable across the whole spectrum of available modes of transportation. This is specifically delineated in the Program Objective (Sect II, para 2):

"The objective of this program is to assure that items of military materiel and equipment are so designed, engineered, and constructed that the required quantities for military use can be efficiently transported by available modes of transportation. This program recognizes that the military departments must have equipment capable of meeting operational requirements."

2. The policies stated in Section II further amplify the transportation requirement as it applies specifically to air transportability:

Section II, para 3f: "The design and engineering

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of equipment intended to be primarily air-transportable shall be based upon employment of the capacities of the available cargo aircraft in order to attain the maximum utilization of aircraft and landing field facilities, and the capacities and capabilities of the supporting surface transport.

3. Appendix D to this reference deals with Air transportability requirements in greater detail in the design and development of items of materiel.

(b) AR 705-35 (R&D - Criteria for Air Portability and Air Drop of Materiel). (DRAFT REVISION).

1. This regulation discusses in great detail the criteria for inclusion in the design and development of materiel to assure air transport and air drop capabilities. The objective as stated in this AR is as follows:

"To insure that materiel and equipment developed and procured by the US Army are designed so as to be capable of air portability and air drop."

2. The objective stated above is unduly restrictive in its application to development of materiel with respect to current air vehicle cargo payload capabilities. To state an objective as above with no qualification or consideration given to the required effectiveness of the end item in terms of staying power on the battlefield, ignores the current state-of-the-art in the development of cargo aircraft as well as that of certain items of equipment required to carry heavy armor to survive. We have not yet reached the stage where air transport capability

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is necessarily compatible with sustainability on the battlefield for all items of equipment. Paragraph 12b of this regulation attempts to qualify this criterion by stating that essential operational characteristics must not be degraded solely for reduction of weight and cube.

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ANNEX B (S) - DOCTRINE AND CONCEPTS FOR AIR MOVEMENT (U)

1. (S) PURPOSE

To evaluate the doctrine and concepts for air movement of the airborne, infantry, mechanized, armored, and air assault divisions to an overseas objective area.

2. (S) SCOPE

a. Determine current doctrine and concepts for air movement of the ROAD airborne, infantry, mechanized, and armored divisions, and the air assault division.

b. Determine for each type division:

(1) Method of employment.

(2) Combat effectiveness.

c. Evaluate requirements stated in paragraph 2b, above, with respect to movement solely by airlift or in conjunction with prestocking or surface movement of heavy equipment.

3. (S) DISCUSSION

a. (U) General. Air movement is a means of transportation used to launch units rapidly into battle, or to deliver troops, supplies, or equipment to a secured objective area or into an area inaccessible to other means of transport. Combat elements can be moved to locations throughout the world to gain strategic surprise, either independently or as part of a larger force. Movements by air may be either tactical or administrative, or a combination of both, depending on the contemplated employment of the force being transported. Movement by air capitalizes on the capability of the aircraft to overcome distances and geographical

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barriers and is characterized by speed and flexibility. It is limited by adverse weather, inadequate air-landing facilities, and enemy counterair activities. A further consideration which limits combat effectiveness in the objective area (depending on the type force) is the fact that transport of bulky or heavy items of equipment is restricted by the configuration and allowable cabin load of available aircraft.

b. (U) Doctrine. An airborne operation is an operation which involves the movement and delivery by air, into an objective area, of combat forces and their logistical support for the execution of a tactical or strategic mission. Normally the ground forces are provided by the Army and the airlift forces are provided by the Air Force. The means employed may be any combination of airborne units, air transportable units, and types of transport aircraft, depending on the mission and the overall situation. Ground forces participating in an airborne operation are either parachuted into the objective area or air-landed therein. A simple administrative air movement of personnel, supplies, and/or equipment is not termed an airborne operation, although some of the techniques employed in airborne operations are applicable (i.e., techniques for preparing, loading, and lashing supplies, or for preparing flight manifests).

(1) Airborne division. The airborne division is the basic large tactical airborne unit and has been designed primarily to perform joint airborne assault landings. All of its equipment can be transported in Air Force transport aircraft, and all essential combat equipment can be delivered by parachute. The division is organized, trained, and equipped to conduct frequent airborne assaults and, therefore, normally is the

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principal participating ground force unit during the assault phase of a joint airborne operation. Because of its organization, training and equipment, the airborne division has a better capability for executing strategic moves by air than does an infantry, armored, or mechanized division.

(2) Infantry division. The infantry division, less certain organic items of heavy equipment and self-deployable aircraft, is air transportable in Air Force medium and heavy aircraft. Its organization, equipment, and training suit it to the conduct of strategic air movements or the conduct of air-landed operations as part of a joint airborne force. Because of weight and size, medium tanks, tank recovery vehicles, armored bridge launchers, and certain other items of heavy equipment must be moved by surface transportation or be prepositioned.

(3) Armored and mechanized divisions. Because the majority of their equipment is not air transportable in contemporary aircraft, these divisions do not participate in joint airborne operations. However, they are capable of relatively rapid deployment from the zone of interior by moving the personnel, individual equipment, and organizational records by air to an overseas theater where substitute equipment has been previously stockpiled. This method of air movement necessarily in conjunction with prestockage of heavy equipment illustrates one Army concept for the employment of these heavy divisions. An example of this concept for rapid air movement of the mechanized or armored divisions is Exercise BIG LIFT.

(4) Air assault division. As in the case of the airborne division, the organization of this division facilitates rapid intertheater movement by air. With the exception of the OV-1 (MOHAWK) aircraft, which

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is self-deployable by established ferry routes, the air assault division can be transported in contemporary Air Force transport aircraft. Another aircraft of this division that is considered to be self-deployable or marginally air transportable in Air Force aircraft is the CH-47 (CHINOOK). It is possible for a crew of nine men to disassemble for air transport and reassemble it in 12 hours working with field maintenance level equipment.

c. (S) Concepts. The overall concept for use of air movement to accomplish the United States Army's global mission provides for the forward deployment of troops in consonance with international agreements or to meet unilateral requirements. Concurrently, a strategic Army corps (STRAC) is maintained in the continental United States for commitment in or reinforcement of overseas theaters under certain specified conditions. These conditions are:

(1) Cold or limited war. United States policy has been and is expected to continue to include the commitment of troops in overseas theater(s) to resist Communist aggression or domestic upheaval when such commitment is in the interest of United States' aims. On decision by competent authority for the commitment of troops, it is planned that the United States, through the appropriate chain of command, will deploy STRAC troops by air to the area of interest. Plans provide for a phased commitment of all of STRAC, including appropriate combat support and combat service support, by a combination of air and sea movement. However, it is anticipated that forces would be tailored at the time of commitment based on the specific threat and the area of employment. Forces would move with

B-4

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all required air transportable TOE equipment. The equipment to be moved by air may well be tailored at the time of execution, based on the threat, airlift available, and geographical conditions.

(2) General war. On the outbreak of general war, U.S. forces in Europe are to be reinforced by an infantry and an armored division from the STRAC troop list. These divisions would deploy from the zone of interior to Europe by air, carrying only individual baggage, equipment and personnel and organizational records. On arrival in Europe, these divisions would be issued TOE equipment previously stockpiled and would be employed as part of USAREUR or NATO forces in accordance with prepared plans. This concept allows an infantry, mechanized or an armored division to deploy strategically by air and minimizes aircraft requirements for these units. Current DCSOPS planning factors visualize that movement of the main portion of the first of these two divisions is essentially complete on the fifth day (D+4). Deployment of the main portion of the total force is completed by D+8. Based on these times, it is possible to assume that the first division would be completely operational in something under 10 days. It is hoped that this planning factor will be reduced based on an analysis of the results of Exercise BIG LIFT.

d. (U) Limitations imposed by air movement. In addition to the specific considerations imposed by the peculiarities of each type division, there are certain general considerations which impose restrictions on operations of forces deployed by air. These are:

(1) Army aircraft transportable in Air Force aircraft must be partially disassembled, the degree of disassembly depending on the configuration of both aircraft.

(2) Army aircraft which are ferried are extremely sensitive

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to weather limitations and may be delayed during certain seasons or in areas in which flying conditions are minimal. Ferry routes may also be limited by political implications which may restrict fly-over rights. Further, a requirement for ferrying over long distance will impose maintenance problems in the objective area which will initially seriously degrade the immediate usefulness of the aircraft.

(3) Vehicular mobility of infantry, airborne, and air assault divisions may be restricted after air movement because of the frequent requirement to phase back equipment due to shortage of airlift.

(4) The combat effectiveness of the mechanized and armored divisions will be significantly decreased immediately upon arrival in the overseas objective area due either to sealift or prestockage of their heavy equipment. After the unit marries up with its heavy equipment and this equipment has been prepared for combat, its pre-movement combat effectiveness will be achieved.

e. (C) Preparation for movement. In response to missions assigned by Department of Army, specific plans have been developed by each headquarters concerned and are constantly being refined for the movement of troops to meet the specific requirements described in subparagraph c, above. These plans are rehearsed and tested by successive echelons of command. An example of an unscheduled movement of troops from CONUS to Europe took place in January 1961 (Operation LONG THRUST IIA). Another example of an exercise involving the air movement of a CONUS based unit to an overseas theater was the airlift of the 2d Armored Division from Fort Hood, Texas to Western Europe in October and November of 1963 (Exercise

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BIG LIFT). This exercise is expected to prove the feasibility of the current concept of an infantry, mechanized, or armored division deployed by air in conjunction with prestockage of heavy equipment from the CONUS to an overseas theater to augment present US forces in an area of possible conflict.

f. (S) Method of employment.

(1) Based on present doctrine and concepts, the ROAD infantry or airborne divisions may be employed during periods of limited war in any area of the world. The mission(s) to be performed could range from a show of force in a friendly environment to full-scale combat, in either a hostile or friendly environment, against an enemy ranging from guerilla forces to organized units. The force would deploy by air with all essential equipment (less those items not air transportable) with or without a follow-up surface echelon. Since the infantry division possesses certain equipment not air transportable, a follow-up surface echelon or prepositioning of heavy equipment is more of a requirement for it than for the airborne division which can transport all of its personnel and equipment (except certain fixed wing aircraft) by strategic airlift.

(2) The general war concept of deploying an infantry and an armored division to Europe as reinforcements could be expanded to include any other type division, provided equipment for that type division is prestocked. The combat effectiveness of any particular division after it marries up with its equipment is the same as that existing at the time deployment is ordered, as modified by the combat serviceability of the prestocked equipment. The deployment of the divisions required to reinforce

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European forces is beyond the scope of this study. Since this deployment is based on a previously made decision and pertinent factors are equally applicable to any type division, the strategic deployment of divisions under these conditions will be omitted from further consideration in this study.

(3) The projected capabilities of the air assault division, presently being tested, appear to make it more suitable than other type divisions for operation in certain geographical areas under conditions which may prevail to fulfill US treaty obligations or to further US policy during limited war. If employed to reinforce European forces during general war, plans should be made to give it a greater combat capability by attachment of appropriate units.

g. (S) Combat effectiveness. The assessment of combat effectiveness requires an evaluation of the terrain, weather, and enemy against all capabilities and resources of friendly forces. The establishment of a tactical situation as a parameter for this study would probably result in favoring one division over another (i.e., air assault division more suited for Viet Nam than an armored division; armored division could perform better in Europe than an air assault division) and would lead to comparisons of type divisions. Since each type division is organized to perform complimentary but differing missions, the only valid comparisons of combat effectiveness are between Pentomic and successor ROAD divisions before and after strategic air movement.

(1) One method of measuring combat effectiveness is firepower. The firepower of each type division has been evaluated using "firepower scores" taken from FM 105-5 (Maneuver Control). In essence, each weapon is

B-8

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assigned a value, ranging from one for an individual weapon to 420 for an HONEST JOHN rocket. The summation of each weapon's value times the number of such weapons in the particular division gives an overall score for that type division. It must be emphasized that this score is artificial and is valid only for comparison between Pentomic and successor ROAD divisions of the same type (Pentomic infantry compared to ROAD infantry) before and after air movement. The complete firepower tabulation is attached as Appendix 1; a summation of the total firepower capability by division follows:

(U) FIREPOWER SCORES (U)

<u>DIVISION</u>	<u>TOTAL</u>	<u>AIR TRANSPORTED</u>	<u>NOT AIR TRANSPORTED</u>	<u>EFFECTIVENESS IMMEDIATELY AFTER AIR MOVEMENT</u>
Pentomic Abn (TOE 57D)	28,911	28,911	---	100%
ROAD Abn (TOE 57E)	36,351	36,351	---	100%

Air Assault (MTEL 20 Jun 63)	40,661	40,661	---	100%

Pentomic Inf (TOE 7D)	32,063	29,303	2,760	91.4%
ROAD Inf (TOE 7E)	51,317	47,861	3,456	93.3%

ROAD Mech (TOE 37E)	54,907	49,723	5,184	90.6%

Pentomic Armd (TOE 17D)	41,441	30,581	10,860	73.8%
ROAD Armd (TOE 17E)	56,031	45,663	10,368	81.5%

(2) In the table above, the type divisions are listed in order of the firepower effectiveness after a strategic air movement to an overseas objective area. The airborne and the air assault divisions will have 100% of their firepower available immediately upon arrival since all

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of their equipment is either air transportable in Air Force aircraft or is self-deployable. As the total firepower score of the infantry, mechanized, and armored divisions increases, so does the firepower that is not air transportable increase. Conversely, the firepower effectiveness immediately after air movement decreases in that same order, with the armored division, because of its large quantity of non-air transportable equipment, being the least combat effective in terms of firepower immediately available after a strategic airlift. However, these three divisions would rapidly regain their pre-movement combat effectiveness when the airlifted personnel marry up with their sealifted or prepositioned equipment.

(3) A second method of measuring combat effectiveness may be made by totalling the maneuver platoons which can be transported by air. Below is a summary by type division. The mechanized and armored divisions are not shown since the majority of their maneuver platoons is not air transportable.

(U) MANEUVER PLATOONS (U)

DIVISION	INF PLAT	TK PLAT	RECON PLAT	TOTAL MANEUVER PLAT	TOTAL AIR- TRANS	PERCENT AIR- TRANS
Pentomic Abn (TOE 57D)	100	0	10	110	110	100%
ROAD Abn (TOE 57E)	81	9**	18	108	108	100%
Air Assault (TOE 47T)	72	0	20	92	92	100%
Pentomic Inf (TOE 7D)	75	15*	14	104	89	85.6%
ROAD Inf (TOE 7E)	72	18*	21	111	93	83.8%

* Not air transportable.

** Equipped with Gun, 90mm, M56.

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(4) Supporting firepower units (artillery batteries, mortar platoons, weapons platoons, etc.) are equitable in ROAD divisions and are present in greater number than in the Pentomic divisions. There is a significant increase in artillery capability in the ROAD airborne division over the Pentomic airborne division.

(5) It is emphasized that these measures of combat effectiveness apply only to movement solely by air; when the surface movement echelon closes or in cases where equipment has been prestocked, the combat effectiveness quickly returns to that existing prior to air movement, except as may be changed by condition of the equipment.

4. (S) SUPPORTING CONCLUSIONS

a. (S) The airborne and air assault divisions are the most suitable for strategic air deployment in terms of combat effectiveness immediately upon arrival in an overseas objective area.

b. (S) The ROAD airborne division can deliver 26% more firepower to the objective area than can the Pentomic airborne division.

c. (S) The ROAD infantry division is more suitable for strategic air deployment than either the ROAD mechanized or armored divisions but less suitable than the ROAD airborne and the air assault divisions in terms of combat effectiveness immediately upon arrival in an overseas objective area.

d. (S) The ROAD infantry division can deliver 60% more firepower to the objective area than can the Pentomic infantry division.

e. (S) The mechanized and armored divisions are the least suitable for strategic air deployment in terms of combat effectiveness immediately upon arrival in an overseas objective area.

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f. (S) The ROAD armored division can deliver 35% more firepower to the objective area than can its Pentomic counterpart.

g. (S) The armored and mechanized divisions are suitable for deployment by air providing certain heavy equipment is either sealifted or prestocked or a combination of both operations is employed.

B-12

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APPENDIX 1 (U) (Relative Firepower of Type Divisions) to ANNEX B

WEAPON	SINGLE WEAPON	PENTOMIC INF DIV (TOE 7D)		ROAD INF DIV (TOE 7E)		PENTOMIC ABN DIV (TOE 57D)		ROAD ABN DIV (TOE 57E)	
	FIRE-POWER VALUE	NR OF WPN	FIRE-POWER SCORE	NR OF WPN	FIRE-POWER SCORE	NR OF WPN	FIRE-POWER SCORE	NR OF WPN	FIRE-POWER SCORE
SMG, Cal .45	1	266	266	295	295	--	--	118	118
Rifla, 7.62mm	1	11,932	11,932	12,579	12,579	9,578	9,578	10,642	10,642
MG, 7.62mm, GP	6	561	3,366	507	3,042	438	2,628	438	2,628
MG, Cal .50, HB	10	101	1,010	205	2,050	4	40	172	1,720
Gun, Tank, Light	28	33	924	22	616	--	--	--	--
Gun, Tank, Lt-90mm*	30	92	2,760	--	--	--	--	--	--
Gun, Tank, Med-105mm*	32	--	--	108	3,456	--	--	--	--
Gun, Rcl, 120mm(DC)	140(1)(9)	--	--	16	2,240	--	--	--	--
Gun, Rcl, 155mm(DC)	140(1)(9)	--	--	16	2,240	--	--	--	--
Gun, 90mm, SPAT	14	--	--	--	--	30	420	47	658
Gun, 152mm, AR/AAV	38(2)	--	--	--	--	--	--	2	76
Howitzer, 105mm	20	30	600	54	1,080	25	500	54	1,080
Howitzer, 155mm	50	30	1,500	18	900	--	--	--	--
Howitzer, 8"	100	4	400	4	400	--	--	--	--
Kit, MG, Quad, 7.62mm	15(3)	--	--	22	330	--	--	22	330
Kit, MG, Dual, 7.62mm	9(4)	--	--	16	144	--	--	47	423
Kit, ATGM	20	--	--	7	140	--	--	7	140
Kit, Rkt, 2.75"	15(5)	--	--	19	285	--	--	7	105
Lchr, Gnde, 40mm	9(6)	--	--	1,057	9,513	765	6,885	1,027	9,243
Lchr, Rkt, 3.5"	10	542	5,420	452	4,520	458	4,580	318	3,180
Lchr, Rkt, 318mm	210(7)(9)	--	--	--	--	--	--	4	840
Lchr, Rkt, 762mm	420(8)(9)	2	840	4	1,680	4	1,680	--	--
Lchr, Set, ATGM	20	25	500	24	480	--	--	--	--
Mortar, 81mm	12	80	960	72	864	75	900	87	1,044
Mortar, 4.2"	15	39	585	32	480	40	600	40	600
RR, 90mm	17(8)	--	--	159	2,703	--	--	172	2,924
RR, 106mm	20	50	<u>1,000</u>	64	<u>1,280</u>	55	<u>1,100</u>	30	<u>600</u>
			32,063		51,317		28,911		36,351

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WEAPON	SINGLE WEAPON	PENTOMIC ARMD DIV (TOE 17D)		ROAD ARMD DIV (TOE 17E)		ROAD MECH DIV (TOE 37E)		AIR ASSAULT DIV (TOE 47T)	
	FIRE-POWER VALUE	NR OF WPN	FIRE-POWER SCORE	NR OF WPN	FIRE-POWER SCORE	NR OF WPN	FIRE-POWER SCORE	NR OF WPN	FIRE-POWER SCORE
SMG, Cal .45	1	764	764	867	867	525	525	17	17
Rifle, 7.62mm	1	12,079	12,079	12,671	12,671	13,082	13,082	13,262	13,262
MG, 7.62mm, GP	6	685	4,110	573	3,438	667	4,002	511	3,066
MG, Cal .50, HB	10	324	3,240	313	3,130	295	2,950	45	450
Gun, Tank, Light	28	34	952	40	1,120	38	1,064	--	--
Gun, Tank, Lt-90mm*	30	306	9,180	--	--	--	--	--	--
Gun, Tank, Med-105mm*	32	--	--	324	10,368	162	5,184	--	--
Gun, Rcl, 120mm(DC)	140(1)(9)	--	--	10	1,400	14	1,960	--	--
Gun, Rcl, 155mm(DC)	140(1)(9)	--	--	10	1,400	14	1,960	--	--
Gun, 90mm, SPAT	14	--	--	--	--	--	--	--	--
Gun, 152mm, AR/AAV	38(2)	--	--	--	--	--	--	--	--
Howitzer, 105mm	20	54*	1,080	54	1,080	54	1,080	54	1,080
Howitzer, 155mm	50	12*	600	18	900	18	900	--	--
Howitzer, 8"	100	4	400	4	400	4	400	--	--
Kit, MG, Quad, 7.62mm	15(3)	--	--	22	330	22	330	166	2,490
Kit, MG, Dual, 7.62mm	9(4)	--	--	16	144	16	144	110	990
Kit, ATGM	20	--	--	7	140	7	140	--	--
Kit, Rkt, 2.75"	15(5)	--	--	19	285	19	285	59	885
Lchr, Gnde, 40mm	9(6)	--	--	954	8,586	1,069	9,621	1,044	9,396
Lchr, Rkt, 3.5"	10	696	6,960	397	3,970	435	4,350	260	2,600
Lchr, Rkt, 318mm	210(7)(9)	--	--	--	--	--	--	12	2,520
Lchr, Rkt, 762mm	420(8)(9)	2	840	4	1,680	4	1,680	--	--
Lchr, Set, 160mm	20	--	--	15	300	21	420	--	--
Mortar, 81mm	12	48	576	45	540	63	756	72	864
Mortar, 4.2"	15	45	650	53	795	49	735	35	525
RR, 90mm	17(8)	--	--	111	1,887	147	2,499	148	2,516
RR, 106mm	20	--	--	30	600	42	840	--	--
			41,441		56,031		54,907		40,661

NOTES:

General: Firepower scores taken from FM 105-5 (Maneuver Control),
Feb 1958, w/C1, 14 Nov 61. Tank scores include all armament.

Interpolations/extrapolations follow:

- (1) Estimated to be equal to 280mm gun.
- (2) Extrapolated from 90mm gun (value 30) 105mm gun (value 32),
and 120mm gun (value 34).
- (3) Estimated to be 1.5 times the firepower value of the dual
7.62mm machine gun.
- (4) Estimated to be 1.5 times the firepower value of the single
7.62mm machine gun.
- (5) Estimated to be 1.5 times the firepower value of the 3.5 in.
rocket launchers.
- (6) Estimated to be $\frac{1}{2}$ the firepower value of the 81mm mortar.
- (7) Estimated to be $\frac{1}{2}$ the firepower value of the 762mm rocket.
- (8) Estimated to be 3 times the firepower value of the 280mm
gun.
- (9) In war gaming, effects of nuclear weapons are determined by
target analysis. However, for this comparison these
arbitrary values have been assigned.

*Not air transportable.

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ANNEX C (S) - COMPARATIVE ANALYSIS OF AIR MOVEMENT CAPABILITIES (U)

1. (U) PURPOSE

To analyze the air movement capabilities of the Pentomic and current ROAD divisions from the standpoint of both equipment and organizational structures.

2. (U) SCOPE

a. Determine the air movement capabilities of the Pentomic and current ROAD divisions from the standpoint of equipment and organizational structures.

b. Determine and compare the equipment weight per man of the current ROAD divisions and the Pentomic divisions.

c. Determine the major factors, with respect to equipment and organizational structures, that limit the air movement capability of these type divisions.

d. Qualitative improvements in equipment and organizational structures that permit more efficient tailoring of units for movement by air.

e. Determine airlift requirements to strategically move type organizations to an overseas objective area.

3. (S) DISCUSSION

a. General. To determine the air movement capabilities of the current ROAD divisions from their equipment and organizational structures, a specified mix of maneuver elements together with the base for each ROAD division must be assumed. (Pentomic divisions are shown as normally employed.)

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b. Pentomic divisions.

(1) The infantry division (TOE 7D) consists of a headquarters and headquarters company, division artillery, five battle groups, division trains, a cavalry squadron, one each tank, signal, and engineer battalion and an aviation company.

(2) The airborne division (TOE 57D) consists of a command and control battalion, division artillery, five battle groups, support group, one each engineer and signal battalion.

(3) The armored division (TOE 17D) consists of a headquarters and headquarters company, division artillery, three combat command headquarters, division trains, four tank battalions, four mechanized infantry battalions, a cavalry squadron, one each signal, engineer battalion, an aviation company, and an MP company.

c. ROAD divisions. The ROAD divisions are organized with a division base consisting of a headquarters and headquarters company, division artillery, three brigade headquarters, support command, a cavalry squadron, one each aviation, signal, engineer battalion and an MP company plus:

(1) EXAMPLE: ROAD airborne division mix:

<u>TOE 57E, 15 Aug 63</u>	<u>Maneuver Elements</u>
Airborne division base	9 - Abn Inf Bns 1 - Abn Tk Bn

(2) EXAMPLE: ROAD infantry division mix:

<u>TOE 7E, 15 Jul 63</u>	<u>Maneuver Elements</u>
Infantry division base	8 - Inf Bns 2 - Tk Bns

(3) EXAMPLE: ROAD mechanized division mix:

<u>TOE 37E, 15 Jul 63</u>	<u>Maneuver Elements</u>
Mechanized division base	7 - Mech Inf Bns 3 - Tk Bns

(4) EXAMPLE: ROAD armored division mix:

<u>TOE 17E, 15 Jul 63</u>	<u>Maneuver Elements</u>
Armored division base	5 - Mech Inf Bns 6 - Tk Bns

d. Air Assault Division. The air assault division (TOE 47T) consists of a headquarters and headquarters company, division artillery, three brigade headquarters, support command, aviation group, eight infantry battalions, an air cavalry squadron, one each signal, engineer battalion, and an MP company. Original Manning Tables and Equipment Lists were used in developing data for this division. Since this unit is currently undergoing tests, all data pertinent to it should be treated as tentative. Definitive data may be developed upon completion of tests and publication of final TOE.

e. Air Movement Capabilities - Organizational Structure. Since the Army is presently reorganizing under the ROAD configuration, the strategic air movement capability of these ROAD divisions is of prime importance. Under ROAD-65, the total strength of all type divisions has increased and, correspondingly, amounts of equipment to sustain the divisions have increased. The continuing essential requirement for Army forces to possess a capability for sustained combat precludes the attainment of a complete capability for rapid deployment by air of all division units within the current state-of-the-art. The force requirements

for two or more operational or geographical environments will seldom be similar enough to be met equally well by one fixed, universal type organization. A variety of flexible organizations is required to meet present and future strategic commitments and the necessity for rapid deployment by air.

(1) While the ROAD-65 concept increases the size of all divisions and correspondingly the overall airlift requirement, the flexibility inherent in the organizational structure of ROAD divisions makes them better suited for rapid deployment by air than the pentomic divisions. This is achieved by maximum standardization in the division base, and the use of a smaller, self-sufficient, basic maneuver element - the battalion. This similarity of organization between and within all type divisions facilitates strategic tailoring of the proper size and type force to meet any given requirement.

(2) The four types of ROAD divisions are organized by adding varying mixes of combat maneuver battalions to a common division base. Each division base includes three brigade tactical headquarters (organization standard in all divisions) capable of controlling from two to five attached combat maneuver battalions and appropriate combat support and combat service support units.

(3) Under the ROAD concept, the doctrine of tailored forces extends to the battalion. Battalions are made up of one combat arm but are trained to give up temporarily a company of one arm and accept a company of another to achieve the balance of forces required by a given operational or geographical environment.

f. Air Movement Capabilities - Equipment.

(1) One method of analyzing the air movement capability of a division from an equipment point of view is to determine the equipment weight per man that must be air transported. A comparison of the slice of the total division weight that must be air transported for each individual soldier or equipment weight per man was made between the Pentomic and ROAD divisions. This was computed for each type division in terms of short tons. The total weights of organic equipment, excluding accompanying supplies, to be moved by air are shown in Appendix 1. Division tonnages are based on the concept of moving by air all personnel and equipment which can be physically transported in existing Air Force aircraft.

(2) Another method of analyzing the air movement capability of a division from the equipment standpoint is to determine recent changes in equipment that would affect air transportability. Most of the major items of equipment of significance due to weight and density within the division are supplied by either the Ordnance or Signal Corps. Changes recently made or programmed were examined to determine trends.

(a) The following items of equipment have increased in weight over predecessor models:

<u>EQUIPMENT</u>	<u>PREDECESSOR MODEL</u>	<u>WEIGHT (LB)</u>	<u>PRESENT MODEL</u>	<u>WEIGHT (LB)</u>	<u>PER CENT INCREASE</u>
Trailer, Ammunition	M10(2-T)	2,235	M332(1½-T)	2,685	20.1
Trailer, water, 1½-T	4 models	2,300 (Avg wt)	M149	2,600	13.0
Tank, recovery veh, med M74		93,750	M86	112,000	19.5
Howitzer, 105mm, towed M101		4,475	M101A1	4,980	11.3

(b) The following items of equipment have decreased in weight over predecessor models:

<u>EQUIPMENT</u>	<u>PREDECESSOR MODEL</u>	<u>WEIGHT (LB)</u>	<u>PRESENT MODEL</u>	<u>WEIGHT (LB)</u>	<u>PER CENT DECREASE</u>
Truck, utility, ½-T	M38A1	2,665	M151	2,273	14.7
Truck, tank, gasoline 2½-T	M217C	14,805	M49	13,490	8.9
Tank, light gun	M41	51,800	AR/AAV*	32,000	38.2
Launcher, rocket, 762mm	M289	41,800	M386	34,250	18.1
Howitzer, 8", SP	M55	98,000	M110	58,500	40.3
Howitzer, 155mm, SP	M44A1	64,000	M109	51,100	20.2
Howitzer, 105mm, SP	M52A1	53,000	M108	46,900	11.5
Carrier, personnel	M59	39,504	M113	19,755	50.0
Combat engineer veh	M102	109,000	T118E1	103,600	5.0

*Not yet type classified

(c) Changes in model weights of ordnance items issued to divisions other than those listed have been insignificant (less than 5%). A more complete tabulation is attached at Appendix 2.

(d) There have been significant improvements within the FM family of tactical radios, including both an improvement in capabilities and a reduction in weight. The weight reduction for FM radios is also shown in Appendix 2. Density of AM radios in ROAD divisions is low and has no significant effect on division air transport requirements.

(e) In new items adopted, there has been some saving in cubage but nothing that is of any great significance nor which indicates a trend. In any event, cubage has been minimized as a problem in air

movement of the type division by the capacities of present strategic aircraft.

(f) There has been no significant change in individual equipment of soldiers which has an appreciable effect on air movement capabilities. In addition, space within the aircraft, rather than weight, is usually the governing criterion when loading personnel into strategic aircraft.

(g) A much greater reliance is being placed on Army aviation to provide tactical mobility. This is reflected in the increased number of aircraft in ROAD divisions and is emphasized in the organization of the air assault division. New aircraft have been coming into the inventory which have provided a greater capability for strategic air deployment through both ease in loading in Air Force aircraft and an ability for self-deployment. This is illustrated in the air assault division, all aircraft of which are either air transportable or self-deployable.

(h) Certain items of equipment cannot be transported by air because of weight, configuration, or time/skill required for assembly and disassembly (i.e. Army aircraft). These items and their weights are listed in Appendix 3.

(3) A comparison of the air movement capability of the Pentomic and current ROAD divisions from the equipment standpoint would be incomplete without a discussion of Army aircraft. This comparison is found in Appendix 4.

g. Air Movement Limitations.

(1) Those items of equipment that are not air transportable (listed in Appendix 3) impose limitations on the air movement capability of specific divisions. An examination of Appendix 3 reveals that the Pentomic division has more non-air transportable items than its ROAD successor, though the total weight not air transportable is greater for the ROAD infantry and airborne divisions than their Pentomic predecessors. These non-air transportable items are primarily tanks and aircraft. Although the tanks of the ROAD divisions are still not transportable by air, their aircraft may either be air transported or self-deployed. The two heaviest divisions, the mechanized and armored, have the greatest non-air transportable weights. Though these items that are not air transportable to restrict the air movement capability of the infantry, mechanized, and armored divisions, this limitation in air transportability may be overcome by either prestockage or advance surface movement of these non-air transportable items. The airborne and air assault divisions do not have any air transportability limitations due to equipment. All of their organic equipment is either air transportable or self-deployable.

(2) Although the fixed Pentomic organization structure imposed restrictions on the rapid commitment of forces by air to perform a specific mission in a particular geographic environment, this limitation has been overcome by the flexible organizational structure of the ROAD divisions.

h. Airlift Requirements. Airlift requirements for strategically moving each type division to an overseas objective area in terms of aircraft sorties for current transport aircraft are shown

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in Appendix 5. The computation of these requirements were made by the Research Analysis Corporation based on the weights for the air-transportable major items of equipment. For the purposes of this study, the ACL was determined by the range of 3000 miles. This figure represents the longest leg between refueling stops that would be required for deployment to either Europe, the Middle East, or South East Asia. Although the CX4 aircraft is in the developmental stages, it was included for a comparative value.

4. (S) SUPPORTING CONCLUSIONS

a. (U) The ROAD divisions are more suitable than the Pentomic divisions for rapid air movement to an overseas objective area with respect to organizational structures.

b. (U) The Pentomic and ROAD airborne divisions and the air assault division are the most suitable for strategic air deployment in terms of short tons per man to be moved.

c. (S) The ROAD airborne division requires 28% short tons of equipment per man more than the Pentomic airborne division. This is mainly accounted for by an increase in artillery and wheeled vehicles in the ROAD airborne division.

d. (U) The ROAD infantry division is more suitable for air movement than the mechanized or armored division but less suitable than either the air assault or airborne divisions in terms of equipment weight per man to be moved.

e. (S) There is an improvement in air movement capability of infantry divisions in that the ROAD infantry division has to move 21% short tons of equipment per man less than the Pentomic infantry division.

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f. (S) The ROAD infantry, mechanized, and armored divisions are suitable for air movement providing their non-air transportable equipment is either prestocked or moved by surface means.

g. (U) The ROAD mechanized and armored divisions are the least suitable for air movement in terms of equipment weight per man to be moved.

h. (U) Although the number of aircraft in the ROAD division is twice that of the Pentomic division, the per cent of aircraft strategically deployable has increased from approximately 50% to 100%.

i. (U) Although the density of Army aircraft has increased in the ROAD and air assault divisions, a qualitative improvement has occurred since their organic aircraft can be either transported in Air Force aircraft with minimum disassembly or are self-deployable.

j. (U) Weights of division ordnance equipment reveal qualitative improvements in that there have been more reductions than increases.

k. (U) A qualitative improvement in equipment weight is shown in the adoption of the VRC-12 family of tactical FM radios.

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APPENDIX 1 (S) (Equipment Weight Per Man of Type Divisions) to

ANNEX C. (U)

1. (U) General. A comparison between the Pentomic and ROAD divisions in terms of the equipment weight per man in short tons that has to be moved is presented herein.

2. (S) Equipment Weight per Man. The equipment weight per man to be moved for each type division is shown on the following chart.

DIVISION	TOTAL EQUIP TO BE MOVED (ST)	TOTAL EQUIP WT PER MAN (ST)	EQUIP WT PER MAN AIR TRANSP (C-130)	EQUIP WT PER MAN AIR TRANSP (C-133)	EQUIP WT PER MAN AIR TRANSP (C-141)
Pentomic Abn	7,091	.617	.596	.615	.596
ROAD Abn	10,952	.788	.740	.786	.751
Pentomic Inf	34,244	2.491	1.871	2.062	1.873
ROAD Inf	32,023	2.054	1.360	1.617	1.362
Pentomic Armd	53,632	3.670	1.980	2.295	1.983
ROAD Armd	50,313	3.155	1.405	1.859	1.406
ROAD Mech	40,599	2.541	1.436	1.863	1.437
Air Aslt	10,395	.652	.590	.617	.590

a. The air assault division compares favorably with the Pentomic airborne division in equipment weight per man. This division is equipped on an austere basis in order to gain strategic and tactical mobility.

b. In contrast, the equipment weight per man is increased by approximately one fifth of a ton in the ROAD airborne division over the Pentomic airborne division although the personnel strength is increased by approximately 2,400. This is accounted for by an increase in artillery

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pieces, and a substantial increase in wheeled vehicles, all with the purpose of providing the ROAD division greater mobility and sustained combat power. If this increase in artillery and general purpose vehicles (approximately .355 short tons per man) in the ROAD airborne division were added to the Pentomic airborne division to provide the latter with the mobility and sustainability equal to that of the ROAD airborne division, the equipment weight per man of the ROAD division would be smaller than that of the Pentomic division. (.970 short tons per man for the Pentomic airborne division versus .786 short tons per man for the ROAD airborne division). Then, the ROAD division, designed to incorporate more mobility and staying power, would show a net decrease in equipment weight per man and thus an improvement over its Pentomic predecessor.

c. There is a general increase in the number of items of equipment in the ROAD infantry division as compared to the Pentomic infantry division. However, a reduction in equipment weight per man to be moved of approximately one half ton is achieved principally through reduction of the number of armored personnel carriers, elimination of twelve self-propelled 105mm howitzers and other air transportable tracked vehicles, and an increase of about 1,850 in personnel strength. Any substantial increases in equipment densities are generally in lighter weight items.

d. The comparison of the two armored divisions shows that the ROAD armored division's equipment weight per man to be moved has decreased almost one half ton over its Pentomic counterpart. This reduction was achieved primarily by the new ROAD organization and the replacement of current equipment with new items of lighter weight.

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e. In terms of the equipment weight per man to be moved by air mechanized division is the heaviest of the ROAD divisions. Its large number of tracked vehicles and other items of heavy equipment places the mechanized division in the same air transportability category as the armored division. Neither of these divisions is completely air transportable. They both must have their heavy equipment either prestocked or moved by surface transportation.

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TAB A (S) (Recapitulation of Total Weights - Type Divisions)(U)

to Appendix 1 to ANNEX C

(S) Below is a recapitulation of total TOE equipment weights for each type division in terms of short tons. Weights of accompanying supplies have been omitted in tonnage calculations since the amounts will depend on the tactical situation, the area of employment, overseas storage facilities, and the policies of the command involved.

Weights by Division:

<u>DIVISIONS</u>	<u>TOTAL WEIGHT EQUIPMENT* (ST)</u>	<u>TOTAL WT EQUIPMENT NON AIR TRANSP (C-130) (ST)</u>	<u>TOTAL WT EQUIPMENT NON AIR TRANSP (C-133) (ST)</u>	<u>TOTAL WT EQUIPMENT NON AIR TRANSP (C-141) (ST)</u>
Pentomic Abn	7,091	235	16	235
ROAD Abn	10,952	665	30	512

Pentomic Inf	34,244	8,512	5,900	8,495
ROAD Inf	32,023	10,808	6,813	10,785

Pentomic Armd	53,632	24,676	20,086	24,646
ROAD Armd	50,313	27,879	20,640	27,855

ROAD Mech	40,599	17,654	10,882	17,631

Air Aslt	10,395	977	551	977

*The weights for ROAD divisions were determined utilizing unit weights provided by US Army Materiel Command for each line item of equipment shown in the final approved ROAD Series E TOE. The weights shown in USCONARC study: "Strategic Airlift Requirements, Army Divisions," dtd 21 January 1963 as revised were utilized for the weights shown for the Pentomic divisions.

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c. Weights of Maneuver Elements (ROAD):

<u>DIVISIONS</u>	<u>TOTAL WEIGHT OF EQUIPMENT* (ST)</u>	<u>TOTAL WEIGHT OF EQUIPMENT AIR TRANSPORTABLE (ST)</u>	<u>TOTAL WEIGHT OF EQUIPMENT NOT AIR TRANS (ST)</u>
ROAD Abn Inf Bn	346	346	0
ROAD Inf Bn	459	459	0
ROAD Mech Inf Bn	1,357	1,357	0
ROAD Abn Tank Bn	549	549	0
ROAD Tank Bn	4,164	911	3,253

*The weights for ROAD divisions were determined utilizing unit weights provided by US Army Materiel Command for each line item of equipment shown in the final approved ROAD Series E TOE. The weights shown in USCONARC study: "Strategic Airlift Requirements, Army Divisions," dtd 21 January 1963 as revised were utilized for the weights shown for the Pentomic divisions.

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TAB B - (Equipment Weight - ROAD Airborne Division) to Appendix 1 to ANNEX C

AIRBORNE DIVISION BASE

<u>SERVICE</u>	<u>POUNDS</u>
CHEMICAL	224,649
ENGINEER	1,517,473
MEDICAL	45,809
ORDNANCE	10,534,751
QUARTERMASTER	1,136,442
SIGNAL	485,024
TRANSPORTATION	460,194
DEVELOPMENTAL	174,532

	<u>POUNDS</u>	<u>SHORT TONS</u>
TOTAL ABN DIV BASE:	14,578,874	7,289
9 Abn Inf Bns:		3,114
1 Abn Tk Bn:		549
		<hr/>
Total Abn Div (ROAD):		10,952
EQUIPMENT WEIGHT PER MAN: .788 Short Tons		

TAB C - (Equipment Weight - ROAD Infantry Division) to Appendix 1 to ANNEX C

INF DIV BASE

<u>SERVICE</u>	<u>POUNDS</u>
CHEMICAL	232,628
ENGINEER	3,713,313
MEDICAL	50,896
ORDNANCE	30,301,906
QUARTERMASTER	1,293,005
SIGNAL:	1,401,836
TRANSPORTATION	526,430
DEVELOPMENTAL	1,264,455

	<u>POUNDS</u>	<u>SHORT TONS</u>
TOTAL INF DIV BASE:	40,048,924	20,025
8 Inf Bns:		3,670
2 Tk Bns:		8,328
		<hr/>
TOTAL Inf Div (ROAD):		32,023
EQUIPMENT WEIGHT PER MAN: 2.054 Short Tons		

TAB D - (Equipment Weight - ROAD Armored Divison) to Appendix 1 to ANNEX C

ARMORED DIV BASE

<u>SERVICE</u>	<u>POUNDS</u>	
CHEMICAL	22,552	
ENGINEER	3,484,262	
MEDICAL	50,898	
ORDNANCE	28,416,203	
QUARTERMASTER	1,315,718	
SIGNAL	1,376,336	
TRANSPORTATION	530,414	
DEVELOPMENTAL	1,892,468	
	<u>POUNDS</u>	<u>SHORT TONS</u>
TOTAL ARMD DIV BASE:	37,088,851	18,544
6 Tk Bns:		24,984
5 Mech Inf Bns:		6,785
		<hr/>
TOTAL Armd Div (ROAD);		50,313
EQUIPMENT WEIGHT PER MAN:	3.151 Short Tons	

TAB E - (Equipment Weight - ROAD Mechanized Division) to Appendix 1 to ANNEX C

MECH DIV BASE

<u>SERVICE</u>	<u>POUNDS</u>	
CHEMICAL	72,860	
ENGINEER	3,493,249	
MEDICAL	51,724	
ORDNANCE	28,473,201	
QUARTERMASTER	1,308,464	
SIGNAL	1,392,616	
TRANSPORTATION	530,846	
DEVELOPMENTAL	1,892,588	
	<u>POUNDS</u>	<u>SHORT TONS</u>
TOTAL MECH DIV BASE	37,215,548	18,608
7 Mech Inf Bns:		9,499
3 Tank Bns:		12,492
		<hr/>
TOTAL MECH DIV (ROAD):		40,599
EQUIPMENT WEIGHT PER MAN: 2.541 Short Tons		

TAB F - (Equipment Weight - ROAD Maneuver Elements) to Appendix 1 to
ANNEX C

	<u>SHORT TONS</u>
AIRBORNE INFANTRY BATTALION	346
AIRBORNE TANK BATTALION	549
INFANTRY BATTALION	459
MECHANIZED INFANTRY BATTALION	1,357
TANK BATTALION	4,164

Appendix 2 (U) (Weight Changes in Ordnance and Signal Items of
Equipment) to ANNEX C

1. Major items of Ordnance equipment.

ITEM OF EQUIPMENT	PREDECESSOR MODEL	WEIGHT (LB)	REPLACE- MENT MODEL	WEIGHT (LB)	PER CENT CHANGE
Truck, utility, ½-T	M38	2,750	M38A1	2,665	- 3.1
	M38A1	2,665	M151	2,273	- 14.7
Truck, ambulance, 3/4-T	M43	8,780	M43B1	8,550	- 2.6
Truck, cargo, dump	M59	14,030	M215	14,460	+ 3.1
2½-T	M215	14,460	M342	15,165	+ 4.9
Truck, shop van, 2½-T	M109A	15,231	M220	15,085	- 1.0
Truck, tank, gasoline	M217C	14,805	M49	13,490	- 8.9
2½-T	M49	13,490	M49C	13,955	+ 3.4
Truck, tractor, 2½-T	M48	11,430	M221	11,695	+ 2.3
	M221	11,695	M275	11,179	- 4.4
Truck, cargo, 5-T	M41	19,120	M154	19,231	+ .6
Truck, tractor, 5-T	M52	18,813	M52A1	19,456	+ 3.4
Truck, wrecker, 5-T	M62	33,675	M543	34,440	+ 2.3
Trailer, cargo, 1½-T	3 models	2,593 (Avg Wt)	M105A2	2,650	+ 2.2
Trailer, ammo, 1½-T	M10(2-T)	2,235	M332(1½-T)	2,685	+ 20.1
Trailer, water, 1½-T	4 models	2,300 (Avg Wt)	M149	2,600	+ 13.0
Semitrailer, stake, 12-T	M127	13,300	M127A1	13,725	+ 3.2
	M127A1	13,725	M127A1C	14,400	+ 4.9

ITEM	PREDECESSOR	WEIGHT	REPLACE-	WEIGHT	PER CENT
ITEM OF EQUIPMENT	MODEL	(LB)	MENT MODEL	(LB)	CHANGE
Semitrailer, low bed 25-T	M127(15-T)	15,500	M172A1	14,860	- 4.1
Tank, light gun	M41	51,800	AR/AAV*	32,000	- 38.2
Tank, med gun	M47	92,883	M48	93,125	+ .3
	M48	93,125	M48A1	97,000	+ 4.2
	M48A1	97,000	M48A2	98,000	+ 1.0
	M48A2	98,000	M60	95,300	- 2.8
Tank, recovery vehicle, med	M74	93,750	M88	112,000	+ 19.5
Launcher, rocket, 762mm	M289	41,800	M386	34,250	- 18.1
Howitzer, 8", SP	M55	98,000	M110	58,500	- 40.3
Howitzer, 155mm, SP	M44A1	64,000	M109	51,100	- 20.2
Howitzer, 105mm, SP	M52A1	53,000	M108	46,900	- 11.5
Howitzer, 105mm, towed	M101	4,475	M101A1	4,980	+ 11.3
Carrier, personnel	M59	39,504	M113	19,755	- 50.0
Combat engr veh	M102	109,000	T118E1	103,600	- 5.0

*Not type classified

2. Signal items - FM Tactical Radios.

<u>PREDECESSOR ITEM</u>	<u>WEIGHT (LB)</u>	<u>PRESENT ITEM</u>	<u>WEIGHT (LB)</u>	<u>APPROXIMATE WEIGHT REDUCTION (LB) (%)</u>	
AN/GRC-3	215	}	105	100	50
AN/GRC-4	190				
AN/GRC-5	215				
AN/GRC-6	190				
AN/GRC-7	215				
AN/GRC-8	190				
		AN/VRC-44 or AN/VRC-48			
AN/PRC-8	26	}	17	9	36
AN/PRC-9	26				
AN/PRC-10	26				
		AN/PRC-25			
AN/VRC-7	87	}	75	32	30
AN/VRC-8	110				
AN/VRC-9	110				
AN/VRC-10	110				
		AN/VRC-43 or AN/VRC-46			

<u>PREDECESSOR ITEM</u>	<u>WEIGHT (LB)</u>	<u>PRESENT ITEM</u>	<u>WEIGHT (LB)</u>	<u>APPROXIMATE WEIGHT REDUCTION</u>					
				<u>(LB)</u>	<u>(%)</u>				
AN/VRC-13	170	}							
AN/VRC-14	170								
AN/VRC-15	170								
AN/VRC-16	150					AN/VRC-12	90		
AN/VRC-17	1					150	or	70	43
AN/VRC-18	150					AN/VRC-47	85		
AN/VRC-20	160								
AN/VRC-21	160								
AN/VRC-22	160								

AN/VRQ-1	230	}						
AN/VRQ-2	230					AN/VRQ-45	150	
AN/VRQ-3	230					or		82
			AN/VRQ-49	140				

Notes:

AN/VRC-12 family of radios type classified standard A, June 1960. This comparison shows that a decrease in weight of from 30% to 85% will be made in the transition to the new family of tactical radios. Considering the quantitative density of these items in divisional organizations, a qualitative improvement in strategic air transportability is made as a result of this weight reduction.

APPENDIX 3 (U) (Non-Air Transportable Equipment of Type Divisions) (Based on C-130 Aircraft) to ANNEX C

NOMENCLATURE	ROAD AIRBORNE		PENTOMIC AIRBORNE		ROAD INFANTRY		PENTOMIC INFANTRY	
	NO.	TOTAL WT (LBS)	NO.	TOTAL WT (LBS)	NO.	TOTAL WT (LBS)	NO.	TOTAL WT (LBS)
Bridge, AVLB, Scissor Type, Alum.					10	480,000	6	288,000
Bridge, Floating, Mobile Assault Amphib					16	848,000		
Cran- shovel, Whl, 20-Ton, 3/4 cu yd					3	174,000	4	232,000
Firefighting Equip Set, Truck, Army Acft Crash	2	42,000			2	62,000	1	21,000
Launcher, (M48) Transporter, AVLB					4	392,000	3	294,000
Launcher, (M60) Transporter, AVLB					4	332,000		
Ramp, Load, Veh Mob Aselt Float Bridge					8	432,000		
Semi-Trailer, Repair Parts					1	17,200		
Shop Equip, Orgenzl Repair, Trk Mtd	2	48,000			2	48,000	1	24,000
Shop Equip, Electronic Rep, Semi Mtd					1	16,075	1	16,075
Shop Equip, Electric Repair, Semi Mtd					1	20,200	1	20,200
Tractor, Whl, Air Transp, w/Bulldozer	6	96,000						
Truck, Stake, 5-Ton Bridge Transp					2	53,100	9	238,950
Water, Purif Equip Set, Trk Mtd, 1500CPH					5	102,925	5	102,925
Combat Engr Veh, Tracked					4	414,400		
Howitzer, S.F. Tracked, 8" M55								
Howitzer, S.F. Tracked, 155mm M44A1								
Launcher, 7.62mm Rocket, Trk Mtd			4	138,328	4	138,328	2	69,164
Mortar, SP, Tracked, 4.2 M48					1	666,400	9	352,800
Repair Shop Truck, Sig Corps M238	2	32,862			19	312,189		
Semitrailer, LB, 25 Ton M172A					14	224,000	14	224,000
Semitrailer, LB, 60 Ton					1	33,500		
Semitrailer, 12 Ton, 4 Whl, M270A1	1	14,002			1	14,002		
Semitrailer, Tank, Fuel, 5000 Gal M131					10	136,000	5	68,000
Semitrailer, Tank Transp, 50Ton M15A2					2	84,740	2	84,740
Semitrailer, Van, Shop, 6 Ton	2	15,000					10	75,000
Semitrailer, Van, Supply, 12 Ton M129A1C					3	45,735		
Tank, Combat, F.Track, Lt Gun, M41A2					32	1,625,248	33	1,676,037
Tank, Combat, F.Track, Med Gun, M60					108	11,340,000	22	9,660,000
Tank, Recovery Veh, Med M88					15	1,579,000	17	1,846,200
Truck, Cargo, 10 Ton, M125					4	146,400	8	292,800
Truck, Trac, 10 Ton, M123C, Sngl Whl					15	425,250	2	56,700
Truck, Trac, 10 Ton, M123, Dual Whl					2	57,880		
Truck, Trac, Wrecker, 5 Ton, XM48	1	32,850			1	32,650	1	32,850
Truck, Shop Van, 2 1/2 Ton, M109	19	289,389			37	867,167		
Truck, Shop Van, 2 1/2 Ton, M109, w/Whl	7	97,300	1	13,900	4	55,600	2	27,800
Truck, Med Wrecker, 5 Ton, M62	1	19,785	5	148,375			36	1,212,300
Intranching, Outfil, Inf-Engr	9	44,850	0		8	37,200		
Truck, Fork Lift, 15,000#, 210 LB	3	55,200	2	36,800				
Airplane, Combat Surveillance	6	59,624	0					
Airplane, Med Obs, OV-1			0		4	39,616	4	39,616
Helicopter, Obs, OH-23	47	83,519	18	31,986	47	83,519	17	30,209
Helicopter, Util, UH-1	25	100,300	20	80,240	19	76,228	4	16,048
Helicopter, Util-Transp UH-1	25	116,550			31	144,522		
Shoppack, Acft Maint, Semitr Mtd M47	1	22,379			1	22,379	1	22,379
Arm Recon Abn Assault Veh, XM551					6	103,200		
Carrier, Cargo, XM548								
Howitzer, Lt SP, 105mm XM103								
Recovery Veh, F.Track, Lt Arm, T120E1					7	331,100		
Shop Equip, Flt Maint, Hal, Van Mtd					1	8,200		

NOMENCLATURE	ROAD ARMORED		PENTOMIC ARMORED		ROAD MECHANIZED		AIR ASSAULT	
	NO.	TOTAL WT (LBS)	NO.	TOTAL WT (LBS)	NO.	TOTAL WT (LBS)	NO.	TOTAL WT (LBS)
Bridge, AVLB, Scissor Type, ALMS	18	864,000	9	432,000	12	376,000		
Bridge, Floating, Mobile Assault Amphib	16	848,000			16	848,000		
Crane Shovel, Whl, 20-Ton, 3/4 cu yd	3	174,000	4	232,000	3	174,000		
Firefighting Equip Set, Truck, Army Acft Crash	2	42,000	1	21,000	2	42,000		
Launcher, (M48) Transporter, AVLB	12	1,176,000	6	588,000	6	368,000		
Launcher, (M60) Transporter, AVLB	4	332,000			4	332,000		
Ramp, Load, Veh Mob Asslt Float Bridge	8	432,000			8	432,000		
Semi-Trailer, Repair Parts	1	17,200			1	17,200		
Shop Equip, Organsl Repair, Trk Mtd	2	48,000	1	24,000	2	48,000	1	24,000
Shop Equip, Electronic Rep, Sml Mtd	1	16,073	1	16,073	1	16,073		
Shop Equip, Electric Repair, Sml Mtd	1	20,200	1	20,200	1	20,200		
Tractor, Whl, Air Transp, w/Bladozer								
Truck, Stake, 3-Ton Bridge Transp	2	33,100	42	1,113,100	2	33,100		
Water, Purif Equip Set, Trk Mtd, 1500 GPN	3	102,923	5	102,923	3	102,923		
Combat Engr Veh, Trackad	8	828,800			8	828,800		
Howitzer, S.P. Trackad, 8" M53	4	208,800	4	208,800	4	208,800		
Howitzer, S.P. Trackad, 155mm M44A1	18	793,600	12	330,400	18	795,600		
Launcher, 7.62mm Rocket, Trk Mtd	4	138,328	2	69,164	4	138,328	3	117,600
Mortar, SP, Trackad, 4.2 M48	33	2,077,600	44	1,724,800	49	1,920,800		
Repair Shop Truck, Sig Corps M238	19	312,189			19	312,189		
Semitrailer, LB, 2 1/2 Ton M172A	10	160,000	7	112,000	10	160,000		
Semitrailer, LB, 60 Tcn	1	33,500			1	33,500		
Semitrailer, 12 Ton, 4 Whl, M270A1	1	14,002	2	28,004	1	14,002		
Semitrailer, Tank, Fuel, 5000 Gal M131	20	272,000	18	244,800	20	272,000		
Semitrailer, Tank Transp, 30Ton M15A2	6	234,220	6	234,220	6	234,220		
Semitrailer, Vee, Shop, 8 Ton			10	75,000				
Semitrailer, Van, Supply, 12 Ton M129A1C	3	45,733			3	43,733		
Tank, Combat, F.Track, Lt Gun, M41A2	40	2,031,360	34	1,726,826	38	1,929,982		
Tank, Combat, F.Track, Med Gun, M60	324	34,020,000	306	32,130,000	162	17,010,000		
Tank, Recovery Veh, Med M58	37	4,018,200	68	7,384,800	22	2,389,200		
Truck, Cargo, 10 Ton, M125			8	292,800				
Truck, Trac, 17 Ton, M123C, Sngl Whl	11	311,850		170,100	11	311,850		
Truck, Trac, 10 Ton, M123, Dual Whl	6	173,640				173,640		
Truck, Trac, Wrecker, 5 Ton, KLMW	1	32,850	1	32,850	1	32,850		
Truck, Shop Van, 2 1/2 Ton, M109	52	792,012			51	776,781		
Truck, Shop Van, 2 1/2 Ton, M109, w/Whl	4	55,600	1	13,900	4	53,600	1	13,100
Truck, Med Wrecker, 5 Ton, M62			50	1,683,750			3	39,355
Intrenching, Outfit, Inf-Engr	5	23,250			7	31,550		
Truck, Fork Lift, 15,000lb, 210 LB								
Airplane, Combat Surveillance								
Airplane, Med Obsn, OV-1	4	39,616	4	39,616	4	39,616	30	317,024
Helicopter, Obsn, OH-23	47	83,519	14	24,878	47	83,519	88	156,376
Helicopter, Util, UH-1	19	76,228	8	32,096	19	76,228	149	597,788
Helicopter, Util-Transp UH-1	31	144,522			31	144,522	144	671,328
Shoepst, Acft Maint, Semi-rl Mtd M4A7	1	22,379	1	22,379	1	22,379		
Arm Recon Assn Assault Veh, XM551								
Carrier, Cargo, XM548	4	108,000			4	168,000		
Howitzer, Lt SP, 105mm XM105	54	2,376,000			54	2,376,000		
Recovery Veh, F Track, Lt Arm, T129B1	46	2,175,800			53	2,506,900		
Shop Equip, Flt Mtd, Sml, Van Mtd	1	6,200			1	6,200	1	6,200

1. PURPOSE

To compare and analyze capabilities for strategic deployment of the Pentomic and ROAD divisions from the equipment standpoint, the Army aircraft organic to these divisions must be discussed.

2. DISCUSSION

a. General. Air mobility, strategic and tactical, has assumed increasing importance concurrently with the development of both Army and Air Force aircraft of increased capabilities. Greater emphasis has been placed on the use of Army aircraft to provide battlefield mobility in recent years. Army aircraft organic to a division must be capable of being strategically deployed with the division.

b. Deployment capability of individual aircraft.

(1) The O-1 (light observation airplane) and the U-6 (utility airplane) can be air transported by Air Force aircraft if required, but this technique is not considered feasible under most circumstances due to the excessive disassembly and reassembly required. Neither aircraft is deployable by ferrying.

(2) Observation helicopters (OH-13 and OH-23) are easily transported in Air Force aircraft with minimum disassembly. They are not capable of deployment by ferrying.

(3) The UH-19 utility helicopter is not easily transportable in Air Force aircraft because of the extensive disassembly required. It has been replaced in Army divisions by the UH-1 utility helicopter which

is easily transported with minimum disassembly. Neither aircraft is capable of being ferried.

(4) The CH-34 light cargo helicopter is neither capable of being ferried nor transportable in Air Force aircraft. The new generation aircraft, the UH-1D, will be transportable in Air Force aircraft.

(5) The CH-47 (Chinook) (authorized within the air assault division) is air transportable, but approximately 12 hours are required to disassemble and reassemble it by a crew of nine men working with field maintenance level equipment. Source of this information is a memorandum prepared for ACSFOR by the CHINOOK project manager on 19 September 1963. It is also self-deployable by ferrying.

c. Organization. There was a quantitative increase in organic aircraft from 49 in the Pentomic infantry division, 59 in the Pentomic armored division, and 52 in the Pentomic airborne division to 103 in the type ROAD division. The air assault division shows a much greater increase to a total of 459.

(1) In the Pentomic infantry division, 43% of organic aircraft are deployable in Air Force aircraft, 8% ferryable, and 49% not deployable by air.

(2) In the Pentomic armored division, 44% of organic aircraft are deployable in Air Force aircraft, 8% ferryable and 48% not deployable by air.

(3) The Pentomic airborne division possess 52 aircraft, 73% of which may be carried in Air Force aircraft and the remainder of

which are not deployable by air. This division does not possess ferryable aircraft.

(4) The mixture of type aircraft in the ROAD division is such that approximately 94% are deployable in Air Force aircraft, and 6% are ferryable. This increase in capability over the Pentomic division is accounted for by a much higher ratio of observation and utility helicopters.

(5) The aircraft of the air assault division are completely deployable by air, 33% transportable by Air Force aircraft, and the remaining 17% ferryable.

(6) A recapitulation by percentage is shown at TAB A. A numerical recapitulation is as follows:

(U) STRATEGIC DEPLOYMENT OF ARMY AIRCRAFT

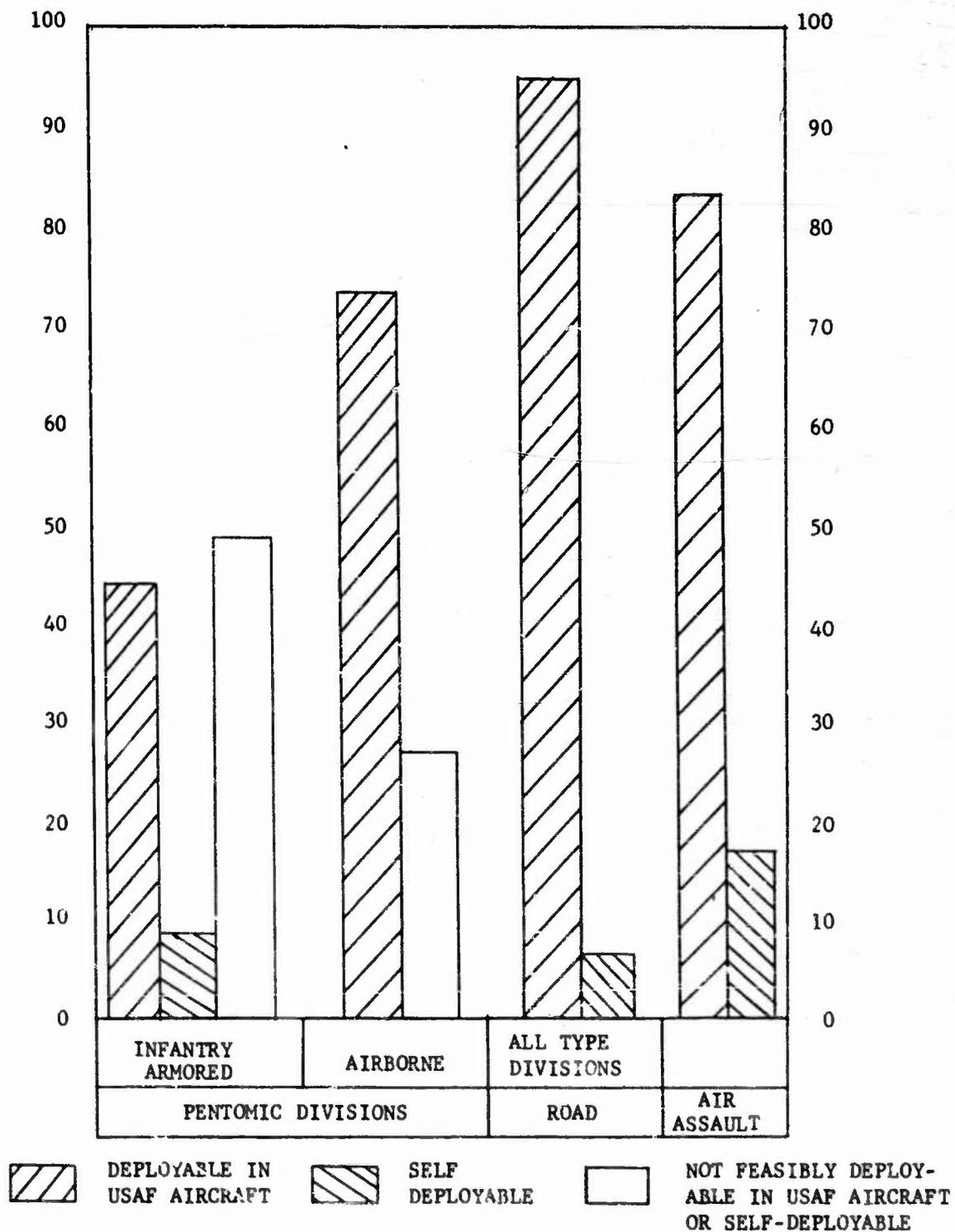
<u>TYPE DIVISION</u>	<u>NUMBER OF AIRCRAFT</u>	<u>DEPLOYABLE IN USAF AIRCRAFT</u>	<u>SELF-DEPLOYABLE (FLIGHT-FERRY)</u>	<u>NOT FEASIBLY DEPLOYABLE BY AIR</u>
Pentomic Infantry	49	21	4	24
Pentomic Armored	50	22	4	24
Pentomic Airborne	52	38	0	14
ROAD	103	97	6	0
Air Assault	459	381	78	0

NOTE: Criteria for deployment: AR 705-35.

(7) A summary of Army aircraft by type division follows:

TAB A - (U) (Transportability of Army Aircraft for Strategic Deployment) to Appendix 4 to ANNEX C.

AIR TRANSPORTABILITY OF ARMY AIRCRAFT FOR STRATEGIC DEPLOYMENT



Appendix 5 (Airlift for Type Organizations) to ANNEX C

1. A determination of specific quantities of aircraft required to move a specified force under any assumed type of emergency or operational environments is not within the scope of this study. However, the representative figures below are compiled to assist in the overall objectives of the study from a strategic mobility standpoint and are not intended to indicate the numbers of aircraft required for a specific, tactically tailored force.

a. Utilizing the major items of equipment of each division as a representation for airlift requirements, it was determined that a relatively few items constitute the greater part of the weight of the division. In the case of the figures below, approximately 85% of the weight of each division has been configured for air movement in various type aircraft. (1)

b. The allowable cabin load for each type aircraft was determined using a range of 3,000 miles. This distance constitutes the longest leg in flight, without a refueling stop, required to reach any point in Europe, the Middle East, or Southeast Asia.

c. Due to the side loading door restrictions of the C-135A, the use of this aircraft was not considered for pure cargo lift in the conduct of this study. The height of the forward cargo hatch is 78" and the width 116.4". This restriction would require most major items of equipment of greater height than a 3/4 ton truck to be considered outside to this aircraft. The C-135A was considered as primarily a troop transport capable of lifting 126 combat troops or a cargo load of smaller palletized equipment.

2. The figures shown below represent airlift requirements for the major items of equipment for the division bases and the type maneuver element.

AIRLIFT REQUIREMENTS - MAJOR ITEMS OF EQUIPMENT

ITEMS CONSIDERED	C-124C				C-130E		C-133		C-141		CX4 (2)	
	ACL:(22.5 TONS)		ACL:(16.0 TONS)		ACL:(37 TONS)		ACL:(35 TONS)		ACL:(60 TONS)			
	NO.	TONS(ST)	OUTSIZE TONS	SORTIES	OUTSIZE TONS	SORTIES	OUTSIZE TONS	SORTIES	OUTSIZE TONS	SORTIES	OUTSIZE TONS	SORTIES
INF DIV												
Div Base	3,656	15,343	2,405	856	4,408	1,083	1,102	748	4,383	802	20	304
Inf Bn	207	412	--	41	42	70	--	32	42	42	--	12
Tk Bn	211	3,795	3,144	35	3,178	59	2,990	30	3,178	35	--	73
ABN DIV												
Div Base	2,318	6,044	162	500	533	823	42	436	480	495	30	160
Abn Inf Bn	185	303	--	32	18	57	--	25	18	34	--	10
Abn Tk Bn	154	533	--	35	27	66	--	30	--	37	--	11
ARMD DIV												
Div Base	3,534	17,681	3,629	865	6,889	1,281	1,594	732	6,863	750	20	333
Mach Inf Bn	203	1,010	249	49	299	87	--	41	299	46	--	21
Tk Bn	211	3,771	3,144	35	3,178	59	2,990	30	3,178	35	--	73
MECH DIV												
Div Base	3,509	17,385	3,529	799	6,725	1,258	1,494	724	6,699	740	20	328
Mach Inf Bn	203	1,218	249	49	299	87	--	41	299	46	--	21
Tk Bn	211	3,795	3,144	35	3,178	59	2,990	30	3,178	35	--	73

(1) Research Analysis Corporation TASK C-524, dated 12 Nov 63.

(2) The CX4 aircraft is currently in project definition study status and is included in this chart for comparison only. Outsize tonnage shown for this aircraft is the Airplane, Cben, Mod-OV-1.

3. The following items of equipment are found to be outsize to the various aircraft listed. Dimension is primarily the restricting factor in this equipment.

NOMENCLATURE	WEIGHT (lbs)	DIMENSION (INCH)			C-124	C-130	C-133	C-141	CX4
		L	W	H	Yes No				
Bridge, AVLB, Scissor Type, Alum.	48,000	474	158	37	x	x	x	x	x
Bridge, Floating, Mobile Assault Amphib	53,000	433	120	124	x	x	x	x	x
Crane Shoal, Whl, 20-Ton, 3/4 cu yd	58,000	497	110	158	x	x	x	x	x
Firefighting Equip Set, Truck, Army Acft Crash	21,000	273	93	109	x	x	x	x	x
Launcher, (M48) Transporter, AVLB	98,000	315	143	92	x	x	x	x	x
Launcher, (M60) Transporter, AVLB	83,000	341	144	125	x	x	x	x	x
Ramp, Load, Veh Mob Asslt Float Bridge	54,000	472	131	96	x	x	x	x	x
Semi-Trailer, Repair Partx	17,200	319	96	127	x	x	x	x	x
Shop Equip, Organzl Repair, Trk Mtd	24,000	340	96	118	x	x	x	x	x
Shop Equip, Electronic Rep, Semi Mtd	16,075	324	97	129	x	x	x	x	x
Shop Equip, Electric Repair, Semi Mtd	20,200	321	96	128	x	x	x	x	x
Tractor, Whl, Air Transp, w/Bulldozer	16,000	204	100	105	x	x	x	x	x
Truck, Stake, 5-Ton Bridge Transp	26,550	376	116	114	x	x	x	x	x
Water, Purif Equip Set, Trk Mtd, 1500GPH	20,585	263	99	135	x	x	x	x	x

NOMENCLATURE	WEIGHT (lbs)	DIMENSION (INCH)			C-124		C-130		C-133		C-141		CX4	
		L	W	H	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Combat Engr Veh, Tracked	103,600	364	143	126	x		x		x		x		x	
Howitzer, S.F. Tracked, 8" M55	52,200	325	140	117	x		x		x		x		x	
Howitzer, S.P. Tracked, 155mm M44A1	44,200	243	128	127	x		x		x		x		x	
Launcher, 7.62mm Rocket, Trk Mtd	34,582	389	114	102	x		x		x		x		x	
Mortar, SP, Tracked, 4.2 M48	39,200	221	129	109	x		x		x		x		x	
Repair Shop Truck, Sig Corps M238	16,431	263	96	129	x		x		x		x		x	
Semitrailer, LB, 25 Ton M172A	16,000	414	115	68	x		x		x		x		x	
Semitrailer, LB, 60 Ton	33,500	448	144	82	x		x		x		x		x	
Semitrailer, 12 Ton, 4 Whl, M270A1	14,002	596	97	72	x		x		x		x		x	
Semitrailer, Tank, Fuel, 5000 Gal M131	13,600	382	97	108	x		x		x		x		x	
Semitrailer, Tank Tranep, 50Ton M15A2	42,370	462	124	105	x		x		x		x		x	
Semitrailer, Van, Shop, 6 Ton	7,500	276	95	136	x		x		x		x		x	
Semitrailer, Van, Supply, 12 Ton M129A1C	15,245	345	96	129	x		x		x		x		x	
Tank, Combat, F.Track, Lt Gun, M41A2	50,789	277	126	108	x		x		x		x		x	
Tank, Combat, F.Track, Med Gun, M60	105,000	320	143	127	x		x		x		x		x	
Tank, Recovery Veh, Med M88	108,600	326	135	115	x		x		x		x		x	
Truck, Cargo, 10 Ton, M125	35,600	320	114	90	x		x		x		x		x	
Truck, Trac, 10 Ton, M122C, Sngl Whl	28,350	280	114	93	x		x		x		x		x	
Truck, Trac, 10 Ton, M123, Dual Whl	28,940	289	114	93	x		x		x		x		x	
Truck, Trac, Wrecker, 5 Ton, XLWB	32,850	352	98	89	x		x		x		x		x	
Truck, Shop Van, 2 1/2 Ton, M109	15,231	263	96	129	x		x		x		x		x	
Truck, Shop Van, 2 1/2 Ton, M109, w/Whl	13,900	277	96	129	x		x		x		x		x	
Truck, Med Wrecker, 5 Ton, M62	33,675	348	96	110	x		x		x		x		x	
Intrenching, Outfit, Inf-Engr	4,650	355	96	126	x		x		x		x		x	
Truck, Fork Lift, 15,000#, 210 LH	18,400	152	96	150	x		x		x		x		x	
Airplane, Combat Surveillance	4,800	502	134	149	x		x		x		x		x	
Airplane, Med Obse, OV-1	9,904	492	504	156	x		x		x		x		x	
Helicopter, Obse, OH-23	1,117	342	93	122	x		x		x		x		x	
Helicopter, Util, UH-1	4,012	510	100	136	x		x		x		x		x	
Helicopter, Util-Transp UH-1	4,662	510	100	136	x		x		x		x		x	
Shopec, Acft Maint, Semitri Mtd M447	22,379	312	96	132	x		x		x		x		x	
Armd Recon Abn Assault Veh, KM551	27,200	265	110	93	x		x		x		x		x	
Carrier, Cargo, KM548	27,200	248	124	117	x		x		x		x		x	
Howitzer, Lt SP, 105mm KM103	44,000	239	124	111	x		x		x		x		x	
Recovery Veh, F.Track, Lt Arm, T120E1	47,300	250	124	115	x		x		x		x		x	
Shop Equip, Fld Mat, Mol, Van Mtd	6,200	263	99	130	x		x		x		x		x	

LOADING FACTORS				
CARGO COMPARTMENT				
	PAYLOAD(ST)	LENGTH(IN)	WIDTH(IN)	HEIGHT(IN)
C-124C	22.5	924	136	138
C-130E	16.0	552	120	108
C-133	37.0	1075	142	144
C-141	35.0	888	123	109
CX4	60.0	1560	210	168

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ANNEX D(S)CURRENT PROCEDURES FOR CONSIDERATION OF AIR TRANSPORTABILITY
REQUIREMENTS (U)

1. (U) PURPOSE

To evaluate the procedures and techniques inherent in the development effort that consider the effect on airlift requirements.

2. (U) SCOPE

a. Determine those methods, procedures, and techniques contained in the combat development system that consider air transportability as a requirement.

b. Determine current procedures that assure consideration of airlift requirements when TOE's are prepared or changed.

3. (S) DISCUSSION

a. General. The current combat development system is the result of a gradual evolution since its inception in 1952. This annex describes and evaluates the methods, techniques, and procedures inherent in the current combat developments system for considering and establishing air transportability requirements. The discussion is presented in the sequence normally associated with the combat development cycle, i.e.:

- (1) Combat Development Studies (For examples, see Appendix 1)
- (2) Qualitative Materiel Development Objectives (QMDO's), Qualitative Materiel Requirements (QMR's), and Small Development Requirements (SDR's)
- (3) Materiel Development
- (4) Materiel Testing and Evaluation
- (5) Troop Tests (For examples, See Appendix 1)
- (6) Tables of Organization and Equipment (TOE's)

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b. Combat development studies. The combat development study program generates from, but is not limited to, the broad guidance contained in Army long range plans and the Combat Development Objectives Guide. ✓

(1) Obvious air transportability considerations are initially incorporated in study directives, i.e.:

(a) Combat Development Study Directive, "Strategic Deployment of Army Aircraft 1963-1970," CSSG 63-1, directed that consideration be given to strategic deployment by Air Force aircraft.

(b) Combat Development Study Directive, "Very Long Range Army Forces Concept (ARMY-80)," CGSC 61-9, states that consideration should be given to the requirement for Army forces to be organized and equipped for improved strategic mobility to fulfill world-wide operational commitments. ?

(2) Air transportability considerations could also be introduced as a result of the study effort uncovering its implications, i.e.:

Although not initially covered in the study directive, the study, "Terminal Requirements in Support of Land Based Aerial Lines of Communication," TCCD 57-11, considered the need for the rapid deployment of Army air terminal cargo transfer capabilities. This consideration was prompted by recognizing the requirement for rapidly establishing a joint Army/Air Force air line of communication in support of forces deployed in under-developed areas.

c. QMDO's, QMR's, and SDR's.

(1) No reference is made directly to air transportability in the official format for writing QMDO's and SDR's. (USACDC Dir 71-4, Procedures for Processing Proposed QMDO's, QMR's, and SDR's). However,

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this directive does permit the proponent agency establishing the QMDO or SDR to incorporate pertinent recognized air transportability considerations.

(2) The official format for writing QMR's (USACDC Dir 71-4, Appendix B) explicitly states that consideration will be given to the desired degree of transportability and refers to AR 705-35, "Criteria for Air Transportability and Air Delivery of Materiel." AR 705-35 defines military operational criteria and the limitations of military aircraft on air transportability.

(3) USACDC Directive 71-4 also dictates that the proposals will contain as much information as is known on the impact of the materiel concept on organizational requirements.

(4) After they are prepared and coordinated among subordinate agencies, draft proposed materiel requirements are reviewed by USACDC headquarters for compatibility with long range Army objectives and plans, and for the probable impact on organizations, doctrine, and tactics for the period in which the requirement is to be used. This evaluation, when applicable, is to include "ascertaining that air transportability characteristics specified are actually required or desired" (AR 71-1, Army Combat Developments). The degree of required air transportability, among other things, is evaluated from an analysis of the answers to the following basic questions:

- (a) What is the piece of equipment expected to do?
- (b) What piece of equipment, if any, will it replace?
- (c) In what type of unit will it be employed?
- (d) How will it be employed?

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(5) Direct personal contact and informal coordination of proposed QMDO's, QMR's, and SDR's by USACDC and its agencies with USAMC and its agencies is authorized and considered normal procedure. (AMCR 705-2, CGUSAMC-CGUSACDC Memorandum of Agreement on Research and Development). By this coordination, all echelons of USACDC are able to determine and evaluate the desired degree of air transportability in view of competing characteristics.

(6) USACDC Regulation 310-2, 27 June 1963, states that all draft proposed, proposed, and approved QMDO's, QMR's, and SDR's are coordinated by USACDC with the Tactical Air Command. The Air Force is specifically asked to comment on:

(a) Similar or related requirements.

(b) Information on developmental items that meet stated requirements.

(c) Additional capabilities required to provide a more suitable item for the Air Force.

(d) Degree of interest to include desired participation of the Air Force in the development of the proposed item. In addition, the Air Force is requested to make any comments or recommendations that it may desire on each QMDO, QMR, or SDR so coordinated.

(7) USACDC approved QMR's and SDR's are submitted to the Chief of Research and Development and are then presented to the Materiel Requirements Review Committee (MRRC) for review to determine the validity and priority of the requirement before final DA approval.

d. Materiel development.

(1) As prescribed in AR 71-1, Army Combat Developments, the

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Commanding General, USACDC, is responsible for maintaining full awareness of research and development activities to insure that developments in fact meet objectives and/or qualitative requirements. USACDC is responsible for providing guidance to the Army Materiel Command during all phases of the development process regarding objectives and qualitative requirements affecting troop operational employment. The necessary coordination between USAMC and USACDC is accomplished through liaison officers, technical committee representation, and "in-process" reviews. (USAMC Reg 705-2, CGUSAMC-CGUSACDC Memorandum of Agreement in Research and Development.)

(2) "In-process" reviews are conducted at major decision making points in the developmental process. One prime objective of the reviews is to insure "fulfillment of transportability requirements, including those for air transportability and parachute delivery (AR 705-35," (AR 705-5). With regard to this objective, the stated air transportability requirements in QMR's and SDR's are used as the basic guidance at the "in-process" reviews.

e. Materiel testing and evaluation. Engineer and service test plans and the recommendations formulated from the test are reviewed and evaluated by USACDC representing the user point of view. Subtests of materiel, when applicable, include testing of air delivery and air transportability characteristics. (AR 710-10)

f. Troop tests. USACDC is responsible for conducting troop tests to evaluate new or revised doctrine, organization, and materiel to develop improved combat capabilities. These tests may be designed to ascertain the potential value of new air transportable materiel and to develop doctrine for the effective deployment of new air transportable organizations, i.e.:

FY 64 Troop Test, Preparation of the Air Assault Division for Strategic Deployment. This exercise will test the ability of the air assault division to prepare for strategic deployment to an overseas theater of operations by USAF aircraft. For more information on troop tests, see Appendix 1.

g. Tables of Organization and Equipment (TOE's).

(1) Directives and regulations do not contain specific guidance for the development and revision of TOE's with regard to transportability other than by organic transportation. Air transportability, however, is considered by the proponent agency as a result of:

(a) Consideration given to air transportability in CD studies, troop tests, and development of materiel since these ultimately will be reflected in the TOE's.

(b) Specific guidance provided in the broad organizational studies from which the TOE is to be developed or revised, i.e.:

"Reorganization Objective Army Divisions 1965 (ROAD-65)," developed a basic framework for divisional TOE's based on the Vice Chief of Staff's guidance which emphasized the need for improving strategic tailoring capabilities. (Letter, DA, Office of the Chief of Staff, file CS320, 16 December 1960, subject: Reorganization of the Infantry and Armored Divisions and Creation of a Mechanized Division (S)). This study was utilized as a basis for developing the ROAD TOE's.

(c) Consideration given to the mission and employment of the specific units, i.e.:

The strategic deployment requirements of the ROAD airborne, infantry, and air assault divisions are considered in the development of the respective divisional TOE's. The TOE's for combat support and combat service support units, in general, are developed so that the supporting units may be as transportable as the supported units.

(2) In all cases austerity is stressed to insure that only personnel and equipment essential for the accomplishment of the mission are incorporated in TOE's.

(3) New and revised TOE's are reviewed by interested field agencies, intermediate USACDC headquarters, and USACDC headquarters prior to submission to DA for approval. The TOE's are reviewed at these echelons for austerity, compatibility with new organizational and operational concepts and objectives, and the propriety of air transportability.

(4) In October 1963 OACSFOR proposed a new TOE format to be included in the revision of AR 310-31, Military Publications - Organization and Equipment Authorization Tables - Tables of Organization and Equipment. This proposed new TOE format will contain the cost, weight, and cubage of each line item in Section IV - Equipment - Recapitulation and Planning Factors. Also to be included are mobility factors for ground, rail, ship, and air transportation. Airlift information will include weight of air transportable and non-air transportable items and aircraft requirements. If implemented (action in progress at this writing), this new TOE format will further assure that air transportability requirements are explicitly considered in the preparation or change of TCE's.

h. Summary.

(1) The procedures in the combat development processing applicable to considering and establishing air transportability requirements are:

(a) Lateral and vertical coordination of studies, QMDO's, QMR's, SDR's, and Troop Tests within the Combat Developments Command. This coordination permits ascertaining the validity of stated air transportability requirements and their compatibility with Army long range guidance and objectives. This coordination may also result in initiating air transportability as a consideration.

(b) Informal and formal coordination between USACDC and USAMC to exchange information and make joint decisions. This coordination with regard to air transportability permits:

1. Obtaining technical information essential in stating realistic air transportability requirements in the development of QMDO's, SDR's, and QMR's.

2. Assuring that equipment under development meets the desired air transportability requirements as stated in QMR's and SDR's.

(c) The preparation of broad organizational studies to bridge the gap between the very broad guidance contained in long range Army plans and the development and revision of specific TOE's.

(d) Lateral and vertical coordination of TOE's within the Combat Development Command prior to DA approval. This coordination with respect to air transportability permits:

1. Attaining consistency with respect to associated TOE's.

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2. Assuring compatibility with long range objectives and the overall organizational concept.

(e) Evaluating the implications on air transportability and requirements for improving air transportability of new organizations and equipment by troop tests.

(2) Regulations and directives which specifically relate to air transportability are:

(a) USACDC Dir 71-4 explicitly states that consideration will be given to the desired degree of air transportability in the development of QMR's.

(b) AR 71-1 states that the evaluation of QMDO's, QMR's, and SDR's will include ascertaining that specified air transportability characteristics are actually required or desired.

(c) AR 705-5 states that a prime objective of "in-process" reviews of materiel under development is to insure fulfillment of air transportability requirements.

(d) AR 710-10 implies that subtests, when applicable, will include testing the air transportability of new items.

(e) AR 705-35 defines military operational criteria with respect to air transportability and delineates the limitations of military aircraft on air transportability. This regulation is used as a guide in the development and evaluation of QMR's and in materiel development.

4. (S) SUPPORTING CONCLUSIONS

a. The steps that assure consideration of aircraft requirements in the preparation or change of TOE's are inherent in the combat developments

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system. In order, these steps are:

(1) Specific guidance for preparation or change of TOE's is provided by organizational studies.

(2) Consideration of air transportability in troop tests and the development of materiel is ultimately reflected in TOE's.

(3) The strategic deployment mission and employment of specific units (ROAD airborne, infantry, and air assault division) are considered when their TOE's are prepared or changed.

(4) TOE's are reviewed within the Combat Developments Command to assure that, where appropriate, air transportability was considered in the organization and equipment of units.

b. The current combat development system is adequately regulated to be responsive to Army objectives for improving strategic air transportability as delineated in long range plans and guidance.

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APPENDIX 1 (C) (Studies and Troop Tests Pertinent to Air Transportability) to ANNEX D

CURRENT STUDIES

Combat Vehicles - 1975 (U). ✓

Scope: (C) To establish a family of combat vehicles to come into service in 1975. The materiel concept predicts that it is highly probable that most of the vehicles can be made air transportable, since technological advances will permit the production of lighter weight vehicles. It recognizes, however, that reduced weight may be even more important in increasing maneuverability and cross-country mobility. Descriptive data pertaining to the family of vehicles developed for the preliminary report (submitted 20 June 1963). All of the vehicles, except the 16-ton general purpose vehicle, list air transportability as a tentative characteristic. (CAG 63-1)

Mobility for the Army (U).

Scope: (U) To provide a comprehensive analysis of critical factors affecting the prompt deployment of Army forces in response to assumed typical contingencies and to determine Army objectives for strategic mobility. These contingencies include enemy capabilities, US force requirements, US reaction time requirements and will focus on Middle East, Southeast Asia, and two additional areas. Account will be taken of present and programmed capabilities with respect to both surface and air transport, the implications of existing and planned prepositioning, both fixed and floating, and the location and commitment of deployable forces. The study pays particular attention to deployments to underdeveloped areas, including problems of lading and off-loading, terminal facilities,

marrying of troops with equipment, and marshalling of transport. It also analyzes the implications of requirements arising from simultaneously occurring contingencies. (RAC-RP-22.31) (CDOG Ref 120.1).

Supply Support to Airmobile Operations Under Concepts of Future Warfare (U).

Scope: (U) To develop organizational and procedural concepts for supply support to airmobile operations. The study analyzes organization and procedures required to support airmobile operations under the concept of highly mobile, dispersed bases, and materials handling equipment. The principle of functionalization is emphasized. Consideration is given to the receipt, storage, and distribution of supplies including water and their close relationship to a transportation system consisting predominantly of an air line of communication. Consideration is also given to the application of air delivery to airmobile operations. (QMCD 64-(3)) (CDOG Ref 1620j)

Supply Support to Airmobile Operations (U).

Scope: (U) To determine by computer simulation the validity of concepts and supply support requirements for airmobile operations. To establish a model for airmobile operations with emphasis on supply support utilizing the concept of supply functionalization. It tests a receipt, storage, and distribution system generally independent of a fixed line of communication for all classes of supply with particular emphasis on class III. (QMCD 64-(2)) (CDOG Ref 1620k)

COMPLETED STUDIES

Strategic Deployment of Army Aircraft, 1963-1970 (U).

Scope: (U) This study considered all Army aircraft, current and programmed, for the Army inventory during the time frame 1963-1970 and analyzed the various methods for their deployment. Additionally, it examined the various methods of strategically deploying the aircraft of the air assault division. (Project CSSG 63-1, Final Report, dated May 1963) (CDOG Ref 1620d)

Strategic Lift for Future Army (U). Component ORO Studies:

(CDOG Ref 1620f)

ORO-T-374, Strategic Lift for a Future Army - Case A (U), October 1958.

ORO-SP-131, Feasibility and Costs of High-Speed Ships for Strategic Deployment of Army Forces (U), February 1960.

ORO-T-150, A Method of Estimating Aircraft Fleet Requirements in Strategic Deployments (U), July 1960.

ORO-T-396, Strategic Lift for Rapid Development of Army Forces (U), March 1961.

ORO-T-24, The Effect of Dimensional Variations in Transport Aircraft Cargo Compartments on Sortie Requirements and Space Utilization in Deployment of Army Units (U), January 1961.

ORO-TP-32, Army Requirements for Surface Transport on Strategic Deployments (U), April 1961.

TROOP TESTS

Preparation for Strategic Deployment (U).

Scope: (U) To test the ability of the Air Assault Division (-) to prepare for strategic deployment to a theater of operations outside the CONUS in USAF aircraft. Major areas of investigation include a test of the division air loading, in transit and debarkation SOP. (CDOG Ref 540 nn).

Exercise "BIG LIFT" - Oct-Nov 1963.

This exercise involved the air movement of a CONUS based division size unit to an overseas theater, the 2d Armored Division from Fort Hood, Texas to Western Europe. This exercise is currently in progress at this writing. This test appears to be similar in scope to that mentioned for the Air Assault Division in paragraph 540 nn of the CDOG.

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ANNEX E (S) - FUTURE RESEARCH AND DEVELOPMENT PLANS (U)

1. (S) PURPOSE

To evaluate the Army's plans for future research and development of materiel and organizational structures as they relate to improvement of air movement capabilities.

2. (S) SCOPE

Determine the broad objectives and general guidance for the development of future Army operational concepts, organizations, and materiel with respect to air transportability requirements.

3. (S) DISCUSSION

a. General. The approach to modernization is to exploit those areas which will produce the most significant improvements within available or forecasted resources. The degree of emphasis placed on improving air transportability in light of other requirements is contained in Army long range plans and the Combat Developments Objectives Guide. These documents contain the Army's plan for improving strategic air transportability.

b. Broad objectives and general guidance.

(1) The broad objectives and general guidance for the development of future Army operational concepts, organizations and materiel are contained in the following documents:

- (a) Army Requirements Development Plan - 75
- (b) The Army Force Development Plan (1964-1983)
- (c) The Army Research and Development Long Range Plan

1962-1982.

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(2) Strategic mobility is discussed in the documents as it relates to the Army's requirement for maintaining highly mobile strategic reserves in CONUS, capable of rapid reinforcement of deployed forces.

c. Basic objectives.

(1) The Combat Development Objectives Guide (CDOG) contains the considerations and basic objectives that will guide the progressive development of the Army's operational capabilities now and in the future. It correlates combat development activities with the research and development program. CDOG identifies general combat development objectives and consolidates those studies, field experiments, tests, and qualitative materiel requirements which are pointed to the obtainment of these objectives.

(2) The Army's general combat development objectives are classified as operational objectives, organizational objectives, and materiel objectives. They are based upon operational capabilities required to support the Army's long range plans. These objectives are closely related and interdependent.

(3) Guidance as it relates to future strategic mobility, contained in the general objectives, is summarized below:

(a) General operational objectives. A strategically mobile Army is required by United States world-wide commitments and the need for prompt reaction in situations which require rapid deployment of Army forces. Strategic mobility is a function of transportability of forces, airlift, sealift, forward deployment, and prestockage of materiel.

(b) General organizational objectives. Organizations must be designed with sufficient flexibility and versatility to develop combat power compatible with the operational situation likely to be encountered. Major factors which affect organizational planning include, but are not limited to, the requirements for tactical and strategic mobility and combat power to conduct sustained operations against a variety of forces in various geographical areas. The ultimate goal is a force that can be tailored quickly both in men and materiel. When committed to combat, this force will have no more and no less than what is needed to accomplish its mission.

(c) General materiel objectives. The materiel to equip the Army must be as simple to operate and maintain and as light weight and compact as possible, without sacrificing any of its capability to perform its primary function. Air transportability will be a major consideration in the development of Army materiel in order to provide an ever-increasing capability for tactical and strategic deployment of forces by air. The capabilities of Army materiel and aircraft will be weighed, one against the other, to achieve the best overall balance of fighting capability versus lift capability.

d. Implementation of guidance.

(1) The Army's plan for implementing the guidance contained in long-range plans and CDOG is one of progression and evolution and is contained, in general, in the following:

(a) Reorganization Objective Army Division 1965 (ROAD-65).

(b) Reorganization Objectives, Division, Army and Corps - 1970 (RODAC-70).

(c) Very Long-Range Army Forces Concept (ARMY-80). The succeeding paragraphs discuss these concepts only as they relate to strategic mobility.

(2) ROAD-65.

(a) General. The ROAD-65 concept is applicable for the time frame 1961-1965. All active Army divisions are scheduled to be reorganized by 1964.

(b) Operations. The operational environment envisioned for this period establishes a major requirement for strategically mobile Army forces employing a combination of peacetime deployment, ready air and surface lift, and forward prestocks.

(c) Organization.

1 The ROAD-65 concept established the requirement for reorganizing the Pentomic airborne, armored, and infantry divisions and creating a mechanized infantry division. There were three major considerations involved in planning optimum organizations:

a The necessity for rapid deployment of combat units by air and/or surface transportation. These units are required for use as a holding or delaying force pending the arrival of other forces or as an independent force capable of sustained combat.

b The continuing requirement for Army forces possessing a capability for heavy sustained combat which will, for the present, prevent the attainment of a complete capability for rapid strategic deployment by air of all divisions and units.

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c The requirement for a variety of type organizations to fulfill present and future strategic commitments.

2 The above considerations preclude the adoption of a single, fixed, standard, divisional organization. ROAD-65 divisions were organized under the tailoring concept which provides greater flexibility and responsiveness, by permitting divisions to be tailored to fulfill various strategic commitments. In retaining the airborne division, ROAD-65 recognized the need for units that could be rapidly deployed by air. In developing division organizations, priority was given to ground mobility and sustained combat power in those instances where air transportability was a factor for consideration.

(d) Materiel. In designing the ROAD-65 divisions, consideration was given to those major items of equipment which would become available up to 1965. This was done in order to develop organizations which would require minimum change in absorbing the new equipment.

(3) RODAC-70.

(a) General. The RODAC-70 concept is applicable for the time frame 1965-1970. By letter, dated 8 November 1962, DCSOPS, DA, approved the November 1961 version of RODAC-70 as a basis for the organization and employment of combat and combat support units of the field army for the 1965-1970 period, subject to certain modifications. The modifications do not have any air transportability implications. It is contemplated that RODAC-70 study will be updated annually until it becomes useful within the time frame.

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(b) Operations. Operational concepts for this period are essentially the same as those visualized for the ROAD-65 time frame. RODAC-70 provides for the maintenance of strategic forces capable of efficient and effective operation through all levels of war. This concept makes provisions for improved strategic mobility by:

- 1 Providing compact, light weight organizational equipment.
- 2 Predeployment of strategic forces.
- 3 Predesignating tailored strategic task forces.
- 4 Increased prestockage of supplies and equipment.

(c) Organization. Division organization and types envisioned under this concept are essentially the same as ROAD-65 divisions and the air assault division with minor exceptions. ROAD-65 divisions are modified only as required to accept the introduction of new equipment expected to become available during the time frame 1965-1970.

(d) Materiel. Data pertinent to representative major items of equipment is included in Appendix 1. RODAC-70 provides for an improved strategic air transportability capability for the division by providing for light weight equipment without sacrificing combat power.

(4) ~~ARMY-80.~~ ✓

(a) General. The ARMY-80 concept is applicable for the time frame 1970-1980. The original study was prepared in 1962. It was condensed and revised by Combat Developments Command in April 1963, and sent to the field for comment. The final version is presently being staffed within Dept of Army.

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(b) Operations. Combat operations for this time frame will be characterized by dispersion and rapid movement to a greater degree than envisioned by ROAD-65 and RODAC-70. Strategic mobility will be attained in much the same manner as proposed for ROAD-65 and RODAC-70, with allowances for technological advances.

(c) Organization. Division organizational concepts forecasted for this time frame are a continuation of those planned for RODAC-70.

(d) Materiel. The ARMY-80 materiel concept highlights the goals toward which the research and development effort should be directed. The concept foresees that only those environmental characteristics which are absolutely essential to materiel are included in QMDO's and QMR's. For example, it is not essential that every piece of equipment be air transportable. Though a particular characteristic may, in itself, be a highly desirable feature, it is not to be pursued to the end that the piece of equipment cannot survive or effectively and economically perform its primary task on the field of battle.

(e) Summary. The ROAD-65, RODAC-70, and ARMY-80 concepts and other pertinent studies provide for units with sufficient flexibility and versatility to develop a degree of combat power compatible with the situation that may be encountered. Each recognizes the technological advances that may permit the introduction of new light weight equipment. The balance between fighting capability and lift capability is also considered, since there is little profit in providing a unit with the

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capability of moving rapidly to an objective area if its ability to fight when it gets there is insufficient to carry out its mission.

4. (S) SUPPORTING CONCLUSIONS ←

a. The Army's plan for improving strategic air transportability consists of guidance contained in long-range plans and the Combat Development Objectives Guide as implemented by approved short, medium and long range reorganization and concept studies.

b. The short, medium, and long range reorganization and concept studies (ROAD-65, RODAC-70, and ARMY-80) provide sufficient guidance for research and development of materiel and organizational structures for future improvement in air movement capabilities. ←

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APPENDIX 1 (S) (Representative Major Items of Equipment, RODAC-70) to ANNEX E (U)

ITEM	CDOG PARA	AIR TRANS REQUIRE- MENT	TYPE CLASS (ACTUAL OR PROPOSED) DATE
<u>W E A P O N S</u>			
1. Howitzer, light, towed, 105mm, XM102	437c(1)	Phase I	1Q, FY 64 For limited procurement.
DESIGNED TO REPLACE: 105mm How in Aon Div			
2. Howitzer, Carriage, 105mm, SP, M108	436a(3)	Phase III	Standard A July 1963
REPLACES: Howitzer Car- riage, SP, M-52			
3. Howitzer Carriage, 155mm, SP, M109	436a(4)	Phase III	Standard A July 1963
REPLACES: Howitzer Car- riage, SP, M44			
4. Division Support Missile System (LANCE)	434a(8)	Phase I	2Q, FY 68
REPLACES: HONEST JOHN and La Crosse systems. May replace LITTLE JOHN.			

C O M B A T V E H I C L E S

1. Armored Reconnaissance Air- borne Assault Vehicle XM551 (AR/AAV)	336a(8)	Phase I	3Q, FY 65
REPLACES: Tank Combat Light Gun and Airborne Assault Weapon, M-56			



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APPENDIX 1 (S) (Representative Major Items of Equipment, RODAC-70) to ANNEX E (Continued) (U)

ITEM	CDOG PARA	AIR TRANS REQUIRE- MENT	TYPE CLASS (ACTUAL OR PROPOSED) DATE
2. Carrier Personnel, Full Tracked, Armored, T-114 REPLACES: Truck, ½ ton, where light armor is required.	236a(1)	Phase I	Standard A 26 Feb 1963
3. Carrier Personnel, Full Tracked, M-113A1 REPLACES: Carriers, M59 and M75.	None	Phase II	Standard A May 1963

S P E C I A L P U R P O S E V E H I C L E S

Vehicle, Military Transport High Mobility, 8 ton Goer-Type 1636g(17) Phase II 4Q, FY 65

REPLACES: This vehicle with the vehicle, military transport high mobility, (16 ton) (Goer) and the vehicle, refueling and liquid fuel transporter (5000 gal) (Goer) will be employed for extensive replacement for the following wheeled transport vehicles: 2½-5, and 10 ton Cargo; 2½ ton fuel Truck; and 12 ton Cargo and fuel Semi-trailer.

T A C T I C A L V E H I C L E S

1. Truck, Utility, High Mobility, Light Duty (1½ ton) XM 561 1636c(8) Phase I 2Q, FY66

REPLACES: Trk Ambulance Front-line, ½ ton, Trk Cargo, ¾ ton, Trk ambulance ¾ ton, and reduces requirements for: Trk Utility, ½ ton and carrier Light Weapons, Infantry ½ ton.

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APPENDIX 1 (S) (Representative Major Items of Equipment, RODAC-70) to
ANNEX E (Continued) (U)

ITEM	CDOG PARA	AIR TRANS REQUIRE- MENT	TYPE CLASS (ACTUAL OR PROPOSED) DATE
2. Truck, Cargo, 2½ ton	1636c(3)	Phase I	2Q, FY 66
REPLACES: Trk, 2½ ton (M-34, 35, 135, and 211)			

A I R C R A F T

1. Helicopter, Light Observation	533a(1)	Phase I	1Q, FY 65 For limited Procurement.
REPLACES: O-1, OH-13 and OH-23			
2. Airplane Combat Surveil- lance.	533a(6)	Phase I (Self- deploy- able)	Standard A OV-1A Dec 61 OV-1B 1Q 64 OV-1C 2Q 64
REPLACES: O-1			

E N G I N E E R E Q U I P M E N T

1. Universal Engineer Tractor	636c(5)	Phase I	4Q, FY 65
REPLACES: Will obviate re- quirement for many of the bulldozers, graders, scrapers, and some dump trucks in the Airborne Engineer Battalion.			
2. Combat Emplacement Excavator High Speed	636c(11)	Phase I	FY 69
REPLACES: Ladder or wheel type crawler mounted ditch- ing machine; also provides an added capability.			
3. Mobile Floating Assault Bridge Ferry	639e(10)	(Not Specified)	3Q, FY 64

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HEADQUARTERS
DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT CHIEF OF STAFF FOR FORCE DEVELOPMENT
WASHINGTON 25, D.C.

FOR DOT DO 3

29 May 1963

SUBJECT: Army's Plan for Tailoring its Forces for Movement by Air (U)

TO: Commanding General
United States Army Combat Developments Command
Fort Belvoir, Virginia

1. (S) Contained among the CY 1963 Projects assigned by Secretary of Defense, and one for which the Army has been assigned primary responsibility, is the study project extracted and quoted as follows:

"II. INDIVIDUAL WEAPONS SYSTEMS AND R&D PROJECTS.

H. * * * * *

F. * * * * *

Q. Evaluate the Army's plan for tailoring its forces for movement by air. What amounts of equipment per man have to be moved? Have these increased in recent years? What steps are being taken to assure that where Tables of Equipment are changed, the effect on air-lift requirements is explicitly considered?"

2. (S) The intent of this study is to evaluate current Army procedures, techniques and review systems which consider air movement capabilities in the development of new weapons systems, material items and organizational structures, to compare existing organizations to reflect current capabilities for tailoring units for air movement and the improvements realized in recent years, and to analyze future plans within the research and development area which relate to increased effectiveness in air movement of tactical units.

3. (U) It is requested that USACDC make a comprehensive study of this subject area as outlined in study plan attached hereto as Inclosure 1.

DOWNGRADED AT 3 YEAR INTERVALS;
DECLASSIFIED AFTER 12 YEARS.
DOD DIR 5200.10

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FOR DOT DO 3

SUBJECT: Army's Plan for Tailoring its Forces for Movement by Air (U)

4. (U) CGUSACDC is authorized direct communication and coordination with CGUSCONARC and CGUSAMC to obtain appropriate assistance of those commands when required.

5. (U) It is requested that the completed study be submitted to ACSFOR, DA not later than 1 July 1963.

1 Incl
Study Plan

Ben Harrell
BEN HARRELL
Lieutenant General, GS
Assistant Chief of Staff
for Force Development

Copy furnished:
CGUSCONARC
CGUSAMC

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STUDY PLAN FOR EVALUATION
OF
ARMY'S PLAN FOR TAILORING ITS FORCES
FOR MOVEMENT BY AIR

1. Reference:

Memorandum GS 320 (22 Apr 63), subject: "CY 1963 Projects Assigned by the Secretary of Defense."

2. Background.

The Secretary of Defense has assigned primary or collateral responsibility to the Army for certain CY 1963 project studies covering areas of particular interest to the Department of Defense. One specific project, extracted from par II of reference above is quoted below:

"II. INDIVIDUAL WEAPONS SYSTEMS AND R&D PROJECTS.

M. * * * * *

P. * * * * *

Q. Evaluate the Army's plan for tailoring its forces for movement by air. What amounts of equipment per man have to be moved? Have these increased in recent years? What steps are being taken to assure that when Tables of Equipment are changed the effect on airlift requirements is explicitly considered?"

3. Discussion.

a. Statement of project is specifically directed toward an evaluation of existing and contemplated equipment items, and unit

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organizational structures, insofar as they relate to air movement capabilities; and the procedures established which relate to air transportability considerations during the developmental stages of material items and units.

b. The study project does not include determination of specific quantities of aircraft required to move a specified force under any assumed conditions of type of emergency or operational environments.

4. Scope of Study.

a. Review and summarize doctrine and/or concepts for air movement of division size forces to an overseas objective area. This should include method of employment and relative combat effectiveness either when movement is solely by air or in conjunction with prestocking or surface movement of heavy equipment. Review should include analyses of:

(1) Pentomic Infantry and Airborne Divisions.

(2) ROAD Infantry and Airborne Divisions.

(3) ROAD Mechanized and Armored Divisions under conditions when air movement is required.

(4) Air Assault Division.

b. Compare and analyze the air movement capabilities of the equipment and organizational structures of the Pentomic, ROAD and Air Assault divisions. The analysis should specifically show the amounts of equipment per man to be moved by air in each of the divisions, based on reasonable tactical assumptions. The analysis should be summarized to indicate qualitatively improvements that have been realized during the past few years to permit more efficient tailoring of division size units for air movement and whether this improvement results in an overall increase or decrease in airlift requirements.

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c. Evaluate and summarize the processes inherent in the development of TOE and the combat development cycle whereby the effect on airlift requirements for air movement of equipment and organizations is considered in developing QMR, QMDO and combat development studies. This should include one or two factual examples based on major items of equipment that have now been or soon will be type classified.

d. Review and summarize the Army's plans for future research and development projects in equipment, material and organizational structures as they relate to improvements in air movement capabilities.

5. Conduct of Study.

The responsibility for conduct of the study is delegated to the Commanding General, U.S. Army Combat Developments Command.

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CDCCD-F

HEADQUARTERS
UNITED STATES ARMY COMBAT DEVELOPMENTS COMMAND
FORT BELVOIR, VIRGINIA

4 June 1963

SUBJECT: CD Study: "Army's Plan for Tailoring its Forces for Movement by Air" (U)

TO: Commanding General
US Army Combat Developments Command
Combined Arms Group
Fort Leavenworth, Kansas

1. Reference letter ACSFOR DOT DO 3, 29 May 1963, subject: "Army's Plan for Tailoring its Forces for Movement by Air" (U) and inclosure thereto. (Inclosure 1).
2. It is requested that CG USACDCCAG undertake the subject analysis.
3. This analysis will conform to the study plan attached as inclosure 1 to reference in paragraph 1 above.
4. CG USACDCCAG is authorized direct communication with CG USCONARC and CG USAMC. CO USACDCCSSG is requested to furnish assistance as requested by CG USACDCCAG.
5. The subject analysis is to be submitted to ACSFOR DA by 1 July 1963. Headquarters USACDC has requested an extension of sixty (60) days. Action on this request has not yet been taken. If it becomes apparent that the suspense date cannot be met, an interim report will be forwarded to reach this headquarters by 28 June 1963. The letter forwarding this interim report will contain an expected submission date of the final report.

FOR THE COMMANDER.


LEWIS V. EDNER
Major, QMC
Asst Dir, Pers & Admin

DISTRIBUTION:
CG USCONARC (1)
CG USAMC (1)
CG USACDCCAG (10)
CO USACDCCSSG (5)
CO USACDCIA (1)
CO USACDCARTYA (1)
CO USACDCAVNA (1)
CO USACDCARMA (1)

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HEADQUARTERS
UNITED STATES ARMY COMBAT DEVELOPMENTS COMMAND
FORT BELVOIR, VIRGINIA

29 AUG 1963

GDCCD-F

SUBJECT: CD Study: "Army's Plan for Tailoring its Forces for Movement
by Air (U)"

TO: Assistant Chief of Staff for Force Development
Department of the Army
Washington 25, D. C.

1. References:

- a. Letter, HQ DA ACSFOR-DOT-DO-3, 29 May 1963, subject as above, with 1 inclosure.
- b. Letter, HQ DA ACSFOR-DOT-DO-3, 12 June 1963, subject as above, (Format).
- c. Letter, HQ DA ACSFOR-DOT-DO-3, 28 June 1963, subject as above, (approval of extension of suspense date).

2. The subject study is hereby forwarded to your headquarters as directed in reference 1a and 1b. This study was developed using as a basis the draft series E ROAD TOE, dated August 1961. The reasons for this are:

- a. U. S. Army Divisions are currently organized under the above Draft Series TOE.
- b. Final approved Series E TOE were not received from TAGO prior to completion of this study.

3. It is realized that utilization of the new TOE would represent a more definitive and meaningful report. However, due to the effort involved, revision prior to submission by 3 September 1963 is not possible. It is believed that revision will not change the conclusions as stated; however, based on such a revision, the weight to be air transported per man in each type division will change.

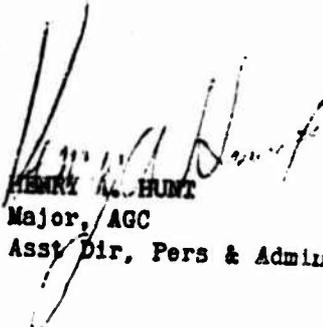
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CDCGD-F

SUBJECT: CD Study: "Army's Plan for Tailoring its Forces for Movement
by Air (U)"

4. Therefore, with the foregoing exception, the study is approved. This study will be supplemented by a revision reflecting the changes brought on by the new TOE. This revision will be submitted to your headquarters on 30 September 1963.

FOR THE COMMANDER:



HENRY A. HUNT
Major, AGC
Asst Dir, Pers & Admin

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HEADQUARTERS
DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT CHIEF OF STAFF FOR FORCE DEVELOPMENT
WASHINGTON 25, D.C.

FOR DOT DO 3

22 October 1963

SUBJECT: Army's Plan for Tailoring its Forces for Movement by Air (U)

TO: Commanding General
United States Army Combat Developments Command
Fort Belvoir, Virginia

1. References:

a. Letter, FOR DOT DO 3, OACSFOR, subject: "Army's Plan for Tailoring its Forces for Movement by Air (U)," 29 May 1963 (S).

b. Letter, CDCCD-F, USACDC, subject: "CD Study: Army's Plan for Tailoring its Forces for Movement by Air (U)," 29 August 1963 (S).

2. USACDC Study, "Army's Plan for Tailoring its Forces for Movement by Air (U)," has been reviewed by DA and is returned for general revision in accordance with DA comments at Inclosure 1.

3. It is requested that the revised study be submitted to ACSFOR, DA, not later than 25 November 1963.

4. Lieutenant Colonel Durham, OACSFOR (X-74850) has been appointed DA project officer for the revision of this study. Colonel Durham will provide additional DA guidance when requested and is available to assist in the general revision as may be desired by the Commanding General, United States Army Combat Developments Command.

1 Incl
as

Ben Harrell

BEN HARRELL

Lieutenant General,
Assistant Chief of Staff
for Force Development

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DEPARTMENT OF THE ARMY COMMENTS
COMBAT DEVELOPMENTS COMMAND STUDY

"ARMY'S PLAN FOR TAILORING ITS FORCES FOR MOVEMENT BY AIR (U)"

(S) General Revision R requirements:

a. Revise the study to more specifically address an evaluation of the Army's Plan for tailoring its forces for movement by air. This will include but not be limited to:

(1) A more detailed evaluation (comparison, analysis) of the Army's objective of strategic mobility of its forces and its resultant implementation in the tailoring of its forces and equipment for movement by air, i.e., development, structuring and design.

(2) Clearly state the Army position relative to the use of airlift for the strategic deployment of mechanized and armored divisions.

(3) Develop clearly the Army's intentions as regarding use of sealift and prepositioned equipment.

(4) Clearly define the Army's position relative to tailoring of divisions for airlift. (Is the Army in favor of tailoring, or partly in favor of tailoring under certain conditions?)

b. Expand the statistical data to include C-130's, programmed C-141 aircraft, and the developmental CX4. (Use the approved ROAD TOE)

c. Details concerning the coordination between the Army and the Air Force effected in the configuring of equipment and forces for airlift.

d. Statistical data will be based on the strategic movement of Pentomic and ROAD Divisions to an overseas objective area.

e. Qualifying statements and remarks should be used to identify degrees of air transportability of equipment.

f. Existing studies and field exercise reports which include information relative to this study, should be consulted and considered for inclusion as appropriate.

Example: Does an exercise such as BIG LIFT alter the DA planning factor (14 days) for marry-up of an air transported division with prepositioned equipment to Europe?

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