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U.S. ARMY TACTICAL MOBILITY REQUIREMENTS BOARD

FORT BRAGG, NORTH CAROLINA

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FINAL REPORT (U)

20 AUGUST 1962

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ATUTR-AVN(S) (20 Aug 62) 1st Ind (S)
SUBJECT: Report of Army Tactical Mobility Requirements Board

Headquarters, United States Continental Army Command, Fort Monroe, Virginia 20 AUGUST 1962

TO: Chief of Staff, United States Army, Washington 25, D. C.

1. (U) I fully support the concepts of airmobile operations as developed by the Board and recommend that they be used as a basis for determining the structure of the Army for the five year period beginning at the earliest practicable date and as a general guide for subsequent years. A decision now to embark on the recommended course is necessary.

2. (U) I support the vulnerability findings as stated by the Board. I recommend the continued study of all means which could reduce this vulnerability.

3. (U) There are marked changes recommended by the Board in the Army's personnel program. I am in general agreement with these concepts. I particularly endorse the increased use of Warrant Officers and a broader recruitment program to attract capable young men into Army aviation.

4. (S) There are areas which I feel require further review in conjunction with the carrying out of the Board's recommendations. These areas are:

a. In the manpower area, the Board developed a structure for the Army based on an over-all strength of 960,000. I agree that the recommended structure will provide significantly increased tactical mobility. However, it is pointed out that the Army now has and will continue to have, even under the Board-recommended structure, serious deficiencies in modernized combat support and combat service support units. Specifically, a detailed analysis must be made to determine what maintenance and POL supply capability is required. It is my view that a strength of about 1,000,000 will more nearly satisfy the urgent requirements of a balanced force under present world-wide commitments.

b. The operational refueling problem will require a major effort for solution. Similarly the problems of airspace utilization, air traffic control and friendly recognition should be solved as soon as possible.

c. The stationing of one Air Assault Division in Korea, one in Hawaii and two in CONUS is considered fully justified. The stationing in CONUS of a third Air Assault Division in place of a mechanized division should, however, receive further review. This review should consider responsiveness to contingency plans and the adequacy of the rotation base.

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d. The Board recommends cancellation of procurement for the GOER program and of further development of the new main battle tank. Although implementation of the airmobile concept will result in a significant reduction in surface mobility requirements, it is felt that there will still be a requirement for continuing at least a portion of this program. Accordingly, it is felt that the cancellation of the GOER program bears further review. The Board feels that the AR/AAV will satisfy the requirement for an armored vehicle once the M60 tank is phased out. In view of studies now under way within Department of the Army, I question the advisability of making this decision at this time.

e. The net increase in costs for the over-all Board-recommended program is about $4.2 billion over a five year period. It is felt that this amount is conservative considering the DOD Directive to achieve markedly increased tactical mobility. The provision of urgently needed additional manpower and the restoration of a portion of the tradeoffs discussed above are considered adequate justification for accepting a net increase in costs of around seven billion dollars. In light of the improved over-all military posture to support the flexible response the nation requires, such an order of magnitude increase is considered reasonable.

5. (U) I am transmitting detailed recommendations separately to the Commanding General, Combat Developments Command for his consideration in connection with his review of the proposed organizations. Adjustments can and should be made during the continued study, test and war-gaming which is so essential to the introduction of these new concepts.

6. (S) It is emphasized that the single corps organization recommended for activation by the Board was specifically designed to support predominately airmobile operations in undeveloped areas such as South East Asia. If this organization is used in a sophisticated environment, it will require considerable reinforcement in artillery as well as other supporting arms and services.

7. (U) I am in complete agreement with the DOD criteria enumerated in paragraph 11 of the Board's recommendations as being applicable to all Army aircraft. To these I would add another:

"The aircraft must have the capability of living in the austere day to day environment of the troops it supports."

8. (U) The requirement for increased Air Force support, both in the

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tactical and logistical fields is emphasized by the findings of this Board. Despite the increases of organic Army aircraft indicated in this study, the Army will continue to rely heavily on the Air Force for support. It would appear desirable that a further review of Air Force requirements in these areas be instituted to insure allocation of adequate resources for these Army missions.

1 Incl
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HERBERT B. POWELL
General, U. S. Army
Commanding

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ARMY TACTICAL MOBILITY
REQUIREMENTS BOARD
Fort Bragg, North Carolina

AJBCG-AB 20 August 1962

SUBJECT: Report of Army Tactical Mobility Requirements Board (U)

THRU: Commanding General
United States Continental Army Command
Fort Monroe, Virginia

Chief of Staff
United States Army
Washington 25, D. C.

TO: Secretary of the Army
Department of the Army
Washington 25, D. C.

1. Forwarded herewith is the report of the Army Tactical Mobility Requirements Board, appointed by letter, United States Continental Army Command, dated 3 May 1962, subject: "Appointment of an Ad Hoc Board to Conduct a Re-examination of the Role of Army Aviation and Aircraft Requirements."

2. The Board has put the report in a format believed to be most useful to the Department of Defense: A brief of the essential proposal, the report proper, and a large volume of contributory committee, war game and test reports, a synthesis of industry proposals and suggestions, and other back-up material which the Army and Defense staffs may wish to consult.

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3. The report devotes a number of paragraphs to the theoretical requirement for greater mobility, not simply as a matter of desirable emphasis but also because the benefits to be derived from an additional mobility must be brought specifically to mind, even among experienced professional soldiers, if we are to decide whether they are worth the cost in dollars and manpower.

4. The Board and its subordinate committees have investigated all essential aspects of the very complex matter which is Army aviation. Work started in early May actually prior to receipt of instructions to proceed and has continued at an urgent pace through May, June, and July. The charter given the Board was so generous and provocative in its terms that the large number of officers, soldiers and civilians constituting its membership, plus some 90 civilians and 3200 military personnel involved for varying periods in troop test, experimentation and war gaming, have worked devotedly at the task on a very arduous schedule. This effort was backed up, in a most vigorous way, by offices of the Department of the Army and by the aviation and other related industries. Even so, I must acknowledge that the job is not in all respects complete, and that further study, test and war gaming are much to be desired and therefore recommended.

5. The foregoing does not indicate that I consider the Board's findings unvalidated or its judgment faulty; the time made available although not sufficient to prove all details of the Boards recommendations as respects organization, personnel, equipment, maintenance and doctrine, was quite sufficient to enable it, with conviction, to chart a course of action which will serve to increase markedly the combat and logistical efficiency of the Army. It is the Board's belief that a decision now to embark on that course may be made by the Secretary of Defense without commitment to the whole program, for the realities of aircraft procurement and the Army's current shortage of aircraft are such that the recommended initial procurement for the first two years will unquestionably fall within the minimum needs of the Army even under the current force structure. The Board moreover is strongly of the opinion that in each year succeeding this one a somewhat similar (but much smaller) board should be convened to review this report, the Department of Defense and Department of the Army decisions respecting it, the progress of the program as

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approved, the continuing development of organization and doctrine, and the state of the art as respects essential items of equipment - and as a result of that review make recommendations as to what modifications should be made to the program. This process should insure against major error in the prosecution of what is deemed to be a sound and essential scheme for the provision of critically needed airmobility to the United States Army.

HAMILTON H. HOWZE
Lieutenant General, USA
President

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Final Report, US Army
Tactical Mobility
Requirements Board

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ARMY TACTICAL MOBILITY REQUIREMENTS BOARD

Fort Bragg, North Carolina

BRIEF BY THE PRESIDENT OF THE BOARD

20 August 1962

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BRIEF BY THE PRESIDENT OF THE BOARD

The material herein is extracted in major part from the accompanying Report of the Army Tactical Mobility Requirements Board, the reading of which is unavoidable if one is to achieve a genuine understanding of the Board's work and the implications of all it recommends. This paper is not a summary of the Report but rather a brief of the primary proposal.

It is organized as follows:

One - The aircraft, by type, needed by the Army, and the equipment the aircraft will carry.

Two - A new organizational structure for the Army's forces in the field.

Three - A recommended program.

Four - The cost of the recommended program in terms of dollars and personnel.

Five - What must be done to make the program go.

Six - The benefits to be derived.

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ONE: EQUIPMENT

The Army has not attained a proper "airmobility" in the past because of a deficiency both in quality and quantity of aircraft. The deficiency in quality has now been largely overcome. We may now proceed, with assurance, to buy to the inventory necessary to achieve genuine mobility and thereby a greatly augmented combat effectiveness.

Table I-A shows aircraft, by category/mission, recommended to be included in the Army inventory.

TABLE I-A
ARMY

Category/Mission	Armament or Special Equipment	Sample Type Aircraft*
Observation		
Observation Helicopter	Light anti-personnel weapons	LOH (OH-?)
Command & Control Helicopters	Light anti-personnel weapons	LOH (OH-?)
Reconnaissance Airplane	IR, Radar, Camera	AO-1 (OV-1)
Attack		
Attack Helicopter	Anti-tank & anti-personnel weapons	HU-1B (AH-1B)
Attack Airplane	Anti-tank & anti-personnel weapons	AO-1 (AV-1)
Utility		
Utility Helicopter	Light anti-personnel weapons	HU-1B (UH-1B)
Tactical Transport Helicopter	Light anti-personnel weapons	HU-1D (UH-1D)
Air Ambulance		HU-1B (UH-1B)
Command Staff Airplane		L-23F (U-8F)
Utility Airplane		L-28 (U-10A)
Cargo		
Transport Helicopter	Light anti-personnel weapons	HC-1B (CH-47B)
Transport Airplane		AC-1 (CV-2A)
Heavy Lift Helicopter (Flying Crane)		(CH-?)

NOTE: *All Army aircraft are classed as Observation, Attack, Utility or Cargo (Helicopter or V/STOL). New designations (shown in parentheses) are from DOD Directive 4505.6, dated 6 July 1962.

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Table I-B shows aircraft by category/mission which will, on many of their flights, support the Army, but which are not recommended for inclusion in the Army inventory. Aircraft not contributing directly to the execution of the Army mission are omitted.

TABLE I-B
OTHER SERVICES

Category/Mission	Armament or Special Equipment	Sample Type Aircraft*	
Attack			
Visual Attack	Rockets, Bombs, Missiles, Napalm	A4D-5	(A-4E)
All Weather Attack	Rockets, Bombs, Missiles, Napalm	A2F-1	(A-6A)
Long Range Attack	Bombs, Missiles	AD-7	(A-1J)
Fighter			
Close Air Support	Rockets, Bombs, Missiles	F4H-1	(F-4A)
Deep Interdiction	Bombs, Missiles	F-111	(F-111)
Counter Air	Cannon, Air-to-Air Missiles	F-104	(F-104)
Deep Reconnaissance	IR, Camera, Radar	RF-101	(RF-101)
Cargo			
Intra-Theater Transport		C-123	(C-123)
& Troop Carrier		C-130	(C-130)
Inter-Theater Transport		C-141	(C-141)
Heavy Equipment Transport		C-133	(C-133)

NOTE: * Designations are from DOD Directive 4505.6, dated 1 July 1962.

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TWO: ORGANIZATION

Faced with the alternative of making all combat and logistic support units somewhat more mobile and of selecting specific units to be given genuine airmobility, the Board chose the latter as being far more productive. Table II shows major organizational innovations. Details of organization are shown in the Report and supporting annexes; here are shown simply the primary subordinate combat units and the aircraft devoted to their mobility, fire support and logistic support.

TABLE II

	Observation & Target Acquisition Helicopters	Command, Control, Utility & Maintenance Helicopters	Reconnaissance Airplane	Attack Helicopters	Attack Airplanes	Tactical Tran Helicopters	Air Ambulances	Transport Helicopters	Transport Airplanes	TOTAL
	*	*	*	**	**	*		*		
Air Assault Division 1 Air Cavalry Squadron 8 Infantry Battalions 5 Artillery Battalions	48	80	6	87	24	154	12	48		459
Air Cavalry Combat Brigade 3 Combat Squadrons (4 troops each)	72	52		144		48				316
Corps Aviation Brigade(1)		51	12	12		80		48		207(1)
Air Transport Brigade(2)		12						32	80	134(2)

NOTES:

* Aircraft in these columns will be armed with light automatic anti-personnel weapons.

** Aircraft in these columns will be armed with a variety of anti-tank and anti-personnel weapons and heavy quantities of ammunition.

(1) Corps Aviation Brigade also has 4 command airplanes.

(2) Air Transport Brigade also has one command airplane and nine heavy helicopters (flying cranes).

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The following organizations were provided additional aircraft. Current TOE's of ROAD Division and Armored Cavalry Regiment are shown for comparison.

TABLE III

	Observation and Target Acquisition Helicopters	Command, control, Utility and Maintenance Helicopters	Reconnaissance Airplanes	Attack Helicopters	Attack Airplanes	Tactical Transport Helicopters	Air Ambulances	Utility Airplanes	Transport Airplanes	TOTAL
	*	*	*	**	**	*				
ROAD Division (Current TOE) (Varying mixes of infantry, mechanized infantry, tank, and artillery battalions)	48		4			49		2		103
ROAD Division (Augmented)	84	23	4 (1)	8	8	25	12			164
Armored Cavalry Regiment (Current TOE)	13		13							26
Armored Cavalry Regiment (Augmented)	63	25		30		21				139
Corps Artillery (RODAC TOE)	8		4			4				16
Corps Artillery (Airmobile)	39	19	4	39		60				161
Special Action Force (Special Warfare)				8	4	4		4	4	24

NOTES: * Aircraft in these columns will be armed with light automatic anti-personnel weapons.

** Aircraft in these columns will be armed with a variety of anti-tank and anti-personnel weapons and heavy quantities of ammunition.

(1) Includes nine L-19 (0-1) airplanes.

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THREE: A RECOMMENDED PROGRAM

Expressed simply in terms of divisions (complementary combat and logistic support units being introduced later in this brief) five alternative programs are offered:

1. A five-year program to achieve a force structure of ten ROAD divisions augmented with additional aircraft and six air assault divisions.

2. An eight-year program to achieve the same force structure.

3. A five-year program to achieve a force structure of eleven ROAD divisions and five air assault divisions.

4. An eight-year program to achieve a force structure of twelve ROAD divisions and four air assault divisions.

5. A five-year program designed to activate and equip promptly a minimum of one each of the major airmobile units, then a rounding out of the force structure by 1967 to have three air assault divisions.

Table IV compares the current programmed objectives with the five alternatives.

TABLE IV
DIVISION FORCE STRUCTURE
(Number of Divisions and Program Years)

Division Type	Current End FY-67	Alt. #1 End FY-67	Alt. #2 End FY-70	Alt. #3 End FY-67	Alt. #4 End FY-70	Alt. #5 End FY-67
Inf	6	2	2	4	4	5
Armd	3	3	3	3	3	3
Abn	2	0	0	0	0	0
Mech	5	5	5	4	5	5
Air Assault	0	6	6	5	4	3
Total	16	16	16	16	16	16

The last formations activated should attain operational readiness by end of FY-68 (Alt. 1, 3 and 5) or FY-71 (Alt. 2 and 4).

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Since all of the air assault divisions will be part of the active Army, Table V shows only the alternative 16-division force structure/deployments. However, in appraising the total effect of the various air assault/ROAD division mixes, the Board considered these 16 divisions as part of the "22-division force."

TABLE V
ALTERNATIVE FORCE STRUCTURE/DEPLOYMENTS

Divisions		Current	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Korea	Air Aslt Div		1	1	1	1	
	Inf Div	2	1	1	1	1	2
Hawaii	Air Aslt Div		1	1	1	1	1
	Inf Div	1					
Europe	Mecz Div	3	3	3	3	3	3
	Arm Div	2	2	2	2	2	2
CONUS	Air Aslt Div		4	4	3	2	2
	Abn Div	2					1
	Inf Div	3	2	2	3	3	2
	Mecz Div	2	1	1	1	2	2
	Arm Div	1	1	1	1	1	1
Total		16	16	16	16	16	16
Air Cavalry Combat Brigades							
Europe			1	1	1	1	1
CONUS			2	2	2	1	1
Total			3	3	3	2	2
Air Transport Brigades							
Pacific			2	2	2	2	
Europe			2	2	2	1	
CONUS			1	1	1	1	1
Total			5	5	5	4	1
Program Years			5	8	5	8	5

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The Board recommends Alternative 3, a five-year program to reach a proposed force structure of eleven ROAD divisions, five air assault divisions, three air cavalry combat brigades and five air transport brigades plus certain other combat, combat support and service support units by the end of 1967, as the most responsive to the requirements for increased combat effectiveness.

An Army so structured will permit deployment as follows:

- In Korea, an infantry division positioned in the line with Korean units, an air assault division as an exceptionally mobile Eighth Army reserve, and an air transport brigade to supplement the difficult ground line of communication north from Pusan.

- In Hawaii, an air assault division, of which one brigade may be stationed in Okinawa, plus an air transport brigade also in Okinawa. These forces may be committed quickly, if necessary, to Southeast Asia.

- In Germany, an air cavalry combat brigade to form a very mobile counterattack reserve, strong in anti-tank weapons, for the Seventh Army. The five ROAD divisions and the armored cavalry regiments will be strengthened with modest additions of aircraft. An air transport brigade may be stationed in Germany and air transport brigades will presumable be available for prompt execution of the contingency plans for which US Army Europe is responsible.

- In the Continental United States, three air assault divisions (two of which would retain parachute capability), two air cavalry combat brigades and an air transport brigade which may be used for the execution of STRAC contingency plans or to reinforce either the European or Pacific theaters. Air assault divisions require about half the strategic airlift of a ROAD infantry division.

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FOUR: THE COST

Subsequent tables reflect only the implications of the recommended alternative. Other alternatives are costed out in the Report and its Inclosure 5.

TABLE VI
AIRCRAFT PROCUREMENT PROGRAM
(Number of New Aircraft)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year
Alt. #3	1,043	1,630	2,585	2,568	3,096	10,922
Current Army Program	582	909	1,224	1,086	1,086	4,887
Increase	461	721	1,361	1,482	2,010	6,035

TABLE VII
AIRCRAFT SYSTEMS AND AMMUNITION
(Millions of Dollars)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year
Alt. #3	544.4	1,120.5	1,362.9	1,265.5	1,153.0	5,446.3
Current Army Program	246.4	331.2	395.8	349.6	339.2	1,662.2
Increase	298.0	789.3	967.1	915.9	813.8	3,784.1

TABLE VIII
COST COMPARISONS FOR CURRENT AND PROPOSED UNITS
(Millions of Dollars)

	Costs (CONUS)		
	Initial Equipment	5-Year Operating Cost	Total 5-Year Cost
Air Assault Div (New)	282	705	987
ROAD Mech Div (Current TOE)	155	646	801
ROAD Inf Div (Current TOE)	111	582	693
ROAD Arm Div (Current TOE)	182	681	863
ROAD Abn Div (Current TOE)	76	579	655

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A major source of trade-off funds is in the PEMA appropriation, wherein savings are realized from a sharp cutback of ground mobility equipment in the converted divisions. Other transportation systems directed towards improvement of ground mobility, such as GOER, are also nominated for trade-off. Savings in these areas are estimated to be 1.6 billion dollars for a 5-year period.

A saving is shown in the R&D appropriation for all fiscal years by the reduction or elimination of R&D programs directed toward drones, a new main battle tank, a new family of trucks, and other systems.

TABLE IX
TRADE-OFF
(Millions of Dollars)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total
PEMA	87.6	237.2	350.4	436.0	533.0	1644.2
RDT&E	45.6	77.5	62.7	70.4	80.6	336.8
Total	133.2	314.7	413.1	506.4	613.6	1981.0

TABLE X
TOTAL OBLIGATION AUTHORITY REQUIRED
(Millions of Dollars)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total
Force Structure Costs	12098.4	13844.0	14149.5	13856.9	13588.6	67537.4
Other Costs*	719.0	773.9	768.7	776.3	776.7	3814.6
Trade-Offs	-133.2	-314.7	-413.1	-506.4	-613.6	-1981.0
Total Obligations Authority Required	12684.2	14303.2	14505.1	14126.8	13751.7	69371.0
Current TOA	12384.1	13484.4	13436.3	13089.7	12751.3	65145.8
Differential	+ 300.1	+ 818.8	+1068.8	+1037.1	+1000.4	+4225.2

* Miscellaneous appropriations including NG and RES.

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TABLE XI
COMPARISON OF 5-YEAR COSTS ACCORDING TO MAJOR APPROPRIATION
(Millions of Dollars - Trade-Offs Included)

Program	RDT&E	MPA	O&MA	PEMA	MCA	Other	Total
Current	7185.5	20555.9	18359.0	14241.7	989.1	3814.6	65145.8
Alt. 3	7390.2	20607.7	19966.5	16381.6	1210.4	3814.6	69371.0

Aviation personnel implications were examined in detail. A comparison of the recommended program to the current program is shown in TABLE XII.

TABLE XII
AVIATION PERSONNEL PROGRAM COMPARISON

	FY-63		FY-64		FY-65	
	Current	New	Current	New	Current	New
Officer	6,500	6,500	6,700	6,900	7,700	8,200
Warrant Off	2,200	2,400	3,000	3,000	3,200	4,000
Enlisted	20,500	34,900	20,500	39,100	21,100	46,100

	FY-66		FY-67		FY-68	
	Current	New	Current	New	Current	New
Officer	7,900	10,100	8,000	10,800	8,200	10,300
Warrant Off	3,200	5,900	3,200	9,600	3,200	10,300
Enlisted	21,800	56,400	23,100	66,600	24,700	71,000

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FIVE: WHAT MUST BE DONE

The recommended program will have great impact on the Army as respects management, doctrine, personnel, maintenance and the budget. Developed in necessary detail in the Report and its annexes, these are summarized here as a matter of emphasis.

Management - As did the Navy for Polaris, the Air Force for the ICBM, and the Army for the Nike family of missiles, the Army must establish a strong management system for the creation of the new capability. The Board does not suggest a parallel staff system, but rather the addition of individual staff positions to the present staff structure - positions to be filled by officers charged with directing staff action necessary to the achievement of the goal and given the authority necessary to make the system work.

Doctrine - The doctrine to support the concepts enunciated by the Report is not difficult to formulate, although a wide departure from present tactical doctrine must be developed for airmobile units and the larger forces incorporating them. The Combat Developments Command, in coordination with other major CONUS commands, must expand the basic concepts of the Board into approved Army doctrine.

Personnel - An extensive revision of the personnel policies of the Army as they apply to the aviation program is necessary. A major requirement is to increase the Army's current authorization of commissioned and warrant officers to provide for the increased number of aviators - particularly warrant officer aviators. New policies are developed fully in the Report and Annex Q.

Maintenance - The concept and procedures of maintenance of Army aircraft also require major revision. This is also developed in the Report and Annex N.

Budget - Major budget implications are shown earlier in this paper.

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Four additional follow-on actions are necessary:

Additional Experimentation and Testing - Fundamental to the eventual achievement of airmobility is a program for continuing experimentation, test, and war gaming. These should be the responsibility of the Combat Developments Command, which should maintain very close association with industrial concerns capable of contributing to the effort. The process should serve to refine the tactical doctrine, organization, procedures, and the requirements for weapons, avionics and aircraft configuration and other action initiated by the Board. The product of the Board work will be turned over in toto to CDC.

Research and Development - RDT&E should be geared specifically to the development of the necessary materiel to support the concepts and organizational structures recommended by the Board as they may be approved and adopted. Special attention should be devoted to research and development that will result in improved reliability and maintainability of future aircraft and power plants. Where practicable the results should be applied to current aircraft and power plants.

Product Improvement - The PEMA program should include, at an early point in all development projects, adequate provisions for improving the reliability, maintainability, and increased life of engines and other dynamic components.

Review - Each year a competent board of officers should be convened to review the recommendations of this Board, the action taken thereon by the Department of the Army and the Department of Defense, the progress of the program in all its aspects (and with particular reference to the results of CDC experimental and test program) and thereafter recommend appropriate modifications to the program proposed by the Board.

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SIX: THE BENEFITS TO BE DERIVED

All these may be lumped under a single heading - the combat effectiveness of the Army.

The United States is faced with the possibility of fighting one or more of four varieties of hostile ground forces:

- A modern army (the Soviet, reinforced by European Satellite armies) whose primary characteristics are great size, a large inventory of heavy combat vehicles and artillery, and a capability to employ nuclear and chemical weapons.

- An Oriental army (Communist Chinese, Vietminh, North Korean or a combination of two of these) characterized by large size, relative unsophistication, great foot mobility, and an association with the area not enjoyed by US forces.

- Insurgents, such as the Viet Cong, who achieve strength not from modern weapons but from foot mobility, elusiveness, difficulty of identification, surprise, and the sympathy or fear of the local populace.

- Other forces (African, Middle Eastern, Latin American) likely to resist the execution of existing STRAC contingency plans.

The Alternative 3 Army will have an unusual flexibility of response to any of the likely demands for the application of land combat power, and a much improved effectiveness in execution.

- Better deployability of airmobile forces will permit faster reaction by the general reserve.

- Improved tactical mobility will provide the best foreseeable chance of coping with the largely unknown contingencies of the land battle in an atomic war.

- Greater mobility will improve the chances of success of the detection, screening and delay missions charged to the cavalry regiments which, in Germany, form the forward fringes of the "shield."

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- A highly mobile counterattack reserve, strong in anti-tank weapons, will, in Europe, serve as a most valuable counter to strong Soviet armored thrusts.

- Airmobile US units will provide the most effective augmentation to friendly indigenous forces fighting Communist armies in Southeast Asia or Korea, not only be reason of their freedom from local limitations to surface transportation buy also because their extreme mobility will permit a flexibility of employment much to be desired, perhaps as a counterattack reserve or as a blocking or enveloping force.

- Whatever the difficulties of detection and identification, airmobile forces have the best chance of surprising and eradicating guerrilla forces, and at the same time stand to suffer fewer losses due to the ambush of combat and supply columns.

- Two of the three CONUS-based air assault divisions will retain the ability to conduct parachute assault in execution of contingency plans, but will also (by the incorporation of additional aircraft in their structures) have far better means to accomplish the missions set by those plans.

There are also corollary benefits, of which one only is worth mentioning here: the incorporation of the concept of modern tactical mobility into the Army will have an enormously vitalizing effect on its whole structure, and this in turn cannot fail to strengthen our national reaction to whatever challenges the future may hold.

Hamilton H. Howze

HAMILTON H. HOWZE
Lieutenant General, USA
President

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FINAL REPORT, ARMY TACTICAL MOBILITY REQUIREMENTS BOARD

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AIRCRAFT DESIGNATIONS

Aircraft designations were changed recently by DOD Directive 4505.6 dated 6 July 1962. To assist the reader of this report, both the old and new designations are shown for each aircraft (the new in parenthesis). Further, since most Army aircraft are used for a variety of missions the following list describes the major Army missions within the various categories, the popular name of the aircraft and its designations.

Observation

Used to observe (through visual or other means) and report information concerning composition and disposition of enemy forces, troops, supplies and adjust artillery fire. In addition used for command, control, liaison, lightweight resupply, reconnaissance and emergency evacuation.

	NAME	OLD DESIGNATION	NEW DESIGNATION
Observation Helicopter	Sioux	H-13	(OH-13)
Observation Helicopter	Raven	H-23	(OH-23)
Observation Helicopter	-----	LOH	(OH-?)
Observation Airplane	Bird Dog	L-19	(O-1)
Surveillance Airplane	Mohawk	AO-1	(OV-1)

Attack

Used to search out, attack and destroy enemy targets using conventional or special weapons. Also used for limited interdiction and very close air support missions. Provides armed escort and conventional artillery-type and automatic weapons-type base of fire. When suitably armed, used as highly mobile anti-tank weapon.

	NAME	OLD DESIGNATION	NEW DESIGNATION
Attack Helicopter	Iroquois	HU-1	(AH-1)
Attack Airplane	Mohawk	AO-1	(AV-1)

AIRCRAFT DESIGNATIONS (Continued)

Utility

Used for miscellaneous missions such as carrying cargo and/or passengers, aerial ambulance, small unit tactical transport and command and control. These aircraft will include those having a small payload.

	NAME	OLD DESIGNATION	NEW DESIGNATION
Utility Helicopter	Iroquois	HU-1	(UH-1)
Utility Airplane	Beaver	L-20	(U-6)
Utility Airplane	--------	L-28	(U-10)
Command/Staff Airplane	Seminole	L-23	(U-8)

Cargo

Used for assault support and logistical cargo and troop transport within the battle area. May also be used for such specialized missions as refueling, resupply of ammunition to combat formations and the evacuation of casualties or damaged equipment. In addition, those aircraft possessing a VTOL capability may be used as flying cranes to transport surface vehicles and other heavy equipment over natural or man made obstacles.

	NAME	OLD DESIGNATION	NEW DESIGNATION
Transport Airplane	Caribou	AC-1	(CV-2)
Transport Helicopter	Chinook	HC-1	(CH-47)
Heavy Lift Aerial Vehicle	Flying Crane	-----	(CH-?)

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The complete membership of the working committees and groups is shown at Annex A.

FINAL REPORT
US ARMY TACTICAL MOBILITY
REQUIREMENTS BOARD

(S) I. TASK

This report is directly responsive to the two April 19 memoranda of the Secretary of Defense and the subsequent directives by Headquarters, Department of the Army, and Headquarters, US Continental Army Command, contained at Inclosure 1; hence it discusses only those requirements for mobility which may be met by aviation. On the other hand ground movement, as a competitor to movement by air, was properly considered throughout the Board's[1] deliberations.

While careful reading of the initiating memoranda and directive is necessary for full understanding, the problem facing the Board may be stated thus: to what extent may aircraft properly be substituted for ground vehicles to provide combat and logistical mobility for the Army? Corollary to the basic question are the advantages and penalties incurred by the substitution. The problem is an immensely complicated one, impinging not only on the whole structure and tactics and doctrine and training of the Army, but also on the structure of the Defense budget, on industry, and to a limited extent on the roles and missions of the armed services.

In recognition of the great cost of any extensive aviation program the Board presents "trade-offs" which partially compensate for that cost. It also presents alternatives to the optimum solution.

(S) Intelligence

The Board is aware that the headquarters reviewing this report are entirely current on the latest intelligence of the Sino-Soviet bloc; the information is therefore omitted here. It should be noted however that the Board received from the Assistant Chief of Staff, Intelligence, Department of the Army, a full report[2] and briefing. Points of special interest to the Board were the increasing Soviet confidence in the deterrent effect of their long range strike forces and defensive posture;

1 - Annex A, Roster of Board Members

2 - Annex D, Intelligence

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the continuing probability of limited conflict along the southern periphery of the Bloc; the increasing possibility of aggression against Western Europe; the preponderance of armored striking power, long range missiles, and tactical aviation organic to the Army of the Soviet Union; and the very considerable possibility of Soviet use of chemical and biological warfare even in non-nuclear warfare.

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(S) II. METHODOLOGY

The most significant activity of the Board was the investigation, test, and evaluation of operational concepts of airmobility. Solutions were expressed in terms of organization, procedures, and the application of weaponry and aircraft. Development and test were concurrent. It would have been better to proceed sequentially, but there was not time for this.

(C) Field Tests[1]

Very great effort was devoted to field experimentation, for which some 150 Army aircraft and their crews were assembled at Fort Bragg for an 11-week period, this strength being supplemented for a period of 7 days by 16 C-130's of the Air Force. Troops of three battle groups of the 82d Airborne Division participated. The force available made it possible to execute several exercises, for purposes of comparison, first by a conventionally equipped force and then by one made mobile by the addition of aircraft. Other exercises, not practicable of execution by conventional forces, were done only by experimental organizations. Some 40 formally identified tests were run, ranging from fairly elaborate live-fire exercises and three major week-long exercises against an assumed force of irregulars (one done in conjunction with the Air Force) down to auxiliary tests of a variety of new items of weapons and other equipment. In the conduct of these tests the Board was much aware of the suggestion of the Secretary of Defense that scientific appraisal be made of results, wherefor Stanford Research Institute (SRI) and other agencies were asked to assist. The seven scientists provided by SRI, Technical Operations Incorporated (CORG), Research Analysis Corporation (RAC), and RAND Corporation observed the tests on a daily basis and combined their judgments with those of the officers who developed the tests and also observed them.

The tests were of three general categories: (1) a series to evaluate the reconnaissance and security, tactical mobility, firepower, and logistical aspects of organizations designed by the four conceptual committees of the Board; (2) tests of newly designed organizations in their applicability to counterinsurgency; (3) "side tests" of new items

1 - Annex O, Field Tests

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of equipment and special techniques, e. g., more accurate airdrop procedures, cargo snatch from moving aircraft, comparative capabilities of aircraft, and hasty airfield construction and repair.

Through the use of experienced military and civilian evaluators the technique assessed the more important indicators in each test. By varying the number of helicopters and planes, vehicles, weapons and the number of soldiers, an attempt was made to gain close approximations of the relative numbers of each going into a proper mixture. Using questionnaires and interviews to supplement observation, test designers and evaluators sought to gain insight into the validity of the new concept.

Of the validity of the basic idea -- that many operational tasks can be done better with than without Army aviation -- the tests left little doubt. It is necessary to state however that the field tests, although most convincing as respects the effectiveness of airmobility applied to the fighting and supply of the land battle and providing a most valuable "hand up" to the agency which should take over the responsibility for this sort of testing, nevertheless constitute simply the start of a process which should never be allowed to die.

While confirming earlier estimates of general feasibility, tests additionally opened new avenues of profitable application. Only partly anticipated new problems also appeared -- but so did measures for their solution. A most important side product was the formulation of new standing operating procedures (SOP's) for the execution of many tactical and logistical chores, which when repeated according to SOP showed tremendous improvement.

(S) War Games[1]

The objective of the war gaming, put under the general supervision of the Research Analysis Corporation (RAC), was to provide measurable responses to various questions posed by the airmobility concept, particularly those pertaining to the combat effectiveness of airmobile organizations (as compared to their surface transported counterparts) and to optimum over-all organization within the airmobile resources likely to be available.

1 - Annex M, War Games

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War game results were greatly influenced by the geographic character of the several countries serving as game locales. The character of existing road nets was of fundamental importance. Games examined the relative effectiveness of the competing concepts with reference to such matters as speed of reaction, destruction rates, economy of force, and eventual compatibility with our economic and industrial capability.

Although the games varied widely in force composition and analytical techniques, the general approach to mission effectiveness was to play repetitive games, employing first ground-bound or ROAD organizations under a given set of circumstances,[1] and repeating the play - under the same circumstances - employing airmobile formations and tactics appropriate to the units' increased mobility. Relative effectiveness was determined by destruction rates, time to accomplish a given mission, and the number of units required to accomplish it. Organization, tactics and logistics were under constant review during the play, adjustments being made to produce what were judged to be optimum solutions.

Games played are listed in ascending order of complexity:

- Varying mixes of airmobile and ground formations, reinforced company and smaller.

- Brigade and battalion-size units with normal reinforcement.

- Divisions.

- Theater, to include combat elements, theater support organization and appropriate portions of the inter-theater lines of communication (LOC).[2]

---

1 - Conventional War Forces, 1967 (Vols I-XI), Office Deputy Chief of Staff for Military Operations, Department of the Army, initial edition, June 1962 (ID 5970300)

2 - Terms used by the Board and cited in this report are used as defined in AR 320-5, Dictionary of United States Army Terms and in JCS Publication 1, Dictionary of United States Military Terms for Joint Usage. Other terms are defined in Inclosure 2, Glossary of Airmobility Terms.

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The final effort was an analysis of four area studies based on the situations developed and employed to examine the general purpose forces requirement by another Army study group.[1] Here the group used analytical techniques rather than gaming; these permitted rapid evaluation of large force engagements throughout the theater.

Although gaming gave reliable quantitative answers to various aspects of an airmobile operation -- particularly those problems relating to deployment, speed of inter-theater movement, character and quantity of lift requirements -- no examination was really exhaustive and time limitations required a number of shortcut techniques which resulted in aggregating results on a rather gross basis. In addition, the generally unprecedented character of airmobile combat made particularly difficult the examination of actual unit-to-unit engagements and what amounted to unit or weapons exchanges. Historical and experience factors are not reliable when the character of combat departs substantially from previous experience. Much of the work had to be done on a pretty subjective basis.

Another weakness was that in many cases examinations were one of a kind. A single test cannot be claimed to establish a very broad base of confidence in the findings. We must acknowledge that the war gaming initiated this summer is incomplete in scope and method, and should therefore be continued and refined until the most accurate answers, practicably to be expected, are provided. Unquestionably the process will serve to steer us away from blind alleys in tactics and technique.

(U) Operations Research

In addition to furnishing individual analysts, the Research Analysis Corporation (RAC) and Technical Operations Incorporated (CORG) contributed studies and analyses used extensively by subcommittees of the Board. RAND Corporation and the Stanford Research Institute furnished several analysts and scientists for consultation and evaluation of subcommittee activities. Their efforts were most beneficial.

1 - Conventional War Forces 1967, ODCSOPS (1D5970300)

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(U) Assistance from Senior Officers

The Board dispatched some 400 letters to ranking, experienced officers, active and retired, setting forth the problem and asking for suggestions and opinions. The response was strong, indicating great interest. Short quotations from a very few of the replies are interspersed within this report, but advice was taken from many officers not quoted.

(U) Technological Forecast[1]

The Board asked a group of experts to review prospects for the period 1963-1975. The resulting Technological Forecast was considered carefully in the development of concept and during preparation of the report.

(U) Contributions of Industry[2]

Over 300 letters were dispatched to interested firms of the airframe, engine, electronics, and armament industries, again asking for suggestions. From the nearly overwhelming response much benefit was derived by the Board and more will be derived by Combat Developments Command and the Research and Development Office of the Department of the Army. Industry is intensely interested in Army aviation developmental efforts, and stands ready to devote very great resources to that endeavor. The Board had to reject numerous offers of briefings.

A large variety of suggestions were received, ranging from modifications of existing equipment to novel devices for improving the Army's effectiveness in critical combat functions. Suggestions and ideas covered reconnaissance, surveillance, target acquisition, maneuver, firepower, logistical support and command and control.

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1 - Appendix 11, Technological Forecast to Annex I, Long Range Concepts and Requirements

2 - Annex P, Industry Inputs

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(C) Logistics Studies[1]

A selected team of Army logisticians, together with a civilian advisory panel representing twelve different civilian aircraft manufacturers and agencies, made an extensive survey of the present Army aircraft logistical support system to appraise its ability to support current aviation and the potential of the system for satisfying expanded requirements. Additionally investigations were made in the fields of theater logistics, the general economics of air and surface transportation, petroleum distribution, airdrop methods, materials handling equipment, airfield construction criteria, vulnerability of surface and aerial lines of communication (ALOC), organizations and communications demands for an ALOC, medical support, uses of strategic lift in theater resupply, deployment patterns of Army aircraft, air transportability, the use of aircraft in the reduction of depot stocks, troop support requirements, and the planning factors involved in the studies themselves.

(C) Southeast Asia Visit[2]

Selected members of the Board visited the several nations of Southeast Asia to obtain an appreciation of the possibilities for Army aircraft employment under the Board's newly developed concepts. Their visit had the benefit of assuring that the Board's solutions were of a nature which could find application in the area.

(S) Special Warfare[3]

In support of the Board's analysis of concepts and requirements, a war game was conducted by the Special Warfare Center at Fort Bragg. Set in Thailand, the game included the play of all elements of a Special Warfare Task Force with the aim of placing aviation support in perspective.

1 - Annex L, Logistics Concepts and Requirements

2 - Annex B, Report of Southeast Asia Visit

3 - Annex J, Special Warfare Concepts and Requirements

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Three phases were played: deployment to Thailand, advice and assistance to indigenous forces countering incipient and low intensity insurgency, and intensified assistance to indigenous forces committed in combat against insurgent elements employing terrorism and guerrilla warfare. Results of the war game provided a reasonably valid basis for determining the basic requirements, capabilities, and limitations of supporting Army aviation.

(C) Loading Studies[1]

A detailed item-by-item aircraft loading study was completed. It demonstrated that strategic air deployment of airmobile formations required substantially less lift than ROAD counterparts. As a prime example, in a move to Europe an airmobile division requires only half the strategic airlift required by a ROAD infantry division.

(S) Force Effectiveness Study[2]

The objective of the force effectiveness study was to assemble the evidence developed by the Board and relate it to principal combat and combat support functions and units for assessment of comparative unit effectiveness. For this a list of comparative advantages and disadvantages of airmobile forces was developed from reports prepared by the various groups designing the proposed units and through interviews with key members. A detailed survey was made of pertinent evidence obtained from field tests, computer and manual war games, analytical models, operations analyses and observations reported from Southeast Asia. The weaknesses of each test system were acknowledged in the evaluation process.

Three sets of comparisons were undertaken:

- Air Assault Division vs ROAD Infantry/mechanized Division;

1 - Appendix 16, Strategic Airlift Requirements, to Annex K, Tactical Concepts and Requirements

2 - Inclosure 4, Force Effectiveness Summary

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- Air Cavalry Combat Brigade vs Armor Group; and

- Air LOC vs Ground LOC (from strategic unloading point to division base).

Each set was then analyzed relative to three conflict situations in the FY-1964 to FY-1968 period: against guerrillas, against an unsophisticated but conventionally organized enemy (e.g., Communist China in Southeast Asia), and against a sophisticated enemy (e.g., the USSR in Europe).

Combat unit comparisons were made in the fields of mobility (maneuver and surprise), surveillance and target acquisition, fire-power, communications, vulnerability, logistic support, and unit maintenance.

The results of the force effectiveness study are presented in Section IX following.

(C) Continuation of Airmobility Studies and Tests

The recent activation of a Combat Developments Command (CDC) recognized the need within the Army for a central agency to develop combat doctrine and organizations. Accordingly, the Board established close liaison with CDC from the outset and has made available to CDC its methodology, test data, and standing operating procedures.

It is anticipated that the momentum of experimentation will be continued under CDC on a scale adequate to insure an orderly transition to the new concepts and doctrine.

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(S) III. THE REQUIREMENT FOR MOBILITY

(S) Fundamental Considerations

The theoretical requirement is so evident as to need little proof, but it is, nevertheless, necessary to examine the requirement with some care.

In battle between sophisticated opponents, improvements in firepower (in terms of missiles, guns, tank-killing weapons, vastly more effective warheads, and improved chemical and biological and nuclear weapons) have outstripped concurrent efforts to improve the cross-country mobility of the combat and logistical forces. If mobility does not match firepower, we cannot properly exploit the effects of our firepower on the enemy, nor ameliorate and otherwise cope with the effects of enemy firepower on ourselves. Even so, cost and other considerations led the Board quickly to the conclusion that not everything can or should be made completely mobile, whether by ground or air means: the principle of selective mobility must be accepted together with the corollary that what one makes mobile at high cost must be worth the effort and expense.

In Western Europe, a special combination of political and other circumstances influence the manner and degree to which airmobility can be exploited. The opposing armies are already deploying for battle, removing one requirement for mobility; the fact that the largest segment of the NATO ground force is German makes psychologically necessary a plan that the shield will stand and fight; and finally, the terrain is fairly traversable by ground vehicle. On the other hand there are still many obstacles to ground movement on the terrain; the Soviet forces will presumably have the initiative, at least in the beginning; and they have a strong preponderance in the major tools of surface combat mobility, the tank and the self-propelled assault gun. In these circumstances an improved capability for the detection and delay of the initial onslaught by the forward fringes of the shield -- the armored cavalry regiments -- appears very necessary, as does a capability for the field army to deploy, with great rapidity, an effective counterattack reserve strong in anti-tank weapons.

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If tactical nuclear weapons and chemical munitions enter the battle additional premiums will accrue to the side possessing the flexibility and mobility inherent to airmobile forces -- which of all forces will be most able to surmount the formidable artificial obstacles characteristic of such a battlefield and react most rapidly to unexpected situations.

The senior Army commanders in Germany, however, do advise a cautious schedule of conversion to airmobile units.

As respects combat against irregular forces in developing areas (Southeast Asia and Central Africa) an even stronger case may be made for airmobility as an essential ingredient of success. In the circumstances existing and likely to exist there surface mobility is very often that of a marching soldier, and the guerrilla -- locally acclimated, lightly equipped, and able to fade easily into the countryside -- must be credited with a foot mobility and an elusiveness greatly exceeding that of his regular soldier opponent.

We must obviously exploit the products of modern science to redress the imbalance, and since the terrain and the nature of the fighting give little hope of doing it by ground vehicle, we must, for much of our tactical movement, take to the air. As respects supply, in the local circumstances, it is enough to say that the doctrinaires of guerrilla warfare maintain that regular forces can be made to employ the major part of all their combat forces to guard surface lines of communication, and even then the irregular will find multiple opportunities for the successful ambush of his opponent's supply columns.

In combat against identifiable, uniformed forces (e. g., the Chinese Communist Army) in areas such as Southeast Asia the products of science must again be made to counter the effects of great enemy numerical superiority. Certainly much attention must be devoted to firepower, but inasmuch as mechanical surface mobility has small chance by reason of the terrain to outstrip enemy foot and animal transport, the air again offers the greatest chance to achieve superiority.

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(S) Selected Situations - Korean War

Whatever the circumstances of combat, the advantages of tactical mobility -- and the surprise which usually can be depended upon to result -- are vividly matched by the penalties which have attended deficits in mobility. Every soldier of any combat experience can look back over his own adventures to discover multiple instances in which the availability of light aircraft would have turned defeat, frustration or indifferent success into thumping victory. The importance of this sort of examination should not be underestimated. Below are cited very briefly three of a large number of situations in which light aviation would have had the most telling influence on the Korean War.

- In the very early days US units and the few remaining, largely demoralized, South Korean forces were falling back rapidly before the advancing North Koreans. The tactics almost invariably employed by the enemy were those of rapid envelopment, via the surrounding hills, of each US-established delaying position. For lack of what General Gavin calls "eyes", the envelopments could not be detected; the result was that the US unit either withdrew prematurely, to the benefit of the enemy, or had to fight its way out of a trap against the ambushing fire of a hostile force emplaced across its line of withdrawal. Light aviation units could have (1) detected and (very often) blocked the envelopment, (2) charted and protected a safe route for a unit that became, in spite of the blocking effort, encircled, or (3) lifted the unit out if, as a last resort, that had proved necessary. The result would have been a vastly more effective operation.

- When the amphibious landing was made at Inchon the 1st Cavalry Division, located in the Pusan perimeter, thrust northwest to link up with the beachhead. The effort, commended at the time as a very laudable one, took five days, in consequence of which the take in prisoners was very disappointing. A division made properly airmobile could have blocked all principal routes of withdrawal between the perimeter and the beachhead within perhaps eight hours, with the consequent prospect of bringing to bay most of the North Korean Army.

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- After the link-up, a period of 28 days was necessary to move the forward edge of the UN forces to a line which averaged about 60 miles south of the north border of Korea. Airmobility of the type visualized by this report could have moved strong elements to seize key positions astride routes of communication -- some at key points on the north border -- within a very few days. It is a matter of speculation as to what the results of this might have been, but it is at least possible that the Chinese Communists (who must have decided to intervene only after the initiation of the successful UN offensive in the south) would not have attacked across the Yalu if its south bank were defended by our forces. Hence the struggle might have ended altogether at that time.

Parenthetically, it may be pointed out that the US offensive started on 24 November was hailed as one "to get the American soldier home by Christmas" -- yet within two days the UN forces were opposed by and retreating from overwhelming numbers of Chinese that had moved, largely undetected, into the area immediately confronting them. Air Cavalry, had it existed, must surely have discovered and delayed this enemy force; our army was blind.

(S) Analysis of Contingency Operations

An analysis was made of the comparative effectiveness of conventional and airmobile operations in the possible execution of one of the most important, thoroughly worked out current STRAC contingency plans.

The 101st Airborne Division developed a subordinate plan for the execution of the division's mission (in the actual plan) under the assumption that Army aviation would be available in optimum quantity. The resulting study is TOP SECRET and is available to authorized persons on a need-to-know basis at Headquarters XVIII Airborne Corps. The results summarized here are within the SECRET classification.

The weather, terrain and enemy's lack of mechanization renders the contingency situation highly suitable to airmobile operations. Seizure of key terrain features by a series of airmobile assaults would, it is believed, result in the rapid deterioration of the enemy's armed forces and the collapse of organized resistance. Operations analysis concluded that the assigned mission could be accomplished in four days using the airmobile concept in contrast to the seven days visualized in the current plan.

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Total support comparison for the two plans are indicated in Table I.

TABLE I

ITEM	CURRENT PLAN	AIRMOBILE PLAN	PERCENT CHANGE
Number of Personnel	38076	29168	- 23.4%
Number of Vehicles	12935	7041	- 45.6%
Number of Aircraft	87	374	+ 329.0%
Short Tons of Supplies	55340*	24820**	- 55.1%

(* Current plan supply factors based on seven day operations.)

(**Airmobile plan supply factors based on four day operations.)

Readily apparent are the large reductions in vehicles and supplies and a significant reduction in personnel. The 329 percent increase in aircraft, while apparently large, is considered nominal in view of increased effectiveness and other support reductions. Reductions were possible for these reasons:

- Minimum surface LOC was required.

- Water terminals were eliminated on D+2 after troops and equipment were landed.

- Surface transportation units were significantly reduced.

- Logistical depots were eliminated.

- Engineer support was restricted to combat support operations and limited maintenance.

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- Other surface logistical installations were eliminated through use of the aircraft carriers as bases.

Surface shipping required to support the operation was reduced, by careful study by the qualified logistical command, as indicated in Table II.

TABLE II
SURFACE SHIPPING REQUIREMENTS

TYPES	CURRENT PLAN	AIRMOBILE PLAN	PERCENT CHANGE
Commercial Ships	68	50	- 26.5%
Comet and Taurus	10	4	- 60.0%
LST's	28	18	- 35.0%
Troop Transports	13	7	- 46.2%

Note: Current plan is based on seven day operation - airmobile plan is based on four day operation.

The contingency plan study should evaluated in light of the fact that it was developed by staffs intimately acquainted with the details of actual plans which they are prepared to execute.

Lieutenant General Gavin, the Ambassador to France, wrote this to the Board: "If there is one thing that stands out clearly in all recorded history of man's military endeavors, it is that innovation is essential to survival and is usually decisive in battle.....Regardless of the weapons system employed, but assuming it is employed with reasonable intelligence and direction, the final criterion of effectiveness is the product of both firepower and mobility. These may have exponential values, and in fact, the mobility part usually does. It is in a thorough exploration of the field of mobility, and the application of the knowledge gained, that we will find the greatest possibility for innovation in the future.

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....."The demand for this form of mobility may be quite staggering..... but if the Soviets develop their forces along these lines and match them with tactical nuclear firepower, they will not only defeat us in all guerrilla action but drive us like chaff before the wind in general conflagration....."[1]

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1 - Lt Gen James M. Gavin, USA-Ret - Ambassador to France
Letter to Board President, 18 June 1962

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(C) IV. RESPONSE TO THE REQUIREMENT

(C) Basic Precepts and Their Application

After some weeks of work the Board accepted the following propositions as fundamental to the problem of how to achieve greater mobility, and hence combat effectiveness, in the Army:

- The Army is not now equipped to meet fully the requirements of battle either against major Soviet forces employing the weapons and equipment already available to them, or against less sophisticated forces operating in very difficult terrain.

- Quantum increases in ground mobility are not to be expected regardless of the effort devoted to the purpose.

- Major advances have been made in light aviation - particularly helicopter design and performance - in the last 20 years, and the field is a viable one. Aggressive research and development in ordnance, avionics, and communications will materially reduce current limitations in the operation of Army aircraft. A minimum number of aircraft types will reduce price and improve maintainability.

- An improved deployability of Army combat units reduces strategic and contingency reaction time.

- Air-delivered firepower by the several services must be complementary. (This matter is discussed further in Section VIII, Joint Considerations.)

- Reliance must be placed on other services for inter-theater sea and air lift, and as much intra-theater airlift as practicable.

- The combat effectiveness of our forces is affected directly by the flexibility and responsiveness of supporting logistic forces. Logistic considerations impose tyrannical limitations on the will of the commander.

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- In all modern warfare lines of communication are subject to serious interdiction by guerrilla action, and this is particularly true in counterinsurgency operations.

- Adherence to a modular or building-block principle permits better operational flexibility of combat units.

- The application of airmobile force requires close coordination of action by supporting means, e.g., other assault elements (if used), attack aircraft, and artillery.

- Airmobile firepower (fixed and rotary wing attack aircraft, air transportable artillery) must be closely integrated into conventional and airmobile combat unit structures.

- Conversion of selected ROAD divisions to air assault divisions places primary reliance for mobility on the shuttle use of air vehicles.

- Continuation, essentially unchanged, of other ROAD infantry, armor and mechanized divisional organizations is required. However, their combat effectiveness (and that of the armored cavalry regiments) can be further improved by the addition of modest quantities of aircraft.

- Conversion of both airborne divisions, which now serve a most important role as contingency forces, to air assault divisions, makes them suitable also for extended utilization in combat against either conventional or guerrilla forces. The parachute capability is retained. Delivery of personnel and equipment by parachute and airlanding is not inconsistent with airmobile organization and tactics.

- Creation of air fighting units (air cavalry combat brigades) provides the Army with forces which are fully airmobile. These open only partially explored but very promising new fields of tactical application.

- Creation of supporting aviation units at corps or higher level permits reinforcement of the mobility means available either to airmobile or conventional formations.

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(C) Tactical Concepts

The concept of airmobility wants careful presentation. As stated elsewhere it is the Board's intention to provide that mobility not to all formations equally but to a selected few, which shall thereby acquire new capabilities to complement the more normal ones of the other parts of our Army and, as well, those of allied foreign armies.

Mobility implies far more than speed: "Mobility means quick decisions, quick movements, surprise attacks with concentrated force; to do always what the enemy does not expect, and to constantly change both the means and the methods and to do the most improbable things whenever the situation permits; it means to be free of all set rules and preconceived ideas." The German general just quoted goes on to say, "Let us kill stereotyped things, otherwise they will kill us."

One usually gains an advantage only by paying a penalty. Airmobility certainly does not come free; it must be paid for by money (to be discussed later) and paid for tactically in terms of all-weather staying power. It is the opinion of the Board that the gain is well worth the penalty -- if we proceed selectively.

A unit provided mobility by air will be able to execute many combat tasks far better than a unit not so equipped, and it can accomplish other tasks that a conventional unit could not attempt at all. An immediately apparent benefit is the effect this will have on the enemy troop dispositions. Because the enemy must take into account the greater reach of our airmobile forces and the comparative ease and speed with which they may cross natural and artificial obstacles -- plus their ability to "change both the means and the methods, and to do the most improbable things" -- he must thin out his array of offensive or defensive strength in front in order to protect rear areas and installations and routes heretofore practically invulnerable to our attack and seizure.

The United States is faced with the possibility of fighting one or more of four varieties of hostile ground forces:

- A modern army (the Soviet, reinforced by European Satellite armies) whose primary characteristics are great size, a large inventory of heavy combat vehicles and artillery, and a capability to employ nuclear and chemical weapons.

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- An Oriental army (Communist Chinese, Vietminh, North Korean or a combination of two of these) characterized by large size, relative unsophistication, great foot mobility, and an association with the area not enjoyed by US forces.

- Insurgents, such as the Viet Cong, who achieve strength not from modern weapons but from foot mobility, elusiveness, difficulty of identification, surprise, and the sympathy or fear of the local populace.

- Other forces (African, Middle Eastern, Latin American) likely to resist the execution of existing STRAC contingency plans.

In Europe the already mentioned circumstances which make commanders there reluctant to sacrifice any strength in the shield -- circumstances which include the political unacceptability of any plan to withdraw very far before the Soviet onslaught -- have forced the Board to a solution which provides for units stationed there a lower than average degree of airmobility.

The exigencies to be faced in a tactical nuclear and chemical war are almost altogether a matter of guesswork, expert and inexpert, because of the complete dearth of experience. The ability of airmobile forces to cope with the problems is unknown, but these forces do at least offer the possibility of being able to react to emergencies and opportunities much more rapidly than can ponderous ground-bound formations, and by reason of their flexibility and elusiveness they will present less lucrative targets to enemy area weapons. Airmobile forces will be uniquely capable of exploiting the effect of our warheads on the enemy, for they will have the greatest possible chance of negotiating the multiple artificial obstacles likely to be present on a nuclear and chemical battlefield -- radioactive areas, defiles made impassable by nuclear destruction, areas contaminated with chemicals, tree and building blowdown which may block long stretches of roads, and blown river bridges.

In such a war an attack cannot be preceded by an assembly of assault forces in strength in what we used to call attack positions, for such concentration will invite wholesale destruction. Notwithstanding, the requirement is still to produce sufficient force at the proper place with the best possible timing.

The solution must lie in mobility. Some portion of the attacking infantry can, of course, move by surface means to a position from which it can jump off in attack. Armored elements (tanks and infantry) can use their own means. Helicopter-borne infantry, originating from positions well to the rear (say twenty-five miles) can be delivered rapidly and with very precise timing to any given area. This affords such a force great latitude in the selection of the point of thrust against the enemy and enhances greatly the possibility of surprise. The ability of the helicopter to cross obstacles (including enemy defenses, temporarily neutralized) affords latitude also in the direction of thrust, a factor of the utmost importance.

In offensive operations airmobile forces in some circumstances may execute shallow penetrations of the enemy defensive area, moving by a natural corridor (e. g., around a sea-flank, over unoccupied or lightly occupied terrain, or over mountains or swamps) or an artificial one (e. g., terrain compartments dominated by our supporting fire). These penetrations may be designed to seize positions in the enemy secondary line of defense, or dominant terrain not occupied by the enemy but important to our over-all scheme of maneuver, or critical points such as key crossroads, communications centers and supply dumps. The actions may be executed in conjunction with conventional surface attacks.

In the course of a general retrograde movement, airmobile units should be uniquely capable in the delay of very strong armored thrusts by reason of their ability to ambush enemy columns, on roads or off, and the freedom they allow supporting engineer forces in the demolition of bridges, culverts and roads, and in laying mine fields -- for these barriers may be established without the vast complication of making sure friendly forces are on the correct side before execution. Helicopters can scatter antitank and antipersonnel mines in quantity in the immediate front of enemy spearheads, and by means of their target acquisition ability may direct the most effective employment of artillery and missile fires. In the fluid circumstances to be expected in the first few days after the initiation of a major war they will find multiple opportunities to destroy enemy personnel and materiel by means of surprise and ambush.

In defense, during an atomic and chemical war, an airmobile unit may act as a reserve, either to fill a gap or gaps inflicted in our general defensive array by the enemy weapons, or to counterattack

penetrations. It will have very considerable capabilities for short-range reconnaissance, and the communications necessary to bring down onto the enemy the conventional and nuclear fires available. If circumstances can be made propitious by the use of our own area weapons the airmobile unit may make penetrations into enemy occupied territory.

If hostile high performance aircraft are unimpeded, Army airmobile forces will be very vulnerable to their attack - but no more so than are surface transported forces. When enemy fighters are active airmobile operations should be confined to those executed at night or under low cloud ceilings, or in good weather and daylight to those areas where the HAWK missile can provide protection for them; this protected area may be reasonably assumed to extend at least 10,000 meters beyond the line of contact, which will provide an area amply large for the great majority of airmobile operations against a modern enemy force. If a successful REDEYE can be brought into production it will be an excellent weapon to accompany airmobile forces.

Shooting helicopters are already in the Soviet inventory and it is inevitable that helicopter-vs-helicopter duels will occur. 7.65mm and 20mm machine guns, believed by the Board to be very necessary for attack helicopters, will undoubtedly be effective weapons in this role, and the possibility of air-to-air action also underlines the desirability of developing a special weapons helicopters, also recommended in this report.

Airmobile forces will be able to hold sectors of the front, with unusual ability for the execution of the principles of mobile defense. They will suffer somewhat, when nuclear warheads are not available, by a partial lack of indirect firepower, but this weakness will be largely balanced by the ability to apply airborne firepower in very heavy quantities, with surprise, on targets of opportunity.

However, the force provided Europe in our recommendations is grossly insufficient in size to substitute adequately for the armored and mechanized divisions should they be destroyed or neutralized by enemy action. In the event of a tactical atomic war, which will presumably reach catastrophic proportions, at least locally, the real source of airmobile ground force must be the Continental United States. The units are relatively easy to deploy, and hence may

reach Europe comparatively quickly -- possibly in advance of the initiation of hostilities. If the initial states of a nuclear war in Europe should not be decisive airmobile forces so deployed may be able, after a time, to conduct the counter offensive.

The foregoing obviously contains generous amounts of speculation. The Board also admits the weakness of any compromise solution, which in this case however must recognize the inhibitions respecting the composition of our forces in Germany. The alternative we choose would provide Seventh Army a small measure of airmobility, and a reserve of airmobile formations in the United States.

It is generally true that the rougher the terrain the greater the application of tactical mobility by air. In the Middle East a great deal of reasonably maneuverable terrain (desert) is mixed with large mountainous areas that are very difficult indeed. While the ground is vastly different from that of Europe, the tactical principles just discussed would apply almost equally well. The reconnaissance, screening, and target acquisition abilities of the new forces would show an increase, the possibilities of ambush -- at least in the flat open spaces -- a decrease. Airmobile forces would be able to meet and block a sudden, distant enemy thrust earlier and therefore closer to the enemy point of departure.

The terrain of Korea may almost be said to be made to order for airmobility, consisting as it does almost entirely of rugged and difficult-to-traverse yet not very high mountains, covered usually with sparse vegetation which allows excellent visibility from above; yet between the multiple ridge fingers are narrow valleys often floored by rice paddies which allow helicopter touchdown. While the mountain ridge tops cannot be said usually to be easily accessible to helicopters, men may descend onto them by ropes, and generally without long effort, prepare landing areas. Helicopter delivered and helicopter supplied infantry will have an enormous advantage in effectiveness over an enemy who must climb everywhere by foot -- simply by being able to get there first. Scouting and target acquisition efforts should prove very productive, and opportunities for ambush will be legion. As an Eighth Army reserve (the Eighth Army consisting of nineteen Korean and two US divisions) an airmobile division would be perhaps three times as effective as a ROAD infantry division in plugging gaps in the line or in exploiting a breakthrough in the enemy defenses. It may be noted that the

enemy positions on the north of the demilitarized zone are known to be very heavily fortified and defended by large quantities of artillery; those positions may be enveloped on either flank, over the sea, by an airmobile force.

Against a uniformed army in Southeast Asia the airmobile force would derive its principal advantage by being able to traverse the terrain with great rapidity, while ground movement is uncommonly tortuous and slow. Penetration of enemy areas should prove relatively simple. Operating in conjunction with friendly local infantry forces, US airmobile divisions and air cavalry brigades may act as a general reserve for commitment in raids, to plug gaps, to delay, and to counterattack.

To counter guerrillas it is believed sound to place initial reliance on indigenous forces modernized, supported and trained to the best of our ability. However it is of course possible that our own forces must eventually be committed, and the question then is what sort of forces they should be.

It would appear that primary reliance for striking power must be placed on relatively small airmobile assault units with less mobile conventional units supplementing their efforts by securing the necessary bases of operations - including some fortified points deep in guerrilla territory. Less mobile troops may also be found useful in reducing guerrilla pockets created by the action of mobile forces. And finally, as areas became relatively free of guerrillas conventional forces might be needed as protective garrisons if native troops and police forces were inadequate to the job.

But a look at the record would seem to indicate that relatively immobile conventional forces alone have great difficulty combating irregulars. In most cases the guerrilla has emerged victorious, or at least unsuppressed, even though outnumbered 5 or 10 to one.

Though it would be inappropriate to suggest that conventional forces have thus proven themselves inept, it is proper to say that they have for the most part been inefficient for the lack of means to make them sufficiently mobile. The guerrilla is himself very mobile, and with the additional advantage of being able to fade into the civilian background, uncommonly elusive. To combat him successfully we need not simply to match his mobility, but to greatly exceed it.

Our greatest hope of success would appear to lie in the employment of units made up of helicopter-borne highly trained infantry, scout helicopters, and attack airplanes and helicopters.

Helicopters will find landing areas in rice paddies and jungle clearings when they exist. To cope with less favorable circumstances however we can lower men into the jungle from a hovering helicopter. Armed with cutting tools, including small power-driven saws, they can with effort prepare small helicopter pads, but this will not always be necessary. Often too the jungle offers water areas on which a suitably equipped helicopter can set down. Floats are costly in terms of weight; the Army should experiment with a raft which can be deposited by one helicopter for others to land on, one at a time.

The tactics and techniques of surrounding and destroying a guerrilla force in jungle areas need improvement. It would appear that a combination of blocking on two or three sides (a technique which demands some technical assistance in the shape of very quickly emplaceable barrier material), while driving on the other sides, would be best.

With a helicopter-borne and helicopter supported force we could at least avoid two of the major gambits of the guerrilla force. First, we need not fear the loss of our supply columns, and therefore not have to commit (as the guerrillas say regular forces must) heavy portions of our means for the guarding of our LOC. The guerrilla would also be thus denied a major source for his own supply. And second, the use of helicopters for the movement of troops would avoid the necessity of long foot marches through difficult and hostile terrain, and the guerrilla would thus be denied the treasured opportunity of ambush - the tactic which more than any other is the secret of his offensive battle success. But perhaps most important is that the initiative would pass to us.

The French, who of course did achieve a great measure of success in breaking up the guerrilla bands in Algeria - whatever their remaining troubles in that area might be - maintain that any offensive operation undertaken against a discovered irregular force had to be completed by nightfall, for the enemy, although surrounded, could not be individually engaged at night and had disappeared by

daybreak. And since the French used the helicopter effectively and extensively - it was usually the sole source of lift for the assault troops - the Board of course is suggesting little that is novel.

In its analysis of new airmobile forces, the Board examined extensively the question of "staying power" in terms of several meanings of that phrase.[1]

"Staying power" was considered in the sense that it connoted ability to hold terrain. However current advances in technology have permitted huge gains in firepower, both nuclear and non-nuclear, which negate the value of key terrain per se. Airmobile forces, freed from dependence on terrain for observation, firepower or lines of communication substitute mobility, flexibility and striking power for staying power. It permits the rapid employment of fresh troops and integrated aerial firepower with little or no need for fatiguing, costly retention of terrain in terms of wearing ground combat.

If "staying power" is defined as the ability to take punishment in combat, one must conclude that the ability to avoid punishment is more desirable. In this respect, the speed, agility, and elusiveness of a highly airmobile force offer advantages over one which has to slug it out on the ground with another ground heavy type.

On the other hand, if "staying power" means the capability to sustain a force on the battlefield, to maintain integrity, and to quickly concentrate combat power so that one's resources can be applied with such intensity in time and space as to create a superior force at the point of application, then it appears that a highly airmobile force, despite its lightness of equipment, presents the better prospect for remaining on and carrying the field.

The question of the vulnerability of aircraft was also a continuing consideration.[2]

1 - Annex K, Tactical Concepts and Requirements
2 - Appendix 17, Annex K, Tactical Concepts and Requirements

Over-all test and other evidence showed Army aircraft less vulnerable than most previous estimates indicated. Different flight patterns, the presence of flank and overwatching aerial firepower, coordination with ground firepower, air battle drill and SOP's, very low altitude flying, evasive action, and the application of surprise all serve to reduce vulnerability to enemy air and ground action to varying extents.

Design improvement, such as adding armored protection to the aircraft and crew or the relocation in the airframe of vital aircraft components, can effect some reduction in vulnerability.

There are many items of equipment in the Army's combat inventory which, in isolation, appear to be very vulnerable - not the least of which is the individual soldier. The survival of a soldier and his equipment, whatever its form, depends on proper assessment of the threat and proper employment in the face of that threat.

(S) Logistical Concepts[1]

New operational concepts must be paralleled by comparable gains in logistical mobility. Air lines of communication (ALOC) will give the combat commander a new operational latitude; in the past tactical plans were based of necessity on the location of relatively fixed surface transport facilities. The movement of supplies by air will enable the army to replace the present echeloned-in-depth supply system with a new one providing for the delivery of supplies from shoreside depots to front line with no intermediate depot structure.

It should also make possible a reduction of 50% in the level of supplies normally carried in a theater of operations. According to the Board's estimate (based on information provided by the Deputy Chief of Staff, Logistics) the value of a day of supply for a 43,000 man division slice is $2,408,000, wherefore a reduction in theater stock levels from the normal 60 to 30 days of supply reflects a potential inventory saving of $72,240,000 per deployed division. Moreover, according to the Quartermaster Board

1 - Annex L, Logistics Concepts and Requirements

supplies being transported to combat units in the present system are handled, on the average, seven times. With the new system it should be possible to reduce the number of handlings to three. Each time an item of supply is handled, nothing is added to its value but much is added to its cost.

The studies of four world areas (Europe, Northeast Asia, Middle East, and Southeast Asia) as outlined in Situation II of the Conventional War Forces 1967 Study (ODCSOPS I D 5970300) revealed that the delivery of supplies by air in Southeast Asia and the Middle East was almost mandatory since surface lines of communication are either grossly insufficient or so extremely vulnerable that dependence upon them would be foolhardy. The employment of an ALOC also permits reduction in combat support personnel.

On the other hand, use of a complete ALOC in Europe generates an increase in requirements for personnel because the ground LOC makes extensive use of railroads operated by indigenous civilians.

The degree to which air transportation can be substituted for surface depends upon the types of units supported as well as the area of employment. While air transportation can be used to greatest advantage in the support of airmobile forces, it is less effective in supporting mechanized and armored units. Fortunately, in Europe, where the use of armor is planned, there are extensive ground facilities for an LOC.

Air lines of communication extended to service the forward combat units require a variety of aircraft. The C-130 and other aircraft in the present or projected Air Force inventory will be required to accomplish intra-theater movements from off-shore bases such as Okinawa or Japan to Korea, and can also make wholesale movements from the shoreline forward when adequate landing fields are available. In the combat zone speed and range are of less importance than a capability to operate continuously from marginal, hastily prepared fields. The combination of C-130's for wholesale movements and Army aircraft (HC-1 Chinook and AC-1 Caribou) for retail deliveries offers an acceptable solution for the present. The cargo snatch technique discussed in Annex L may well increase the feasibility of using C-130 type aircraft in more advanced areas.

The use of Army Medical Service helicopters and ALOC aircraft will permit intra-theater evacuation of all casualties by air. The casualty rates of the Korean conflict (where aeromedical evacuation was used extensively) were considerably lower than World War II casualty rates. The Korean experience implies that had aeromedical evacuation been available in all operational areas of World War II, 12,000 lives might have been saved, 43,000 crippling injuries prevented, and 1,400,000 man-days in hospitals eliminated.

The continued use of strategic airlift for inter-theater resupply, after initial deployments have been accomplished, can increase the efficiency of supply. Over and above the requirement to move emergency items (which represent approximately 5% of the dry cargo shipped to a theater) consideration should be given to airlifting items which have a high dollar value and items which have a low issue rate. So doing offers great promise for reducing the Army's inventory investment and the number of personnel required to operate overseas depots. It should be noted however that the percentage of supplies which can economically be moved by air decreases proportionately as the length of haul increases. For example, for each ton of cargo airlifted a distance of 4,000 miles, 3.5 tons of fuel and supplies must be transported by sea to support the aircraft involved. It follows that a short air line of communication over a rough (or denied) surface will show the greatest cost advantage over a ground LOC.

The Army must certainly exploit the responsiveness, flexibility, and potential for supply tonnage reduction, force reduction and inventory savings afforded by the employment of air transportation. The decision is not however an automatic one; it must be made separately for each situation. The capability to create, on short notice, an air LOC is an essential part of our readiness to react.

(S) Special Warfare Concepts[1]

It is obviously desirable that US forces possess the resources capable of fulfilling the unconventional warfare and psychological operations requirements likely to arise in every variety of war.

1 - Annex J, Special Warfare Concepts and Requirements

The Army expects to bear the major burden in meeting these requirements, particularly those relating to counterinsurgency - which is rooted in the people and the land - a form of land warfare. To meet the threat in newly developing areas we must presumably help our friends prevent the emergence of insurgency or, in the event that terrorism and guerrilla warfare already have made their appearance, to win the ensuing battle.

The Special Warfare organizational concept for the 1963-68 period, proposed by Department of the Army, entails a flexible, quick-reaction posture which avoids excessive specialization in favor of reliance on multi-purpose units within the over-all structure - forces that can be committed to counterinsurgency as well as to limited and general war. The concept provides for:

- A special warfare base in the United States.

- A number of intensively trained, skill-balanced, area oriented Special Action Forces deployed in those areas facing the threat of subversion and insurgency (Asia, Latin America, Africa, the Middle East and Europe). The primary mission of these forces is to advise, train and assist indigenous armed forces. Special Action Forces are capable however of undertaking unconventional warfare and psychological operations tasks in limited and general war.

- Six brigade-size forces designed to provide selective reinforcement of the Special Action Forces. These elements, known as first echelon back-up, are to contain a mix of units akin to that found in the Special Action Forces. They will be designated from divisional and non-divisional resources of the Army and receive area orientation and counterinsurgency training on a primary mission basis. They can be committed to limited and general war operations.

- Second echelon back-up forces to be designated from among the major combat and support type units of the Army. These units will provide large scale reinforcement of indigenous forces engaged in major guerrilla warfare.

In execution, Army aviation assets should be used primarily to advise, train and assist indigenous forces. In the counter-insurgency battle Army aviation should be used to provide fire support, reconnaissance, delivery of supplies, aeromedical evacuation, command and control, leaflet drop, an aerial loud-speaker capability and support of civic action. The Air Force must continue to support long-range unconventional warfare operations.

The variety of tasks which Army special warfare aviation is called upon to perform requires an unusually broad mix of aircraft, a mix which reflects the need for small, slow-flying fixed wing aircraft such as the L-28, attack and transport helicopters of the HU-1 (UH) family, versatile fixed wing transports of the AC-1 (CV-2A) type, and the reconnaissance/strike capability found in the AO-1 (OV-1). The aviation unit should possess a high degree of remote area self-sufficiency.

(C) Command and Control Concepts[1]

An extensive increase in tactical mobility through the use of greater numbers of aircraft, the increased tempo of activity characteristic of air assault units, and the extended reach of these units demand a communications system capable of positive and reliable command and control. A number of possible breakthroughs in this field are foreseen; however, in the meantime, proven equipment can perform the required tasks.

Important conceptual problems arise in the command and control of airmobile operations.

- Primary emphasis on signal communications within airmobile forces will be placed on responsive and reliable point-to-point radio links, links which must ensure that the commander can affect directly the actions of his subordinate commanders and, in turn, be kept informed. Lateral communications will be of near equal priority. Secondary (but considerable) emphasis will be placed on general support communications to logistics echelons.

1 - Annex R, Communications and Electronics

- Air to ground tactical communications will rely on VHF FM aircraft avionics with a "command from the air" capability added by the high frequency single side band radio. The employment of HU-1 (UH-1) Iroquois helicopters will provide the commander with a versatile flying command post. Use of switched communication service from an aircraft to the Radio Center AN/USC-3 subscriber stations was successfully demonstrated during Board field tests.

- Air traffic regulation will be the minimum essential for expeditious aircraft movement. It will normally be employed only during instrument weather and at such other times as air traffic separation is required. Provision is made for an air traffic regulation and identification (ATRI) company at corps level, with flight operation centers (FOC) located at corps and division base areas. Air traffic will not normally be regulated below brigade. Control of aircraft below brigade will be the responsibility of the air assault force commanders.

- The Army concept of tactical navigation in combat areas is sufficiently different from the other services, by virtue of land combat support mission requirements, to warrant a new approach. The only common usage navigational system that can be made available to meet Army requirements for 1962-1968 is the Position Fixing and Navigation System, AN/GRN-14 commonly referred to as PFNS. Any number of aircraft, ground vehicles or individuals properly equipped can use this system simultaneously for navigation and position information. Self-contained navigation systems with desirable weight, size, and accuracy/reliability ratios are expected to become available to a limited extent by 1967-1968.

There are other control problems which need only be listed here:

- Compatibility of control of airmobile operations with control of air defense nets operated by the Army (MSG-4), the Marines (MTDPS) and the Air Force (GPA-73). The identification of friend or foe (IFF) is a major component of this problem.

- Adaptability to a heavy electronic countermeasures (ECM) environment.

- Rapid processing of reconnaissance information.

- Use of computers in the quick readjustment of flight orders, in air traffic control, and in priority assignment of messages according to link and relay point capacities.

- The interaction of Army command nets and those of other services and indigenous forces in joint and combined operations.

It is anticipated that the Army philosophy of assigning aircraft to the lowest level of command where there is a continuing need for these aircraft will be continued in the new organizations. Adequate safeguards will insure the most efficient use of available equipment and the proper employment of aircraft.

Due to time limitations the Board did not attempt to cover possible revisions in presently established joint doctrine regarding control of aircraft and airspace.

(S) V. ORGANIZATIONS AND CAPABILITIES

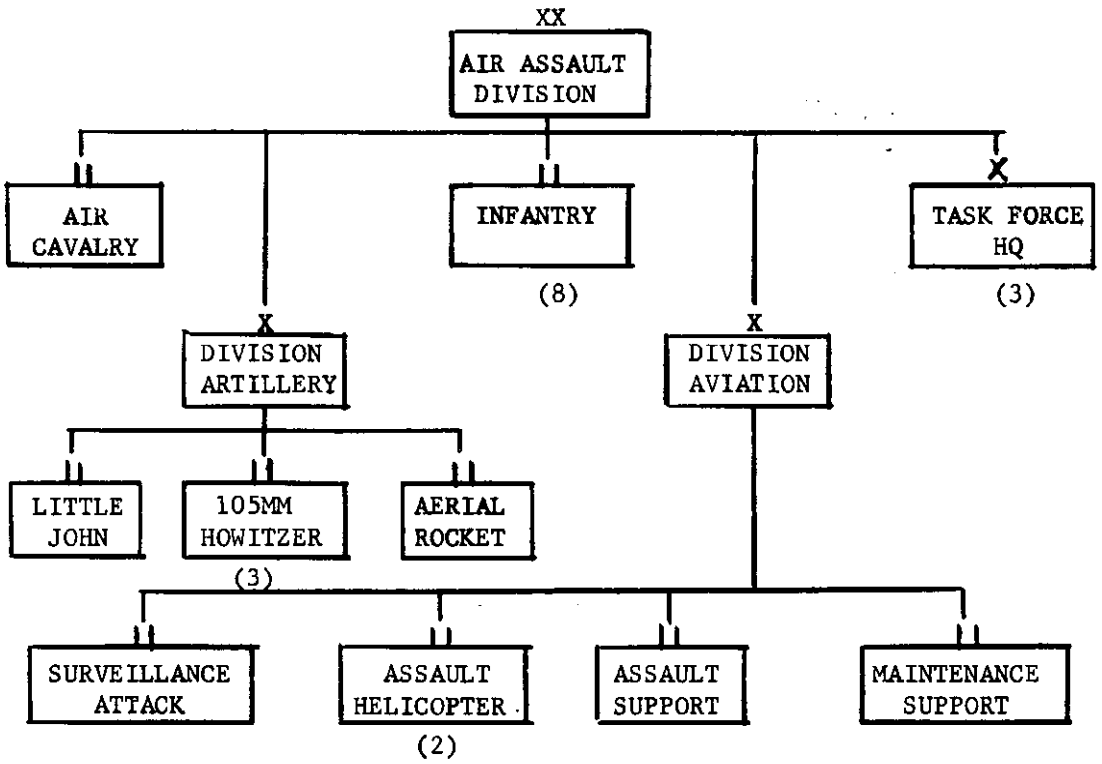
(U) Tactical Organizations

The war games indicated airmobile formations of division size may be employed to great advantage. Their use permits rapid accomplishment of the mission, or alternatively time may be traded for numbers of units, a smaller airmobile force accomplishing the same task as a larger ground organization. Divisional organizations of approximately 14,000 men were examined with aircraft mixes totaling 250 to 1400. An optimum combination, at the present state of the art, was judged to be between 400 and 600; substantially fewer aircraft could not provide the lift and accomplish the missions which should be assigned to a force of that size, while substantially greater began to reduce mobility through the increased requirements for support, control, and particularly for protection of the aircraft bases. As the war games were conducted in progressively more sophisticated areas, the requirement for increased firepower showed that a mix of airmobile and standard ROAD organizations gave the optimum combination. In newly developing areas ROAD units provided a desirable augmentation to base security forces.

(C) Air Assault Division

The Army division is a well established basic unit, being the smallest organization which encompasses all combat arms and services and which, when proper administrative support is provided by higher echelons, is capable of sustained independent operation. It is a traditional unit, thoroughly understood; and its name and honors should be retained regardless of modern reorganizational concepts. This has been done with the new "Air Assault Division" which captures the opportunity for increasing tactical mobility in the battle area through the use of helicopters.

FIGURE I. THE AIR ASSAULT DIVISION



The division will have:

80 Command and Maintenance Helicopters* (OH & UH Types)

6 Fixed Wing Reconnaissance Aircraft (OV Type)

48 Observation and Target Acquisition Helicopters* (OH Type)

24 Fixed Wing Attack Aircraft** (AV Type)

87 Attack Helicopters** (AH Type)

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154 Tactical Transport Helicopters* (UH Type)

48 Assault Support Helicopters* (CH Type)

12 Air Ambulances (UH Type)

459 Total

* Armed with light automatic weapons

** Armed with effective anti-tank or anti-personnel weapons and heavy quantities of ammunition

The air assault division is designed as a collection of type forces which can be arranged quickly into task forces of the size and composition required by the mission. In a theater of operations an airmobile force of division size would be part of a unified command, or a joint task force. Subordinate elements of the division, brigade task forces, may operate out of advanced bases supplied by divisional transport aircraft roughly 100 kilometers forward of the division base. Smaller forces - battalions or companies - would operate at distances of 25-35 kilometers from the brigade base.

To decrease the problem of providing the proper degree of airmobility, combat elements have been relieved, so far as practicable, of every responsibility for support, whether combat support or administrative. These responsibilities are placed on the shoulders of the combat support and combat service support elements, and a high standard of performance may be demanded. Light rifle companies are essential to the concept of airmobility.

In the air assault division each of the essential elements of striking power are present: maneuver forces, reconnaissance, firepower, communications and support. By reason of its facility for task force composition in a wide variety of strengths and with a much reduced response time, the division has the capability for striking a number of widely dispersed targets. Organic air reconnaissance and fire support will permit execution of completely integrated airmobile task force missions.

The provision of aircraft to lift one-third of the combat elements means that the entire division can be committed by air: after one-third is put into combat, the second third may (after only a very short interval) be committed by a second lift;

and the last third may be held in reserve, the aircraft standing by for lifting it on division order. Air transported artillery and mortars permit continuous prosecution of the land battle at night and during non-flyable weather.

The new division represents a rapid acceleration of the ROAD tailoring concept, although considerable organizational surgery was necessary to switch reliance for mobility from ground to air vehicles. The proposed structure has only 1113 ground vehicles as compared with 3452 in the ROAD infantry division. Vehicles retained consist mainly of the lighter air transportable type. Most of the heavier surface transportation still in the division will be used in base areas for logistical and administrative support.

ROAD infantry units are heavily loaded with support equipment, a rifle company having 12 vehicles. The Board proposes that in the new organization rifle companies be relieved of all burdens except those of fighting the battle, the responsibility for combat support and combat service support being pushed as far back in the organization as possible with the division commander insuring that assistance and supplies are delivered when and where needed. The rifle company will employ only direct fire weapons; mortars, ground surveillance radars and anti-tank weapons are centralized at battalion.

The infantry battalion is dependent upon the aviation brigade for tactical airlift. The battalion structure is essentially unchanged from ROAD except for the formation of a combat support company which provides all crew-served weapons and teams to assist the rifle companies. The battalion relies on higher headquarters to provide mechanical mobility, artillery fire support and supply.

The equipment and vehicles of the artillery units of the division are also reduced. Within the artillery brigade each of three direct support battalions has eighteen 105mm howitzers. The current M2A2 howitzer, stripped down to reduce its weight, can be effectively employed until XM102 is available. The loss of the 155mm and 8 inch howitzers in division artillery is

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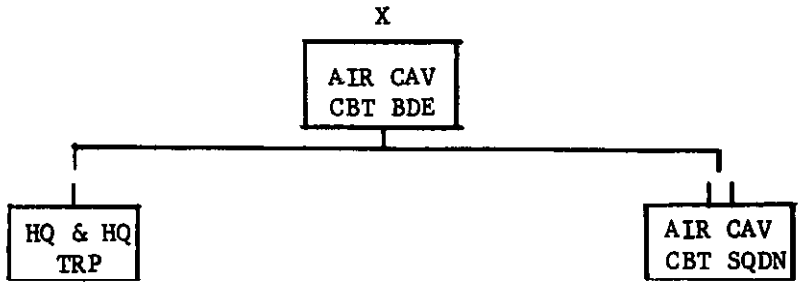
FIGURE 2. AIR CAVALRY COMBAT BRIGADE



The brigade will have:

52 Command and Maintenance Helicopters* (OH & UH Type)

72 Reconnaissance Helicopters* (OH Type)

144 Attack Helicopters** (AH Type)

48 Tactical Transport Helicopters* (UH Type)

316 Total

* Armed with light automatic weapons

** Armed with anti-tank and anti-personnel weapons and heavy quantities of ammunition

The brigade is an air fighting unit which destroys or punishes the enemy by aerial maneuver, surprise and heavy application of firepower delivered from rotary wing, light attack helicopters, and by air delivered riflemen and tank killer teams.

In war gaming conflict in highly developed areas, such as Europe, the air cavalry combat brigade proved most effective as a supplement to ground divisions. A compact, hard-hitting unit, heavily weighted with air reconnaissance and airmobile firepower, it provided a most valuable assist to ground units in defense of river lines and other obstacles, meeting engagements, and delaying operations. It was estimated that in blocking an enemy breakthrough, or in the hasty defense of a river line, airmobile units could reduce

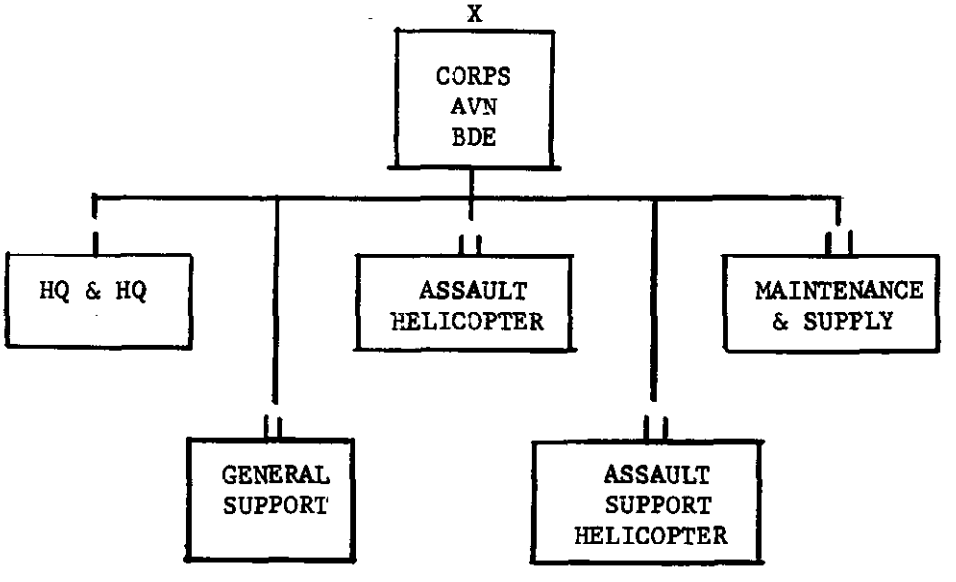
by approximately 25 percent the time required to put the mission in effect by a comparable ground organization.

While the brigade's primary purpose is to destroy or neutralize enemy forces (particularly armored and mecahnized forces) by air and ground delivered fire, it and its subordinate elements are also capable of extended reconnaissance, security for a larger force, delay of large enemy forces, and of seizing critical terrain features (bridges or defiles) in advance of slower moving friendly elements. The brigade will be extremely useful in counterinsurgency operations, helicopters being armed with anti-personnel instead of anti-tank weapons.

Each of three air cavalry combat squadrons in the brigade have four combat troops equipped either as anti-tank or anti-personnel weapons troops. The mix is flexible and may vary according to the requirements of the theater of operations. The brigade can accept attachment of other combat support elements.

(C) Corps Aviation Brigade

FIGURE 3. CORPS AVIATION BRIGADE



The brigade will have:

4	Fixed Wing Command Aircraft (U Type)
51	Command and Maintenance Helicopters* (OH & UH Type)
12	Fixed Wing Reconnaissance Aircraft (OV Type)
12	Attack Helicopters** (AH Type)
80	Tactical Transport Helicopters* (UH Type)
48	Assault Support Helicopters* (CH Type)
207	Total
*	Armed with light automatic weapons
**	Armed with anti-tank and anti-personnel weapons and heavy quantities of ammunition

The corps aviation brigade will provide the corps commander with the capability to move reserve units rapidly, to reinforce the airlift of any of the committed air assault divisions, or to displace corps artillery units by air. Four ROAD infantry battalions or two 105mm howitzer battalions can be airlifted simultaneously by transport helicopters assigned to the brigade.

Within the brigade a general support battalion has been provided to perform command and control functions, surveillance, and air traffic regulation and identification. Within the battalion a general support company has the aircraft required by corps headquarters and other corps units without organic aircraft. A company of twelve AO-1 (OV-1) fixed wing observation aircraft provide aerial surveillanc The air traffic regulation and identification (ATRI) company, which does not have organic aircraft, regulates and identifies Army air traffic within the corps area. Electronic navigational aids and communications systems are provided.

The assault support helicopter battalion contains three companies of transport helicopters (CH-47) which provide an additional

capability to airlift simultaneously three infantry battalions, or one 105mm howitzer battalion, or any combination thereof.

Although the corps aviation brigade was not war gamed as such, the need for such a back-up capability was proved in connection with the divisional games. If the air assault division was required to move more than 75-100 miles, or it was necessary to move brigades more than once every three days, some form of back-up airlift in the form of the corps aviation brigade or the air transport brigade was needed. The same lift would provide a limited degree of airmobility to ROAD infantry divisions of the corps.

(C) Other Organizations

Though this report gives major emphasis to new organizations providing large dividends in terms of increased mobility, some modifications are made to existing units.

ROAD Division Aircraft Augmentation

The Board found that the number of aircraft authorized the ROAD mechanized, armored, and infantry divisions should be increased from 103 to 164 to augment the limited capability of the division aviation battalion and combat support unit. Augmentation includes weapons helicopters, light fixed wing attack aircraft, ambulance ships, and some general purpose aircraft.

ROAD DIVISION AIRCRAFT AUTHORIZATION

Present	Augmented	
0	23	Command and Maintenance Helicopters* (OH & UH Type)
4	4	Fixed Wing Reconnaissance Aircraft (OV Type)
0	8	Fixed Wing Attack Aircraft** (AV Type)
0	8	Attack Helicopters** (AH Type)

Present	Augmented	
48	84	Observation and Target Acquisition Helicopters* (OH & UH Type)
49	25	Tactical Transport Helicopter* (UH Type)
2	0	Fixed Wing Utility Aircraft (U Type)
0	12	Air Ambulances (UH Type)
103	164	Total

* Armed with light automatic weapons

** Armed with anti-tank and anti-personnel weapons and heavy quantities of ammunition

Armored Cavalry Regiment Augmentation

A substantial infusion of aircraft in the armored cavalry regiments (resulting from a trade-off with the presently assigned howitzer batteries) will greatly improve the capability of these units to carry out their important screening and delaying missions along the Seventh Army front. Augmentation includes additional reconnaissance helicopters, attack helicopters, and light transport helicopters. Each squadron (three per regiment) will have 3 armored cavalry troops, one air cavalry troop, and one tank troop.

ARMORED CAVALRY REGIMENT AIRCRAFT AUTHORIZATION

Present	Augmented	
0	25	Command and Maintenance Helicopters* (OH - UH Type)
13	0	Fixed Wing Reconnaissance Aircraft (O-OV Type) (OV Type)
13	63	Reconnaissance Helicopters* (OH Type)
0	21	Tactical Transports* (UH Type)
0	30	Attack Helicopters** (AH Type)
26	139	Total

* Armed with light automatic weapons

** Armed with effective anti-tank or anti-personnel weapons heavy quantities of ammunition

(C) Corps Artillery (Airmobile)

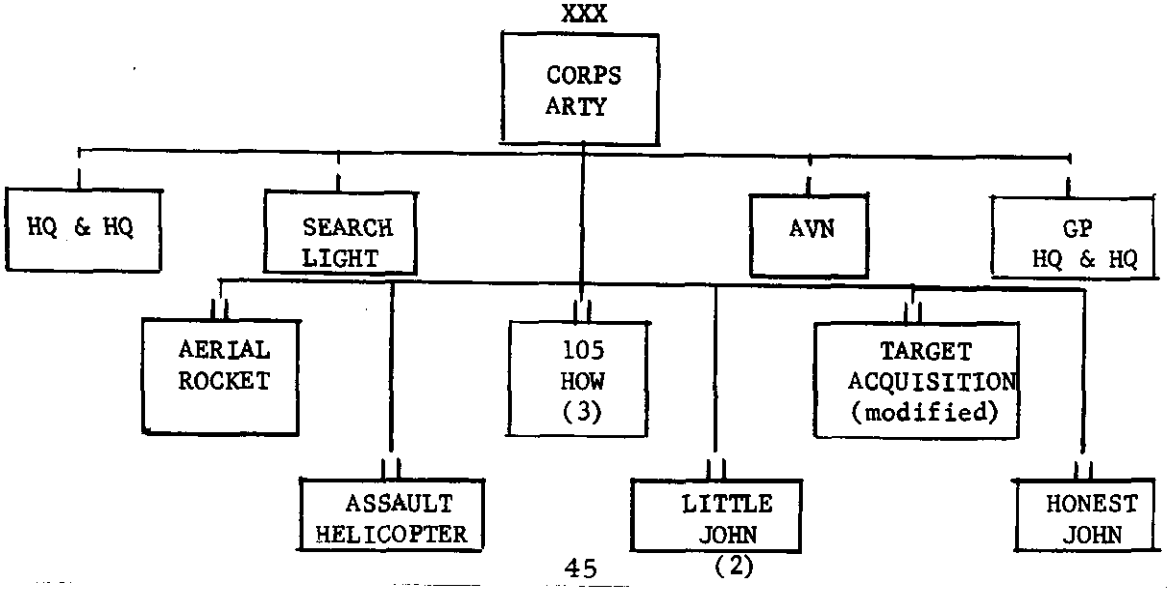
The Board felt that the present RODAC Corps Artillery aviation company (16 aircraft) should be modified to furnish aerial fire support. Therefore an aerial rocket battalion of 39 attack helicopters (AH Type) was added to the RODAC Corps Artillery. No other modifications are proposed for this organization.

For operations in undeveloped areas, however the heavier towed and self-propelled artillery weapons have been deleted in favor of lighter systems which are readily air-transportable. As a partial substitute for these weapons an aerial rocket battalion has been introduced. The battalion consists of three batteries of light attack helicopters for fire support missions.

The 105mm howitzer battalions are lightweight units which have been reduced considerably in heavy equipment to provide an air transport capability. To enhance their mobility an assault helicopter battalion, capable of airlifting simultaneously the assault elements of one howitzer battalion is provided.

Missile units of both the Little John and Honest John type have been provided in a general support role to offset the deletion of heavier cannon artillery.

FIGURE 4. CORPS ARTILLERY (AIRMOBILE)



The organization will have:

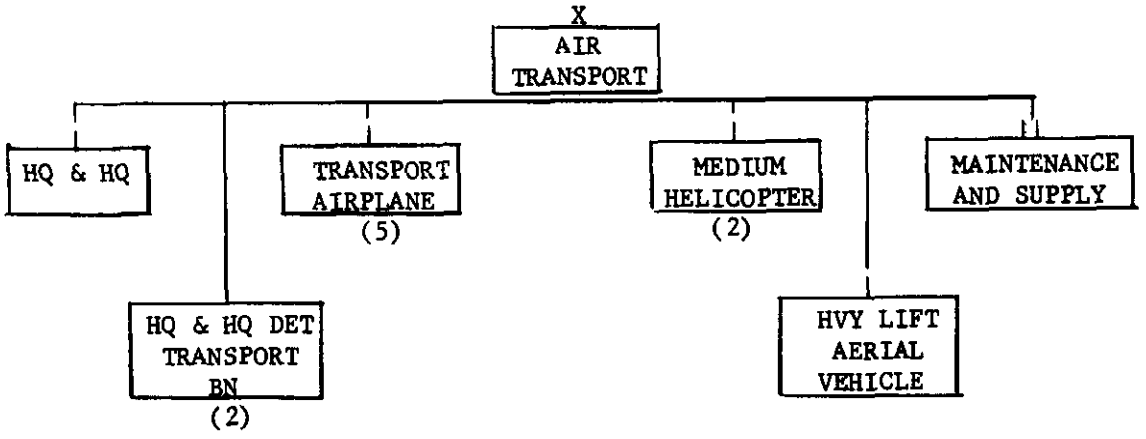
19	Command and Maintenance Helicopters* (OH & UH Type)
4	Fixed Wing Reconnaissance Aircraft (OV Type)
39	Observation and Target Acquisition Helicopters* (OH Type)
60	Tactical Transport Helicopters* (UH Type)
39	Attack Helicopters** (AH Type)
161	Total

* Armed with light automatic weapons

** Armed with point and area weapons and heavy quantities of ammunition

(C) Air Transport Brigade

FIGURE 5. AIR TRANSPORT BRIGADE



A type brigade will have:

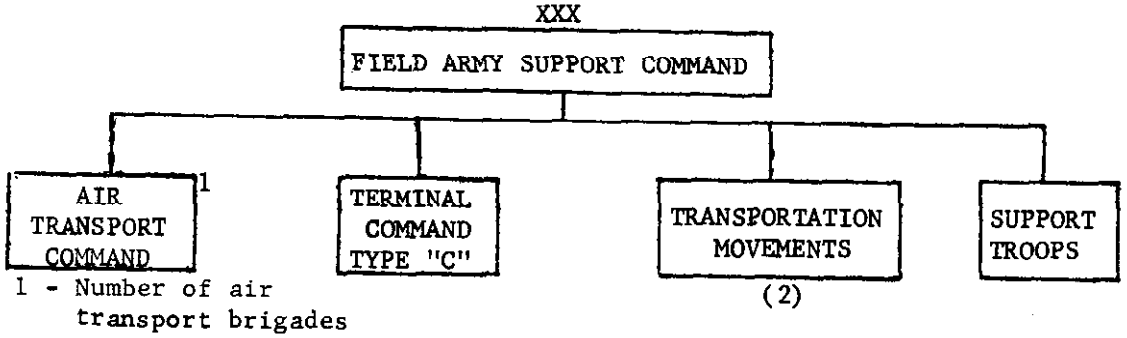
12	Command and Maintenance Helicopters (OH & UH Types)
32	Medium Transport Helicopters (OH Type)
80	Fixed Wing Transport Aircraft (CV Type)
1	Fixed Wing Command Aircraft (U Type)
9	Heavy Lift Aerial Vehicles (Flying Cranes) (CH or CV Type)
134	Total

The air transport command will operate sufficient fixed and rotary wing aircraft of 3-5 ton payload capability to support one air assault division entirely by air over an average distance of 175 miles. The brigade, an army unit which may be stationed in the corps area, may also be used to supplement the tactical airlift capability of corps and divisions.

In addition to the transport airplanes and medium helicopters, heavy lift aerial vehicles will be used for the short haul transport of heavy items. The company is authorized nine heavy lift aerial vehicles for recovery of disabled vehicles and aircraft from the forward areas, shuttle of heavy loads over very short spaces (e.g., a river) and for the movement of such items as mobile surgical hospital pods. One vehicle will habitually be positioned at the rear base of each air assault division engaged in operations.

(C) Field Army Support Command

FIGURE 6. FIELD ARMY SUPPORT COMMAND



1 - Number of air transport brigades as required

The Field Army Support Command (FASCOM) has an air transport command headquarters similar to the operations department of a commercial airline. It schedules all FASCOM aircraft and coordinates with the Air Force such matters as the use of Air Force aircraft for LOC hauls, allocation of air space and operation of Army logistical support aircraft at Air Force terminals.

Most of the air transport brigade would normally be located in the forward Army area, where it would make retail deliveries in combat units. Some Army aircraft would also be required in rear areas. For theaters such as Southeast Asia, Chinooks might be utilized to make direct deliveries from shoreside depots to combat units. Traffic management will vary with each situation.

It is not necessary that Air Force transport operating on the LOC be placed under FASCOM command, although the Air Force must plan to furnish a proper number of sorties when and where they would be most effective and adjust schedules for FASCOM aircraft accordingly.

A terminal command and subordinate units are in the proposed organization. The functions of the headquarters will parallel those of the traffic department of a commercial airline. It also offloads ships, transfers cargo from ship to depot, depot to airfield, and from one aircraft to another throughout the LOC. Subordinate terminal service units provide personnel and equipment to handle cargo. Motor transport units assigned was engaged in drayage operations as opposed to long hauls. The transportation movements battalion is composed of cellular type TOE units which can be stationed at depots and airfields to coordinate and expedite traffic.

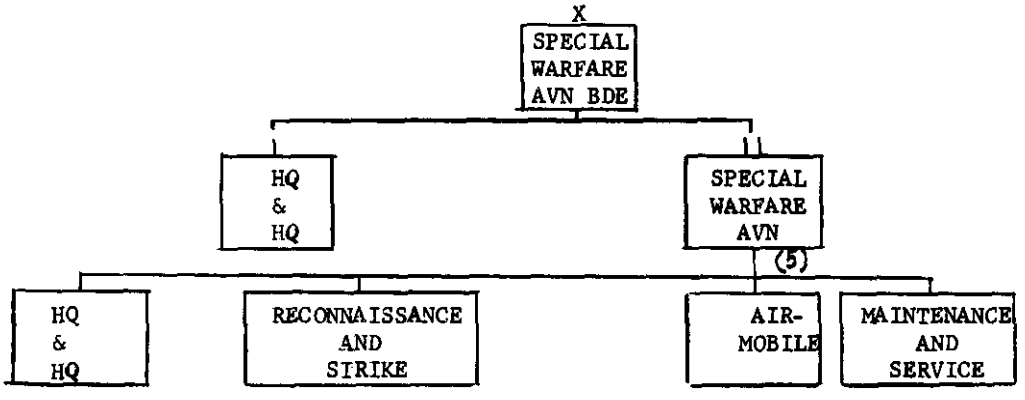
The assignment of air transport brigades to FASCOM does not preclude the use of their aircraft for tactical moves, since FASCOM is a subordinate command of the field army.

While the chart portrays a type organization for supporting a field army, FASCOM can be tailored to support smaller forces by removing building blocks. For instance, two air transport brigades can support a four division corps force, including all troops in the combat zone, at 75 miles' distance.

(S) Special Warfare Aviation

Special warfare operations require a variety of aircraft ranging from very small, short range machines to large, long range ones, and from slow unarmed models to the best of the fighter types. The support should be provided by the service most competent to provide it. Annex J contains an analysis of special warfare aviation missions and requirements versus aircraft types and responsibility for their operation.

FIGURE 7. SPECIAL WARFARE AVIATION BRIGADE



This brigade will have:

20	Fixed Wing Attack Aircraft** (OV Type)
21	Fixed Wing Transport Aircraft (CV Type)
23	Fixed Wing Utility Aircraft (U Type)
40	Attack Helicopters** (AH Type)
21	Tactical Transport Helicopters* (UH Type)
125	Total
*	Armed with light automatic weapons
**	Armed with point and area weapons and heavy quantities of ammunition

Based on the special warfare concept discussed in Section IV, the Board proposes establishment of a Special Warfare Aviation Brigade with a small headquarters and five special warfare aviation squadrons (SWAS) (Figure 7).

The brigade should be activated during FY 1963, and with its squadrons should be regarded as a pilot organization requiring continuous test and evaluation.

The brigade headquarters and one SWAS should be located at the CONUS special warfare base. One SWAS is proposed for attachment to each of the special action forces for Asia, Latin America, Africa and the Middle East. The SWAS is organized into a composite of cellular teams (command, control, communications, aerial reconnaissance, aerial firepower and transport). Its 204 personnel and 24 aircraft are capable of operating from three separate bases with a high degree of remote area self-sufficiency.

(C) VI. COMMAND MANAGEMENT PROBLEMS

A rapid expansion of Army aviation will be confronted with some constraints. Although solutions will be difficult, the prospects for success are good if the problems are attacked with the necessary energy.

(U) Managerial Structure

As did the Navy for Polaris, the Air Force for ICBM, and the Army for the Nike family of missiles, the Army must establish a strong management system for the new program. At present the Director of Aviation is merely a coordinating point within the Office of the Deputy Chief of Staff for Military Operations and lacks the means and authority to manage an undertaking of the dimensions recommended. The Board does not suggest a parallel staff system, but rather the addition of individual staff positions to the present structure, positions to be filled by officers charged with directing staff action necessary to the achievement of the goal and given the authority necessary to make the system work.

(C) Maintenance

Air assault operations require highly responsive logistical support to the aircraft. The present system will not meet the demand.

New concepts, developed by a selected team of military logisticians after making an extensive survey of all types of commercial aviation and manufacturing facilities, were presented to a panel of thoroughly qualified civilian aviation manufacturers and users -- the latter being executives of companies which are forced to make the operation of their aircraft a paying proposition. The panel modified the concepts somewhat but thereafter agreed that they should be implemented promptly.

The following major actions, constituting a fundamental change to the present manner of operation, were recommended by the panel and are accepted by the Board:

Maintenance Inspection System.[1] Revise the current scheduled inspection system at the operator level to reduce and simplify inspection requirements. The revised inspection system will approximate the procedures of commercial aircraft operators, placing emphasis on safety of flight and mission-essential items.

Maintenance Echelons. Revise the current maintenance system from five echelons to three, emphasizing forward area maintenance by assignment of the best qualified personnel in the forward area and providing direct support to forward units by aircraft-transported specialist teams. Rapid repair may be accomplished through the use of quick-change assemblies and component replacement. Dependent upon the tactical situation and the extent of required repairs, aircraft may be evacuated by one-time flight or other means and replaced from a maintenance float. Consideration should also be given to the use of water-based maintenance and supply facilities to provide rear area support. TOE's should be designed to reflect the military occupational specialties (MOS's) required to support this maintenance system.

Supply. Modernize the aircraft supply system to expedite the flow of aircraft repair parts from the source of supply to the user. The new system should be designed to route user requisitions through maintenance channels utilizing transceivers, memory consoles and random access computers. Delivery of repair parts may be by the most expeditious means, using internal procedures to effect serialized control of repairable components to reduce quantities of components required and to program overhaul requirements more effectively.

Component Time Between Overhaul (TBO). Implement at once a vigorous, properly supported program to attain the optimum component TBO in a minimum time. This would be accomplished by:

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1 - Annex N, Aircraft Maintenance and Supply

- Accepting the manufacturer's design TBO.

- Progressive samplings of components on high time aircraft in various areas.

- Expeditious supply action to sampling agencies.

- Prime-contractor overhaul.

- Sampling analysis of components in order to detect and analyze deficiencies.

- Designing and incorporating required modifications.

- Providing for the prime contractor's participation in the program at the appropriate operational sites.

Policies and Procedures. Revise current regulations to permit the Army to procure, evaluate and otherwise solely manage the introduction of aircraft into the Army system. Further revisions of policy are required which will allow long-range repair parts provisioning and contract overhaul programs. Finally, the establishment of a single agency is required to develop, coordinate and implement a proper Army aircraft maintenance and support program.

It is also necessary that the Army strengthen its aircraft systems management program to insure that simplicity of maintenance and reliability of components are incorporated in the end item during the development stage. A program incorporating many features of the Navy Weapons Readiness Achievement Program (WRAP) must and can be developed to meet the Army's requirement.

(U) Aviation Personnel[1]

The effective management of a much larger number of highly skilled personnel will require drastic change to current procedures. Weaknesses and remedial measures are summarized on the next page.

1 - Annex Q, Aviation Personnel

The Establishment of an Aviation Personnel Division in the Office of Personnel Operations (OPO), Department of the Army. The function to be performed by the proposed agency is carried out currently by a branch-level office in OPO headed by a Lieutenant Colonel. The office has not the stature or capability to exercise supervision over the aviation personnel program. The proposed staff office, headed by a general officer, will have assignment responsibility for all warrant officer aviators and would, in addition, monitor the assignment of officer aviators. It will coordinate aviation personnel actions with other OPO and ODCSPER agencies, particularly in the fields of authorization, distribution and requirements.

An Aviation Officer Career that Will Attract the High Quality Individuals Which a Successful Program Demands. The officer aviators will comprise only one-half of the total pilot population, and will occupy a much smaller proportion of the pilot seats. The officer must normally be a commander, staff officer or instructor. At approximately the mid-point of his career, he may choose between two career sub-patterns -- that of a tactician or logistician, or that of an aviation technician. In either career actual piloting will be secondary and career opportunities will be commensurate with the officer's ability and energy.

A Far Greater Use of the Warrant Officer as a Pilot. An aviation program composed primarily of officers ultimately must result in costly and unmanageable personnel problems such as have been experienced by the Air Force and the Navy; a well conceived warrant officer pilot program will avoid the pitfall.

The aviator population should include officers and warrant officers in approximately equal numbers. Since the warrant officer is not required to have other than aviation skills, he may be utilized continuously in a flying assignment. He does not require the military schooling nor other non-aviation training of the officer aviator. He is intended to have a well-developed capability in aviation maintenance in addition to his flying ability, a characteristic noted as becoming prevalent among civilian professional light aircraft pilots.

Such an arrangement will permit a reduction in the computed over-all aviator requirements by a factor of almost one-fourth as compared to a program manned only by officer aviators. Thus we may contemplate the flight warrant officer strictly as a pilot, with uninterrupted (save by aviation schooling) repetitive assignments to cockpit positions, and retirement from the Army when his flying skill begins to dull. It may be noted that to the extent (1100 warrant officer pilots) this program has been tried it has proven uncommonly successful -- the flight warrant is a professionally competent individual, and his retention rate is comparatively excellent.

A Change to the Army 11.5% Ratio of Commissioned Officers, Including Warrant Officers, to Aggregate Strength. The larger number of officers and warrant officers will necessitate exceeding the currently authorized 11.5% ratio. The assistance of Department of Defense will be required to secure an increase, manifestly in the national interest.

An Expanded Aviator Procurement Program. An effective, radically improved procurement program must be developed to obtain enough trainees for the training base. The program cannot be created by simple revision; new approaches are necessary. The over-all increase in officer aviators is comparatively small due to the present high (6:1) ratio of officer/warrant officer to the new objective of a 1:1 ratio. Increased yearly inputs to officer aviator training can be achieved.

Warrant officer pilot trainees currently are recruited from within the active Army, a source which will not be sufficient to meet expanded trainee requirements. We can undoubtedly enlist capable young men of high school and junior college education into the Army for flight training, and an enlistment program should be developed to this end. A policy to allow proven pilots to transfer from other services into the Army as flying warrant officers is also most desirable and may partially avoid a serious waste of valuable skills. An expanded procurement program should also permit the retention on active duty, as AUS warrant officers, of trained officer aviators who retire as officers at 20 years of service.

The present warrant officer pilot career is weak as respects opportunity to progress. Indicated is a review of the career pattern for warrant officers with consideration of an additional grade, rotation of assignments, and advancement in aviation qualification.

An Aviator Grade Structure Symmetrical to That of the Entire Army Officer Corps. The reduced base of company grade aviators realized by the expanded warrant-officer-pilot concept will result in smaller numbers in the higher grades. Numbers in each grade above captain will be determined by the operation of the Army's regular promotion system. Retention on flying status is one of the greatest contributors to career attractiveness, and officer quality the most critical element of the entire aviation program.

Improved Management of Enlisted Personnel with Aviation Skills. This applies particularly to the skilled mechanic who, under the maintenance system proposed in this report, must be trained in numbers to an even higher skill level than in the past. Recent experience during the Berlin buildup has shown that aviation maintenance units containing the hard skills of an aviation mechanic must be included in adequate numbers in the active Army troop basis. Reserve units are not fully effective for many months after mobilization. Therefore the Army will be required to take energetic action to accomplish the following:

- Procure large numbers of men, preferably with civilian-acquired skill, for training as aviation mechanics.

- Insure that aviation mechanics are properly utilized in their MOS, and that MOS structures and feeder MOS patterns satisfy the new maintenance concept.

- Insure that the ratings of aviation mechanics are proportionate to the mechanic's value to the Army and that aviation mechanics are entitled to the full benefits of proficiency pay.

- Improve the retention rates of aviation mechanics.

(C) Safety

Almost all aircraft accidents occur as the aircraft is in the process of take-off, approach to landing, or landing. A normal mission of a transport, bomber or fighter involves one take-off, a cruise which may run several hours, and one landing; with the benefit

of modern navigational systems the possibility of accident is almost negligible except during take-off and landing. In contrast the aircraft in the test program operated largely at very low level and in areas heavily congested with other aircraft. During 11,186 hours of flying during the tests, there were some 60,200 take-offs, and landings, or one take-off and landing every 12 minutes. The vast majority of take-offs and landings were made on unprepared, sometimes very difficult areas without benefit of tower control.

In the first week of the test safety meetings were held, and these were repeated throughout the period. Command supervision was also vigorous throughout. However, an above-normal accident rate was anticipated at the start, for the flying approximated combat conditions using new techniques, tactics and operating procedures.

In the course of the test program one person was killed and eleven injured; sixteen aircraft suffered various degrees of damage. Such an accident rate could not be tolerated under peacetime training conditions, but one would not expect the urgency and pioneering nature of the Board's tests to be reflected in normal training.

However certain measures are additionally necessary. One recurring source of accident lay in the complete or partial failure of the T53 turbine which powers the HU-1 helicopter. Limited experience certainly does not justify condemning the engine, but it is enough to point up the wisdom of putting an appropriate amount of RDT&E and PEMA money into the improvement of present hardware. The HU-1 (UH-1) is a fine family of helicopters, good enough in general performance to do excellent service over the next several years: money to make the same product more reliable, longer lived, and easier to maintain (all related virtues) will be money eminently well spent. The same comment applies to other aircraft, notably the Caribou, the Mohawk, and the Chinook.

The Army must also contemplate extensive use of aircraft mock-ups, some static and some mounted on truck beds, for the training of troops in airmobility. Flight with more clearance over the trees will be acceptable for training purposes; Board aircraft flew practically between the trees to determine vulnerability, visibility, and problems of navigation. The pilots themselves must be kept at maximum proficiency by periodic flight over established confidence courses.

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Mechanical simulation of some pilot training is possible. Full auto-rotation (the practice of which damages many helicopters annually) may possibly be simulated.

And finally, command supervision requires constant emphasis.

We may conclude that the very nature of low level flight is conducive to accident, but also that the accident rate may be confined to acceptable limits by the imposition of proper - and also acceptable - constraints. The Army should accept this obligation as part of the price of an expanded capability.

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(S) VII. RESEARCH AND DEVELOPMENT

Army research and development projects, identifiable with the implementation of airmobile operations, were reviewed in light of currently known operational weaknesses[1] and the requirements of the 1969-1975 period.[2]

The necessary expansion of that part of the current R&D program which is applicable to Army aviation should be directed in part toward increasing the capabilities and application of the new aircraft now coming or about to come into the Army system. The last few years have produced the HU-1 (UH-1), AO-1 (OV-1), HC-1B (HC-47B) and the AC-1 (CV-2A); all are outstanding machines, and the LOH now under development has great promise. The general excellence of these aircraft warrants expenditure of the funds necessary to increase their reliability and maintainability, and as well the adaptation of weapons to their use. Concurrently, research and developmental effort should seek continual improvement of materiel in the fields of weaponry, avionics, aircraft performance, and auxiliary hardware intended to increase the general usability of Army aviation.

As respects current aircraft much benefit will accrue from a proper program of dynamic component development. Improvements may well increase speed and range, and will certainly increase reliability while reducing vibration, noise, maintenance time and possible infra-red radiation, radar reflectivity, fuel consumption and cost.

Methods of increasing the air transportability of current small Army aircraft, including rapid knockdown and reassembly provisions, are of obvious importance. Investigation may show that small design changes will make this possible.

(S) Weapons

Although Army aircraft weapons are in general somewhat different from those of the Navy and Air Force and impose slow flight speed and lightweight as considerations, there is much R&D effort by the other services that will assist the Army. Outstanding are developments of the Naval Ordnance Test Station at China Lake. The Army should take appropriate advantage of Navy and Air Force projects.

1 - Incl 4, Force Effectiveness Summary

2 - Annex I, Long Range Concepts and Requirements

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The following weapons projects should be funded at the optimum level beginning in FY-63: (Items marked with asterisk are understood to be beyond the R&D process, in which case the weapons should be produced and issued to units as required.)

- Better tank killing direct fire weapons for launch from low speed aircraft. Terminal guidance (and passive homing) wants further investigation.

- Tank killing bombs or bomblets.

- Light aerial delivered anti-tank mines. *

- Man-portable ground launched anti-tank weapons.

- Aerial-delivered anti-personnel bomblets. *

- Aerial-delivered variable delay anti-personnel mines (to have the effect of a standing barrage over a period of several hours).

- Air deliverable devices for sealing off or fencing a guerrilla force in jungle areas. The anti-personnel "gravel" mine will partly accomplish this. The trip wire concept offers some promise. The rapid installation of wire-activated mines by a few men lowered through the jungle canopy by ropes from helicopters may be a solution.

- Helicopter-deliverable napalm bombs.

- Improved airborne smoke dispensers, including devices capable of continuing to generate smoke after they reach the ground. *

- Anti-radar missile for launch from low speed aircraft.

- Rocket boosted XM-75 round, with anti-personnel and anti-tank warhead.

- LASER range finders.

- Special LASER applications.

- Stabilized sights for fixed-wing and rotary-wing aircraft.

Survivability is related to the ability to punish an enemy. These are recommended for continued investigation:

- Very lightweight armor protection for aircraft crews and selected aircraft parts, and self-sealing fuel tanks (as required). *

- Suppression of infra-red signals given off by engines.

- Suppression of radar reflectivity.

- Incorporation of radar absorption materials into airframes.

- Electronic airborne countermeasures.

(S) Avionics

Although major investment has been made in the development of avionics and surveillance equipment the results have not been impressive to date. There is a need for more dependable, lightweight avionics equipment and for surveillance equipment with greater capabilities. Technical forecasts indicate that desired improvements can be achieved if sufficient additional funds are invested in carefully selected projects capitalizing on the best of today's state of the art. The following projects should be properly funded beginning in FY-63:

- An all-weather navigation and position fixing system.

- An air traffic regulation system compatible with air defense systems.

- A radio central system, such as the AN/VSC-3.

- Light, simple tactical system for aircraft let-downs in low visibility.

- Lightweight single side band radios (SSB).

- Light airborne automatic dead reckoning equipment.

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- Lighter, more reliable and longer range air-to-ground and ground-to-ground communications equipment.

- Suitable surveillance systems for the surveillance-attack aircraft.

(S) Aircraft

The development of aircraft engines requires substantially longer periods of time than the development of aircraft. A development program is required for a family of quiet, single-fuel engines, graduated in size and demonstrating a marked improvement in thrust-to-weight ratio, specific fuel consumption, interchangeability of parts, and operation in extremes of humidity and temperature. A concurrent program should perhaps be pursued to develop new fuels.

There follows a series of very brief discussions of prospects for improvement of Army aircraft in the several mission categories. The Board could not in the time available produce with confidence firm recommendations in each case, but the discussions do reflect the technological forecasts made to the Board and the Board's recommended guidance, in these respects, to the Army's Office of Research and Development.

The first chart shows the whole family of Army aircraft.

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REQUIRED, FAMILY of AIRCRAFT

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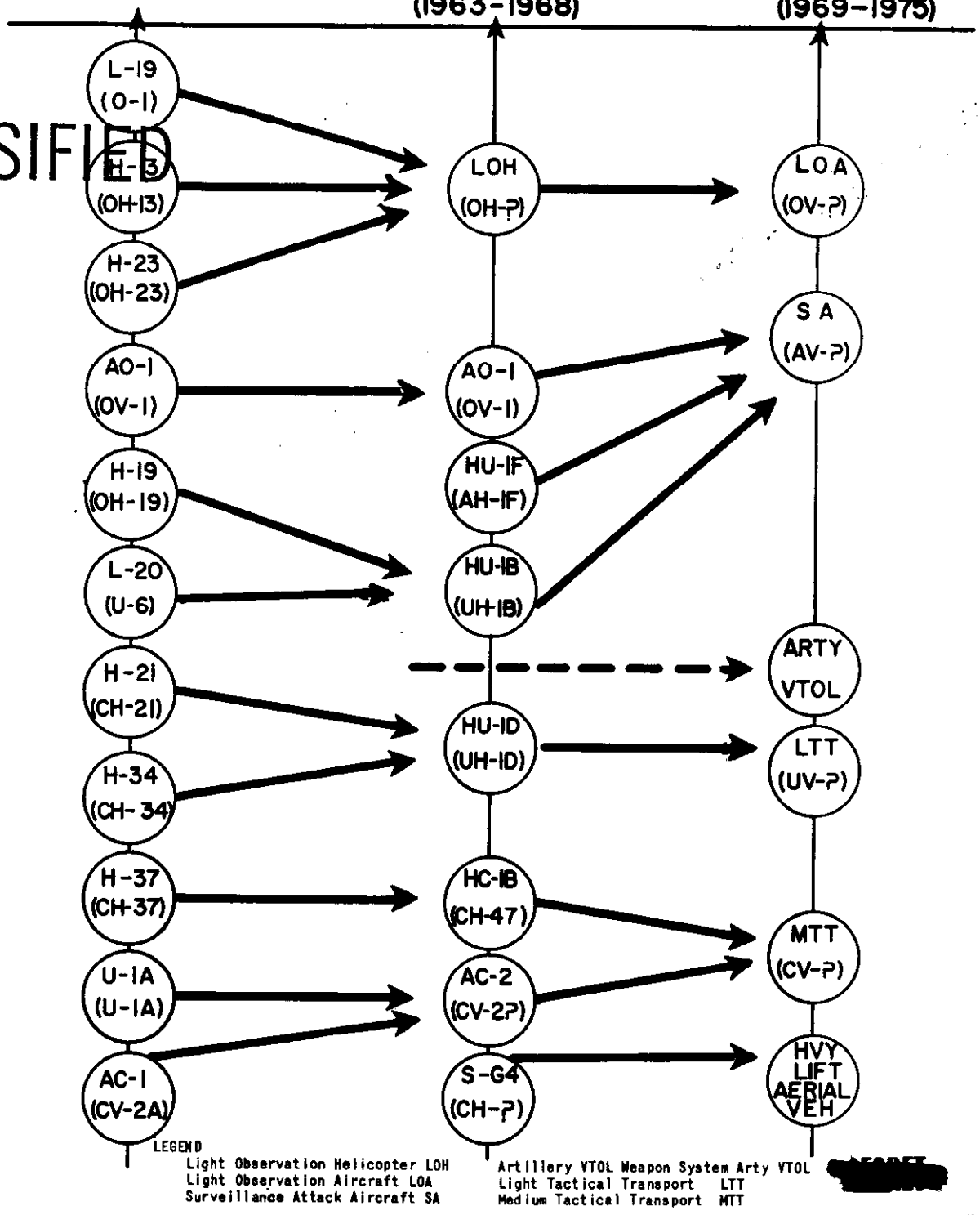

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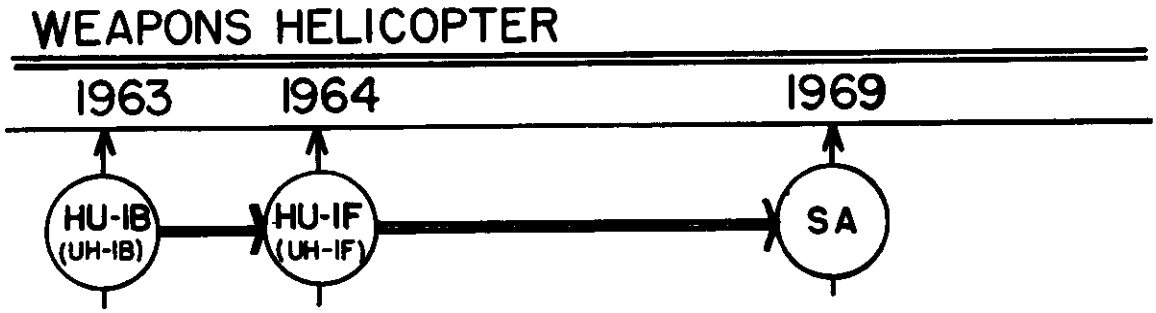
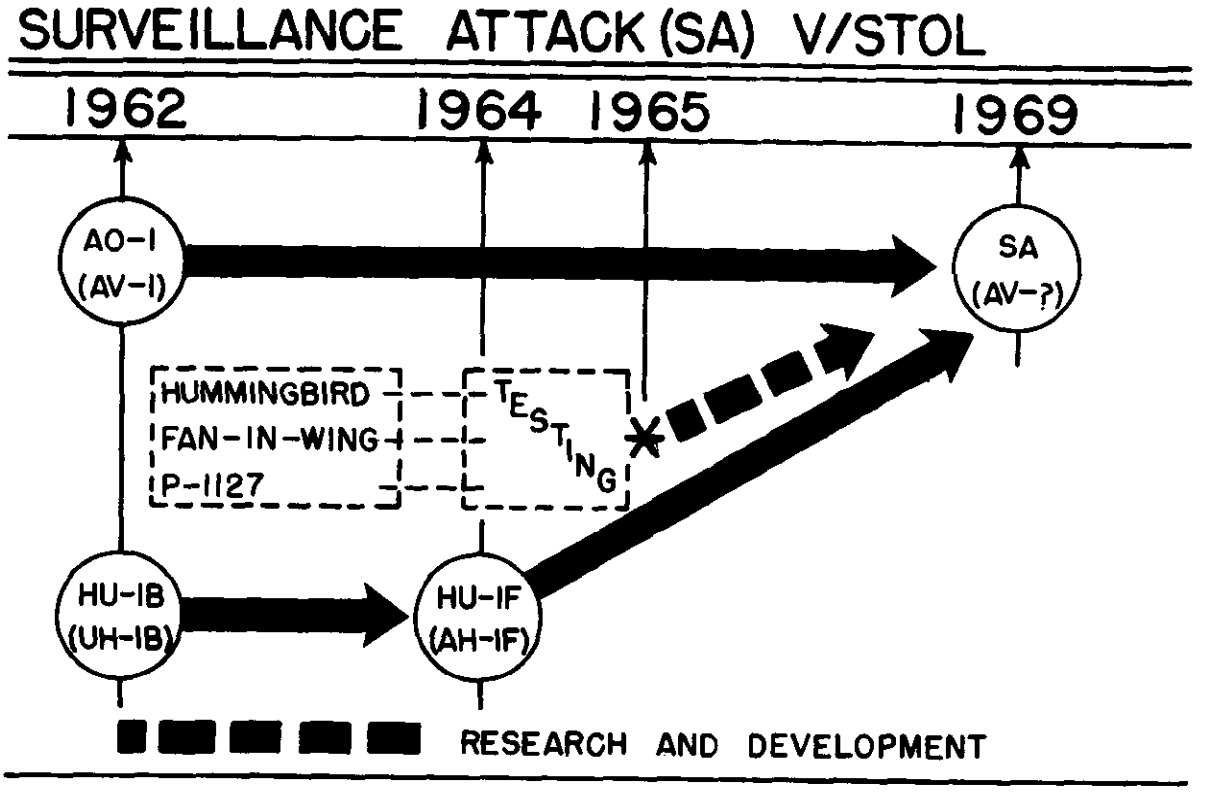
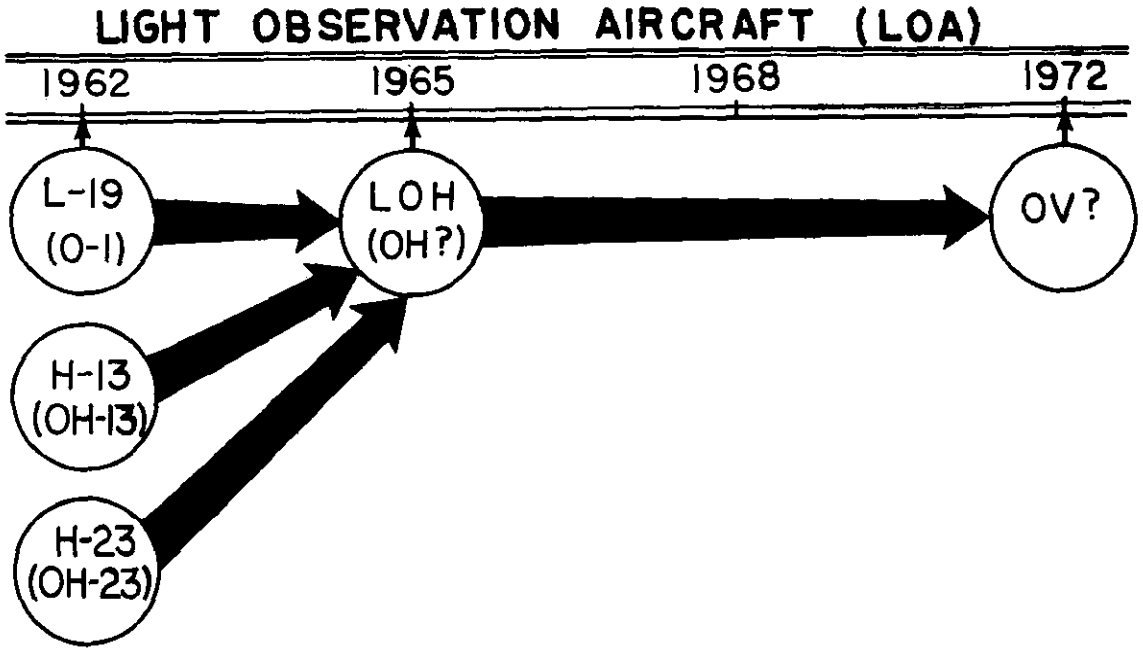


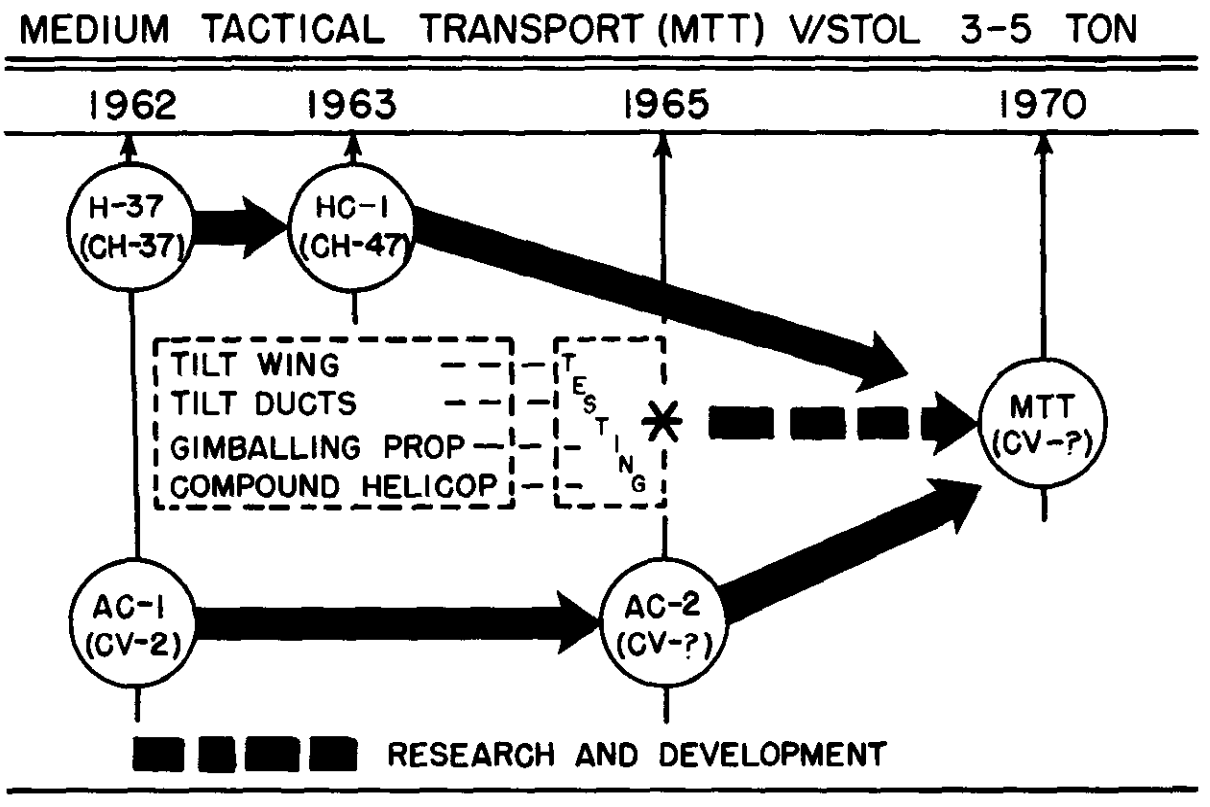
The concepts of operations proposed by the Board and current experience in Southeast Asia establish a requirement for an armed helicopter capable of operating with troop carrying helicopters in airmobile operations. This aircraft must be able to protect the tactical transport helicopters from attack during flight and provide fire support in the course of ground operations. The HU-1B (UH-1B) has much to offer now in this role, but best performance of the duty requires that the escort aircraft must have a sizeable speed differential over the troop carrying helicopters. A suitable machine can be obtained in a comparatively short period of time by modification of the HU-1 (UH-1). Using the dynamic components of this helicopter, redesigning the fuselage and adding stub wings to unload the rotor system, an aircraft can be produced capable of carrying a pilot and gunner with appropriate armament at cruising speeds of about 160 knots.



This area offers promise for an excellent multi-mission aircraft with speed range from zero to .9 Mach and an efficient loiter speed. Multi-sensor and weapons pods will be carried on a selectively exchangeable basis to fit the mission. Tests of the present operational and experimental type aircraft should provide sufficient technical information so that decision can be made by 1965 (*) concerning configuration of the surveillance-attack aircraft to replace the HU-1F (AH-1F) and the AO-1 (AV-1). Production should begin by 1969.



Studies and field tests establish that product improvement is necessary for the Light Observation Helicopter (LOH) to increase its speed to the maximum practical, with a goal of 150 knots. For the follow-on aircraft (the Light Observation Aircraft - LOH) the significant advances required include decreased maintenance and cost, increased reliability, and increased speed to at least equal that of the Light Tactical Transport.



Through 1970, the present transport aircraft with product improvement, promise to be the most efficient and effective aircraft for the medium tactical transport mission. The four experimental programs (three currently in progress under the tri-service V/STOL program, and the shaft-driven compound helicopter project recommended in this report) should provide data upon which to base a decision as to configuration and desired performance of the optimum vehicle by 1965 (*).

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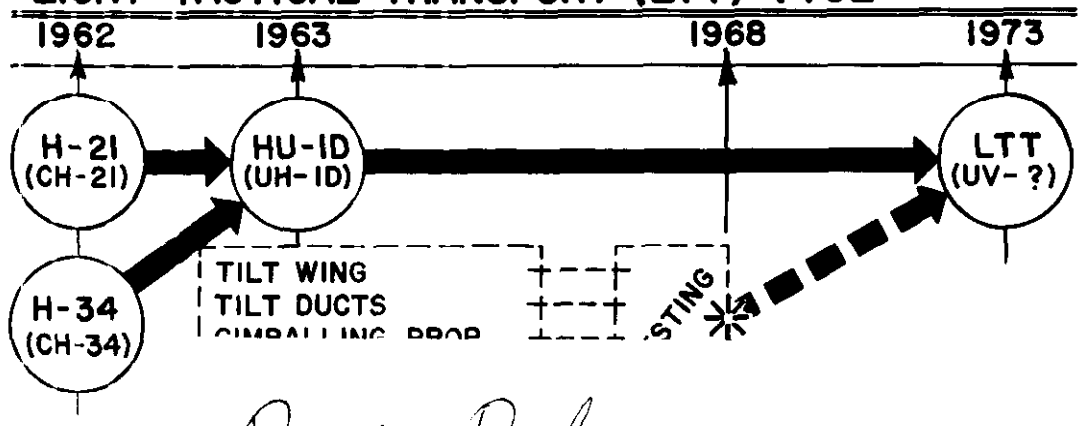
LIGHT TACTICAL TRANSPORT (LTT) VTOL



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Th by a new helicopter
until res pabilities of new
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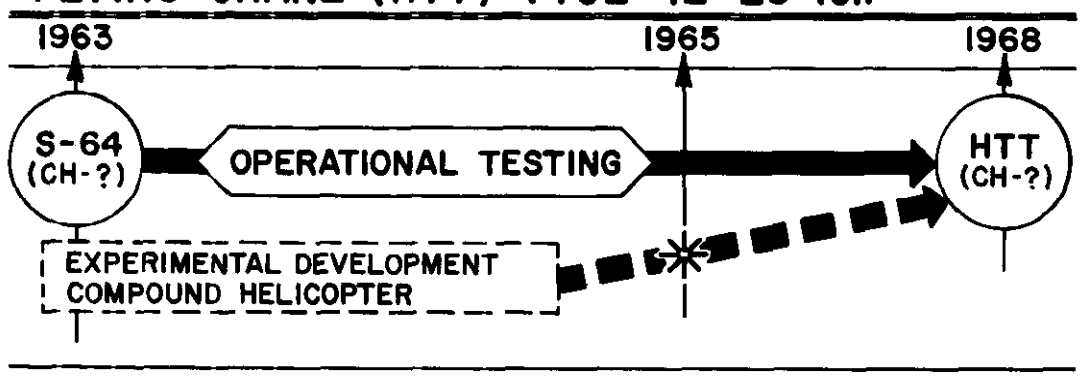
1973.

FLYING



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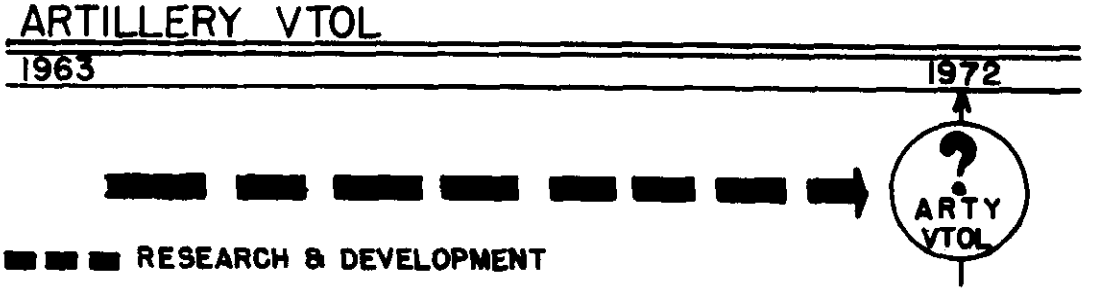
The S-64 (Sikorsky) flying crane should be procured immediately as an off-the-shelf aircraft to meet current Army requirements for a flying crane type aircraft. Concepts of operational and mission requirements should be further tested and defined by operational experience with the S-64 during 1963-1965. In addition, results of experimental development and testing, particularly in regard to the compound helicopter, will be available in 1965 (*). At that time a decision will be required as to whether the conventional or compound helicopter type configuration should be adopted for heavy lift. A competition can then be held to select the specific design to be developed and placed in production by 1969.



By 1968 technical information from new aircraft and artillery weapons research should indicate the design most promising for a mid-1970 integrated VTOL artillery weapons system. The weapon should be capable of indirect fire support as a primary mission with instantaneous position and target area survey information available upon landing. Direct fire, either from ground or air, will be a secondary mission. Production could begin by 1972.

(S) Auxiliary Equipment

Specifically to complement the aircraft of the period, development of several types of hyper-light, simple, inexpensive ground vehicles is required. These vehicles would be habitually transported in aircraft (LTT and MTT) and would not require high speed or long range.

Other items deemed very necessary:

- Low level light intensification equipment, which will be of tremendous value to ground and airborne personnel, with application to surveillance, reconnaissance, aircraft pilotage, target acquisition and optical control of weapons.

- Suitable POL air delivery and light POL field handling systems to permit very fast refueling of aircraft.

- Techniques and equipment for aerial delivery into confined areas.

- Anti-guerrilla devices to detect small groups of personnel in jungle areas.

- Devices to permit helicopter operation from water surfaces.

The future should see the steady replacement of obsolescent equipment with new, advanced systems if our effort is properly focused. It is easy to invest millions in various "interesting" items which divert funds from less picturesque but more important efforts. If the important items are identified and pursued to completion, the R&D dollar will pay greater dividends.

Systems designed to meet specific requirements should not be withheld from production until all deficiencies and shortcomings have been eliminated, but should be accepted at less than optimum configuration on a limited production basis. This is necessary if the Army is to expedite integration of new materiel into the new tactical and logistical concepts.

(S) VIII. JOINT CONSIDERATIONS

The Board strongly supports the view that in the national interest the Army should take every advantage of aviation support which can be effectively furnished by the other services, the Air Force in particular.

There is a continuing requirement for Air Force fighter-bomber aircraft, operating in support of the ground battle, to counter enemy aircraft, and for interdiction, deep reconnaissance, and close air support missions. Fighter-bombers now in the Air Force system are designed primarily for the first three, and must also meet the demands of theater Air Force headquarters. Joint Operation Centers (JOC) allocate missions on an on-call or pre-planned basis. This method provides the very desirable capability of massing air power on a single target system, but is not responsive to many of the day-to-day legitimate requirements of the Army for close support.

Army aircraft, fixed and rotary wing, armed with appropriate weapons, are capable of delivering a measure of fire support for conventional and airmobile forces, of escorting helicopterborne forces, and of executing close-in visual, photographic, radar and IR reconnaissance. The Air Force also has capabilities in these fields, but there are many missions to be flown in each category which absolutely require for effectiveness the most intimate coordination with ground combat elements - infantry, tanks, and armor - and this coordination, and the responsiveness also necessary, can only be achieved if the pilots are part of and under command of the ground elements, live with them, and operate their aircraft from fields close to the headquarters they serve. It is quite impossible for a commander or staff officer to brief a strange pilot, whom he has never met, by radio or telephone (in code perhaps) as well as he can a familiar face in a tent before a map; it is unrealistic to expect a stranger to understand the interrelation of artillery and missile fires, tank and infantry maneuver, air reconnaissance and air delivered fires if he has not seen the plan of operation about to be placed in effect and has not detailed knowledge of the situation and terrain. It is not a question of courage, or will - the Army pilot may be inferior in both to his Air Force counterpart,

yet be infinitely more useful because his aircraft is of a type that permits him to live and work in the Army environment, and the chain of command which governs his action is direct and unequivocal. Having made that point, however, it is necessary to repeat that the Board holds firm the view that the Army should remain dependent on the Air Force for the far greater part of the weight of close air support. The division of the function into two parts will permit the desirable concentration of Air Force fighter firepower in support of the primary objective which, according to the situation, may be the destruction of enemy local airpower, deep interdiction, the attack of enemy ground forces opposing the main US ground effort, or a combination of these.

As a subsequent action to the efforts of this Board, a detailed examination should be made of the operational and numerical requirements for intermediate performance fighter-bombers in joint operations. However, this examination should not delay incorporation of light attack aircraft in the Army structure.

The Army must also depend on the Air Force for inter-theater, troop carrier and long haul intra-theater airlift. Again the same aircraft also support theater Air Force elements; again flexibility and the capability of massing the effort are essential. The Army will want wholesale movements by Air Force C-130's to bases as far forward as practical.

A corollary to this requirement is the need for the reorientation of MAP and appropriate ECA programs to provide additional airfields, pipelines and associated facilities in order to enhance the aviation environment of those recipient countries identified with high priority contingency plans. These measures could greatly facilitate both the strategic deployment and tactical mobility of modern forces.

The Army utility and cargo aircraft (helicopter and V/STOL) do not duplicate the Air Force aircraft in capability or mission. Of short range and limited payload, they can live with the Army units.

Both the Air Force and the Army can make important aviation contributions in support of Special Warfare activities. Certain of these require deep penetration at ranges beyond the capabilities of

Army aircraft. Nevertheless, counterinsurgency operations are basically an aspect of land warfare, and Army aircraft are particularly well suited to the requirements. It follows that the Army should be charged with the supervision and training of foreign personnel employing these types of aircraft, whether they are assigned to the local army or air force.

The Army airmobility program as recommended by the Board does not lessen in any way the importance or the magnitude of Army requirements for support by the Air Force. In the past, apprehension that the Army might unjustifiably expand its aviation so as to duplicate Air Force capabilities has caused restrictions to be placed on Army aviation in the form of weight limitations and denial of authority to employ organic aircraft for aerial fire support. Unfortunately, these restrictions have, in major respect, created a demilitarized zone in air support capability rather than a desirable interface between Army and Air Force aviation. A policy statement by the Secretary of Defense promulgating a basis for Army programming of organic aviation is a desirable concomitant to the implementation of the Board's findings. The criteria stated in the analysis of the Army Aviation Program by the OSD staff is sound and includes all of the guidance and guards against duplication required.

In summary, if the Board's recommendations are accepted, the Army - without moving into the fields of deep penetration by observation aircraft, or fighter-bomber support of ground forces - will have a sufficiently broad area of endeavor to absorb all its aviation effort and ingenuity for the indefinite future. By the same token, the Air Force will retain practically all of the vitally important functions it now carries with respect to the support of the land battle, and these functions will absorb profitably all the energy that the Air Force can afford to devote to them.

(S) IX. THE ALTERNATIVES

(U) The formulation of alternatives, and the selection of a recommended alternative, were preceded by consideration of force effectiveness, trade-offs, and cost comparisons.

(S) Force Effectiveness

Based on the proposed airmobile TOE's and using the current 5-year program for a 16 division Army and its deployment as a departure point, the Board considered the following:

- Force effectiveness of the three major airmobile units. The air assault division was compared with the ROAD infantry and ROAD mechanized divisions; the air cavalry combat brigade, with an armor group; and the air lines of communication with surface lines of communication. Comparisons were made using the proposed units, or components thereof, in the following situations: counterinsurgency in Southeast Asia, unsophisticated formal war in the Middle East and Southeast Asia, and a sophisticated war in Europe and Korea. All comparisons were in a non-nuclear environment. The evidence developed tends to be indicative rather than conclusive; it does, however, support military judgments.

- Trade-offs to decrease funding and manpower requirements.

- Cost comparisons of the major units in terms of initial investment and annual operating costs.

All of these factors were correlated to permit examination of alternative force structures and selection of the most effective structure.

The ratios of effectiveness of performance (air assault division units versus ROAD Division units) by function, derived from field test data extended to recognize the differing areas of possible conflict, are shown on the following chart. (See also Inclosure 4, Force Effectiveness Summary.)

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FIELD TEST ANALYSIS OF COMPARATIVE EFFECTIVENESS

TACTICAL MOBILITY	Ctr-Insurg (SE Asia) Air Aslt to ROAD	Unsoph War (ME, SE Asia) Air Aslt to ROAD	Soph Non-Nucl War (Eur, Korea) Air Aslt to ROAD
Surprise and shock effect from violent surprise attack	4 to 1	3 to 1	3 to 2
Freedom from terrain obstacles - natural and man-made	5 to 1	4 to 1	2 to 1
Choice of objective and direction of attack	5 to 1	3 to 1	2 to 1
Rapid shift of forces and weapons to weight attack; disperse for passive protection	3 to 1	2 to 1	3 to 2
Avoid a slugging engagement; strike for deep objectives	4 to 1	2 to 1	3 to 2
Less fatigue/loss of people and equipment	3 to 1	3 to 1	2 to 1
Shortened campaign from more rapid phasing and conduct of separate missions	3 to 1	2 to 1	3 to 2
Fewer casualties from reduced exposure in advance to the objective	2 to 1	2 to 1	3 to 2
Weather and visibility limitations on movement	2 to 3	1 to 2	2 to 3
SURVEILLANCE/TARGET ACQUISITION			
Finding and recognition of more distant targets	3 to 2	4 to 1	2 to 1
Early warning and faster notification of approaching enemy	4 to 3	2 to 1	3 to 1
Extension of coverage over greater area	5 to 1	3 to 1	2 to 1
Detailed, repetitive search of critical areas	3 to 1	2 to 1	2 to 1
Weather and visibility effect on search and target identification	2 to 3	1 to 2	2 to 3
Maintenance of contact with enemy force	1 to 1	3 to 4	2 to 3

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	Ctr-Insurg (SE Asia) Air Aslt to ROAD	Unsoph War (ME, SE Asia) Air Aslt to ROAD	Soph Non-Nucl War (Eur, Korea) Air Aslt to ROAD
FIREPOWER			
Ability to attack more and deeper targets	4 to 1	2 to 1	3 to 2
Casualty-producing effect of short, violent attacks	2 to 3	1 to 1	2 to 1
Volume of firepower on targets	2 to 1	3 to 2	2 to 3
Use of direct, observed fire support	4 to 1	3 to 1	2 to 1
Promptness and accuracy of damage assessment	1 to 1	2 to 1	3 to 1
Coordination and control to provide quick follow-up of fire support	2 to 1	2 to 1	3 to 1
Maintenance of sustained fire	1 to 2	1 to 3	1 to 4
COMMUNICATIONS, COMMAND AND CONTROL			
Decentralization of command authority	3 to 2	3 to 2	1 to 1
Personal direction of combat action by commander	2 to 1	4 to 1	5 to 1
Sensitivity to radio reliability, range and netting	4 to 1	2 to 1	3 to 2
Essentiality of precise air traffic control	2 to 1	4 to 1	5 to 1
Precision of execution without detailed coordination	1 to 2	1 to 3	1 to 3
Speed of reaction based on planning and decision making	3 to 1	2 to 1	3 to 2
VULNERABILITY-SURVIVABILITY			
Distant extension of warning means	4 to 3	3 to 1	3 to 2
Drain in combat elements for security	4 to 1	3 to 1	3 to 2
Frequency of formation of target for enemy attack	3 to 1	3 to 1	1 to 1
Dispersion of targets offered to enemy	1 to 3	2 to 3	2 to 3
Exposure of weapons providing fire support for maneuver elements	3 to 4	1 to 1	4 to 3
Sensitivity to enemy interference	3 to 1	2 to 1	3 to 2

LOGISTIC SUPPORT	Ctr-Insurg (SE Asia) Air Aslt to ROAD	Unsoph War (ME, SE Asia) Air Aslt to ROAD	Soph Non-Nucl War (Eur, Korea) Air Aslt to ROAD
Savings in security troops for LOC	5 to 1	3 to 1	3 to 2
Construction effort for LOC	1 to 3	1 to 4	2 to 3
Maintenance effort for LOC	1 to 3	1 to 4	1 to 2
Casualty evacuation	2 to 1	3 to 1	3 to 2
Dependence on specialized maintenance skills	5 to 1	3 to 1	3 to 2
Tonnage of resupply required to complete campaigns	1 to 3	1 to 1	2 to 1

As a result of war gaming, the following indicators were derived:

WAR GAMES

FORCE EFFECTIVENESS ANALYSIS

Units Employed	Area	No. Combat Forces	No. Log Forces	Force Deployment Time	Completed Mission Time	Most Advanced Position
Air Assault Division	Soph (EUR)	The air assault division was not gamed in a sophisticated area due to limitations in time and facilities. However, some measure of comparison is available in M2, a game in which an Air Cavalry Combat Brigade was employed in support of ROAD units.				
versus	Unsoph Conv (ME)	-14% (M7*)	-25% (M7*)	-54% (M7*)	-51% (M7*)	+20% (M7*)
ROAD Division(s)	Unsoph Ctr-Insurg (SEA)	-25% (M1*)	-24% (L-Log*)	-14% (M5*)	-14% (M5*)	+30% (M5*)

As compared to ROAD Forces in the situations developed in The Conventional War Forces 1967 Study **, in areas other than Europe properly balanced task forces (estimated 40% air assault division, 40% ROAD infantry, 20% airborne) can, with 85% of combat troops and 80% of support troops, advance by 25% the line of contact and stabilize limited formal war situations in two-thirds the time.

NOTES: * Note indicates annex reference.
** Conventional War Forces 1967, Vols I-XI, Office Deputy Chief of Staff for Military Operations, Department of the Army, initial edition, June 1962, (ID5970300).

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(S) Analysis

Air Assault Division. A large body of evidence supports the contention that increased mobility provides multiple advantages to the air assault division when compared to the ROAD infantry or mechanized division (see Inclosure 4). However, the analysis is not so conclusive nor are the advantages so one-sided as to warrant considering a solution more extreme than a mix of airmobile and ROAD type units in these alternatives. The significance of mobility as a basis for change is seen in the fact that a large majority of the advantages listed in the force effectiveness analysis fall under the heading of Maneuver and Surprise, while only a few of the disadvantages listed lie in this category.

The force effectiveness analysis suggests that mobility of manpower and firepower yields sizable advantages for the new division in all three types of war, with the strongest benefits in counterinsurgency and against an unsophisticated - but conventionally organized - enemy.

Available communication and navigation equipments provide the air assault division with only a fair capability in these respects in all types of conflicts. It is likely that major improvements can be realized in the FY 1964-68 time period if a concerted effort is directed to these programs.

The vulnerability of the air assault division to air and ground weapons is greatest in a conflict against a sophisticated enemy and least in a counterinsurgency type of conflict. The surveillance and target acquisition capabilities of the unit are good against both a sophisticated and unsophisticated enemy, but are poor (as they are poor for other units) in counterinsurgency actions. There is some likelihood that improvements in these functional areas will be realized in the FY 1964-68 period.

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Combining advantages and disadvantages, the following rating suggests itself as the basis of utilization of the air assault division:

Type of Conflict	Application
Counterinsurgency	Second
Unsophisticated Formal War	First (most applicable)
Sophisticated Formal War	Third (least applicable)

Air Cavalry Combat Brigade. The brigade has been designed primarily for use as a striking force to operate in conjunction with other type units. It has good capability against armored vehicles and other materiel. It is heavier in airborne firepower than is the air assault division, but has less staying power.

Employment of the brigade in conjunction with an armor group greatly enhances the effectiveness of the armor group.

The brigade has the same advantages and disadvantages as the air assault division as regards mobility, vulnerability and command and control, but acquires additional advantages in other functional fields because of its capability for applying heavier concentrations of airborne firepower quickly.

The brigade shows to best advantage in a battlefield environment where materiel targets are plentiful. These conclusions are summarized in the following table:

Type of Conflict	Application
Counterinsurgency	Third (least advantageous)
Unsophisticated Formal War	Second
Sophisticated Formal War	First (most advantageous)

Air Lines of Communication. (strategic unloading point to division base)

Three major factors measure the effectiveness of a line of communication:

- Responsiveness, or the ability to deliver the item required to the right place with least delay.

- Reliability, or the ability to deliver under all situations, including enemy interference.

- Flexibility, or the ability to react quickly to change in the tactical situation.

From the standpoint of responsiveness and flexibility, an air line of communication has definite advantages in all potential theaters of operations. From the standpoint of reliability, an air line of communication is unquestionably superior in underdeveloped areas such as Southeast Asia, but may be less efficient in a very highly developed area such as Europe.

Conclusions summarized:

Type of Conflict	Application
Counterinsurgency	First (most advantageous)
Unsophisticated Formal War	Second
Sophisticated Formal War	Third (least advantageous)

(S) Trade-Offs

Trade-offs are defined as military units, systems, and principal items of equipment suggested for reduction or elimination when the substitution of aircraft could improve the over-all Army capability.

In comparing the proposed force structures with the approved Five-Year Force Structure and Financial Program it may be seen that an imbalance and deficiency exist in the tactical and support units of the present and proposed force structures. The present limitations on Army resources will not permit elimination of these deficiencies. The reorganization of the forces from the Pentomic to ROAD, together with the modernization program for equipment and materiel, further complicates the accurate identification of units for trade-off purposes.

During the recent military build-up for Europe, it became apparent that certain support type units requiring "hard skills" were not readily available from the Reserve and National Guard. As an example, the reserve Army aircraft maintenance units called to active duty required large numbers of skilled fillers and a long period of intense training prior to becoming effective. A major increase in aircraft assets will require additional aircraft logistical support units in the active Army.

The Army also experienced, during the build-up, a shortage of many types of surface vehicles. Therefore while savings can be achieved by reducing future procurement, they cannot be achieved by reducing an inventory objective below assets on hand, nor can savings result from reducing a requirement that is not being met by current programs.

Inactivation or reorganization of units so designated must be delayed until new aircraft and other airmobile items of materiel are procured and available to permit the activation of the new, more effective fighting units.

As respects logistics units, there is also a threshold that must be passed; until units and equipment exist in the force which could operate and maintain a reliable air LOC of adequate capacity, no significant savings can be effected by reducing elements of the force required to maintain and operate the ground LOC.

There will, inevitably, be some period of increased expenditure while the new units are building up but are not yet adequate to permit full reliance on an air LOC. This period is lengthened, with consequent increase in costs, by slowly phased procurement programs. The major increase of aircraft and aviators results in additional space requirements for aircraft maintenance and flight training spaces which must be absorbed within the authorized personnel ceiling.

The Department of Army FY 1962-1967 Force Structure and Financial Program (S), dated 15 June 1962, geared to the ROAD division concept, is used as the basis for evaluation. Examination of the Alternative Force Structures recommended indicate certain traditional surface system units and equipment as candidates for trade-off.

For example, the air assault division has approximately 1,100 ground vehicles compared to 3,452 in the ROAD infantry division. The vehicles retained by the proposed force consist primarily of those most easily air transported. The proposed TOE's reflect the introduction of new ground vehicles such as mechanical mules and gamma goats for this force, and virtually all heavy combat vehicles are deleted.

Some reductions in artillery (divisional and nondivisional) are possible since the artillery has been tailored to the air assault operations and has been offset in part with firepower of armed helicopters and fixed wing aircraft.

A recapitulation of trade-offs is computed at approximately 1.6 billion dollars for the five-year period of FY 63-67. The emphasis placed by the Department of Defense on the early obligation of funds for FY-63 will not permit major reprogramming action within the PEMA appropriation this year. Selected items of equipment and systems for trade-off are summarized in three categories as follows:

- Category I, TOE Item Reduction. The principal end items of PEMA equipment authorized in ROAD and other current TOE were compared to the proposed TOE's, a comparison which resulted in a reduction of certain items in the proposed TOE with savings of procurement costs of at least 1,094 million dollars over the period FY 63-67. Refinement of requirements and development of new shopping lists will undoubtedly result in a major increase of estimated savings. Dollar savings include the TOE equipment, together with maintenance float and depot stocks required for back-up.

COMPARISON OF SELECTED PRINCIPAL ITEMS OF EQUIPMENT

Selected Items	Current Procurement	Suggested Procurement	Item Reduction
Main Battle Tank	4,140	2,274	- 1,866
Howitzer, Lt, SP, FT, 105MM, T195E1	1,024	795	- 229
Mortar, SP, FT, T257E1, XM106	3,958	3,480	- 478
Carrier, Personnel, FT, Armrd, M113	11,100	8,776	- 2,324
Tank Recovery Vehicle, Med. M88	280	144	- 136
Truck, Utility, 1/4 Ton M151	60,000	49,028	- 10,972
Truck, 3/4 Ton ABT	50,000	42,265	- 7,735
Truck, 2-1/2 Ton ABT	41,500	26,568	- 14,932
Truck, 5 Ton ABT	17,530	12,559	- 4,971
Truck, Tractor 10 Ton 6 x 6 ABT	1,200	913	- 287
Trailer, Cargo, 1-1/2 Ton, M105A2	13,366	4,362	- 9,004
Heavy Equip Transporter, 55 Ton	1,466	1,333	- 133
Crane, Shovel, Basic Trk Mtd 20 Ton	1,387	1,054	- 333

- Category II. Other surface transportation systems were considered. In that these systems are primarily directed to improved ground mobility, activation of fixed and rotary wing aerial transportation units will result in the elimination of the major items of equipment. Savings are estimated to be approximately 551 million dollars.

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OTHER SURFACE TRANSPORTATION SYSTEMS FOR TRADE-OFF

FIVE-YEAR FORCE STRUCTURE AND FINANCIAL PROGRAM

1962-67 Inclusive 15 June 1962

Item	FY-63 Qty	FY-63 Cost	FY-64 Qty	FY-64 Cost	FY-65 Qty	FY-65 Cost	FY-66 Qty	FY-66 Cost	FY-67 Qty	FY-67 Cost	Total Mill
Truck, 8 Ton ABT* GOER	100	3.6	1000	30.0	2000	54.9	3500	80.1	5000	118.8	287.4
Truck 16 Ton ABT* GOER	100	4.6	300	13.7	700	28.5	1200	46.4	1800	69.7	162.9
Truck Tank Fuel GOER 5000 Gal.	150	7.2	500	22.8	500	21.9	500	21.9	500	21.9	95.7
Loco-motive Narrow Gauge	-	-	10	2.3	10	2.3	-	-	-	-	4.6
Total Cost (Millions $)	$15.4		$ 68.8		$ 107.6		$ 148.4		$ 210.4		$ 550.6

- Category III. Other Systems Trade-Offs. The Pershing and the Sergeant Missile Systems were reviewed. Since the elimination or reduction of either or both of these nuclear delivery systems could not be directly related to the improvement in capabilities afforded by airmobile units, it was considered inappropriate for the Board to explore them further.

* All Body Types

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(U) Methods of Cost Computation

Procedures utilized in costing the alternatives proposed in this study are in consonance with those of the Comptroller of the Army. The data under each alternative are predicated on identifiable changes in the current force structure and troop basis, generally limited to major combat and combat support units. Due to the limitation of time and the vast detail involved, it was impracticable to identify all TOE and TD units needed to support the major combat units under each alternative; nor were all TOE changes determined for organizations requiring modification under the airmobile concept.

Where applicable, cost computations and usage factors were based on initial equipment and operating costs derived from the current Army budget. Where new units were substituted for old, rates of operating costs were adjusted to provide for new equipment and new operating concepts. Basic loads and ammunition day of supply had to be developed for current RODAC units, the new air assault division, and other proposed airmobile units. Peace and combat usage rates could not all be determined with finite accuracy. Thus for budgetary purposes, the flying hours of aircraft were computed on the basis of the current DA flying hour program, and maintenance and operating costs were based on the US Army Transportation Maintenance Command study dated February 1961.

TOE's and TD's were costed by major line item based on the assumption that all equipment and materiel required for an organization would be procured new. The average cost of a five-year or more production buy for equipment was used.

(C) Cost Comparison

The proposed airmobile units are more costly than units they are designed to replace. For example, the cost of an air assault division (15,029 men) for initial equipment and five years of operating costs is 987 million dollars. The comparable cost for a ROAD infantry division (15,845 men) is 693 million dollars, and for an armored division (13,617 men) is 863 million dollars.

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Chief reasons for the increased costs are the investment costs for the aircraft increment plus the additional costs of operations and maintenance.

Table 1, Estimated Initial and Five-Year Operating Costs lists the major airmobile units and their corresponding costs.

TABLE 1

(Millions $)

Units Based on New TOE's	Initial Investment	5-Year Operating CONUS[1]	Total 5-Year Cost CONUS
Air Assault Division	282.1	704.9	987.0
Air Cavalry Combat Brigade	203.6	162.6	366.2
Armored Cavalry Regiment	83.9	134.5	218.4
Corps Aviation Brigade	133.6	195.6	329.2
Corps Artillery (Airmobile)	82.3	208.4	290.7
Corps Artillery (other)	56.8	70.4	127.2
Air Transport Brigade	195.4	269.0	464.4
Special Warfare Aviation Brigade (5 squadrons)	69.5	79.9	149.4

Table 2, Initial and Five-Year Operating Costs, lists the ROAD divisions and their corresponding costs.

TABLE 2

(Millions $)

	Initial Investment	5-Year Operating CONUS[1]	Total 5-Year Cost CONUS
ROAD Armored Division	182.0	681.0	863.0
ROAD Mechanized Division	155.0	646.0	801.0
ROAD Infantry Division	111.0	582.0	693.0
ROAD Airborne Division	76.0	579.0	655.0

1 - Overseas based operating costs would be about 17% higher.

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(C) Cost Comparison/Force Effectiveness Alternatives

Board consideration of the evidence produced by the War Games, Field Tests, Operations Research, and other sources explained in Chapter II, Methodology, and as correlated in the preceding sections on Force Effectiveness, Cost Comparisons and Trade-Offs led to the derivation of a number of alternative force structures. The table on the next page indicates the proposed force structure and deployment for five alternatives.

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ALTERNATIVE FORCE STRUCTURE/DEPLOYMENTS

Divisions		Current	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Korea	Air Aslt Div		1	1	1	1	
	Inf Div	2	1	1	1	1	2
Hawaii	Air Aslt Div*		1	1	1	1	1
	Inf Div	1					
CONUS	Air Aslt Div		4	4	3	2	2
	Abn Div	2					1
	Inf Div	3	2	2	3	3	2
	Mecz Div	2	1	1	1	2	2
	Arm Div	1	1	1	1	1	1
Europe	Air Aslt Div						
	Mecz Div	3	3	3	3	3	3
	Arm Div	2	2	2	2	2	2
TOTALS		16	16	16	16	16	16
Air Cavalry Combat Brigades							
CONUS			2	2	2	1	1
Europe			1	1	1	1	1
Air Transport Brigades							
Pacific			2	2	2	2	
CONUS			1	1	1	1	1
Europe			2	2	2	1	
TOTALS			5	5	5	4	1
Program Years			5	8**	5	8**	5

* 1 Brigade of this division is stationed in Okinawa.
** Two Alternatives are 8-year programs.

REQUIREMENTS FOR ACTIVE AIRCRAFT AND AVIATORS

Requirements	Current	Alt #1	Alt #2	Alt #3	Alt #4	Alt #5
Aviator	11,500	20,662	21,123*	20,600	16,157*	14,438
Total Aircraft Excluding Res/NG	4,887	10,903	10,905*	10,608	8,317*	7,875

* Represents total strength in eight years.

Approximately one-half of the aviator requirements should be filled by warrant officers.

COST COMPARISONS OF ALTERNATIVES

(Millions $)

Five Years

Appropriations	Current	Alt #1	Alt #2 *	Alt #3	Alt #4 **	Alt #5
MCA	989.1	1238.7	1176.2	1210.4	1143.9	1120.5
MPA	20555.9	20621.5	20596.6	20607.7	20587.2	20586.9
PEMA	14241.7	18233.0	16849.8	18025.8	16027.4	16394.8
RDT&E	7185.5	7727.0	7727.0	7727.0	7727.0	7727.0
O&MA	18359.0	19998.9	19355.0	19966.5	19156.7	19062.5
Other Costs	3814.6	3814.6	3814.6	3814.6	3814.6	3814.6
Less Trade-Offs		-2117.4	-1662.3	-1981.0	-1379.9	-1469.0
Net Total	65145.8	69516.3	67856.9	69371.0	67076.9	67237.3
Increase Over Current		+4370.5	+2711.1	+4225.2	+1931.1	+2091.5

* 8-year program total, Alternative #2 $ 105,296.1
** 8-year program total, Alternative #4 $ 103,241.0

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The Board considers that Alternative 3 is most responsive to the requirement and is most compatible with the Army's mission and over-all structure.

Alternative 3, a five-year program of implementation, is chosen not merely because the over-all funding costs are lower than an eight-year program, but because the Board is convinced that the Army must attain this added capability as rapidly as is practically feasible. Recognizing that funding projections and trade-off computations cannot be exact, the Board is of the opinion that the funding cost differential between Alternative 1 and Alternative 3 will in fact be greater than indicated in its cost comparisons.

An Army structured according to Alternative 3 will permit deployment as follows:

- In Korea, a ROAD infantry division positioned in the line with Korean units, an air assault division as an exceptionally mobile Eighth Army reserve, and an air transport brigade to supplement the difficult ground line of communication north from Pusan.

- In Hawaii, an air assault division, of which one brigade may be stationed in Okinawa, plus an air transport brigade also in Okinawa. These forces may be committed quickly, if necessary, to Southeast Asia.

- In Germany, an air cavalry combat brigade to form a very mobile counterattack reserve, strong in anti-tank weapons, for the Seventh Army. The five ROAD divisions and the armored cavalry regiments will be strengthened with modest additions of aircraft. An air transport brigade may be stationed in Germany and air transport brigades will presumably be available for prompt execution of the contingency plans for which US Army Europe is responsible.

- In the Continental United States, five ROAD divisions, three air assault divisions (two of which would retain parachute capability), two air cavalry combat brigades and an air transport brigade which may be used for the execution of STRAC contingency plans or to reinforce either the European or Pacific theaters. Air assault divisions require about half the strategic airlift of a ROAD infantry division.

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FORCE STRUCTURE BY FISCAL YEAR

UNITS	FY-63	FY-64	FY-65	FY-66	FY-67
Air Aslt Div	1	2	3	4	5
Inf Div (ROCID)	9	2	2	1	-
Inf Div (ROAD)	-	4	4	4	4
Armd Div (ROCAD)	3	-	-	-	-
Armd Div (ROAD)	-	3	3	3	3
Abn Div (ROTAD)	1	1	-	-	-
Abn Div (ROAD)	-	-	-	-	-
Mech Div (ROAD)	2	4	4	4	4
Air Cav Cbt Bde	-	1	2	2	3
Armd Cav Regt	4	4	2	1	-
Armd Cav Regt (Modified)	-	-	1	2	3
Field Army Avn Bde	-	-	-	1	1
Corps Avn Bde	-	-	1	2	3
Corps Gen Spt Avn Co (EUR)	-	-	-	1	2
Corps Aerial Surv Co (EUR)	-	-	-	1	2
Corps Arty (Airmobile)	-	-	1	1	1
Corps Arty (other)	-	-	-	2	4
Spec Warfare Avn Bde	1	1	1	1	1
Aslt Heli Bn (ALAS)	-	-	1	1	1
Army Tac Avn Co	-	-	-	1	2
FW Co (CARIB)	-	-	1	1	1
Aslt Heli Co (CARIB)	1	1	1	1	1
Air Trans Bde	1	2	3	4	5
Air Amb Bn	1	1	1	2	2

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The aircraft procurement program under Alternative 3 requires the obligation of funds in the amount of $5.4 billion for 10,922 aircraft during the five-year period. These funds also cover weapons and associated PEMA equipment. Deducting the estimated attrition from the fleet and adjusting for delivery leadtime, the aircraft inventory would amount to 9,206 units by the end of FY-1967; of this total, 6,655 would be new aircraft.

AIRCRAFT PROCUREMENT PROGRAM

(Number of Aircraft)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year
Alt #3	1,043	1,630	2,585	2,568	3,096	10,922
Current	582	909	1,224	1,086	1,086	4,887
Diff	+ 461	+ 721	+ 1,361	+ 1,482	+ 2,010	+6,035

AIRCRAFT AND ASSOCIATED PEMA

(Millions $)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year
Alt #3	544.4	1,120.5	1,362.9	1,265.5	1,153.0	5,446.3
Current	246.4	331.2	395.8	349.6	339.2	1,662.2
Diff	+ 298.0	+ 789.3	+ 967.1	+ 915.9	+ 813.8	+ 3,784.1

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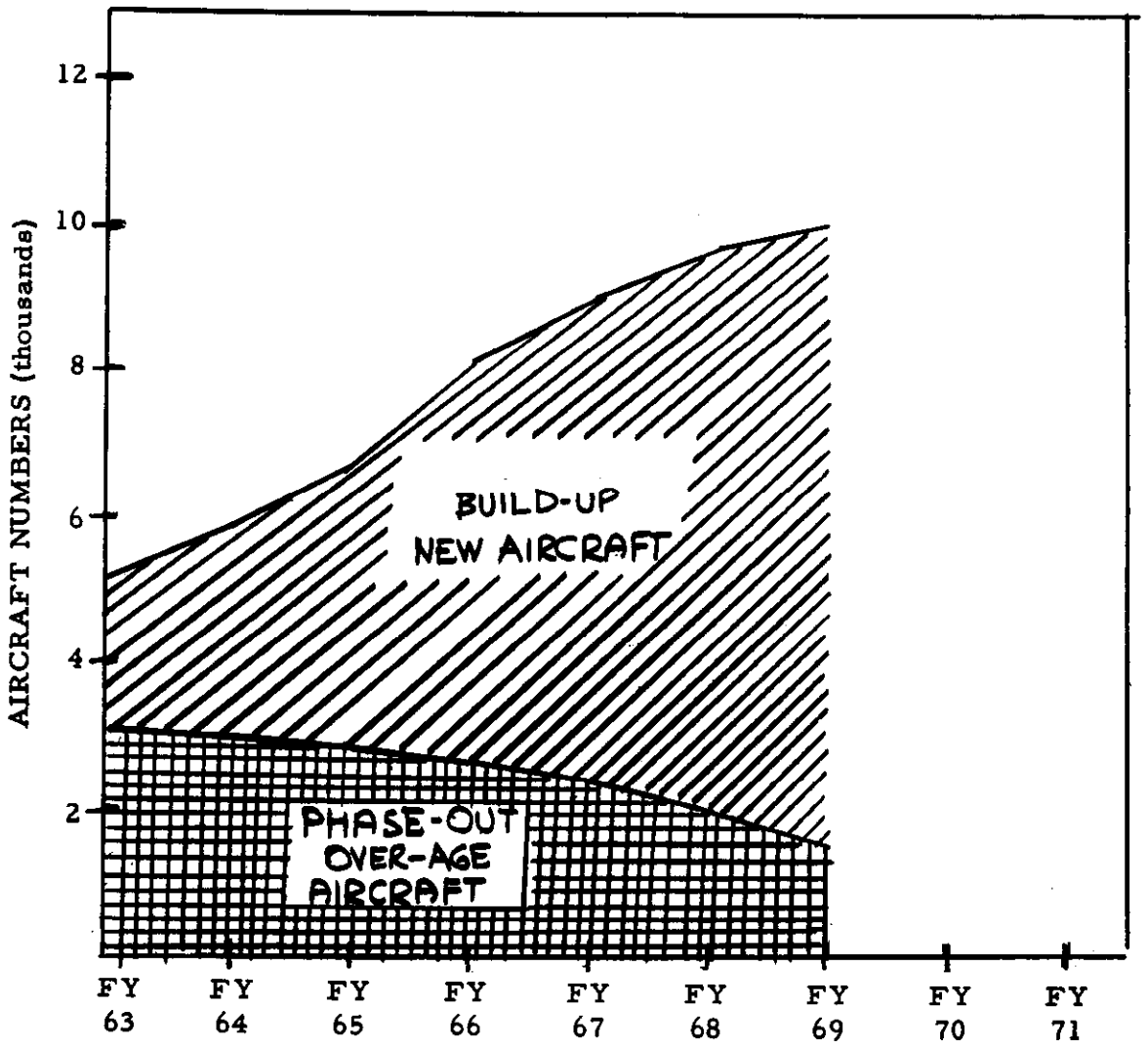
ALTERNATIVE 3

ACTIVE AIRCRAFT FLEET STATUS

(Less Maintenance Float, Pre-Stock and Reserves)



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Deriving from adjusted PEMA requirements to suit the changes proposed under Alternative 3, a total saving of almost $405 million in trade-offs is contemplated.

Total Army obligational authority required for the five-year period based on Alternative 3 is as follows:

FIVE-YEAR FINANCIAL PROJECTION

(Millions $)

	FY-63	FY-64	FY-65	FY-66	FY-67	5-Year Total
Force Structure Costs	12098.4	13844.0	14149.5	13856.9	13588.6	67537.4
Other Costs *	719.0	773.9	768.7	776.3	776.7	3814.6
Trade-Offs	-133.2	-314.7	-413.1	-506.4	- 613.6	-1981.0
Total Obligation Authority Required	12684.2	14303.2	14505.1	14126.8	13751.7	69371.0
Current TOA	12384.1	13484.4	13436.3	13089.7	12751.3	65145.8
Differential	+300.1	+818.8	+1068.8	+1037.1	+1000.4	+4225.2

* Miscellaneous appropriations including National Guard and Reserves

For detailed cost information on Alternatives 1, 2, 4, and 5, see Inclosure 5, this report.

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(S) X. CONCLUSIONS AND RECOMMENDATIONS

The Board has only a single, general conclusion: adoption by the Army of the airmobile concept - however imperfectly it may be described and justified in this report - is necessary and desirable. In some respects the transition is inevitable, just as was that from animal mobility to motor.

Even so the Board urges a selective approach, which designates only a part of the Army's force structure for conversion to airmobility while retaining the rest as battlefield surface-transported force whose capabilities are however improved by an increase in their organic aviation and the provision of back-up aviation at the corps level.

As indicated in the preceding section, the Board recommends that the Army structure be modernized as outlined in Alternative 3, a program which will provide, at the end of 6 years, eleven augmented ROAD divisions, five operational air assault divisions, three air cavalry combat brigades, strengthened armored cavalry regiments, and provisions for increasing the mobility of other combat units as well as the rapidity and responsiveness of their logistic support.

Three other alternatives were carefully considered by the Board but rejected as not fully meeting the demand, and another was judged somewhat too ambitious.

Approval of Alternative 3 will initiate the transition, which in some respects may be difficult, from the current force structure to a far more modern one. Subsequent field testing, war gaming and materiel development may modify some elements of the target force, but the tests and the recommended annual review of progress will provide adequate safeguards against the Board's errors in the details of organization, and against slippage in the implementation of the program.

The Board recommends the following measures as primary contributions to the over-all program:

1. Accelerate the procurement of aircraft early in FY-63.

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2. Approve and fund, commencing in FY-63, R&D programs for aircraft and other equipment in accordance with the guidance suggested in Section VII.

3. Institute under the general supervision of Combat Developments Command, a continuing program of field tests with the first units that become operational under the activation schedule and a program of war games and operations research. These shall be designed to refine the concepts and organizations proposed herein.

4. Establish a strong aviation management system as outlined in Section VI.

5. Initiate the maintenance program set forth in Section VI.

6. Initiate the aviation personnel program described in Section VI.

7. Increase the Army's current authorization of commissioned and warrant officers to provide for the increased number of commissioned and - particularly - warrant officer aviators required.

8. Activate the Special Warfare Aviation Brigade in FY-63.

9. Revise MAP and appropriate ECA programs by providing additional airfields, pipelines, and prepositioned heavy and aviation associated equipment to enhance the capability for strategic deployment and tactical employment of modern units.

10. Establish subsequent to action on these recommendations an ad hoc group within OSD to examine the operational and numerical requirements for intermediate performance fighter-bombers in joint operations. Under no circumstances, however, should decision on this recommendation serve to slow action to approve incorporation of light attack aircraft in the Army structure.

11. Formalize in official Department of Defense directives the following criteria, originally stated on pp. 4-5, Review of Army Aircraft Requirements, (file reference OASD (C) prog (SA)), attachment to Secretary of Defense Memorandum for the Secretary of the Army, subject: "Army Aviation (U)," 19 April 1962:

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"Organic Army aircraft should meet the following criteria:

"The Army should have a full time use for the aircraft.

"The aircraft should be suitable (as respects performance) for inclusion in Army units and be compatible with Army support capabilities.

"The mission the aircraft performs must require close coordination with Army activities.

"Air Force aircraft should support the Army when either of the following situations prevail:

"The Army requirement is a part time or variable requirement, and the aircraft can be used to meet other service requirements when not supporting the Army or to render a strategic airlift role.

"The aircraft has characteristics that require special or extensive support facilities not normally found in the Army."

Hamilton H. Howze

HAMILTON H. HOWZE
Lieutenant General, USA
President

Inclosures to Final Report:
1. Directives
2. Glossary of Airmobility Terms
3. (In back cover pocket) Army Aviation Present and Future
4. Force Effectiveness Summary
5. Detailed Analysis of Alternatives

[redacted] UNCLASSIFIED

INCLOSURE 1, Directives

OFFICE OF THE ADJUTANT GENERAL
WASHINGTON 25, D. C.

IN REPLY REFER TO
AGAO-CC 360
(28 Apr 62)SGS

28 April 1962

SUBJECT: Army Aviation Requirements (U)

TO: Commanding General
United States Continental Army Command
Fort Monroe, Virginia

1. (U) In response to a request by the Secretary of Defense, copies of which have been provided to you, the Army will review the role of organic aviation in maximizing the tactical mobility and over-all effectiveness of Army forces, and re-examine its quantitative and qualitative requirements for aircraft. The Secretary of the Army has designated the Assistant Secretary of the Army (Research and Development) as his representative in this review and re-examination.

2. (C) Oral instructions to initiate the foregoing action have been issued to your headquarters and to appropriate agencies of the Army staff. In confirmation of these oral instructions, and in order to meet the desires of the Secretary of Defense as to content and timing of the material to be submitted to him, the actions listed below will be taken. Similar instructions are being provided to the Army staff.

a. Deputy Chief of Staff for Military Operations: In coordination with other staff agencies, prepare and submit by 10 May 1962 comments on an analysis made by the Office of the Assistant Secretary of Defense (Comptroller), dated 24 January 1962, and entitled "Review of Army Aircraft Requirements."

b. Commanding General, United States Continental Army Command: Establish, supervise, and provide support to include necessary working groups for, the U. S. Army Tactical Mobility Requirements Board described in the inclosure hereto. This board will be established as an ad hoc board, and will perform its functions under the guidelines indicated in the inclosure. It will:

(1) Submit to the Secretary of the Army, through the CG, USCONARC, and the Chief of Staff, U. S. Army, an outline plan for the conduct of the review and re-examination indicated in paragraph 1 above.

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

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[redacted]

AGAO-CC 360
(28 Apr 62)SGS
SUBJECT: Army Aviation Requirements (U)

28 April 1962

This outline plan should reach the Chief of Staff by 10 May 1962 and include an estimate of the funds required for complete implementation of the plan.

(2) Submit, through the same channels, monthly progress reports on implementation of the plan, beginning 1 June 1962.

(3) Submit, through the same channels, to reach the Chief of Staff not later than 24 August 1962, a final report incorporating a recommended program for development and procurement of Army aircraft during the period 1963-1975, together with specific recommendations covering the areas indicated in the inclosure.

c. Other Agencies: Provide appropriate support and assistance to CG, USCONARC, and to the U. S. Army Tactical Mobility Requirements Board, as requested, in execution of the foregoing actions.

By Order of the Secretary of the Army:

John J. McLeod
Adjutant General

1 Incl
Guidelines for U. S.
Army Tactical Mobility
Requirements Board
(10 copies)

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U. S. Army Tactical Mobility Requirements Board

1. Composition: As directed by CG, USCONARC, to include, but not limited to, best qualified representatives of: USCONARC, the Army General Staff, Army Technical and Administrative Services, operations research organizations, and industry. In addition, the Department of the Army will invite OSD to furnish a representative to the board.

2. Responsibilities: The board will undertake a comprehensive study of aviation requirements for Army forces during the period 1963-1975, and develop a recommended program taking maximum advantage of aviation technology to meet these requirements. The study and recommended program will:

a. Be based on careful analysis and war games, and to the extent feasible on the results of field tests and exercises.

b. Examine and exploit new approaches and concepts; consider substitution of air for ground systems wherever analysis indicates that improved capabilities would result, but at the same time take full cognizance of major limitations involved in air systems and insure that the systems contained in the program are fully compatible with other elements of Army forces as an over-all weapons system for execution of all Army missions, both offensive and defensive. In this connection, consideration should be given to variations in potential areas of deployment and types of operations.

c. Not be restricted by current limitations on characteristics of organic Army aircraft, but identify those areas where the recommended program exceeds such limitations.

3. Recommendations: The recommendations of the board will be submitted without change through the channels indicated in paragraph 2b of the basic memorandum. The comments of CG, USCONARC, will be submitted at the time these recommendations are forwarded.

Downgraded at 3 Year Intervals:
Declassified after 12 Years
DOD Dir 5200.10

Inclosure

UNCLASSIFIED

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Recommendations will be directed toward attaining maximum tactical effectiveness without inordinate increases in over-all program costs, and will be based on cost-effectiveness factors within alternative funding levels. Recommendations will include, but are not limited to:

a. The extent to which aviation can be substituted for conventional surface systems, and associated organizational and operational concepts to exploit resultant increases in over-all effectiveness.

b. The extent to which newer VTOL and STOL concepts can be substituted for helicopters to reduce procurement and operating costs, to include those qualitative requirements for such aircraft which can be established and developed in the immediate future for various military purposes.

c. The extent to which heavier tactical aircraft and new air drop or landing techniques can be employed to substitute for present surface logistic support systems, taking into account the anticipated availability of complementary USAF lift.

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UNITED STATES CONTINENTAL ARMY COMMAND
Fort Monroe, Virginia

ATAVN 334 (C) 3 May 1962

SUBJECT: Appointment of an Ad Hoc Board to Conduct a Re-examination of the Role of Army Aviation and Aircraft Requirements

TO: Lieutenant General Hamilton H. Howze
Commanding General
XVIII Airborne Corps
Fort Bragg, North Carolina

1. Confirming instructions to you . . . . . you are hereby appointed President of a Board of officers and selected civilian specialists to undertake the study outlined in the inclosed "Guidelines" provided by the Department of the Army and as directed in the basic memorandum of the Secretary of Defense, dated 19 April 1962. Both of these referenced documents have previously been provided to you.

2. The Board will be convened at Fort Bragg and such other stations as you deem appropriate.

3. The Board will be organized as you determine necessary in order to provide a thorough, effective and expeditious evaluation of the specifics outlined in the Department of Defense and Department of the Army directives.

4. Resource Requirements

a. In addition to personnel already provided to you for conduct of the Board's activities, requests for additional personnel from CONARC sources will be made to Deputy Chief of Staff for Personnel and Administration, Headquarters, United States Continental Army Command. Requests for individuals, including civilians, from Department of the Army or higher levels will also be submitted in the same manner.

b. In accordance with the requirements listed in your draft Outline Plan, separate aviation units and supporting elements therefor are being moved to Fort Bragg for conduct of field tests and exercises.

These units are made available to you consistent with your operational mission and other special tests as may be required. Your requirements for additional units or equipments, either under control of this headquarters or elsewhere, will be made to Deputy Chief of Staff for Operations, Plans and Training, Headquarters, United States Continental Army Command.

c. Instructions are being issued to insure that supply and maintenance priorities within US Continental Army Command are commensurate with your requirements. Department of the Army is being requested to establish similar priorities.

d. An initial allotment of funds is being made by separate action. Additional funds specifically earmarked for support of Board activities will be furnished by CG USCONARC through CG Third US Army to CG Fort Bragg. A detailed listing of fund requirements in excess of those which can be met from within your resources is desired by 8 May 1962.

5. Administrative Instructions

a. An outline plan for the conduct of the review and re-examination should arrive at this headquarters by 8 May 1962.

b. The final Board Report should be submitted to this headquarters by 20 August 1962.

c. Monthly progress reports on implementation of the plans and activities of your Board should be submitted to this headquarters beginning 1 June 1962.

d. In addition to the foregoing, direct communication with Department of the Army, Department of Defense, other military services, government agencies and civilian industry is authorized for coordination on technical aspects of your evaluation.

s/Herbert B. Powell
t/HERBERT B. POWELL
General, U.S. Army
Commanding

THE SECRETARY OF DEFENSE
Washington
Apr 19 1962

MEMORANDUM FOR MR. STAHR

I have not been satisfied with Army program submissions for tactical mobility. I do not believe the Army has fully explored the opportunities offered by aeronautical technology for making a revolutionary break with traditional surface mobility means. Air vehicles operating close to, but above, the ground appear to me to offer the possibility of a quantum increase in effectiveness, I think that every possibility in this area should be exploited.

We have found that air transportation is cheaper than rail or ship transportation even in peacetime. The urgency of war time operations makes air transportation even more important. By exploiting aeronautical potential, we should be able to achieve a major increase in effectiveness while spending on airmobility systems no more than we have been spending on systems oriented for ground transportation.

I therefore believe that the Army's re-examination of its aviation requirements should be a bold "new look" at land warfare mobility. It should be conducted in an atmosphere divorced from traditional viewpoints and past policies. The only objective the actual task force should be given is that of acquiring the maximum attainable mobility within alternative funding levels and technology. This necessitates a readiness to substitute airmobility systems for traditional ground systems wherever analysis shows the substitution to improve our capabilities or effectiveness. It also requires that bold, new ideas which the task force may recommend be protected from veto or dilution by conservative staff review.

In order to ensure the success of the re-examination I am requesting in my official memorandum, I urge you to give its implementation your close personal attention. More specifically, I suggest that you establish a managing group of selected individuals to direct the review and keep you advised of its progress. If you choose to appoint such a committee, I suggest the following individuals be considered as appropriate for service thereon: Lt. Gen. Hamilton H. Howze, Brig. Gen. Delk M. Oden, Brig. Gen. Walter B. Richardson, Col. Robert R. Williams, Col. John Norton, Col. A. J. Rankin, Mr. Frank A. Parker, Dr. Erwin W. Paxon and Mr. Edward H. Heinemann.

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[illegible] activities such as [illegible], SAG (Strategic and Tactics Analysis Group, Washington, D.C.), CDEC (Combat Development Experimental Center, Ft. Ord), and CORG (Combat Operations Research Group, Ft. Monroe), combined with the troop units and military study headquarters of CONARC, and in cooperation with Air Force troop carrier elements, appear to provide the required capabilities to conduct the analyses, field tests and exercises, provided their efforts are properly directed.

The studies already made by the Army of airmobile divisions and their subordinate airmobile units, of airmobile reconnaissance regiments, and of aerial artillery indicate the type of doctrinal concepts which could be evolved, although there has been no action to carry these concepts into effect. Parallel studies are also needed to provide air vehicles of improved capabilities and to eliminate ground-surface equipment and forces whose duplicate but less effective capabilities can no longer be justified economically. Improved V/STOL air vehicles may also be required as optimized weapons platforms, command and communications vehicles, and as short range prime movers of heavy loads up to 40 or 50 tons.

I shall be disappointed if the Army's re-examination merely produces logistics-oriented recommendations to procure more of the same, rather than a plan for implementing fresh and perhaps unorthodox concepts which will give us a significant increase in mobility.

/s/ Robert S. McNamara

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THE SECRETARY OF DEFENSE
Washington
Apr 19 1962

MEMORANDUM FOR THE SECRETARY OF THE ARMY

SUBJECT: Army Aviation (U)

This is in response to your two November 1, 1961, memoranda which discussed Army Aviation and presented the Army's proposed procurement program.

These studies greatly enhanced my understanding of what the Army is seeking to achieve through its organic aviation. However, the quantitative procurement programs fall considerably short of providing, in the near future, modern aircraft to fill the stated requirements. While it appears to me that the Army can and should turn increasingly to aviation to improve its tactical mobility, your memoranda do not give a clear picture regarding either the optimum mix of aircraft types or the absolute total numbers that will be required.

Attached is an analysis of your studies made by my office. I would like your comments on this analysis with particular emphasis on the proposed increased buy of Army aircraft for 1964 and on the position that your predicted requirements in this area through 1970 are too low. These comments should be submitted by 15 May 1962.

Furthermore, I would like the Army to completely re-examine its quantitative and qualitative requirements for aviation. This re-examination should consist of an extensive program of analyses, exercises and field tests to evaluate revolutionary new concepts of tactical mobility and to recommend action to give the Army the maximum attainable mobility in the combat area. It appears to me that air vehicles, operating in the environment of the ground soldier but freed from the restrictions imposed by the earth's surface, may offer the opportunity to acquire quantum increases in mobility, provided technology, doctrine, and organization potentials are fully exploited. I believe further that these mobility increases can be acquired without increased funding by reducing less effective surface transportation systems concurrently. The Army's re-examination should therefore give special attention to the following:

(1) To what extent can aviation be substituted for conventional military surface systems of vehicles, roads, bridging, engineer troops, theater supply and hospital complexes, etc?

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(2) Should newer concepts of VTOL or STOL fixed-wing aircraft be substituted for helicopters, as a means of avoiding some of the high procurement and operating costs of helicopters?

(3) May we use heavy tactical airlift, combined with new techniques in air dropping and possibly better airlift construction and repair capability, to provide part of the logistic support for ground operations? There should be considered the possibility that Air Force lift may be available, after the first thirty or so days of a strategic lift, to augment Army tactical lift capabilities.

(4) What qualitative requirements can be defined for immediately developable V/STOL air vehicles optimized for such purposes as surveillance, target acquisition, weapons platforms, command posts, communications centers, or troop and cargo carriers of significantly heavier loads?

(5) What organizations and operational concepts are required to exploit the potential increases in mobility? Consideration should be given to completely airmobile infantry, anti-tank, reconnaissance, and artillery units.

(6) What other concepts and ideas, as well as major limitations, bear on this subject? We should seriously consider fresh, new concepts, and give unorthodox ideas a hearing.

The results of the study should be presented in terms of cost-effectiveness and transport-effectiveness factors. The study should involve the full use of field tests and exercises to test new concepts of mobility.

In addition, the use of operations analysts in planning, observing, recording data, and analyzing results for the field test program appears to me to be essential to the effective accomplishment of the entire re-examination.

As a first step in your re-examination of Army aviation requirements, I would like by 15 May 1962 an outline of how you plan to conduct the re-examination program. The actual re-examination should be completed and your recommendations submitted by 1 September 1962.

/s/ Robert S. McNamara

Attachment
Review of Army Acft Req
(omitted)

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GLOSSARY OF AIRMOBILITY TERMS

1. Air Assault Division

An Army division specifically organized, equipped and trained to execute air assault operations.

2. Air Assault Operations

Tactical operations characterized by great speed and shock action conducted against enemy forces by air assault units utilizing organic or attached Army aviation for movement and fire support.

3. Air Assault Units

Army TOE units specifically designed, equipped and trained to conduct air assault operations.

4. Air Combat Elements

(See Air Fighting Units.)

5. Air Fighting Units

Army units which attack the enemy by aerial maneuver and firepower delivered from aerial platforms.

6. Air Fire Support

Fire delivered from the air by aircraft in support of ground combat operations.

Incl 2

7. Air Lines of Communication (ALOC)

As distinguished from ground lines of communication, the air route which connects an operating military force with a base of operations, along which supplies and reinforcements move.

8. Airmobile Operations

Operations in which combat forces and their equipment move about the battlefield in aerial vehicles under the control of a ground force commander to engage in ground combat (FM 57-35).

9. Airmobile Force

A force composed of ground combat and support elements combined with Army aviation elements to conduct airmobile operations.

10. Airmobility

The capability of a unit to be tactically deployed and supported by aircraft under the control of the ground force commander.

11. Air Mounted Combat

Air-to-air or air-to-ground offensive-defensive operations conducted from aerial vehicles.

12. Air Route Traffic Control Center (ARTTC)

The principal facility exercising en route control of instrument flight rules (IFR) flights within its area of jurisdiction.

13. Air Transported Firepower

As contrasted with air fire support, firepower achieved by means of transporting ground fire weapons to ground locations for delivery of fire on the enemy.

14. Alternative Funding Levels

Funds required to support various selected budget programs, costed by fiscal year for comparative purposes to assist in determining the funding implications of various force levels.

15. Antitank Guided Missile (ATGM)

A guided missile designed to immobilize or destroy a tank or other hard targets (see SS-11).

16. Area Weapons

Weapons designed and utilized to deliver fire on a prescribed area, generally for purposes of neutralization.

17. Army Air Traffic Regulation and Identification Company (AATRI)

A TOE Army unit of company size whose function is identification and regulation of Army air traffic within a specified area.

18. Command Alternative

A course of action which may be selected by the commander in lieu of the recommended course of action.

19. Cost Effectiveness

A comparison which relates the financial resources required by a system to the resulting capabilities to be achieved.

20. Force Effectiveness

An evaluation of a specific force to accomplish an assigned mission expressed either quantitatively or qualitatively.

21. Ground Lines of Communication

As distinguished from an air lines of communication, the ground route which connects an operating military force with a base of operations, along which supplies and reinforcements move.

22. Guerrilla

A combat participant in guerrilla warfare.

23. Guerrilla Warfare (GW)

Military and paramilitary operations conducted in enemy-held or hostile territory by irregular, predominantly indigenous forces.

24. Helicopter Drop Point

A designated point within a landing zone where helicopters are unable to land because of terrain, but where they can discharge cargo or troops while hovering.

25. Insurgency

A condition resulting from a revolt or insurrection against a constituted government which falls short of civil war. In the current context, subversive insurgency is primarily communist inspired, supported, or exploited.

26. Infrared Counter Measures (IRCM)

Actions taken to prevent or reduce the effectiveness of enemy equipment to acquire infrared radiations.

27. Landing Zone Control Party

A specially trained and equipped group which operates communications devices for control of aircraft at a specific landing zone.

A phased plan for improving the Army's capabilities which can reasonably be obtained within the stated period of time from available resources.

29. Mission Effectiveness

A qualitative or quantitative expression of a unit's capability to accomplish the mission for which it was designed.

30. Paramilitary Forces

Forces or groups which are distinct from the regular and armed forces of any country, but resembling them in organization, equipment, training, or mission.

31. Paramilitary Operation

An operation undertaken by a paramilitary force.

32. Point Weapons

As contrasted with area weapons, weapons which are designed to fire at a particular object or structure requiring accurate placement of fire.

33. Prime Contractor Overhaul

Major maintenance performed by the original prime contractor to return equipment to its original condition or to perform a required modification beyond the authorized capability of the Army maintenance system.

Incl 2

The inherent capability of an aircraft for strategic deployment under its own power.

35. "SNATCH" (see "Touch and Go")

36. Special Warfare Aviation Squadron (SWAS)

An area oriented aviation unit trained in special warfare operations, attached to a special action force.

37. SS-11

An antitank wire-guided missile capable of being mounted on and fired from an aircraft (see Antitank Guided Missile, ATGM).

38. STOL

A designation for aircraft capable of short take-off and landing.

39. Subversion

Action designed to undermine the military, economic, psychological, moral, or political strength of a regime.

40. Tactical Airlift

The lift capability of assigned or attached aircraft for purposes of transporting combat or support units or materiel.

41. "Touch and Go" ("Snatch") Air Delivery

A technique for delivery of palletized loads by aircraft while in low level flight.

Military units or end items of equipment reduced or eliminated (or nominated for reduction or elimination) where analysis reveals the substitution of other units or end items will improve the capability or effectiveness of the Army.

43. Transport Effectiveness

A measure of the capability of a means of transportation to accomplish a specific mission.

44. Type Forces

A typical mix of units required to perform a particular mission in a specific area.

45. V/STOL

A designation for aircraft capable of either vertical or short take-off and landing depending upon the circumstances under which employed.

46. VTOL

A designation for aircraft capable of vertical take-off and landing.

Incl 2

TO

FINAL REPORT

(S) FORCE EFFECTIVENESS SUMMARY

Section I - Effectiveness Charts

Time often precluded more than partial comparisons, particularly in the area of sustained operations. In some instances, the evidence presented merely verified the feasibility of a component of an operation. Three sets of comparisons were undertaken:

(1) Air Assault Division vs ROAD Infantry/Mechanized Division;

(2) Air Cavalry Combat Brigade vs Armor Group; and

(3) Air LOC vs Ground LOC (from strategic unloading point to division base).

Each set was then analyzed relative to three conflict situations in the FY-1964 to FY-1968 period:

- against guerrillas;

- against an unsophisticated but conventionally organized enemy; e. g., Communist China in Southeast Asia; and

- against a sophisticated enemy; e. g., USSR in Europe.

The functional categories selected for the combat unit comparisons include:

(1) Mobility (maneuver and surprise).

(2) Surveillance and target acquisition.

(3) Firepower.

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(4) Communications, command and control.

(5) Vulnerability.

(6) Logistics, support, and maintenance.

The advantages and disadvantages of the new concept are listed in the tables that follow, together with references identifying the source of the evidence. The references are listed in Section II.

For each disadvantage, an attempt was made to assess the possibility of significantly alleviating, or even eliminating, the weakness in the 1964 - 68 period. Those cases for which some action appears feasible are marked by an asterisk (*).

Important statements which do not constitute relative advantages or disadvantages are included as footnotes.

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Air Assault Division (AAD) vs ROAD Infantry/Mechanized Division

Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	1. Tactical Mobility (Maneuver-Surprise)				
	Advantage				
General[1]	Speed of movement enhances surprise and shock.	X	X	X	WG-2, 3, 4, 5, 6 FT-12, 13 ES-3, 4
	Natural and man-made obstacles are more easily overcome (attack direction is more flexible and range is greater).	X	X	X	WG-2, 3, 4, 5, 6 FT-6, 9, 12 ES-3, 4
	Air movement causes less mental and physical fatigue; hence, increases combat efficiency.	X	X	X	FT-5, 6, 9, 12, 13, 14 ES-3, 4 TR
	Ability to concentrate and disperse forces is greater.	X	X	X	WG-3, 5, 6 FT-12, 13

1 - Although only indirect evidence is available, it is believed that, in view of the mobility advantages shown, a reduction in casualties will result. On the same basis, it is felt that the compression in time for component tasks will result in a reduction of the length of the campaign.

* Improvement appears feasible during 1964-1968.

CODE: ES: Sources External to the Board
FT: Field Tests (Annex O)
L: Logistic Concepts & Requirements
TR: "Report on SE Asia Trip" (Annex B)
WG: War Games (Annex M)

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	1. Tactical Mobility (Maneuver-Surprise) (Contd)				
	Advantage (Contd)				
General 1 (Contd)	Faster response time is possible and frequently reduces required number of combat troops.	X	X		WG-5 FT-9 ES-3, 4 TR
	In some underdeveloped, difficult terrain areas, air movement is less restricted by weather than road/rail movement.	X	X		WG-3, 6 TR
	Disadvantage				
	Weather limits air movement at certain times when ground movement is possible (particularly in case of fixed wing aircraft). *	X	X	X	FT-13

1 - Although only indirect evidence is available, it is believed that, in view of the mobility advantages shown, a reduction in casualties will result. On the same basis, it is felt that the compression in time for component tasks will result in a reduction of the length of the campaign.

*Improvement appears feasible during 1964-1968.

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	1. Tactical Mobility (Maneuver-Surprise) (Contd)				
	Disadvantage (Contd)				
General (Contd)	Lack of navigation aids hampers air movement even for VFR conditions (many aircraft temporarily lost).	X	X	X	WG-6 FT-12, 13, 16 TR
Preparation for Movement	More coordination is required (improved by training). *	X	X	X	FT-12, 13, 14
	Advantage				
Movement to contact	Opposition is easily by-passed	X	X	X	WG-3, 4, 5 FT-9, 12, 13
	Disadvantage				
	Enemy may hear helicopters and identify sound (turbine engines, silencing devices helpful). *	X			FT-13

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	I. Tactical Mobility (Maneuver-Surprise) (Contd)				
	Advantage				
Raids in Force	Raids are feasible at greater ranges and with multiple penetrations.	X	X		WG-5 FT-4, 6, 7, 12, 13 ES-4 TR
Defense	Rapid availability of firepower and reserves increases defense capability.	X	X	X	FT-4, 12
Encirclement	Speed permits rapid positioning on cordon; hence, fewer troops are required.	X			FT-13 ES-3
	Disadvantage				
Disengagement	Fire is not sustained (particularly significant in defensive operations).	X	X	X	WG-7, 8 FT-9
	Advantage				
Exploitation	More targets can be engaged per unit time.	X	X	X	WG-2

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	I. Tactical Mobility (Maneuver-Surprise) (Contd)				
	Advantage (Contd)				
Exploitation (Contd)	More constant pressure can be exerted.	X	X		FT-4 ES-4
Withdrawal	After disengagement, more rapid withdrawal is possible	X	X	X	FT-12
Delaying action	Fires are available at greater ranges.	X	X	X	WG-3, 4, 6 FT-4
	There is more time for preparation of positions.	X	X	X	WG-3, 4
	Rearguard action is feasible.		X	X	WG-4 FT-4 ES-2
Deception	Enemy can be deceived more easily by decoy maneuvers as to location and direction of assault.	X	X	X	FT-6
Utilization of reserves	Reserves may be held until the critical moment.	X	X	X	WG-6 FT-14

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	1. Tactical Mobility (Maneuver-Surprise) (Contd)				
	Advantage (Contd)				
Utilization of reserves (Contd)	Reserves are reconstituted more efficiently; hence, fewer reserves are required.	X	X	X	WG-3, 4, 5
	Combat effectiveness is increased by rapid and accurate application of reserves.	X	X	X	FT-12, 13, 14
Barriers	Barriers are more readily overcome.	X	X	X	WG-5 FT-9, 12, 13, 14 ES-4
	More rapid emplacement of barriers is feasible.	X	X	X	WG-5
	2. Surveillance and Target Acquisition[1]				
	Advantage				
General	Integrated ground and air reconnaissance is more effective than pure ground or pure air reconnaissance units.	X	X	X	WG-1, 2, 3, 4, 5, 6 FT-1, 12, 25

1 - The difficulty of detecting and identifying guerrillas is not significantly altered by the introduction of the air assault division. (counterinsurgency)

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	2. Surveillance and Target Acquisition (Contd)				
	Advantage (Contd)				
General (Contd)	More aerial sensors are available, providing additional range or density of coverage.		X	X	WG-2, 3, 4, 5 FT-1, 2, 3, 12, 13, 14
	More exploration capability is available after initial detection.		X	X	FT-12, 13, 14
	Earlier warning is provided.	X	X	X	WG-1, 2, 3, 4, 5 FT-5
	In certain situations there is greater capability for nighttime target acquisition.		X	X	FT-3, 12
	Disadvantage				
	The same difficulty in detecting targets through foliage exists in the Air Assault Division.	X			FT-2, 3, 12, 13 ES-1c TR

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	3. Firepower[1]				
	Advantage				
Against ground targets[2]	Greater direct fire capability is available against area and moving targets.	X	X	X	WG-2, 3, 4, 5 FT-9, 12
	Superior casualty producing power is available for short engagements.	X	X	X	WG-1, 2, 3, 4, 5
	Target damage assessment is immediate.	X	X	X	WG-1, 2, 3, 4, 5, 6 FT-12, 24
	Preparation fires are possible up to the moment troops land on the objective.	X	X	X	WG-1, 2, 3, 4, 5
	Aircraft (armed and weapon transport) extend the fire range.	X	X		WG-3, 4, 5, 6 FT-7, 8, 9, 12

1 - Greater mobility of firepower leads to stronger shock effort (see 1, Tactical Mobility).

2 - The detection and identification problem in counter-guerrilla warfare indicates that designation of targets to air and ground weapons is difficult. (Counter-insurgency) (FT-3, 13)

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	3. Firepower (Contd)				
	Disadvantage				
	Sustained fire is limited.	X	X	X	WG-1, 2, 3, 4, 5, 7, 8 FT-8, 9, 12, 13
	Aerial fire is limited to VFR conditions. *	X	X	X	FT-9, 12, 13, 18
Against air targets[1]	Air defense is more difficult due to the spread of friendlies, and the identification problem.		X	X	ES-5
	4. Communications, Command, and Control[2]				
	Disadvantage				
Communication range	Little line-of-sight with nap-of-the-earth flying (improved HF is needed for air and ground vehicles; aerial relays are a temporary expendient *).	X	X	X	FT-12, 13

1 - Very little organic air defense capability exists for either type of division. (Unsophisticated Conventional War and Sophisticated Non-Nuclear War)

2 - Present communications are incompatible with many host countries and with USAF. (TR)

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	4. Communications, Command, and Control (Contd)				
	Disadvantage (Contd)				
Communication capacity	Many vehicular sets are eliminated (canned messages or additional radios are needed *).	X	X	X	FT-12
Air Space	Lack of navigation aids is more serious. *	X	X	X	FT-12, 13
	Greater problems exist in coordinating movement (e. g., collision avoidance, air space allocation). *	X	X	X	FT-12
	Advantage				
Command	More frequent direct personal communication is feasible.	X	X	X	FT-12, 13, 14
	A larger fraction of vehicles has communication facilities, resulting in better command capability.	X	X	X	FT-12, 13, 14
	Squads operate more often as intact units.	X	X	X	FT-12, 13, 14

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	4. Communications, Command, and Control (Contd)				
	Disadvantage				
Command (Contd)	There are increased command problems (more detailed SOP's are necessary *).	X	X	X	FT-12, 13
	5. Vulnerability				
	Advantage				
	Fewer Army aircraft are damaged or destroyed when proper techniques and timing are employed. (Also see Note 1 of Tactical Mobility.)	X	X		FT-9, 12, 13, 14
	Disadvantage				
	Fires are direct; therefore, armed aircraft are more vulnerable while firing. (Indirect fire weapons may be feasible. *)	X	X	X	WG-9 FT-9, 24, 25
	Vulnerability to enemy tactical aircraft is higher while engaged.	X	X	X	WG-1

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	6. Logistics, Support, Maintenance (Intra-Division)				
	Advantage				
General	The requirement for security for overland supplies is eliminated (en route).	X	X	X	WG-1, 2, 3, 4, 5 FT-12, 13 ES-1a, 4 TR
Ammunition	Reduction in battle duration lowers total ammunition requirements.	X	X	X	WG-4 FT-12, 13, 14
	Disadvantage				
	Ammunition is expended at a faster rate.		X		WG-4
POL	There is an increase in fuel consumption. (However, over-all supply tonnage does not necessarily increase.)	X	X	X	WG-3, 4, 5 L-6 ES-4
	The POL handling problem is greater	X	X	X	WG-5, 6, 7 FT-11, 12 ES-4

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L: Logistic Concepts & Requirements (Annex L)
TR: "Report on SE Asia Trip" (Annex B)
WG: War Games (Annex M)

Incl 4

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Function	Change: Advantage or Disadvantage of Air Assault Division	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	6. Logistics, Support, Maintenance (Intra-Division) (Contd)				
	Disadvantage (Contd)				
Maintenance	Higher skills are needed.	X	X	X	FT-1-8 Incl and FT-12-14 Incl
	Advantage				
Medical	More rapid evacuation is possible; hence, fewer deaths occur.	X	X	X	WG-3, 4, 5 FT-12, 13 ES-1b, 4

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Incl 4

Air Cavalry Combat Brigade (ACCB) vs Armor Group

Function	Change: Advantage or Disadvantage of Air Cavalry Combat Brigade	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	1. Tactical Mobility (Maneuver-Surprise)				
	Advantage				
General[1]	Speed of movement enhances surprise and shock.		X	X	WG-2 FT-12
	Natural and man-made obstacles are more easily overcome. (Attack direction is more flexible and range is greater.)		X	X	WG-2 FT-6, 9, 12
	Ability to concentrate and disperse forces is greater.		X	X	WG-3, 5 FT-12
	Faster response time is possible and frequently reduces required number of combat troops.		X	X	WG-5 ES-3, 4
	In some underdeveloped, difficult terrain areas, air movement is less restricted by weather than road movement.		X		WG-3, 6 TR

1 - Although only indirect evidence is available, it is believed that the increased mobility will result in a reduction of the campaign time and fewer casualties.

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Incl 4

Function	Change: Advantage or Disadvantage of Air Cavalry Combat Brigade	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	1. Tactical Mobility (Maneuver-Surprise) (Contd)				
	Disadvantage				
General (Contd)	Weather limits air movement at certain times when ground movement is possible (particularly in case of fixed wing aircraft). *		X	X	FT-13
	Lack of navigation aids hampers air movement even for VFR conditions (many aircraft temporarily lost).		X	X	WG-6 FT-12, 13, 16 TR
Preparation for movement	More coordination is required (improved by training *).		X	X	FT-9, 12
	Advantage				
Movement to Contact	Opposition (particularly warning elements) is easily by-passed.		X	X	FT-9, 12
	Movement is not canalized by the terrain. Few casualties are suffered during movement.		X		FT-6, 9, 12

* Improvement appears feasible during 1964 - 1968.

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Incl 4

Air Cavalry Combat Brigade (ACCB) vs Armor Group (Contd)

Function	Change: Advantage or Disadvantage of Air Cavalry Combat Brigade	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	1. Tactical Mobility (Maneuver-Surprise) (Contd)				
	Advantage				
Raids in force	Raids are feasible at greater ranges and with multiple penetrations.		X		FT-4, 6, 7, 12 WG-5
Defense	Rapid availability of firepower and reserves increases defensive capability.		X	X	FT-4, 12
	Disadvantage				
Disengagement	Fire is not sustained (particularly significant in defensive operations).		X	X	WG-7 FT-9
	Advantage				
Exploitation	More targets can be engaged per unit time.		X	X	WG-2
Withdrawal	After disengagement, more rapid withdrawal is possible.		X	X	FT-9
Delaying action	Fires are available at greater ranges.		X	X	FT-4

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WG: War Games (Annex M)

Incl 4

Air Cavalry Combat Brigade (ACCB) vs Armor Group (Contd)

Function	Change: Advantage or Disadvantage of Air Cavalry Combat Brigade	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	I. Tactical Mobility (Maneuver-Surprise) (Contd)				
	Advantage (Contd)				
Delaying action (Contd)	Rearguard action is feasible.		X	X	ES-2
Deception	Enemy can be deceived by decoy maneuvers as to location and direction of assaults.		X	X	FT-6
Utilization of reserves	Reserves may be held until the critical moment.		X	X	FT-14
	Reserves are reconstituted more efficiently; hence, fewer reserves are required.		X	X	WG-4, 5
	Rapid and accurate application of reserves increases effectiveness.		X	X	FT-12, 13, 14
Barriers	Barriers are more readily overcome.		X	X	FT-9, 12, 13, 14
	More rapid emplacement of barriers is feasible.		X	X	WG-4

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Incl 4

Function	Change: Advantage or Disadvantage of Air Cavalry Combat Brigade	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	2. Surveillance and Target Acquisition				
	Advantage				
	Integrated ground and air reconnaissance is more effective than pure ground or pure air reconnaissance units.		X	X	FT-1, 12, 25
	More aerial sensors are available, providing additional range or density of coverage.		X	X	WG-2, 3, 4, 5
	More exploration capability is available after initial detection.		X	X	FT-12, 13, 14
	In certain situations there is greater capability for nighttime target acquisition.		X	X	FT-3, 12
	3. Firepower[1]				
	Advantage				
Against ground targets	Superior casualty producing power is available for short engagements.		X	X	WG-1, 2, 3, 4, 5

1 - Greater mobility of firepower leads to stronger shock effect (see 1, Tactical Mobility).

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Incl 4

Function	Change: Advantage or Disadvantage of Air Cavalry Combat Brigade	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	3. Firepower (Contd)				
	Advantage (Contd)				
	Target damage assessment is immediate.		X	X	FT-12, 24
	Aircraft (armed and weapon transport) extend the fire range.		X	X	WG-3, 4, 5, 6 FT-7, 8, 9, 12
	Disadvantage				
	Sustained fire is limited. *		X	X	WG-7, 8 FT-8, 9
	Aerial fire is limited to VFR conditions. *		X	X	FT-9, 12, 13, 18
Against air targets[1]	Air defense is more difficult due to the spread of friendlies and the identification problem.		X	X	ES-5

1 - Very little organic air defense capability exists for either unit.
* Improvement appears feasible during 1964 - 1968.

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WG: War Games (Annex M)

Incl 4

Function	Change: Advantage or Disadvantage of Air Cavalry Combat Brigade	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	4. Communications, Command, and Control[1]				
	Disadvantage				
Air space	Lack of navigation aids is more serious (automatic dead reckoning systems may be available *).		X	X	FT-12, 13
	There is an increased need for air space monitoring techniques and collision avoidance devices. *		X	X	FT-12
Command	There are increased command problems (detailed SOP's are necessary *).		X	X	FT-12, 13
	5. Vulnerability				
	Advantage				
	Fewer Army aircraft are damaged or destroyed if proper techniques and timing are employed. (Also see Note 1 of Tactical Mobility.)		X		WG-3, 4, 5 FT-9, 12, 14

1 - Air-to-ground equipment is inadequate for both units. There is little line-of-sight with either nap-of-the-earth flying or with ground movement. (Improved HF is needed for air and ground vehicles; aerial relays are a temporary expedient). *

* Improvement appears feasible during 1964 - 1968.

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L: Logistic Concepts & Requirements (Annex L)
TR: "Report on SE Asia Trip" (Annex B)
WG: War Games (Annex M)

Incl 4

Function	Change: Advantage or Disadvantage of Air Cavalry Combat Brigade	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	5. Vulnerability (Contd)				
	Disadvantage				
	Armed aircraft are more vulnerable to ground fire while engaged. (Indirect fire weapons may be feasible. *)		X	X	WG-9
	6. Logistics, Support, Maintenance (Intra-Division)				
	Advantage				
General	The requirement for security for overland supplies is eliminated (en route).		X	X	WG-1, 2, 4, 5 ES-1a
Medical	More rapid evacuation is possible; hence, fewer deaths occur.		X	X	WG-4, 5 FT-12, 13
	Disadvantage				
Maintenance	Higher skills are needed.		X	X	FT-1-8 Incl FT-12, 14

* Improvement appears feasible during 1964 - 1968.

CODE: ES: Sources External to the Board
FT: Field Tests (Annex O)
L: Logistic Concepts & Requirements Annex L)
TR: "Report on SE Asia Trip" (Annex B)
WG: War Games (Annex M)

Incl 4

Air LOC vs Ground LOC (Strategic Unloading Point to Division Base)

Function	Change: Advantage or Disadvantage of Air LOC	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	Advantage				
Personnel	Substantially less logistic personnel is required.	X	X		L-1
POL	Use of aerial systems results in lower cost/ton-mile.	X			L-3
	Disadvantage				
	Fuel consumption is increased.	X	X	X	L-2
	Use of aerial systems results in greater cost/ton-mile.		X	X	L-3
	Advantage				
Responsiveness	The aerial system is much faster, resulting in a more flexible LOC.	X	X	X	L-3 ES-4
Level of supply	Decrease in over-all theater level is expected because of reduced reserve stocks.	X	X	X	L-4 ES-4
Reliability	The ground LOC is impracticable in certain underdeveloped areas.	X	X		TR FT-12, 13, 14

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WG: War Games (Annex M)

Incl 4

Air LOC vs Ground LOC (Strategic Unloading Point to Division Base) (Contd)

Function	Change: Advantage or Disadvantage of Air LOC	Application: Ctr Insurg	Unsoph Conv War	Soph Non-Nucl War	Evidence
	Advantage (Contd)				
Vulner-ability	Sustained disruption of air LOC is less likely than that of ground LOC.	X			TR
	Advantage				
Deploy-ment in theater	The aerial system is self-deployable and can be deployed more rapidly.	X	X	X	L-5

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Incl 4

Section II - List of Evidence

An identification code precedes each paragraph and refers to the corresponding item listed in the column entitled "Evidence" on the charts. The letter in the code refers to the basic data source, i.e.:

WG: War Games (Annex M of over-all report)
WG-1
WG-2, etc.

FT: Field Tests (Annex O of over-all report)
FT-1

L: Logistic Concepts & Requirements (Annex L of over-all report)

ES: Sources External to the Army Tactical Requirements Mobility Board.

TR: "Report on Southeast Asia Trip" to the President of the Army Tactical Mobility Requirements Board

War Games - Annex M

WG-1:	TACSPIEL	Appendix M 2
WG-2:	SYN TAC Side Analysis	Appendix M 4
WG-3:	Southeast Asia	Appendix M 5
WG-4:	Korea	Appendix M 6
WG-5:	Middle East	Appendix M 7
WG-6:	Draft Report War Gaming Evaluation of ROAD, The Air-Mobile Division in an under-developed area, CONARC, Jun 62	
WG-7:	SYN TAC Side Analysis	Appendix M 4
WG-8:	SYN TAC Side Analysis	Appendix M 4
WG-9:	US CONARC Analysis of Armored Cavalry Units in Laos - Developed from ROAD Air-Mobile Division War Games	

FT-1:	Air-Mobile Route Reconnaissance	Tab A- 1
FT-2:	Air Reconnaissance and Security Unit in Zone Reconnaissance	Tab A- 2
FT-3:	Night Reconnaissance	Tab A- 3
FT-4:	Air Reconnaissance and Security Unit in Delaying Action	Tab A- 4
FT-5:	Air-Mobile Rifle Platoon and Company	Tab B- 1
FT-6:	Air-Mobile Platoon Refueling and Attack	Tab B- 3
FT-7:	4.2 Mortar Battery - Ground and Air-Mobile	Tab C- 1
FT-8:	Aerial Weapons Fire Support Unit	Tab C- 3
FT-9:	Aircraft Armaments	Tab C- 4
FT-10:	Air-Mobile Engineer Report	Tab D- 1
FT-11:	Major Refueling Task Force	Tab D- 2
FT-12:	Stewart-62, Air-Mobile Assault with USAF Support	Tab E
FT-13:	Kill Quick-62, Air-Mobile Battle Group in Counterguerrilla Operations	Tab F
FT-14:	Pusan-62, Air-Mobile Force Employed as Army Reserve	Tab G
FT-15:	a. Transport Airplane Hastily Prepared Air Strip Requirements	Tab H- 3
	b. Rapid Air Strip Construction for USAF C-130 Aircraft	Tab H- 9
FT-16:	Communication Equipment for use in Air-Mobile Operations	Tab H- 14
FT-17:	Rapid Preparation of Helicopter Landing Site in Wooded Areas	Tab H- 10
FT-18:	Night Vision Devices	Tab H- 2
FT-19:	Stewart-62, Air-Mobile Assault with USAF Support	Tab E
FT-20:	TIARA - Target Identification and Recognition Agent	Tab H- 1
FT-21:	618T SSB Radio	Tab H- 7
FT-22:	Stewart-62, Air-Mobile Assault with USAF Support	Tab E

Field Tests - Annex O, Appendix 02 (Contd)

FT-23:	Aerial Delivery of Cargo by Touch and Go Snatch-out	Tab H- 8
FT-24:	SS-11 Firing from Helicopters at Simulated Tank Targets under Tactical Field Conditions	Tab H- 17
FT-25:	Helicopters vs Tank Tactical Combat Test	Tab H- 16
FT-26:	Transport Airplane Hastily Prepared Air Strip Requirements	Tab H- 3

Logistics Concepts and Requirements, Annex L

L-1:	Theater Studies	Appendix L- 1
L-2:	Petroleum, Air Drop Methods and Materials Handling Equipment	Appendix L- 3
L-3:	General Economic of Air and Surface Transport	Appendix L- 2
L-4:	Logistic Concepts and Requirements	Annex L
L-5:	Concept of Deployment of Army Aircraft	Appendix L-11
L-6:	Petroleum, Air Drop Methods and Materials Handling Equipment	Appendix L- 3

Sources External to the Tactical Mobility Requirements Board

ES-1:	W. S. Payne, et al, "Problems of Logistical Operations in Limited War Areas (U)," ORO-T-402, Jan 62
ES-1a:	" " " " " "
ES-1b:	" " " " " "
ES-1c:	" " " " " "
ES-2:	Exercise White Cloud, Ft Campbell, Ky, Mar-Apr 1958
ES-3:	503d Airborne Battle Group ATT, 4-8 Jun 62
ES-4:	Contingency Plan, 101st Airborne Division and 301st Logistical Command

Incl 4

Sources External to the Tactical Mobility Requirements Board (Contd)

ES-5: "ACE Long Term Requirements for the Defense of 'NATO" Stanford Research Institute Report 30 and G. Gershon. "Preliminary Views on Air Space Control," Stanford Research Institute, Extension for Col C. H. Lee, Study on General Purpose Forces

TR: Memo to: President, Army Tactical Mobility Requirements Board, subject: "Report on Southeast Asia Trip, July 1962" (Annex B)

INCLOSURE 5

TO

FINAL REPORT

Detailed analysis of Alternatives 1, 2, 4 and 5 are attached.

Alternative 1 is the maximum solution considered by the Board. A force structure and activation schedule, active aircraft fleet status, aircraft and associated PEMA procurement program, and a five-year financial projection plan are included.

Alternative 2 stretches the same force structure as Alternative 1 over an eight-year period. The same information is provided as for Alternative 1, except that the financial projection covers an eight-year period.

Alternative 4, in eight years, provides for four air assault divisions, two air cavalry combat brigades, and only four of the five air transport brigades necessary to the air lines of communication.

Alternative 5 is the minimum force structure considered by the Board. It provides for development of a very limited airmobile tactical capability in five years as well as for type units for testing.

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Rationale

Alternative I is the maximum solution considered by the Board. It is recognized that attainment would push industry and pilot training to their practical limits. Funding costs are the highest for any five-year program considered, but trade-offs are more remunerative.

As regards deployment, Korea is an ideal environment for the air assault division. The division could be teamed with Korean divisions and perhaps permit eventual redeployment of the other infantry division from Korea. The air assault division in Hawaii, with one of its brigades in Okinawa, is well located for contingency operations in Southeast Asia. The four air assault divisions in CONUS provide the maximum feasible build-up of contingency force capabilities for most theaters.

Some flexibility as regards appropriate mix with the air assault divisions is achieved by retaining two infantry divisions in CONUS, but this is accomplished at the expense of one mechanized division. It is recognized that some risk is involved in cutting into the Armor/Mechanized reserve for Europe, but countering is the considerably enhanced contingency capabilities for other parts of the world.

The three air cavalry combat brigades provide an acceptable solution pending further test and development of this unit's capabilities. Europe is a good environment for employment of this unit and it will be well placed for contingency operations in the Middle East and North Africa. It offers a bonus trade-off for the airborne brigade now in Europe. The two air cavalry combat brigades in CONUS provide more responsive and flexible contingency forces as trade-offs for the armored cavalry regiments and at the same time provide an adequate test base.

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In view of the serious logistic capabilities deficiencies in Southeast Asia, and to some lesser extent in the Middle East, the Board has concluded that the full Army portion of the air lines of communication for these areas (5 air transport brigades) should be developed as soon as possible.

The two brigades in the Pacific (1 in Korea and 1 in Hawaii or Okinawa) are well positioned for contingency operations in Southeast Asia and could in fact be employed in counterinsurgency operations there today. With their partial capability for self-deployment to the east via Europe, the two units in Europe are well placed for contingencies in both Southeast Asia and the Middle East. The one brigade in CONUS provides flexibility to contingency plans and will serve as a test base for further development.

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Force Structure by Fiscal Year

UNITS	FY-63	FY-64	FY-65	FY-66	FY-67
Air Aslt Div	1	2	4	5	6
Inf Div (ROCID)	10	4	2	1	-
Inf Div (ROAD)	-	2	3	3	3
Armd Div (ROCAD)	3	-	-	-	-
Armd Div (ROAD)	-	3	3	3	3
Abn Div (ROTAD)	1	1	-	-	-
Abn Div (ROAD)	-	-	-	-	-
Mech Div (ROAD)	1	4	4	4	4
Air Cav Cbt Bde	-	1	1	2	3
Armd Cav Regt	5	3	2	-	-
Armd Cav Regt (Modified)	-	1	2	3	3
Field Army Avn Bde	-	-	1	1	1
Corps Avn Bde	-	1	2	2	3
Corps Gen Spt Avn Co (EUR)	-	-	-	1	2
Corps Aerial Surv Co (EUR)	-	-	-	1	2
Corps Arty (SEA)	-	1	1	1	1
Corps Arty	-	-	1	2	4
Spec Warfare Avn Bde	1	1	1	1	1
Aslt Heli Bn (ALAS)	-	-	1	1	1
Army Tac Avn Co	-	-	-	1	2
FW Co (CARIB)	-	-	1	1	1
Aslt Heli Co (CARIB)	1	1	1	1	1
Air Trans Bde	1	2	2	3	5
Air Amb Bn	1	1	2	2	2

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Aircraft Program

The aircraft procurement program under Alternative 1 would obligate funds for a total of 11,258 new units by FY-67 at a cost of 5.6 billion dollars for the aircraft and associated weapons and equipment. Deducting the estimated attrition to the fleet and adjusting for delivery leadtime, the aircraft inventory will number 10,651 units by the end of FY-67, of which 8,198 will be new generation aircraft.

AIRCRAFT PROCUREMENT PROGRAM

(Number of Aircraft)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year
Alt. #1	1,043	1,630	2,585	2,736	3,264	11,258
Current	582	909	1,224	1,086	1,086	4,887
Diff	+ 461	+ 721	+ 1,361	+ 1,650	+ 2,178	+ 6,371

AIRCRAFT AND ASSOCIATED PEMA

(Millions $)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year
Alt. #1	544.4	1120.5	1362.9	1369.0	1256.7	5653.5
Current	246.4	331.2	395.8	349.6	339.2	1662.2
Diff	+ 298.0	+ 789.3	+ 967.1	+ 1019.4	+ 917.5	+ 3991.3

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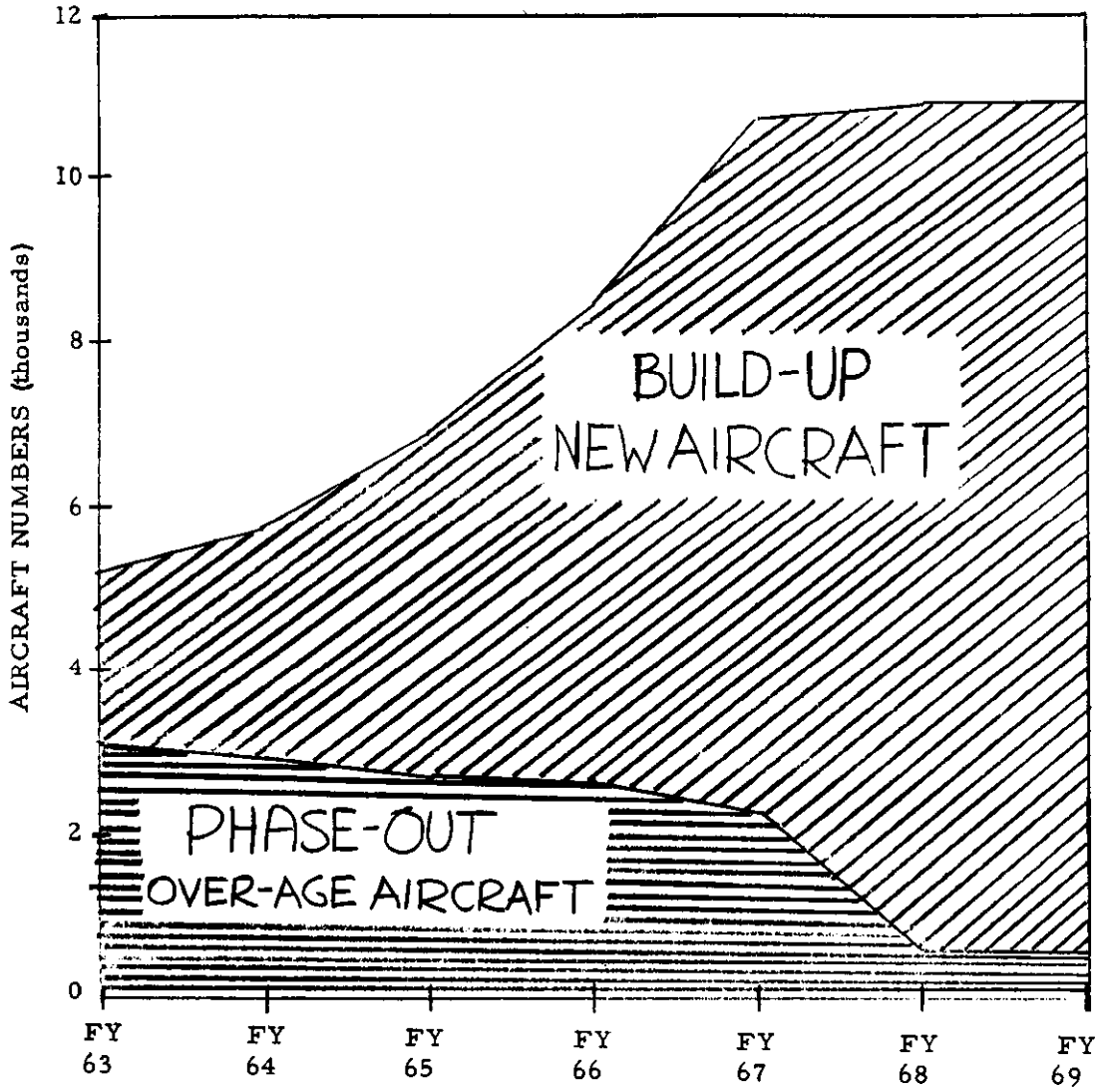
AIRCRAFT FLEET STATUS

(Less Maintenance Float, Pre-stock and Reserves)



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wherein savings are realized from a cutback of equipment not required in the new airmobile organizations as well as in the R&D appropriation for all fiscal years. These savings, available for reprogramming, include 336.8 million dollars for RDT&E projects and total 1,407 million dollars over the five-year period.

Five-Year Financial Projection

Total Army obligational authority required for the five-year period based on Alternative 1 is as follows:

FIVE-YEAR FINANCIAL PROJECTION

(Millions $)

	FY-63	FY-64	FY-65	FY-66	FY-67	5-Year Total
Force Structure Costs	12119.5	13854.8	14182.3	13979.5	13683.0	67819.1
Other Costs *	719.0	773.9	768.7	776.3	776.7	3814.6
Trade-Offs	-144.6	-334.5	-440.9	-547.2	-650.2	-2117.4
Total Obligation Authority Reqd	12693.9	14294.2	14510.1	14208.6	13809.5	69516.3
Current TOA	12384.1	13484.4	13436.3	13089.7	12751.3	65145.8
Differential	+309.8	+809.8	+1073.8	+1118.9	+1058.2	+4370.5

* Miscellaneous appropriations, including National Guard and Reserve Components.

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Alternative 2 stretches the same force structure as Alternative 1 over an eight-year period rather than five. Although yearly increments of funding costs are reduced, the total fundings cost is increased and is the maximum for any alternative considered. This program would ease the impact on industry and pilot training imposed by Alternative 1. Trade-offs are the same.

Capabilities considerations as regards deployment, effective division mix and contingency operations are the same for Alternative 1 and 2, except that the total capability is attained three years later in Alternative 2.

Force Structure by Fiscal Year

UNITS	FY-63	FY-64	FY-65	FY-66	FY-67	FY-68	FY-69	FY-70
Air Aslt Div	-	1	2	3	4	5	6	6
Inf Div (ROCID)	10	4	3	3	2	1	-	-
Inf Div (ROAD)	-	3	3	3	3	3	3	3
Armd Div (ROCAD)	3	-	-	-	-	-	-	-
Armd Div (ROAD)	-	3	3	3	3	3	3	3
Abn Div (ROTAD)	2	1	1	-	-	-	-	-
Abn Div (ROAD)	-	-	-	-	-	-	-	-
Mech Div (ROAD)	1	4	4	4	4	4	4	4
Air Cav Cbt Bde	-	-	1	1	2	2	2	3
Armd Cav Regt	5	5	3	2	-	-	-	-
Armd Cav Regt (Mdfd)	-	-	1	2	3	3	3	3
Field Army Avn Bde	-	-	-	-	-	1	1	1
Corps Avn Bde	-	-	1	2	2	2	2	3
Corps Gen Spt Avn Co (EUR)	-	-	-	-	-	1	2	2
Corps Aerial Surv Co (EUR)	-	-	-	-	-	1	2	2
Corps Arty (SEA)	-	-	1	1	1	1	1	1
Corps Arty	-	-	-	1	1	2	3	4
Spec Warfare Avn Bde	1	1	1	1	1	1	1	1
Aslt Heli Bn (ALAS)	-	-	1	1	1	1	1	1
Army Tac Avn Co	-	-	-	-	-	-	1	2
FW Co (CARIB)	-	-	1	1	1	1	1	1
Aslt Heli Co (CARIB)	1	1	1	1	1	1	1	1
Air Trans Bde	-	1	1	2	2	3	4	5
Air Amb Bn	1	1	1	1	2	2	2	2

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Aircraft Program

The aircraft procurement program under Alternative 2 would obligate funds for a total of 13,706 new units by FY-1970 at a cost of 6.3 billion dollars for the aircraft and associated weapons and equipment. Aircraft attrition and delivery leadtime delays would net an inventory of 10,905 units by the end of FY-1970 of which 10,099 are new generation aircraft.

AIRCRAFT PROCUREMENT PROGRAM

(Number of Aircraft)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year	Total 8-Year
Alt. #2	1,043	1,443	1,812	1,752	2,004	8,054	13,706
Current	582	909	1,224	1,086	1,086	4,887	
Diff	+ 461	+ 534	+ 588	+ 666	+ 918	+ 3,167	

AIRCRAFT AND ASSOCIATED PEMA

(Millions $)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year	Total 8-Year
Alt. #2	538.1	915.9	979.6	934.3	902.4	4,270.3	6,258.0
Current	246.4	331.2	395.8	349.6	339.2	1,662.2	
Diff	+ 291.7	+ 584.7	+ 583.8	+ 584.7	+ 563.2	+ 2,608.1	

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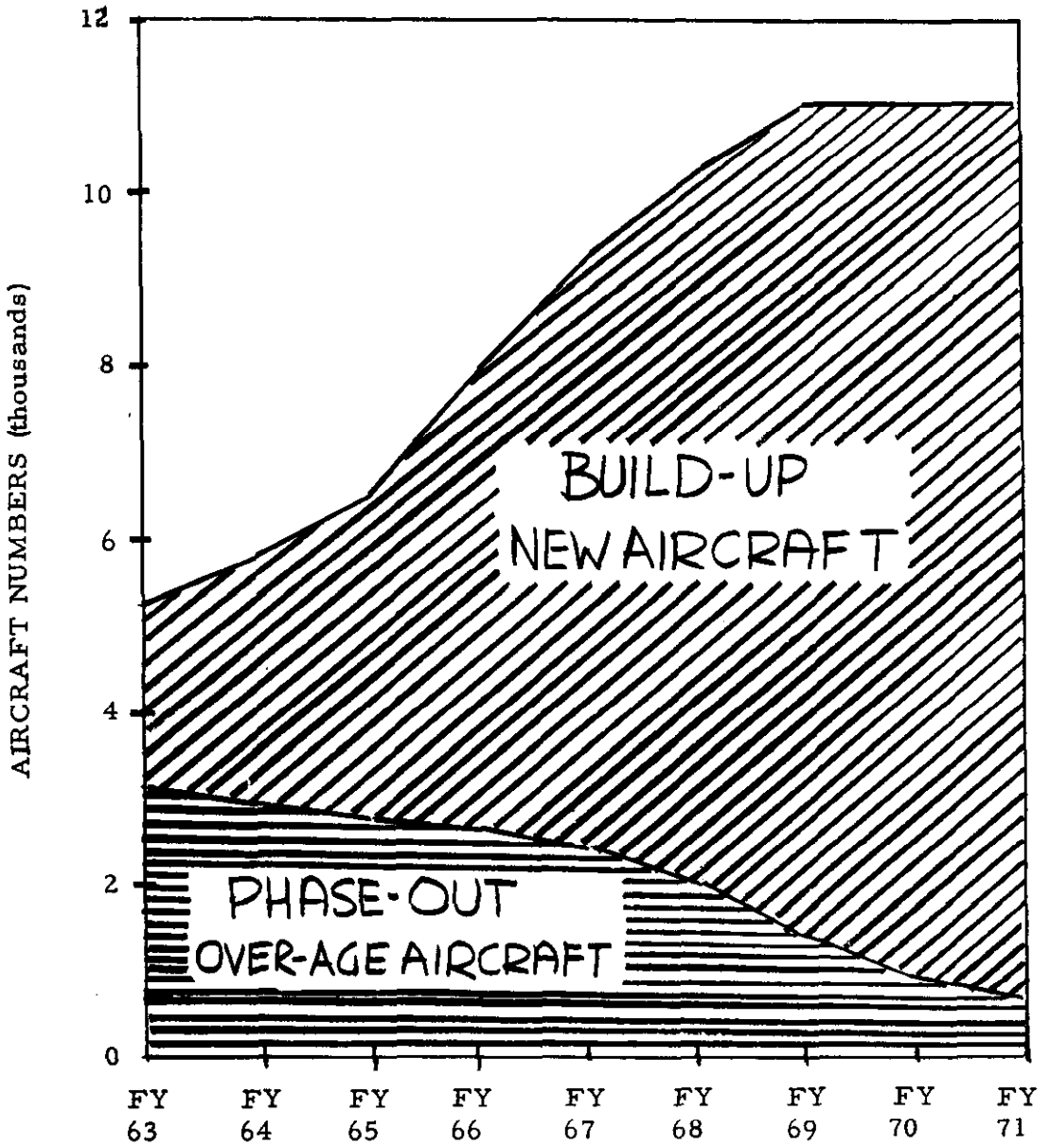
ALTERNATIVE 2

AIRCRAFT FLEET STATUS

(Less Maintenance Float, Pre-Stock and Reserves)



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frame is indicated below; the total value remains the same as for Alternative 1. The fiscal increment is lowered to match the force structure changes.

The Army's total obligational authority for the eight-year period based on Alternative 2 is as follows:

8-YEAR FINANCIAL PROJECTION

(Millions $)

Alt. #2	FY-63	FY-64	FY-65	FY-66	FY-67	FY-68/70
Force Structure Costs *	12070.3	13554.2	13627.8	13369.6	13082.6	39591.5
Other Costs *	719.0	773.9	768.7	776.3	776.7	2330.1
Trade-Offs	-113.7	-264.9	-340.8	-425.7	-517.2	-954.6
Total Obligation Authority Required	12675.6	14063.2	14055.7	13720.2	13342.1	40967.0
Current TOA	12384.1	13484.4	13436.3	13089.7	12751.3	38253.9
Diff	+291.5	+578.8	+619.4	+630.5	+590.8	+2713.1

	5-Yr Total	8-Yr Total
Force Structure Costs *	65704.5	105296.0
Other Costs *	3814.6	6144.7
Trade-Offs	-1662.3	-2616.9
Total Obligation Authority Required	67856.8	108823.8
Current TOA	65145.8	103399.7 *
Diff	+2711.0	+5424.1

* Miscellaneous appropriations including National Guard and Reserve Components.

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Alternative 4, in eight years, provides for four air assault divisions, two air cavalry combat brigades and four air transport brigades.

Total eight-year funding requirements for this program are greater than the five-year total for Alternative 3, but the yearly increments are less. Pay-off from trade-offs are less, since fewer conversions and substitutions are effected. Requirements on industry and pilot training are brought to better manageable proportions.

The program permits stationing of one air assault division in Korea and one in Hawaii/Okinawa with the resultant advantages as in Alternatives 1 and 3. The two air assault divisions in CONUS, together with the Hawaii/Okinawa unit provide an acceptable contingency force for Southeast Asia and Northeast Asia. However, contingency capabilities for other theaters are not enhanced to the degree provided by Alternatives 1 and 3.

The three infantry and two mechanized divisions in CONUS permit maximum mix effectiveness with the available air assault divisions for all theaters. The total CONUS contingency force provided by this program does not have the rapid response and flexibility for strategic deployment provided by Alternatives 1 and 3.

The one air cavalry combat brigade deployed to Europe has the advantage of the ideal environment for that unit, plus being well placed for contingency operations in the Middle East and North Africa. The CONUS unit adds strength and flexibility to contingency forces plus serving as a training base.

This program provides for only four of the five air transport brigades required for the Army portion of the air lines of communication for Southeast Asia. This has the net result of reducing by about one-half the capability of the proposed air lines of communication to support indigenous forces, the capability to support United States Army Forces remaining constant.

Deployment of only one air transport brigade to Europe reduces the capability of that theater for contingency operations in the Middle East provided by Alternatives 1 and 3.

As in the case of Alternative 2, the Board is of the opinion that this program provides for the attainment of the total capability in entirely too leisurely fashion.

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Force Structure by Fiscal Year

UNITS	FY-63	FY-64	FY-65	FY-66	FY-67	FY-68	FY-69	FY-70
Air Aslt Div	-	1	2	3	3	4	4	4
Inf Div (ROCID)	9	2	1	1	1	-	-	-
Inf Div (ROAD)	-	4	4	4	4	4	4	4
Armd Div (ROCAD)	3	-	-	-	-	-	-	-
Armd Div (ROAD)	-	3	3	3	3	3	3	3
Abn Div (ROTAD)	2	1	1	-	-	-	-	-
Abn Div (ROAD)	-	-	-	-	-	-	-	-
Mech Div (ROAD)	2	5	5	5	5	5	5	5
Air Cav Cbt Bde	-	-	1	1	2	2	2	2
Armd Cav Regt	5	5	4	3	1	-	-	-
Armd Cav Regt (Mdfd)	-	-	-	1	2	3	3	3
Field Army Avn Bde	-	-	-	-	-	-	1	1
Corps Avn Bde	-	-	1	2	2	2	2	2
Corps Gen Spt Avn Co (EUR)	-	-	-	-	-	1	2	2
Corps Aerial Surv Co (EUR)	-	-	-	-	-	1	2	2
Corps Arty (SEA)	-	-	1	1	1	1	1	1
Corps Arty	-	-	-	1	1	2	3	3
Spec Warfare Avn Bde	1	1	1	1	1	1	1	1
Aslt Heli Bn (ALAS)	-	-	1	1	1	1	1	1
Army Tac Avn Co	-	-	-	-	-	-	1	2
FW Co (CARIB)	-	-	1	1	1	1	1	1
Aslt Heli Co (CARIB)	1	1	1	1	1	1	1	1
Air Trans Bde	-	1	1	2	2	3	3	4
Air Amb Bn	1	1	1	1	2	2	2	2

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Under Alternative 4, the aircraft procurement program would require the obligation of funds in the amount of $5 billion for 10,448 aircraft over the eight-year period. Associated weapons and auxiliary equipment are included in this cost. Deducting the estimated attrition from the fleet and adjusting for delivery leadtime, the aircraft inventory will aggregate 8,317 units, of which 7,607 are new generation aircraft, by the end of FY-70.

AIRCRAFT PROCUREMENT PROGRAM

(Number of Aircraft)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year	Total 8-Year
Alt. #4	1,043	1,251	1,416	1,236	1,410	6,356	10,448
Current	582	909	1,224	1,086	1,086	4,887	
Diff	+ 461	+ 342	+ 192	+ 150	+ 324	+ 1,469	

AIRCRAFT AND ASSOCIATED PEMA

(Millions $)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year	Total 8-Year
Alt. #4	534.8	692.4	790.5	744.9	685.3	3,447.9	5,036.0
Current	246.4	331.2	395.8	349.6	339.2	1,662.2	
Diff	+ 288.4	+ 361.2	+ 394.7	+ 395.3	+ 346.1	+ 1,785.7	

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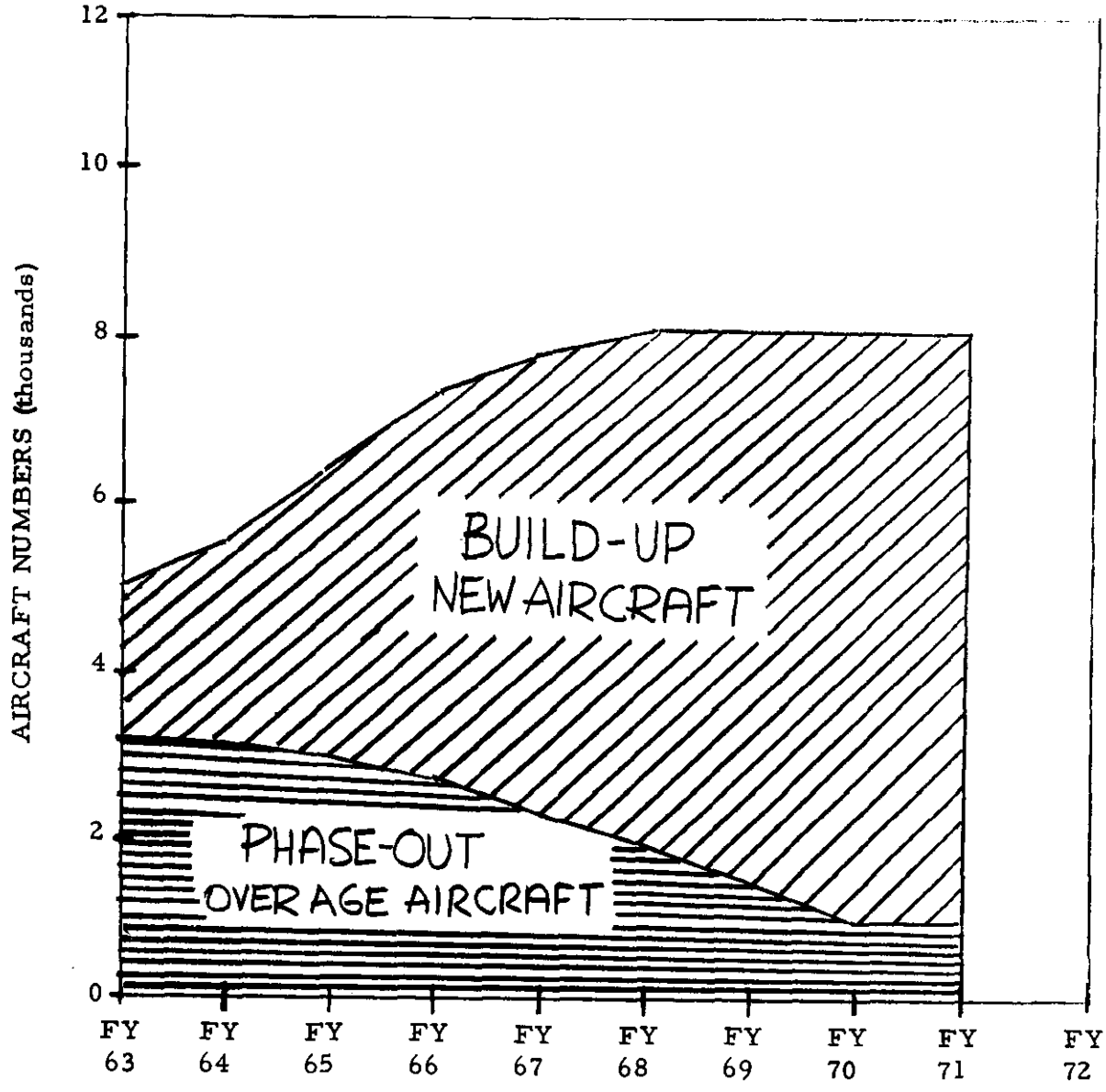
ALTERNATIVE 4

AIRCRAFT FLEET STATUS

(Less Maintenance Float, Pre-Stock and Reserves)



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alternative. This should total 1.3 billion dollars by FY-1970.

Eight-Year Financial Projection

The total Army obligational authority required for an eight-year period based on Alternative 4 is as follows:

FINANCIAL PROJECTION

(Millions $)

Alt. #4	FY-63	FY-64	FY-65	FY-66	FY-67	FY-68/70
Force Structure Costs	12057.9	13307.3	13415.3	13115.2	12746.5	38598.8
Other Costs *	719.0	773.9	768.7	776.3	776.7	2330.1
Trade-Offs	-93.5	-222.6	-274.7	-346.9	-442.2	-688.8
Total Obligation Authority Required	12683.4	13858.6	13909.3	13544.6	13081.0	40240.1
Current TOA	12384.1	13484.4	13436.3	13089.7	12751.3	38253.9
Diff	+299.3	+374.2	+473.0	+454.9	+329.7	+1986.2

	5-Yr Total	8-Yr Total
Force Structure Costs	64642.2	103241.0
Other Costs *	3814.6	6144.7
Trade-Offs	-1379.9	-2068.7
Total Obligation Authority Required	67076.9	107317.0
Current TOA	65145.8	103399.7
Diff	+1931.1	+3917.3

* Miscellaneous appropriations including National Guard and Reserve Components.

Incl 5

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ALTERNATIVE 5

Rationale

Alternative 5, providing for 3 air assault divisions, 2 air cavalry combat brigades and 1 air transport brigade is the minimum force structure considered by the Board for inclusion in the report. In truth, this program merely provides a test base for the concepts and organizations considered by the Board.

Funding costs are minimal and do not represent in their magnitude the urgency of the requirement. Requirements on the aircraft industry would be insufficient to reap the benefits of reduced unit costs contemplated in other alternatives. Pilot training would be somewhat more than currently programmed goals.

The program will not permit stationing of a division in Korea. The two divisions in CONUS offer minimum enhancement to current contingency capabilities.

The total division structure in CONUS provides maximum flexibility as regards appropriate mix with available air assault divisions. However, only Southeast and Northeast Asia are provided an acceptable level of air assault divisions in the total contingency force available for a theater.

The two air cavalry combat brigades are the same as provided in Alternatives 1, 3 and 4 and provide the same advantages.

The one air transport brigade would have some contingency capability in CONUS but would serve primarily as a test base. The logistic capability for Southeast Asia and the Middle East would still be unsatisfactory.

Force Structure by Fiscal Year

UNITS	FY-63	FY-64	FY-65	FY-66	FY-67
Air Aslt Div	-	1	1	2	3
Inf Div (ROCID)	9	2	2	1	-
Inf Div (ROAD)	-	4	4	4	4
Armd Div (ROCAD)	3	-	-	-	-
Armd Div (ROAD)	-	3	3	3	3
Abn Div (ROTAD)	2	1	-	-	-
Abn Div (ROAD)	-	-	1	1	1
Mech Div (ROAD)	2	5	5	5	5
Air Cav Cbt Bde	-	1	1	2	2
Armd Cav Regt	5	4	3	1	-
Armd Cav Regt (Mdfd)	-	-	1	2	3
Corps Avn Bde	-	-	1	1	1
Corps Arty (SEA)	-	-	-	-	1
Corps Arty	-	-	-	-	-
Spec Warfare Avn Bde	1	1	1	1	1
Aslt Heli Bn (ALAS)	-	-	1	1	1
FW Co (CARIB)	-	-	1	1	1
Aslt Heli Co (CARIB)	1	1	1	1	1
Air Trans Bde	-	1	1	1	1
Air Amb Bn	-	-	1	1	1

Aircraft Procurement Program

During the five-year period required to accomplish Alternative 5, $3.8 billion would be obligated for 7,846 aircraft, weapons and auxiliary equipment. This inventory would contain 6,476 new generation aircraft at the end of FY-67. Adjusting for delivery leadtime and deducting from fleet assets for attrition, the total aircraft inventory would be 7,841 by the end of FY-1967.

AIRCRAFT PROCUREMENT PROGRAM

(Number of Aircraft)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year
Alt. #5	606	1,516	1,716	1,728	2,280	7,846
Current	582	909	1,224	1,086	1,086	4,887
Diff	+24	+607	+492	+642	+1,194	+2,959

AIRCRAFT AND ASSOCIATED PEMA

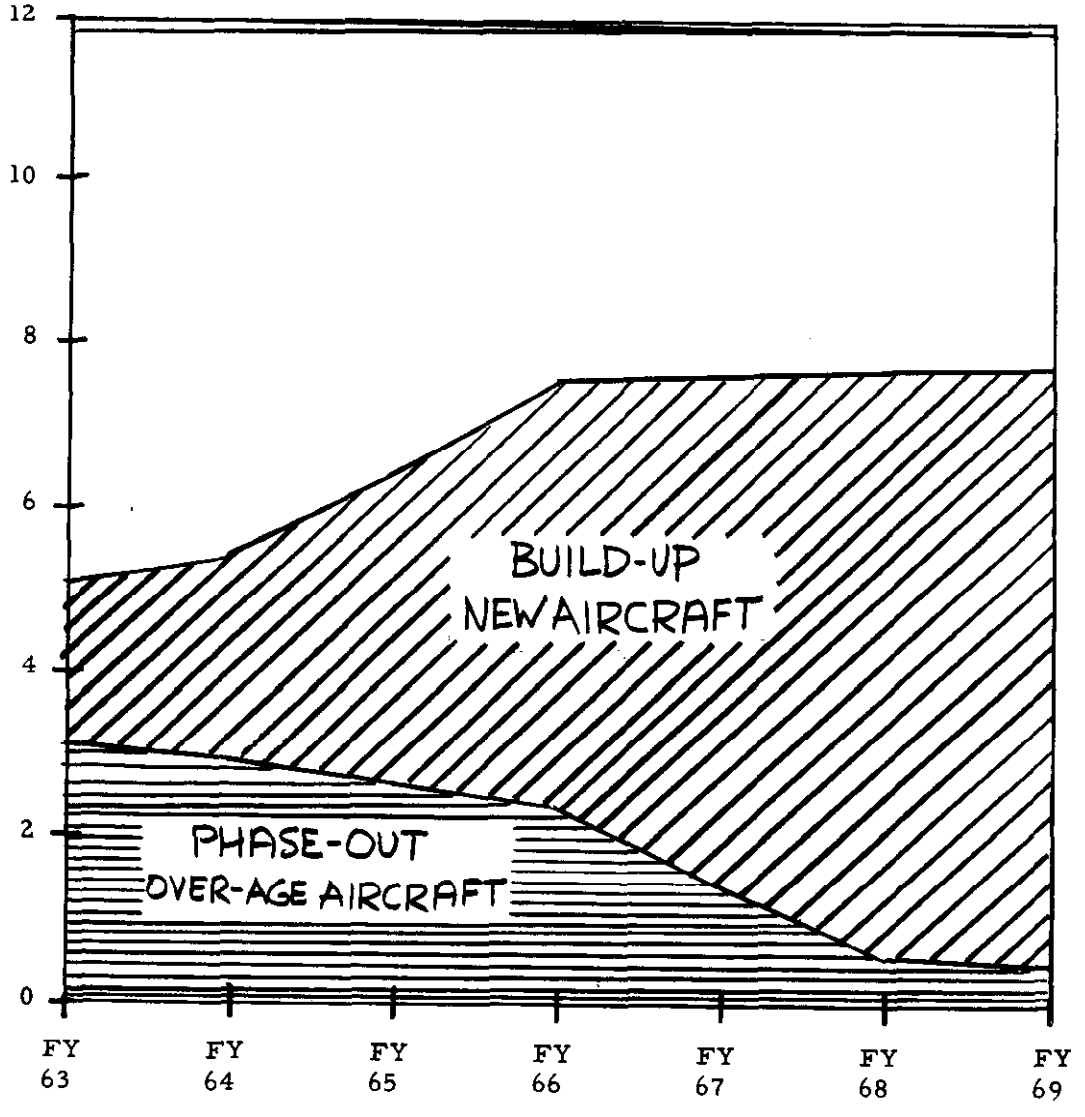
(Millions $)

	FY-63	FY-64	FY 65	FY-66	FY-67	Total 5-Year
Alt. #5	248.1	886.7	916.3	877.4	886.8	3,815.3
Current	246.4	331.2	395.8	349.6	339.2	1,662.2
Diff	+1.7	+555.5	+520.5	+527.8	+547.6	+2,153.1

ALTERNATIVE 5

AIRCRAFT FLEET STATUS

(Less Maintenance Float, Pre-Stock and Reserves)



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Funds generated by trade-offs of PEMA items in this alternative are somewhat less than Alternative 1, which is also phased on a five-year conversion. This is predicated on the reduced number of major units that are to be converted to the air assault TOE's. Funds made available through trade-offs total 363.3 million dollars over the five-year period.

Five-Year Financial Projection

Total Army obligational authority required for the five-year period based on Alternative 5 is as follows:

FINANCIAL PROJECTION

(Millions $)

Alt. #5	FY-63	FY-64	FY-65	FY-66	FY-67	5-Year Total
Force Structure Costs	11797.6	13497.4	13469.3	13194.5	12392.9	64891.7
Other Costs *	719.0	773.9	768.7	776.3	776.7	3814.6
Trade-Offs	-99.4	-235.9	-295.9	-371.2	-466.6	-1469.0
Total Obligation Authority Required	12417.2	14035.4	13942.1	13599.6	13243.0	67237.3
Current TOA	12384.1	13484.4	13436.3	13089.7	12751.3	65145.8
Diff	+33.1	+551.0	+505.8	+509.9	+491.7	+2091.5

* Miscellaneous appropriations including National Guard and Reserve Components.

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U.S. ARMY TACTICAL MOBILITY REQUIREMENTS BOARD

FORT BRAGG, NORTH CAROLINA

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FINAL REPORT (U)

20 AUGUST 1962

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ATUTR-AVN(S) (20 Aug 62) 1st Ind (S)
SUBJECT: Report of Army Tactical Mobility Requirements Board

Headquarters, United States Continental Army Command, Fort Monroe, Virginia 10 AUGUST 1962

TO: Chief of Staff, United States Army, Washington 25, D. C.

1. (U) I fully support the concepts of airmobile operations as developed by the Board and recommend that they be used as a basis for determining the structure of the Army for the five year period beginning at the earliest practicable date and as a general guide for subsequent years. A decision now to embark on the recommended course is necessary.

2. (U) I support the vulnerability findings as stated by the Board. I recommend the continued study of all means which could reduce this vulnerability.

3. (U) There are marked changes recommended by the Board in the Army's personnel program. I am in general agreement with these concepts. I particularly endorse the increased use of Warrant Officers and a broader recruitment program to attract capable young men into Army aviation.

4. (S) There are areas which I feel require further review in conjunction with the carrying out of the Board's recommendations. These areas are:

a. In the manpower area, the Board developed a structure for the Army based on an over-all strength of 960,000. I agree that the recommended structure will provide significantly increased tactical mobility. However, it is pointed out that the Army now has and will continue to have, even under the Board-recommended structure, serious deficiencies in modernized combat support and combat service support units. Specifically, a detailed analysis must be made to determine what maintenance and POL supply capability is required. It is my view that a strength of about 1,000,000 will more nearly satisfy the urgent requirements of a balanced force under present world-wide commitments.

b. The operational refueling problem will require a major effort for solution. Similarly the problems of airspace utilization, air traffic control and friendly recognition should be solved as soon as possible.

c. The stationing of one Air Assault Division in Korea, one in Hawaii and two in CONUS is considered fully justified. The stationing in CONUS of a third Air Assault Division in place of a mechanized division should, however, receive further review. This review should consider responsiveness to contingency plans and the adequacy of the rotation base.

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d. The Board recommends cancellation of procurement for the GOER program and of further development of the new main battle tank. Although implementation of the airmobile concept will result in a significant reduction in surface mobility requirements, it is felt that there will still be a requirement for continuing at least a portion of this program. Accordingly, it is felt that the cancellation of the GOER program bears further review. The Board feels that the AR/AAV will satisfy the requirement for an armored vehicle once the M60 tank is phased out. In view of studies now under way within Department of the Army, I question the advisability of making this decision at this time.

e. The net increase in costs for the over-all Board-recommended program is about $4.2 billion over a five year period. It is felt that this amount is conservative considering the DOD Directive to achieve markedly increased tactical mobility. The provision of urgently needed additional manpower and the restoration of a portion of the tradeoffs discussed above are considered adequate justification for accepting a net increase in costs of around seven billion dollars. In light of the improved over-all military posture to support the flexible response the nation requires, such an order of magnitude increase is considered reasonable.

5. (U) I am transmitting detailed recommendations separately to the Commanding General, Combat Developments Command for his consideration in connection with his review of the proposed organizations. Adjustments can and should be made during the continued study, test and war-gaming which is so essential to the introduction of these new concepts.

6. (S) It is emphasized that the single corps organization recommended for activation by the Board was specifically designed to support predominately airmobile operations in undeveloped areas such as South East Asia. If this organization is used in a sophisticated environment, it will require considerable reinforcement in artillery as well as other supporting arms and services.

7. (U) I am in complete agreement with the DOD criteria enumerated in paragraph 11 of the Board's recommendations as being applicable to all Army aircraft. To these I would add another:

"The aircraft must have the capability of living in the austere day to day environment of the troops it supports."

8. (U) The requirement for increased Air Force support, both in the

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tactical and logistical fields is emphasized by the findings of this Board. Despite the increases of organic Army aircraft indicated in this study, the Army will continue to rely heavily on the Air Force for support. It would appear desirable that a further review of Air Force requirements in these areas be instituted to insure allocation of adequate resources for these Army missions.

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HERBERT B. POWELL
General, U. S. Army
Commanding

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ARMY TACTICAL MOBILITY
REQUIREMENTS BOARD
Fort Bragg, North Carolina

AJBCG-AB 20 August 1962

SUBJECT: Report of Army Tactical Mobility Requirements Board (U)

THRU: Commanding General
United States Continental Army Command
Fort Monroe, Virginia

Chief of Staff
United States Army
Washington 25, D. C.

TO: Secretary of the Army
Department of the Army
Washington 25, D. C.

1. Forwarded herewith is the report of the Army Tactical Mobility Requirements Board, appointed by letter, United States Continental Army Command, dated 3 May 1962, subject: "Appointment of an Ad Hoc Board to Conduct a Re-examination of the Role of Army Aviation and Aircraft Requirements."

2. The Board has put the report in a format believed to be most useful to the Department of Defense: A brief of the essential proposal, the report proper, and a large volume of contributory committee, war game and test reports, a synthesis of industry proposals and suggestions, and other back-up material which the Army and Defense staffs may wish to consult.

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3. The report devotes a number of paragraphs to the theoretical requirement for greater mobility, not simply as a matter of desirable emphasis but also because the benefits to be derived from an additional mobility must be brought specifically to mind, even among experienced professional soldiers, if we are to decide whether they are worth the cost in dollars and manpower.

4. The Board and its subordinate committees have investigated all essential aspects of the very complex matter which is Army aviation. Work started in early May actually prior to receipt of instructions to proceed and has continued at an urgent pace through May, June, and July. The charter given the Board was so generous and provocative in its terms that the large number of officers, soldiers and civilians constituting its membership, plus some 90 civilians and 3200 military personnel involved for varying periods in troop test, experimentation and war gaming, have worked devotedly at the task on a very arduous schedule. This effort was backed up, in a most vigorous way, by offices of the Department of the Army and by the aviation and other related industries. Even so, I must acknowledge that the job is not in all respects complete, and that further study, test and war gaming are much to be desired and therefore recommended.

5. The foregoing does not indicate that I consider the Board's findings unvalidated or its judgment faulty; the time made available although not sufficient to prove all details of the Boards recommendations as respects organization, personnel, equipment, maintenance and doctrine, was quite sufficient to enable it, with conviction, to chart a course of action which will serve to increase markedly the combat and logistical efficiency of the Army. It is the Board's belief that a decision now to embark on that course may be made by the Secretary of Defense without commitment to the whole program, for the realities of aircraft procurement and the Army's current shortage of aircraft are such that the recommended initial procurement for the first two years will unquestionably fall within the minimum needs of the Army even under the current force structure. The Board moreover is strongly of the opinion that in each year succeeding this one a somewhat similar (but much smaller) board should be convened to review this report, the Department of Defense and Department of the Army decisions respecting it, the progress of the program as

[redacted]

approved, the continuing development of organization and doctrine, and the state of the art as respects essential items of equipment - and as a result of that review make recommendations as to what modifications should be made to the program. This process should insure against major error in the prosecution of what is deemed to be a sound and essential scheme for the provision of critically needed airmobility to the United States Army.

HAMILTON H. HOWZE
Lieutenant General, USA
President

1 Incl
Final Report, US Army
Tactical Mobility
Requirements Board

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ARMY TACTICAL MOBILITY REQUIREMENTS BOARD

Fort Bragg, North Carolina

BRIEF BY THE PRESIDENT OF THE BOARD

20 August 1962

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BRIEF BY THE PRESIDENT OF THE BOARD

The material herein is extracted in major part from the accompanying Report of the Army Tactical Mobility Requirements Board, the reading of which is unavoidable if one is to achieve a genuine understanding of the Board's work and the implications of all it recommends. This paper is not a summary of the Report but rather a brief of the primary proposal.

It is organized as follows:

One - The aircraft, by type, needed by the Army, and the equipment the aircraft will carry.

Two - A new organizational structure for the Army's forces in the field.

Three - A recommended program.

Four - The cost of the recommended program in terms of dollars and personnel.

Five - What must be done to make the program go.

Six - The benefits to be derived.

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ONE: EQUIPMENT

The Army has not attained a proper "airmobility" in the past because of a deficiency both in quality and quantity of aircraft. The deficiency in quality has now been largely overcome. We may now proceed, with assurance, to buy to the inventory necessary to achieve genuine mobility and thereby a greatly augmented combat effectiveness.

Table I-A shows aircraft, by category/mission, recommended to be included in the Army inventory.

TABLE I-A
ARMY

Category/Mission	Armament or Special Equipment	Sample Type Aircraft*
Observation		
Observation Helicopter	Light anti-personnel weapons	LOH (OH-?)
Command & Control Helicopters	Light anti-personnel weapons	LOH (OH-?)
Reconnaissance Airplane	IR, Radar, Camera	AO-1 (OV-1)
Attack		
Attack Helicopter	Anti-tank & anti-personnel weapons	HU-1B (AH-1B)
Attack Airplane	Anti-tank & anti-personnel weapons	AO-1 (AV-1)
Utility		
Utility Helicopter	Light anti-personnel weapons	HU-1B (UH-1B)
Tactical Transport Helicopter	Light anti-personnel weapons	HU-1D (UH-1D)
Air Ambulance		HU-1B (UH-1B)
Command Staff Airplane		L-23F (U-8F)
Utility Airplane		L-28 (U-10A)
Cargo		
Transport Helicopter	Light anti-personnel weapons	HC-1B (CH-47B)
Transport Airplane		AC-1 (CV-2A)
Heavy Lift Helicopter (Flying Crane)		(CH-?)

NOTE: *All Army aircraft are classed as Observation, Attack, Utility or Cargo (Helicopter or V/STOL). New designations (shown in parentheses) are from DOD Directive 4505.6, dated 6 July 1962.

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Table I-B shows aircraft by category/mission which will, on many of their flights, support the Army, but which are not recommended for inclusion in the Army inventory. Aircraft not contributing directly to the execution of the Army mission are omitted.

TABLE I-B
OTHER SERVICES

Category/Mission	Armament or Special Equipment	Sample Type Aircraft*	
Attack			
Visual Attack	Rockets, Bombs, Missiles, Napalm	A4D-5	(A-4E)
All Weather Attack	Rockets, Bombs, Missiles, Napalm	A2F-1	(A-6A)
Long Range Attack	Bombs, Missiles	AD-7	(A-1J)
Fighter			
Close Air Support	Rockets, Bombs, Missiles	F4H-1	(F-4A)
Deep Interdiction	Bombs, Missiles	F-111	(F-111)
Counter Air	Cannon, Air-to-Air Missiles	F-104	(F-104)
Deep Reconnaissance	IR, Camera, Radar	RF-101	(RF-101)
Cargo			
Intra-Theater Transport		C-123	(C-123)
& Troop Carrier		C-130	(C-130)
Inter-Theater Transport		C-141	(C-141)
Heavy Equipment Transport		C-133	(C-133)

NOTE: * Designations are from DOD Directive 4505.6, dated 1 July 1962.

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TWO: ORGANIZATION

Faced with the alternative of making all combat and logistic support units somewhat more mobile and of selecting specific units to be given genuine airmobility, the Board chose the latter as being far more productive. Table II shows major organizational innovations. Details of organization are shown in the Report and supporting annexes; here are shown simply the primary subordinate combat units and the aircraft devoted to their mobility, fire support and logistic support.

TABLE II

	Observation & Target Acquisition Helicopters	Command, Control, Utility & Maintenance Helicopters	Reconnaissance Airplane	Attack Helicopters	Attack Airplanes	Tactical Tran Helicopters	Air Ambulances	Transport Helicopters	Transport Airplanes	TOTAL
	*	*	*	**	**	*		*		
Air Assault Division 1 Air Cavalry Squadron 8 Infantry Battalions 5 Artillery Battalions	48	80	6	87	24	154	12	48		459
Air Cavalry Combat Brigade 3 Combat Squadrons (4 troops each)	72	52		144		48				316
Corps Aviation Brigade(1)		51	12	12		80		48		207(1)
Air Transport Brigade(2)		12						32	80	134(2)

NOTES:

* Aircraft in these columns will be armed with light automatic anti-personnel weapons.

** Aircraft in these columns will be armed with a variety of anti-tank and anti-personnel weapons and heavy quantities of ammunition.

(1) Corps Aviation Brigade also has 4 command airplanes.

(2) Air Transport Brigade also has one command airplane and nine heavy helicopters (flying cranes).

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The following organizations were provided additional aircraft. Current TOE's of ROAD Division and Armored Cavalry Regiment are shown for comparison.

TABLE III

	Observation and Target Acquisition Helicopters	Command, control, Utility and Maintenance Helicopters	Reconnaissance Airplanes	Attack Helicopters	Attack Airplanes	Tactical Transport Helicopters	Air Ambulances	Utility Airplanes	Transport Airplanes	TOTAL
	*	*	*	**	**	*				
ROAD Division (Current TOE) (Varying mixes of infantry, mechanized infantry, tank, and artillery battalions)	48		4			49		2		103
ROAD Division (Augmented)	84	23	4 (1)	8	8	25	12			164
Armored Cavalry Regiment (Current TOE)	13		13							26
Armored Cavalry Regiment (Augmented)	63	25		30		21				139
Corps Artillery (RODAC TOE)	8		4			4				16
Corps Artillery (Airmobile)	39	19	4	39		60				161
Special Action Force (Special Warfare)				8	4	4		4	4	24

NOTES: * Aircraft in these columns will be armed with light automatic anti-personnel weapons.

** Aircraft in these columns will be armed with a variety of anti-tank and anti-personnel weapons and heavy quantities of ammunition.

(1) Includes nine L-19 (0-1) airplanes.

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THREE: A RECOMMENDED PROGRAM

Expressed simply in terms of divisions (complementary combat and logistic support units being introduced later in this brief) five alternative programs are offered:

1. A five-year program to achieve a force structure of ten ROAD divisions augmented with additional aircraft and six air assault divisions.

2. An eight-year program to achieve the same force structure.

3. A five-year program to achieve a force structure of eleven ROAD divisions and five air assault divisions.

4. An eight-year program to achieve a force structure of twelve ROAD divisions and four air assault divisions.

5. A five-year program designed to activate and equip promptly a minimum of one each of the major airmobile units, then a rounding out of the force structure by 1967 to have three air assault divisions.

Table IV compares the current programmed objectives with the five alternatives.

TABLE IV
DIVISION FORCE STRUCTURE
(Number of Divisions and Program Years)

Division Type	Current End FY-67	Alt. #1 End FY-67	Alt. #2 End FY-70	Alt. #3 End FY-67	Alt. #4 End FY-70	Alt. #5 End FY-67
Inf	6	2	2	4	4	5
Armd	3	3	3	3	3	3
Abn	2	0	0	0	0	0
Mech	5	5	5	4	5	5
Air Assault	0	6	6	5	4	3
Total	16	16	16	16	16	16

The last formations activated should attain operational readiness by end of FY-68 (Alt. 1, 3 and 5) or FY-71 (Alt. 2 and 4).

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Since all of the air assault divisions will be part of the active Army, Table V shows only the alternative 16-division force structure/deployments. However, in appraising the total effect of the various air assault/ROAD division mixes, the Board considered these 16 divisions as part of the "22-division force."

TABLE V
ALTERNATIVE FORCE STRUCTURE/DEPLOYMENTS

Divisions		Current	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Korea	Air Aslt Div		1	1	1	1	
	Inf Div	2	1	1	1	1	2
Hawaii	Air Aslt Div		1	1	1	1	1
	Inf Div	1					
Europe	Mecz Div	3	3	3	3	3	3
	Arm Div	2	2	2	2	2	2
CONUS	Air Aslt Div		4	4	3	2	2
	Abn Div	2					1
	Inf Div	3	2	2	3	3	2
	Mecz Div	2	1	1	1	2	2
	Arm Div	1	1	1	1	1	1
Total		16	16	16	16	16	16
Air Cavalry Combat Brigades							
Europe			1	1	1	1	1
CONUS			2	2	2	1	1
Total			3	3	3	2	2
Air Transport Brigades							
Pacific			2	2	2	2	
Europe			2	2	2	1	
CONUS			1	1	1	1	1
Total			5	5	5	4	1
Program Years			5	8	5	8	5

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The Board recommends Alternative 3, a five-year program to reach a proposed force structure of eleven ROAD divisions, five air assault divisions, three air cavalry combat brigades and five air transport brigades plus certain other combat, combat support and service support units by the end of 1967, as the most responsive to the requirements for increased combat effectiveness.

An Army so structured will permit deployment as follows:

- In Korea, an infantry division positioned in the line with Korean units, an air assault division as an exceptionally mobile Eighth Army reserve, and an air transport brigade to supplement the difficult ground line of communication north from Pusan.

- In Hawaii, an air assault division, of which one brigade may be stationed in Okinawa, plus an air transport brigade also in Okinawa. These forces may be committed quickly, if necessary, to Southeast Asia.

- In Germany, an air cavalry combat brigade to form a very mobile counterattack reserve, strong in anti-tank weapons, for the Seventh Army. The five ROAD divisions and the armored cavalry regiments will be strengthened with modest additions of aircraft. An air transport brigade may be stationed in Germany and air transport brigades will presumable be available for prompt execution of the contingency plans for which US Army Europe is responsible.

- In the Continental United States, three air assault divisions (two of which would retain parachute capability), two air cavalry combat brigades and an air transport brigade which may be used for the execution of STRAC contingency plans or to reinforce either the European or Pacific theaters. Air assault divisions require about half the strategic airlift of a ROAD infantry division.

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FOUR: THE COST

Subsequent tables reflect only the implications of the recommended alternative. Other alternatives are costed out in the Report and its Inclosure 5.

TABLE VI
AIRCRAFT PROCUREMENT PROGRAM
(Number of New Aircraft)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year
Alt. #3	1,043	1,630	2,585	2,568	3,096	10,922
Current Army Program	582	909	1,224	1,086	1,086	4,887
Increase	461	721	1,361	1,482	2,010	6,035

TABLE VII
AIRCRAFT SYSTEMS AND AMMUNITION
(Millions of Dollars)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total 5-Year
Alt. #3	544.4	1,120.5	1,362.9	1,265.5	1,153.0	5,446.3
Current Army Program	246.4	331.2	395.8	349.6	339.2	1,662.2
Increase	298.0	789.3	967.1	915.9	813.8	3,784.1

TABLE VIII
COST COMPARISONS FOR CURRENT AND PROPOSED UNITS
(Millions of Dollars)

	Costs (CONUS)		
	Initial Equipment	5-Year Operating Cost	Total 5-Year Cost
Air Assault Div (New)	282	705	987
ROAD Mech Div (Current TOE)	155	646	801
ROAD Inf Div (Current TOE)	111	582	693
ROAD Arm Div (Current TOE)	182	681	863
ROAD Abn Div (Current TOE)	76	579	655

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A major source of trade-off funds is in the PEMA appropriation, wherein savings are realized from a sharp cutback of ground mobility equipment in the converted divisions. Other transportation systems directed towards improvement of ground mobility, such as GOER, are also nominated for trade-off. Savings in these areas are estimated to be 1.6 billion dollars for a 5-year period.

A saving is shown in the R&D appropriation for all fiscal years by the reduction or elimination of R&D programs directed toward drones, a new main battle tank, a new family of trucks, and other systems.

TABLE IX
TRADE-OFF
(Millions of Dollars)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total
PEMA	87.6	237.2	350.4	436.0	533.0	1644.2
RDT&E	45.6	77.5	62.7	70.4	80.6	336.8
Total	133.2	314.7	413.1	506.4	613.6	1981.0

TABLE X
TOTAL OBLIGATION AUTHORITY REQUIRED
(Millions of Dollars)

	FY-63	FY-64	FY-65	FY-66	FY-67	Total
Force Structure Costs	12098.4	13844.0	14149.5	13856.9	13588.6	67537.4
Other Costs*	719.0	773.9	768.7	776.3	776.7	3814.6
Trade-Offs	-133.2	-314.7	-413.1	-506.4	-613.6	-1981.0
Total Obligations Authority Required	12684.2	14303.2	14505.1	14126.8	13751.7	69371.0
Current TOA	12384.1	13484.4	13436.3	13089.7	12751.3	65145.8
Differential	+ 300.1	+ 818.8	+1068.8	+1037.1	+1000.4	+4225.2

* Miscellaneous appropriations including NG and RES.

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TABLE XI
COMPARISON OF 5-YEAR COSTS ACCORDING TO MAJOR APPROPRIATION
(Millions of Dollars - Trade-Offs Included)

Program	RDT&E	MPA	O&MA	PEMA	MCA	Other	Total
Current	7185.5	20555.9	18359.0	14241.7	989.1	3814.6	65145.8
Alt. 3	7390.2	20607.7	19966.5	16381.6	1210.4	3814.6	69371.0

Aviation personnel implications were examined in detail. A comparison of the recommended program to the current program is shown in TABLE XII.

TABLE XII
AVIATION PERSONNEL PROGRAM COMPARISON

	FY-63		FY-64		FY-65	
	Current	New	Current	New	Current	New
Officer	6,500	6,500	6,700	6,900	7,700	8,200
Warrant Off	2,200	2,400	3,000	3,000	3,200	4,000
Enlisted	20,500	34,900	20,500	39,100	21,100	46,100

	FY-66		FY-67		FY-68	
	Current	New	Current	New	Current	New
Officer	7,900	10,100	8,000	10,800	8,200	10,300
Warrant Off	3,200	5,900	3,200	9,600	3,200	10,300
Enlisted	21,800	56,400	23,100	66,600	24,700	71,000

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FIVE: WHAT MUST BE DONE

The recommended program will have great impact on the Army as respects management, doctrine, personnel, maintenance and the budget. Developed in necessary detail in the Report and its annexes, these are summarized here as a matter of emphasis.

Management - As did the Navy for Polaris, the Air Force for the ICBM, and the Army for the Nike family of missiles, the Army must establish a strong management system for the creation of the new capability. The Board does not suggest a parallel staff system, but rather the addition of individual staff positions to the present staff structure - positions to be filled by officers charged with directing staff action necessary to the achievement of the goal and given the authority necessary to make the system work.

Doctrine - The doctrine to support the concepts enunciated by the Report is not difficult to formulate, although a wide departure from present tactical doctrine must be developed for airmobile units and the larger forces incorporating them. The Combat Devélopments Command, in coordination with other major CONUS commands, must expand the basic concepts of the Board into approved Army doctrine.

Personnel - An extensive revision of the personnel policies of the Army as they apply to the aviation program is necessary. A major requirement is to increase the Army's current authorization of commissioned and warrant officers to provide for the increased number of aviators - particularly warrant officer aviators. New policies are developed fully in the Report and Annex Q.

Maintenance - The concept and procedures of maintenance of Army aircraft also require major revision. This is also developed in the Report and Annex N.

Budget - Major budget implications are shown earlier in this paper.

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Four additional follow-on actions are necessary:

Additional Experimentation and Testing - Fundamental to the eventual achievement of airmobility is a program for continuing experimentation, test, and war gaming. These should be the responsibility of the Combat Developments Command, which should maintain very close association with industrial concerns capable of contributing to the effort. The process should serve to refine the tactical doctrine, organization, procedures, and the requirements for weapons, avionics and aircraft configuration and other action initiated by the Board. The product of the Board work will be turned over in toto to CDC.

Research and Development - RDT&E should be geared specifically to the development of the necessary materiel to support the concepts and organizational structures recommended by the Board as they may be approved and adopted. Special attention should be devoted to research and development that will result in improved reliability and maintainability of future aircraft and power plants. Where practicable the results should be applied to current aircraft and power plants.

Product Improvement - The PEMA program should include, at an early point in all development projects, adequate provisions for improving the reliability, maintainability, and increased life of engines and other dynamic components.

Review - Each year a competent board of officers should be convened to review the recommendations of this Board, the action taken thereon by the Department of the Army and the Department of Defense, the progress of the program in all its aspects (and with particular reference to the results of CDC experimental and test program) and thereafter recommend appropriate modifications to the program proposed by the Board.

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SIX: THE BENEFITS TO BE DERIVED

All these may be lumped under a single heading - the combat effectiveness of the Army.

The United States is faced with the possibility of fighting one or more of four varieties of hostile ground forces:

- A modern army (the Soviet, reinforced by European Satellite armies) whose primary characteristics are great size, a large inventory of heavy combat vehicles and artillery, and a capability to employ nuclear and chemical weapons.

- An Oriental army (Communist Chinese, Vietminh, North Korean or a combination of two of these) characterized by large size, relative unsophistication, great foot mobility, and an association with the area not enjoyed by US forces.

- Insurgents, such as the Viet Cong, who achieve strength not from modern weapons but from foot mobility, elusiveness, difficulty of identification, surprise, and the sympathy or fear of the local populace.

- Other forces (African, Middle Eastern, Latin American) likely to resist the execution of existing STRAC contingency plans.

The Alternative 3 Army will have an unusual flexibility of response to any of the likely demands for the application of land combat power, and a much improved effectiveness in execution.

- Better deployability of airmobile forces will permit faster reaction by the general reserve.

- Improved tactical mobility will provide the best foreseeable chance of coping with the largely unknown contingencies of the land battle in an atomic war.

- Greater mobility will improve the chances of success of the detection, screening and delay missions charged to the cavalry regiments which, in Germany, form the forward fringes of the "shield."

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- A highly mobile counterattack reserve, strong in anti-tank weapons, will, in Europe, serve as a most valuable counter to strong Soviet armored thrusts.

- Airmobile US units will provide the most effective augmentation to friendly indigenous forces fighting Communist armies in Southeast Asia or Korea, not only be reason of their freedom from local limitations to surface transportation buy also because their extreme mobility will permit a flexibility of employment much to be desired, perhaps as a counterattack reserve or as a blocking or enveloping force.

- Whatever the difficulties of detection and identification, airmobile forces have the best chance of surprising and eradicating guerrilla forces, and at the same time stand to suffer fewer losses due to the ambush of combat and supply columns.

- Two of the three CONUS-based air assault divisions will retain the ability to conduct parachute assault in execution of contingency plans, but will also (by the incorporation of additional aircraft in their structures) have far better means to accomplish the missions set by those plans.

There are also corollary benefits, of which one only is worth mentioning here: the incorporation of the concept of modern tactical mobility into the Army will have an enormously vitalizing effect on its whole structure, and this in turn cannot fail to strengthen our national reaction to whatever challenges the future may hold.

Hamilton H. Howze

HAMILTON H. HOWZE
Lieutenant General, USA
President

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FINAL REPORT, ARMY TACTICAL MOBILITY REQUIREMENTS BOARD

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ANNEXES (Separate):

NOTE: Pending final distribution of this report as may be authorized by Department of the Army, Appendices to Final Report Annexes not otherwise included in supported Annexes will be on file in the Army Library, Room 1A530, The Pentagon, Washington 25, D.C.

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AIRCRAFT DESIGNATIONS

Aircraft designations were changed recently by DOD Directive 4505.6 dated 6 July 1962. To assist the reader of this report, both the old and new designations are shown for each aircraft (the new in parenthesis). Further, since most Army aircraft are used for a variety of missions the following list describes the major Army missions within the various categories, the popular name of the aircraft and its designations.

Observation

Used to observe (through visual or other means) and report information concerning composition and disposition of enemy forces, troops, supplies and adjust artillery fire. In addition used for command, control, liaison, lightweight resupply, reconnaissance and emergency evacuation.

	NAME	OLD DESIGNATION	NEW DESIGNATION
Observation Helicopter	Sioux	H-13	(OH-13)
Observation Helicopter	Raven	H-23	(OH-23)
Observation Helicopter	-----	LOH	(OH-?)
Observation Airplane	Bird Dog	L-19	(O-1)
Surveillance Airplane	Mohawk	AO-1	(OV-1)

Attack

Used to search out, attack and destroy enemy targets using conventional or special weapons. Also used for limited interdiction and very close air support missions. Provides armed escort and conventional artillery-type and automatic weapons-type base of fire. When suitably armed, used as highly mobile anti-tank weapon.

	NAME	OLD DESIGNATION	NEW DESIGNATION
Attack Helicopter	Iroquois	HU-1	(AH-1)
Attack Airplane	Mohawk	AO-1	(AV-1)

AIRCRAFT DESIGNATIONS (Continued)

Utility

Used for miscellaneous missions such as carrying cargo and/or passengers, aerial ambulance, small unit tactical transport and command and control. These aircraft will include those having a small payload.

	NAME	OLD DESIGNATION	NEW DESIGNATION
Utility Helicopter	Iroquois	HU-1	(UH-1)
Utility Airplane	Beaver	L-20	(U-6)
Utility Airplane	--------	L-28	(U-10)
Command/Staff Airplane	Seminole	L-23	(U-8)

Cargo

Used for assault support and logistical cargo and troop transport within the battle area. May also be used for such specialized missions as refueling, resupply of ammunition to combat formations and the evacuation of casualties or damaged equipment. In addition, those aircraft possessing a VTOL capability may be used as flying cranes to transport surface vehicles and other heavy equipment over natural or man made obstacles.

	NAME	OLD DESIGNATION	NEW DESIGNATION
Transport Airplane	Caribou	AC-1	(CV-2)
Transport Helicopter	Chinook	HC-1	(CH-47)
Heavy Lift Aerial Vehicle	Flying Crane	-----	(CH-?)

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The complete membership of the working committees and groups is shown at Annex A.

FINAL REPORT
US ARMY TACTICAL MOBILITY
REQUIREMENTS BOARD

(S) I. TASK

This report is directly responsive to the two April 19 memoranda of the Secretary of Defense and the subsequent directives by Headquarters, Department of the Army, and Headquarters, US Continental Army Command, contained at Inclosure 1; hence it discusses only those requirements for mobility which may be met by aviation. On the other hand ground movement, as a competitor to movement by air, was properly considered throughout the Board's[1] deliberations.

While careful reading of the initiating memoranda and directive is necessary for full understanding, the problem facing the Board may be stated thus: to what extent may aircraft properly be substituted for ground vehicles to provide combat and logistical mobility for the Army? Corollary to the basic question are the advantages and penalties incurred by the substitution. The problem is an immensely complicated one, impinging not only on the whole structure and tactics and doctrine and training of the Army, but also on the structure of the Defense budget, on industry, and to a limited extent on the roles and missions of the armed services.

In recognition of the great cost of any extensive aviation program the Board presents "trade-offs" which partially compensate for that cost. It also presents alternatives to the optimum solution.

(S) Intelligence

The Board is aware that the headquarters reviewing this report are entirely current on the latest intelligence of the Sino-Soviet bloc; the information is therefore omitted here. It should be noted however that the Board received from the Assistant Chief of Staff, Intelligence, Department of the Army, a full report[2] and briefing. Points of special interest to the Board were the increasing Soviet confidence in the deterrent effect of their long range strike forces and defensive posture;

1 - Annex A, Roster of Board Members

2 - Annex D, Intelligence

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the continuing probability of limited conflict along the southern periphery of the Bloc; the increasing possibility of aggression against Western Europe; the preponderance of armored striking power, long range missiles, and tactical aviation organic to the Army of the Soviet Union; and the very considerable possibility of Soviet use of chemical and biological warfare even in non-nuclear warfare.

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(S) II. METHODOLOGY

The most significant activity of the Board was the investigation, test, and evaluation of operational concepts of airmobility. Solutions were expressed in terms of organization, procedures, and the application of weaponry and aircraft. Development and test were concurrent. It would have been better to proceed sequentially, but there was not time for this.

(C) Field Tests[1]

Very great effort was devoted to field experimentation, for which some 150 Army aircraft and their crews were assembled at Fort Bragg for an 11-week period, this strength being supplemented for a period of 7 days by 16 C-130's of the Air Force. Troops of three battle groups of the 82d Airborne Division participated. The force available made it possible to execute several exercises, for purposes of comparison, first by a conventionally equipped force and then by one made mobile by the addition of aircraft. Other exercises, not practicable of execution by conventional forces, were done only by experimental organizations. Some 40 formally identified tests were run, ranging from fairly elaborate live-fire exercises and three major week-long exercises against an assumed force of irregulars (one done in conjunction with the Air Force) down to auxiliary tests of a variety of new items of weapons and other equipment. In the conduct of these tests the Board was much aware of the suggestion of the Secretary of Defense that scientific appraisal be made of results, wherefor Stanford Research Institute (SRI) and other agencies were asked to assist. The seven scientists provided by SRI, Technical Operations Incorporated (CORG), Research Analysis Corporation (RAC), and RAND Corporation observed the tests on a daily basis and combined their judgments with those of the officers who developed the tests and also observed them.

The tests were of three general categories: (1) a series to evaluate the reconnaissance and security, tactical mobility, firepower, and logistical aspects of organizations designed by the four conceptual committees of the Board; (2) tests of newly designed organizations in their applicability to counterinsurgency; (3) "side tests" of new items

1 - Annex O, Field Tests

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of equipment and special techniques, e. g., more accurate airdrop procedures, cargo snatch from moving aircraft, comparative capabilities of aircraft, and hasty airfield construction and repair.

Through the use of experienced military and civilian evaluators the technique assessed the more important indicators in each test. By varying the number of helicopters and planes, vehicles, weapons and the number of soldiers, an attempt was made to gain close approximations of the relative numbers of each going into a proper mixture. Using questionnaires and interviews to supplement observation, test designers and evaluators sought to gain insight into the validity of the new concept.

Of the validity of the basic idea -- that many operational tasks can be done better with than without Army aviation -- the tests left little doubt. It is necessary to state however that the field tests, although most convincing as respects the effectiveness of airmobility applied to the fighting and supply of the land battle and providing a most valuable "hand up" to the agency which should take over the responsibility for this sort of testing, nevertheless constitute simply the start of a process which should never be allowed to die.

While confirming earlier estimates of general feasibility, tests additionally opened new avenues of profitable application. Only partly anticipated new problems also appeared -- but so did measures for their solution. A most important side product was the formulation of new standing operating procedures (SOP's) for the execution of many tactical and logistical chores, which when repeated according to SOP showed tremendous improvement.

(S) War Games[1]

The objective of the war gaming, put under the general supervision of the Research Analysis Corporation (RAC), was to provide measurable responses to various questions posed by the airmobility concept, particularly those pertaining to the combat effectiveness of airmobile organizations (as compared to their surface transported counterparts) and to optimum over-all organization within the airmobile resources likely to be available.

1 - Annex M, War Games

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War game results were greatly influenced by the geographic character of the several countries serving as game locales. The character of existing road nets was of fundamental importance. Games examined the relative effectiveness of the competing concepts with reference to such matters as speed of reaction, destruction rates, economy of force, and eventual compatibility with our economic and industrial capability.

Although the games varied widely in force composition and analytical techniques, the general approach to mission effectiveness was to play repetitive games, employing first ground-bound or ROAD organizations under a given set of circumstances,[1] and repeating the play - under the same circumstances - employing airmobile formations and tactics appropriate to the units' increased mobility. Relative effectiveness was determined by destruction rates, time to accomplish a given mission, and the number of units required to accomplish it. Organization, tactics and logistics were under constant review during the play, adjustments being made to produce what were judged to be optimum solutions.

Games played are listed in ascending order of complexity:

- Varying mixes of airmobile and ground formations, reinforced company and smaller.

- Brigade and battalion-size units with normal reinforcement.

- Divisions.

- Theater, to include combat elements, theater support organization and appropriate portions of the inter-theater lines of communication (LOC).[2]

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1 - Conventional War Forces, 1967 (Vols I-XI), Office Deputy Chief of Staff for Military Operations, Department of the Army, initial edition, June 1962 (ID 5970300)

2 - Terms used by the Board and cited in this report are used as defined in AR 320-5, Dictionary of United States Army Terms and in JCS Publication 1, Dictionary of United States Military Terms for Joint Usage. Other terms are defined in Inclosure 2, Glossary of Airmobility Terms.

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The final effort was an analysis of four area studies based on the situations developed and employed to examine the general purpose forces requirement by another Army study group.[1] Here the group used analytical techniques rather than gaming; these permitted rapid evaluation of large force engagements throughout the theater.

Although gaming gave reliable quantitative answers to various aspects of an airmobile operation -- particularly those problems relating to deployment, speed of inter-theater movement, character and quantity of lift requirements -- no examination was really exhaustive and time limitations required a number of shortcut techniques which resulted in aggregating results on a rather gross basis. In addition, the generally unprecedented character of airmobile combat made particularly difficult the examination of actual unit-to-unit engagements and what amounted to unit or weapons exchanges. Historical and experience factors are not reliable when the character of combat departs substantially from previous experience. Much of the work had to be done on a pretty subjective basis.

Another weakness was that in many cases examinations were one of a kind. A single test cannot be claimed to establish a very broad base of confidence in the findings. We must acknowledge that the war gaming initiated this summer is incomplete in scope and method, and should therefore be continued and refined until the most accurate answers, practicably to be expected, are provided. Unquestionably the process will serve to steer us away from blind alleys in tactics and technique.

(U) Operations Research

In addition to furnishing individual analysts, the Research Analysis Corporation (RAC) and Technical Operations Incorporated (CORG) contributed studies and analyses used extensively by subcommittees of the Board. RAND Corporation and the Stanford Research Institute furnished several analysts and scientists for consultation and evaluation of subcommittee activities. Their efforts were most beneficial.

1 - Conventional War Forces 1967, ODCSOPS (1D5970300)

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(U) Assistance from Senior Officers

The Board dispatched some 400 letters to ranking, experienced officers, active and retired, setting forth the problem and asking for suggestions and opinions. The response was strong, indicating great interest. Short quotations from a very few of the replies are interspersed within this report, but advice was taken from many officers not quoted.

(U) Technological Forecast[1]

The Board asked a group of experts to review prospects for the period 1963-1975. The resulting Technological Forecast was considered carefully in the development of concept and during preparation of the report.

(U) Contributions of Industry[2]

Over 300 letters were dispatched to interested firms of the airframe, engine, electronics, and armament industries, again asking for suggestions. From the nearly overwhelming response much benefit was derived by the Board and more will be derived by Combat Developments Command and the Research and Development Office of the Department of the Army. Industry is intensely interested in Army aviation developmental efforts, and stands ready to devote very great resources to that endeavor. The Board had to reject numerous offers of briefings.

A large variety of suggestions were received, ranging from modifications of existing equipment to novel devices for improving the Army's effectiveness in critical combat functions. Suggestions and ideas covered reconnaissance, surveillance, target acquisition, maneuver, firepower, logistical support and command and control.

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1 - Appendix 11, Technological Forecast to Annex I, Long Range Concepts and Requirements

2 - Annex P, Industry Inputs

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(C) Logistics Studies[1]

A selected team of Army logisticians, together with a civilian advisory panel representing twelve different civilian aircraft manufacturers and agencies, made an extensive survey of the present Army aircraft logistical support system to appraise its ability to support current aviation and the potential of the system for satisfying expanded requirements. Additionally investigations were made in the fields of theater logistics, the general economics of air and surface transportation, petroleum distribution, airdrop methods, materials handling equipment, airfield construction criteria, vulnerability of surface and aerial lines of communication (ALOC), organizations and communications demands for an ALOC, medical support, uses of strategic lift in theater resupply, deployment patterns of Army aircraft, air transportability, the use of aircraft in the reduction of depot stocks, troop support requirements, and the planning factors involved in the studies themselves.

(C) Southeast Asia Visit[2]

Selected members of the Board visited the several nations of Southeast Asia to obtain an appreciation of the possibilities for Army aircraft employment under the Board's newly developed concepts. Their visit had the benefit of assuring that the Board's solutions were of a nature which could find application in the area.

(S) Special Warfare[3]

In support of the Board's analysis of concepts and requirements, a war game was conducted by the Special Warfare Center at Fort Bragg. Set in Thailand, the game included the play of all elements of a Special Warfare Task Force with the aim of placing aviation support in perspective.

1 - Annex L, Logistics Concepts and Requirements

2 - Annex B, Report of Southeast Asia Visit

3 - Annex J, Special Warfare Concepts and Requirements

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Three phases were played: deployment to Thailand, advice and assistance to indigenous forces countering incipient and low intensity insurgency, and intensified assistance to indigenous forces committed in combat against insurgent elements employing terrorism and guerrilla warfare. Results of the war game provided a reasonably valid basis for determining the basic requirements, capabilities, and limitations of supporting Army aviation.

(C) Loading Studies[1]

A detailed item-by-item aircraft loading study was completed. It demonstrated that strategic air deployment of airmobile formations required substantially less lift than ROAD counterparts. As a prime example, in a move to Europe an airmobile division requires only half the strategic airlift required by a ROAD infantry division.

(S) Force Effectiveness Study[2]

The objective of the force effectiveness study was to assemble the evidence developed by the Board and relate it to principal combat and combat support functions and units for assessment of comparative unit effectiveness. For this a list of comparative advantages and disadvantages of airmobile forces was developed from reports prepared by the various groups designing the proposed units and through interviews with key members. A detailed survey was made of pertinent evidence obtained from field tests, computer and manual war games, analytical models, operations analyses and observations reported from Southeast Asia. The weaknesses of each test system were acknowledged in the evaluation process.

Three sets of comparisons were undertaken:

- Air Assault Division vs ROAD Infantry/mechanized Division;

1 - Appendix 16, Strategic Airlift Requirements, to Annex K, Tactical Concepts and Requirements

2 - Inclosure 4, Force Effectiveness Summary

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- Air Cavalry Combat Brigade vs Armor Group; and

- Air LOC vs Ground LOC (from strategic unloading point to division base).

Each set was then analyzed relative to three conflict situations in the FY-1964 to FY-1968 period: against guerrillas, against an unsophisticated but conventionally organized enemy (e.g., Communist China in Southeast Asia), and against a sophisticated enemy (e.g., the USSR in Europe).

Combat unit comparisons were made in the fields of mobility (maneuver and surprise), surveillance and target acquisition, fire-power, communications, vulnerability, logistic support, and unit maintenance.

The results of the force effectiveness study are presented in Section IX following.

(C) Continuation of Airmobility Studies and Tests

The recent activation of a Combat Developments Command (CDC) recognized the need within the Army for a central agency to develop combat doctrine and organizations. Accordingly, the Board established close liaison with CDC from the outset and has made available to CDC its methodology, test data, and standing operating procedures.

It is anticipated that the momentum of experimentation will be continued under CDC on a scale adequate to insure an orderly transition to the new concepts and doctrine.

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(S) III. THE REQUIREMENT FOR MOBILITY

(S) Fundamental Considerations

The theoretical requirement is so evident as to need little proof, but it is, nevertheless, necessary to examine the requirement with some care.

In battle between sophisticated opponents, improvements in firepower (in terms of missiles, guns, tank-killing weapons, vastly more effective warheads, and improved chemical and biological and nuclear weapons) have outstripped concurrent efforts to improve the cross-country mobility of the combat and logistical forces. If mobility does not match firepower, we cannot properly exploit the effects of our firepower on the enemy, nor ameliorate and otherwise cope with the effects of enemy firepower on ourselves. Even so, cost and other considerations led the Board quickly to the conclusion that not everything can or should be made completely mobile, whether by ground or air means: the principle of selective mobility must be accepted together with the corollary that what one makes mobile at high cost must be worth the effort and expense.

In Western Europe, a special combination of political and other circumstances influence the manner and degree to which airmobility can be exploited. The opposing armies are already deploying for battle, removing one requirement for mobility; the fact that the largest segment of the NATO ground force is German makes psychologically necessary a plan that the shield will stand and fight; and finally, the terrain is fairly traversable by ground vehicle. On the other hand there are still many obstacles to ground movement on the terrain; the Soviet forces will presumably have the initiative, at least in the beginning; and they have a strong preponderance in the major tools of surface combat mobility, the tank and the self-propelled assault gun. In these circumstances an improved capability for the detection and delay of the initial onslaught by the forward fringes of the shield -- the armored cavalry regiments -- appears very necessary, as does a capability for the field army to deploy, with great rapidity, an effective counterattack reserve strong in anti-tank weapons.

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If tactical nuclear weapons and chemical munitions enter the battle additional premiums will accrue to the side possessing the flexibility and mobility inherent to airmobile forces -- which of all forces will be most able to surmount the formidable artificial obstacles characteristic of such a battlefield and react most rapidly to unexpected situations.

The senior Army commanders in Germany, however, do advise a cautious schedule of conversion to airmobile units.

As respects combat against irregular forces in developing areas (Southeast Asia and Central Africa) an even stronger case may be made for airmobility as an essential ingredient of success. In the circumstances existing and likely to exist there surface mobility is very often that of a marching soldier, and the guerrilla -- locally acclimated, lightly equipped, and able to fade easily into the countryside -- must be credited with a foot mobility and an elusiveness greatly exceeding that of his regular soldier opponent.

We must obviously exploit the products of modern science to redress the imbalance, and since the terrain and the nature of the fighting give little hope of doing it by ground vehicle, we must, for much of our tactical movement, take to the air. As respects supply, in the local circumstances, it is enough to say that the doctrinaires of guerrilla warfare maintain that regular forces can be made to employ the major part of all their combat forces to guard surface lines of communication, and even then the irregular will find multiple opportunities for the successful ambush of his opponent's supply columns.

In combat against identifiable, uniformed forces (e. g., the Chinese Communist Army) in areas such as Southeast Asia the products of science must again be made to counter the effects of great enemy numerical superiority. Certainly much attention must be devoted to firepower, but inasmuch as mechanical surface mobility has small chance by reason of the terrain to outstrip enemy foot and animal transport, the air again offers the greatest chance to achieve superiority.

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(S) Selected Situations - Korean War

Whatever the circumstances of combat, the advantages of tactical mobility -- and the surprise which usually can be depended upon to result -- are vividly matched by the penalties which have attended deficits in mobility. Every soldier of any combat experience can look back over his own adventures to discover multiple instances in which the availability of light aircraft would have turned defeat, frustration or indifferent success into thumping victory. The importance of this sort of examination should not be underestimated. Below are cited very briefly three of a large number of situations in which light aviation would have had the most telling influence on the Korean War.

- In the very early days US units and the few remaining, largely demoralized, South Korean forces were falling back rapidly before the advancing North Koreans. The tactics almost invariably employed by the enemy were those of rapid envelopment, via the surrounding hills, of each US-established delaying position. For lack of what General Gavin calls "eyes", the envelopments could not be detected; the result was that the US unit either withdrew prematurely, to the benefit of the enemy, or had to fight its way out of a trap against the ambushing fire of a hostile force emplaced across its line of withdrawal. Light aviation units could have (1) detected and (very often) blocked the envelopment, (2) charted and protected a safe route for a unit that became, in spite of the blocking effort, encircled, or (3) lifted the unit out if, as a last resort, that had proved necessary. The result would have been a vastly more effective operation.

- When the amphibious landing was made at Inchon the 1st Cavalry Division, located in the Pusan perimeter, thrust northwest to link up with the beachhead. The effort, commended at the time as a very laudable one, took five days, in consequence of which the take in prisoners was very disappointing. A division made properly airmobile could have blocked all principal routes of withdrawal between the perimeter and the beachhead within perhaps eight hours, with the consequent prospect of bringing to bay most of the North Korean Army.

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- After the link-up, a period of 28 days was necessary to move the forward edge of the UN forces to a line which averaged about 60 miles south of the north border of Korea. Airmobility of the type visualized by this report could have moved strong elements to seize key positions astride routes of communication -- some at key points on the north border -- within a very few days. It is a matter of speculation as to what the results of this might have been, but it is at least possible that the Chinese Communists (who must have decided to intervene only after the initiation of the successful UN offensive in the south) would not have attacked across the Yalu if its south bank were defended by our forces. Hence the struggle might have ended altogether at that time.

Parenthetically, it may be pointed out that the US offensive started on 24 November was hailed as one "to get the American soldier home by Christmas" -- yet within two days the UN forces were opposed by and retreating from overwhelming numbers of Chinese that had moved, largely undetected, into the area immediately confronting them. Air Cavalry, had it existed, must surely have discovered and delayed this enemy force; our army was blind.

(S) Analysis of Contingency Operations

An analysis was made of the comparative effectiveness of conventional and airmobile operations in the possible execution of one of the most important, thoroughly worked out current STRAC contingency plans.

The 101st Airborne Division developed a subordinate plan for the execution of the division's mission (in the actual plan) under the assumption that Army aviation would be available in optimum quantity. The resulting study is TOP SECRET and is available to authorized persons on a need-to-know basis at Headquarters XVIII Airborne Corps. The results summarized here are within the SECRET classification.

The weather, terrain and enemy's lack of mechanization renders the contingency situation highly suitable to airmobile operations. Seizure of key terrain features by a series of airmobile assaults would, it is believed, result in the rapid deterioration of the enemy's armed forces and the collapse of organized resistance. Operations analysis concluded that the assigned mission could be accomplished in four days using the airmobile concept in contrast to the seven days visualized in the current plan.

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Total support comparison for the two plans are indicated in Table I.

TABLE I

ITEM	CURRENT PLAN	AIRMOBILE PLAN	PERCENT CHANGE
Number of Personnel	38076	29168	- 23.4%
Number of Vehicles	12935	7041	- 45.6%
Number of Aircraft	87	374	+ 329.0%
Short Tons of Supplies	55340*	24820**	- 55.1%

(* Current plan supply factors based on seven day operations.)

(**Airmobile plan supply factors based on four day operations.)

Readily apparent are the large reductions in vehicles and supplies and a significant reduction in personnel. The 329 percent increase in aircraft, while apparently large, is considered nominal in view of increased effectiveness and other support reductions. Reductions were possible for these reasons:

- Minimum surface LOC was required.

- Water terminals were eliminated on D+2 after troops and equipment were landed.

- Surface transportation units were significantly reduced.

- Logistical depots were eliminated.

- Engineer support was restricted to combat support operations and limited maintenance.

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- Other surface logistical installations were eliminated through use of the aircraft carriers as bases.

Surface shipping required to support the operation was reduced, by careful study by the qualified logistical command, as indicated in Table II.

TABLE II
SURFACE SHIPPING REQUIREMENTS

TYPES	CURRENT PLAN	AIRMOBILE PLAN	PERCENT CHANGE
Commercial Ships	68	50	- 26.5%
Comet and Taurus	10	4	- 60.0%
LST's	28	18	- 35.0%
Troop Transports	13	7	- 46.2%

Note: Current plan is based on seven day operation - airmobile plan is based on four day operation.

The contingency plan study should evaluated in light of the fact that it was developed by staffs intimately acquainted with the details of actual plans which they are prepared to execute.

Lieutenant General Gavin, the Ambassador to France, wrote this to the Board: "If there is one thing that stands out clearly in all recorded history of man's military endeavors, it is that innovation is essential to survival and is usually decisive in battle.....Regardless of the weapons system employed, but assuming it is employed with reasonable intelligence and direction, the final criterion of effectiveness is the product of both firepower and mobility. These may have exponential values, and in fact, the mobility part usually does. It is in a thorough exploration of the field of mobility, and the application of the knowledge gained, that we will find the greatest possibility for innovation in the future.

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....."The demand for this form of mobility may be quite staggering..... but if the Soviets develop their forces along these lines and match them with tactical nuclear firepower, they will not only defeat us in all guerrilla action but drive us like chaff before the wind in general conflagration....."[1]

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1 - Lt Gen James M. Gavin, USA-Ret - Ambassador to France
Letter to Board President, 18 June 1962

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(C) IV. RESPONSE TO THE REQUIREMENT

(C) Basic Precepts and Their Application

After some weeks of work the Board accepted the following propositions as fundamental to the problem of how to achieve greater mobility, and hence combat effectiveness, in the Army:

- The Army is not now equipped to meet fully the requirements of battle either against major Soviet forces employing the weapons and equipment already available to them, or against less sophisticated forces operating in very difficult terrain.

- Quantum increases in ground mobility are not to be expected regardless of the effort devoted to the purpose.

- Major advances have been made in light aviation - particularly helicopter design and performance - in the last 20 years, and the field is a viable one. Aggressive research and development in ordnance, avionics, and communications will materially reduce current limitations in the operation of Army aircraft. A minimum number of aircraft types will reduce price and improve maintainability.

- An improved deployability of Army combat units reduces strategic and contingency reaction time.

- Air-delivered firepower by the several services must be complementary. (This matter is discussed further in Section VIII, Joint Considerations.)

- Reliance must be placed on other services for inter-theater sea and air lift, and as much intra-theater airlift as practicable.

- The combat effectiveness of our forces is affected directly by the flexibility and responsiveness of supporting logistic forces. Logistic considerations impose tyrannical limitations on the will of the commander.

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- In all modern warfare lines of communication are subject to serious interdiction by guerrilla action, and this is particularly true in counterinsurgency operations.

- Adherence to a modular or building-block principle permits better operational flexibility of combat units.

- The application of airmobile force requires close coordination of action by supporting means, e. g., other assault elements (if used), attack aircraft, and artillery.

- Airmobile firepower (fixed and rotary wing attack aircraft, air transportable artillery) must be closely integrated into conventional and airmobile combat unit structures.

- Conversion of selected ROAD divisions to air assault divisions places primary reliance for mobility on the shuttle use of air vehicles.

- Continuation, essentially unchanged, of other ROAD infantry, armor and mechanized divisional organizations is required. However, their combat effectiveness (and that of the armored cavalry regiments) can be further improved by the addition of modest quantities of aircraft.

- Conversion of both airborne divisions, which now serve a most important role as contingency forces, to air assault divisions, makes them suitable also for extended utilization in combat against either conventional or guerrilla forces. The parachute capability is retained. Delivery of personnel and equipment by parachute and airlanding is not inconsistent with airmobile organization and tactics.

- Creation of air fighting units (air cavalry combat brigades) provides the Army with forces which are fully airmobile. These open only partially explored but very promising new fields of tactical application.

- Creation of supporting aviation units at corps or higher level permits reinforcement of the mobility means available either to airmobile or conventional formations.

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(C) Tactical Concepts

The concept of airmobility wants careful presentation. As stated elsewhere it is the Board's intention to provide that mobility not to all formations equally but to a selected few, which shall thereby acquire new capabilities to complement the more normal ones of the other parts of our Army and, as well, those of allied foreign armies.

Mobility implies far more than speed: "Mobility means quick decisions, quick movements, surprise attacks with concentrated force; to do always what the enemy does not expect, and to constantly change both the means and the methods and to do the most improbable things whenever the situation permits; it means to be free of all set rules and preconceived ideas." The German general just quoted goes on to say, "Let us kill stereotyped things, otherwise they will kill us."

One usually gains an advantage only by paying a penalty. Airmobility certainly does not come free; it must be paid for by money (to be discussed later) and paid for tactically in terms of all-weather staying power. It is the opinion of the Board that the gain is well worth the penalty -- if we proceed selectively.

A unit provided mobility by air will be able to execute many combat tasks far better than a unit not so equipped, and it can accomplish other tasks that a conventional unit could not attempt at all. An immediately apparent benefit is the effect this will have on the enemy troop dispositions. Because the enemy must take into account the greater reach of our airmobile forces and the comparative ease and speed with which they may cross natural and artificial obstacles -- plus their ability to "change both the means and the methods, and to do the most improbable things" -- he must thin out his array of offensive or defensive strength in front in order to protect rear areas and installations and routes heretofore practically invulnerable to our attack and seizure.

The United States is faced with the possibility of fighting one or more of four varieties of hostile ground forces:

- A modern army (the Soviet, reinforced by European Satellite armies) whose primary characteristics are great size, a large inventory of heavy combat vehicles and artillery, and a capability to employ nuclear and chemical weapons.

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- An Oriental army (Communist Chinese, Vietminh, North Korean or a combination of two of these) characterized by large size, relative unsophistication, great foot mobility, and an association with the area not enjoyed by US forces.

- Insurgents, such as the Viet Cong, who achieve strength not from modern weapons but from foot mobility, elusiveness, difficulty of identification, surprise, and the sympathy or fear of the local populace.

- Other forces (African, Middle Eastern, Latin American) likely to resist the execution of existing STRAC contingency plans.

In Europe the already mentioned circumstances which make commanders there reluctant to sacrifice any strength in the shield -- circumstances which include the political unacceptability of any plan to withdraw very far before the Soviet onslaught -- have forced the Board to a solution which provides for units stationed there a lower than average degree of airmobility.

The exigencies to be faced in a tactical nuclear and chemical war are almost altogether a matter of guesswork, expert and inexpert, because of the complete dearth of experience. The ability of airmobile forces to cope with the problems is unknown, but these forces do at least offer the possibility of being able to react to emergencies and opportunities much more rapidly than can ponderous ground-bound formations, and by reason of their flexibility and elusiveness they will present less lucrative targets to enemy area weapons. Airmobile forces will be uniquely capable of exploiting the effect of our warheads on the enemy, for they will have the greatest possible chance of negotiating the multiple artificial obstacles likely to be present on a nuclear and chemical battlefield -- radioactive areas, defiles made impassable by nuclear destruction, areas contaminated with chemicals, tree and building blowdown which may block long stretches of roads, and blown river bridges.

In such a war an attack cannot be preceded by an assembly of assault forces in strength in what we used to call attack positions, for such concentration will invite wholesale destruction. Notwithstanding, the requirement is still to produce sufficient force at the proper place with the best possible timing.

The solution must lie in mobility. Some portion of the attacking infantry can, of course, move by surface means to a position from which it can jump off in attack. Armored elements (tanks and infantry) can use their own means. Helicopter-borne infantry, originating from positions well to the rear (say twenty-five miles) can be delivered rapidly and with very precise timing to any given area. This affords such a force great latitude in the selection of the point of thrust against the enemy and enhances greatly the possibility of surprise. The ability of the helicopter to cross obstacles (including enemy defenses, temporarily neutralized) affords latitude also in the direction of thrust, a factor of the utmost importance.

In offensive operations airmobile forces in some circumstances may execute shallow penetrations of the enemy defensive area, moving by a natural corridor (e.g., around a sea-flank, over unoccupied or lightly occupied terrain, or over mountains or swamps) or an artificial one (e.g., terrain compartments dominated by our supporting fire). These penetrations may be designed to seize positions in the enemy secondary line of defense, or dominant terrain not occupied by the enemy but important to our over-all scheme of maneuver, or critical points such as key crossroads, communications centers and supply dumps. The actions may be executed in conjunction with conventional surface attacks.

In the course of a general retrograde movement, airmobile units should be uniquely capable in the delay of very strong armored thrusts by reason of their ability to ambush enemy columns, on roads or off, and the freedom they allow supporting engineer forces in the demolition of bridges, culverts and roads, and in laying mine fields -- for these barriers may be established without the vast complication of making sure friendly forces are on the correct side before execution. Helicopters can scatter antitank and antipersonnel mines in quantity in the immediate front of enemy spearheads, and by means of their target acquisition ability may direct the most effective employment of artillery and missile fires. In the fluid circumstances to be expected in the first few days after the initiation of a major war they will find multiple opportunities to destroy enemy personnel and materiel by means of surprise and ambush.

In defense, during an atomic and chemical war, an airmobile unit may act as a reserve, either to fill a gap or gaps inflicted in our general defensive array by the enemy weapons, or to counterattack

penetrations. It will have very considerable capabilities for short-range reconnaissance, and the communications necessary to bring down onto the enemy the conventional and nuclear fires available. If circumstances can be made propitious by the use of our own area weapons the airmobile unit may make penetrations into enemy occupied territory.

If hostile high performance aircraft are unimpeded, Army airmobile forces will be very vulnerable to their attack - but no more so than are surface transported forces. When enemy fighters are active airmobile operations should be confined to those executed at night or under low cloud ceilings, or in good weather and daylight to those areas where the HAWK missile can provide protection for them; this protected area may be reasonably assumed to extend at least 10,000 meters beyond the line of contact, which will provide an area amply large for the great majority of airmobile operations against a modern enemy force. If a successful REDEYE can be brought into production it will be an excellent weapon to accompany airmobile forces.

Shooting helicopters are already in the Soviet inventory and it is inevitable that helicopter-vs-helicopter duels will occur. 7.65mm and 20mm machine guns, believed by the Board to be very necessary for attack helicopters, will undoubtedly be effective weapons in this role, and the possibility of air-to-air action also underlines the desirability of developing a special weapons helicopters, also recommended in this report.

Airmobile forces will be able to hold sectors of the front, with unusual ability for the execution of the principles of mobile defense. They will suffer somewhat, when nuclear warheads are not available, by a partial lack of indirect firepower, but this weakness will be largely balanced by the ability to apply airborne firepower in very heavy quantities, with surprise, on targets of opportunity.

However, the force provided Europe in our recommendations is grossly insufficient in size to substitute adequately for the armored and mechanized divisions should they be destroyed or neutralized by enemy action. In the event of a tactical atomic war, which will presumably reach catastrophic proportions, at least locally, the real source of airmobile ground force must be the Continental United States. The units are relatively easy to deploy, and hence may

reach Europe comparatively quickly -- possibly in advance of the initiation of hostilities. If the initial states of a nuclear war in Europe should not be decisive airmobile forces so deployed may be able, after a time, to conduct the counter offensive.

The foregoing obviously contains generous amounts of speculation. The Board also admits the weakness of any compromise solution, which in this case however must recognize the inhibitions respecting the composition of our forces in Germany. The alternative we choose would provide Seventh Army a small measure of airmobility, and a reserve of airmobile formations in the United States.

It is generally true that the rougher the terrain the greater the application of tactical mobility by air. In the Middle East a great deal of reasonably maneuverable terrain (desert) is mixed with large mountainous areas that are very difficult indeed. While the ground is vastly different from that of Europe, the tactical principles just discussed would apply almost equally well. The reconnaissance, screening, and target acquisition abilities of the new forces would show an increase, the possibilities of ambush -- at least in the flat open spaces -- a decrease. Airmobile forces would be able to meet and block a sudden, distant enemy thrust earlier and therefore closer to the enemy point of departure.

The terrain of Korea may almost be said to be made to order for airmobility, consisting as it does almost entirely of rugged and difficult-to-traverse yet not very high mountains, covered usually with sparse vegetation which allows excellent visibility from above; yet between the multiple ridge fingers are narrow valleys often floored by rice paddies which allow helicopter touchdown. While the mountain ridge tops cannot be said usually to be easily accessible to helicopters, men may descend onto them by ropes, and generally without long effort, prepare landing areas. Helicopter delivered and helicopter supplied infantry will have an enormous advantage in effectiveness over an enemy who must climb everywhere by foot -- simply by being able to get there first. Scouting and target acquisition efforts should prove very productive, and opportunities for ambush will be legion. As an Eighth Army reserve (the Eighth Army consisting of nineteen Korean and two US divisions) an airmobile division would be perhaps three times as effective as a ROAD infantry division in plugging gaps in the line or in exploiting a breakthrough in the enemy defenses. It may be noted that the

enemy positions on the north of the demilitarized zone are known to be very heavily fortified and defended by large quantities of artillery; those positions may be enveloped on either flank, over the sea, by an airmobile force.

Against a uniformed army in Southeast Asia the airmobile force would derive its principal advantage by being able to traverse the terrain with great rapidity, while ground movement is uncommonly tortuous and slow. Penetration of enemy areas should prove relatively simple. Operating in conjunction with friendly local infantry forces, US airmobile divisions and air cavalry brigades may act as a general reserve for commitment in raids, to plug gaps, to delay, and to counterattack.

To counter guerrillas it is believed sound to place initial reliance on indigenous forces modernized, supported and trained to the best of our ability. However it is of course possible that our own forces must eventually be committed, and the question then is what sort of forces they should be.

It would appear that primary reliance for striking power must be placed on relatively small airmobile assault units with less mobile conventional units supplementing their efforts by securing the necessary bases of operations - including some fortified points deep in guerrilla territory. Less mobile troops may also be found useful in reducing guerrilla pockets created by the action of mobile forces. And finally, as areas became relatively free of guerrillas conventional forces might be needed as protective garrisons if native troops and police forces were inadequate to the job.

But a look at the record would seem to indicate that relatively immobile conventional forces alone have great difficulty combating irregulars. In most cases the guerrilla has emerged victorious, or at least unsuppressed, even though outnumbered 5 or 10 to one.

Though it would be inappropriate to suggest that conventional forces have thus proven themselves inept, it is proper to say that they have for the most part been inefficient for the lack of means to make them sufficiently mobile. The guerrilla is himself very mobile, and with the additional advantage of being able to fade into the civilian background, uncommonly elusive. To combat him successfully we need not simply to match his mobility, but to greatly exceed it.

Our greatest hope of success would appear to lie in the employment of units made up of helicopter-borne highly trained infantry, scout helicopters, and attack airplanes and helicopters.

Helicopters will find landing areas in rice paddies and jungle clearings when they exist. To cope with less favorable circumstances however we can lower men into the jungle from a hovering helicopter. Armed with cutting tools, including small power-driven saws, they can with effort prepare small helicopter pads, but this will not always be necessary. Often too the jungle offers water areas on which a suitably equipped helicopter can set down. Floats are costly in terms of weight; the Army should experiment with a raft which can be deposited by one helicopter for others to land on, one at a time.

The tactics and techniques of surrounding and destroying a guerrilla force in jungle areas need improvement. It would appear that a combination of blocking on two or three sides (a technique which demands some technical assistance in the shape of very quickly emplaceable barrier material), while driving on the other sides, would be best.

With a helicopter-borne and helicopter supported force we could at least avoid two of the major gambits of the guerrilla force. First, we need not fear the loss of our supply columns, and therefore not have to commit (as the guerrillas say regular forces must) heavy portions of our means for the guarding of our LOC. The guerrilla would also be thus denied a major source for his own supply. And second, the use of helicopters for the movement of troops would avoid the necessity of long foot marches through difficult and hostile terrain, and the guerrilla would thus be denied the treasured opportunity of ambush - the tactic which more than any other is the secret of his offensive battle success. But perhaps most important is that the initiative would pass to us.

The French, who of course did achieve a great measure of success in breaking up the guerrilla bands in Algeria - whatever their remaining troubles in that area might be - maintain that any offensive operation undertaken against a discovered irregular force had to be completed by nightfall, for the enemy, although surrounded, could not be individually engaged at night and had disappeared by

daybreak. And since the French used the helicopter effectively and extensively - it was usually the sole source of lift for the assault troops - the Board of course is suggesting little that is novel.

In its analysis of new airmobile forces, the Board examined extensively the question of "staying power" in terms of several meanings of that phrase.[1]

"Staying power" was considered in the sense that it connoted ability to hold terrain. However current advances in technology have permitted huge gains in firepower, both nuclear and non-nuclear, which negate the value of key terrain per se. Airmobile forces, freed from dependence on terrain for observation, firepower or lines of communication substitute mobility, flexibility and striking power for staying power. It permits the rapid employment of fresh troops and integrated aerial firepower with little or no need for fatiguing, costly retention of terrain in terms of wearing ground combat.

If "staying power" is defined as the ability to take punishment in combat, one must conclude that the ability to avoid punishment is more desirable. In this respect, the speed, agility, and elusiveness of a highly airmobile force offer advantages over one which has to slug it out on the ground with another ground heavy type.

On the other hand, if "staying power" means the capability to sustain a force on the battlefield, to maintain integrity, and to quickly concentrate combat power so that one's resources can be applied with such intensity in time and space as to create a superior force at the point of application, then it appears that a highly air-mobile force, despite its lightness of equipment, presents the better prospect for remaining on and carrying the field.

The question of the vulnerability of aircraft was also a continuing consideration.[2]

1 - Annex K, Tactical Concepts and Requirements
2 - Appendix 17, Annex K, Tactical Concepts and Requirements

Over-all test and other evidence showed Army aircraft less vulnerable than most previous estimates indicated. Different flight patterns, the presence of flank and overwatching aerial firepower, coordination with ground firepower, air battle drill and SOP's, very low altitude flying, evasive action, and the application of surprise all serve to reduce vulnerability to enemy air and ground action to varying extents.

Design improvement, such as adding armored protection to the aircraft and crew or the relocation in the airframe of vital aircraft components, can effect some reduction in vulnerability.

There are many items of equipment in the Army's combat inventory which, in isolation, appear to be very vulnerable - not the least of which is the individual soldier. The survival of a soldier and his equipment, whatever its form, depends on proper assessment of the threat and proper employment in the face of that threat.

(S) Logistical Concepts[1]

New operational concepts must be paralleled by comparable gains in logistical mobility. Air lines of communication (ALOC) will give the combat commander a new operational latitude; in the past tactical plans were based of necessity on the location of relatively fixed surface transport facilities. The movement of supplies by air will enable the army to replace the present echeloned-in-depth supply system with a new one providing for the delivery of supplies from shoreside depots to front line with no intermediate depot structure.

It should also make possible a reduction of 50% in the level of supplies normally carried in a theater of operations. According to the Board's estimate (based on information provided by the Deputy Chief of Staff, Logistics) the value of a day of supply for a 43,000 man division slice is $2,408,000, wherefore a reduction in theater stock levels from the normal 60 to 30 days of supply reflects a potential inventory saving of $72,240,000 per deployed division. Moreover, according to the Quartermaster Board

1 - Annex L, Logistics Concepts and Requirements

supplies being transported to combat units in the present system are handled, on the average, seven times. With the new system it should be possible to reduce the number of handlings to three. Each time an item of supply is handled, nothing is added to its value but much is added to its cost.

The studies of four world areas (Europe, Northeast Asia, Middle East, and Southeast Asia) as outlined in Situation II of the Conventional War Forces 1967 Study (ODCSOPS I D 5970300) revealed that the delivery of supplies by air in Southeast Asia and the Middle East was almost mandatory since surface lines of communication are either grossly insufficient or so extremely vulnerable that dependence upon them would be foolhardy. The employment of an ALOC also permits reduction in combat support personnel.

On the other hand, use of a complete ALOC in Europe generates an increase in requirements for personnel because the ground LOC makes extensive use of railroads operated by indigenous civilians.

The degree to which air transportation can be substituted for surface depends upon the types of units supported as well as the area of employment. While air transportation can be used to greatest advantage in the support of airmobile forces, it is less effective in supporting mechanized and armored units. Fortunately, in Europe, where the use of armor is planned, there are extensive ground facilities for an LOC.

Air lines of communication extended to service the forward combat units require a variety of aircraft. The C-130 and other aircraft in the present or projected Air Force inventory will be required to accomplish intra-theater movements from off-shore bases such as Okinawa or Japan to Korea, and can also make wholesale movements from the shoreline forward when adequate landing fields are available. In the combat zone speed and range are of less importance than a capability to operate continuously from marginal, hastily prepared fields. The combination of C-130's for wholesale movements and Army aircraft (HC-1 Chinook and AC-1 Caribou) for retail deliveries offers an acceptable solution for the present. The cargo snatch technique discussed in Annex L may well increase the feasibility of using C-130 type aircraft in more advanced areas.

The use of Army Medical Service helicopters and ALOC aircraft will permit intra-theater evacuation of all casualties by air. The casualty rates of the Korean conflict (where aeromedical evacuation was used extensively) were considerably lower than World War II casualty rates. The Korean experience implies that had aeromedical evacuation been available in all operational areas of World War II, 12,000 lives might have been saved, 43,000 crippling injuries prevented, and 1,400,000 man-days in hospitals eliminated.

The continued use of strategic airlift for inter-theater resupply, after initial deployments have been accomplished, can increase the efficiency of supply. Over and above the requirement to move emergency items (which represent approximately 5% of the dry cargo shipped to a theater) consideration should be given to airlifting items which have a high dollar value and items which have a low issue rate. So doing offers great promise for reducing the Army's inventory investment and the number of personnel required to operate overseas depots. It should be noted however that the percentage of supplies which can economically be moved by air decreases proportionately as the length of haul increases. For example, for each ton of cargo airlifted a distance of 4,000 miles, 3.5 tons of fuel and supplies must be transported by sea to support the aircraft involved. It follows that a short air line of communication over a rough (or denied) surface will show the greatest cost advantage over a ground LOC.

The Army must certainly exploit the responsiveness, flexibility, and potential for supply tonnage reduction, force reduction and inventory savings afforded by the employment of air transportation. The decision is not however an automatic one; it must be made separately for each situation. The capability to create, on short notice, an air LOC is an essential part of our readiness to react.

(S) Special Warfare Concepts[1]

It is obviously desirable that US forces possess the resources capable of fulfilling the unconventional warfare and psychological operations requirements likely to arise in every variety of war.

1 - Annex J, Special Warfare Concepts and Requirements

The Army expects to bear the major burden in meeting these requirements, particularly those relating to counterinsurgency - which is rooted in the people and the land - a form of land warfare. To meet the threat in newly developing areas we must presumably help our friends prevent the emergence of insurgency or, in the event that terrorism and guerrilla warfare already have made their appearance, to win the ensuing battle.

The Special Warfare organizational concept for the 1963-68 period, proposed by Department of the Army, entails a flexible, quick-reaction posture which avoids excessive specialization in favor of reliance on multi-purpose units within the over-all structure - forces that can be committed to counterinsurgency as well as to limited and general war. The concept provides for:

- A special warfare base in the United States.

- A number of intensively trained, skill-balanced, area oriented Special Action Forces deployed in those areas facing the threat of subversion and insurgency (Asia, Latin America, Africa, the Middle East and Europe). The primary mission of these forces is to advise, train and assist indigenous armed forces. Special Action Forces are capable however of undertaking unconventional warfare and psychological operations tasks in limited and general war.

- Six brigade-size forces designed to provide selective reinforcement of the Special Action Forces. These elements, known as first echelon back-up, are to contain a mix of units akin to that found in the Special Action Forces. They will be designated from divisional and non-divisional resources of the Army and receive area orientation and counterinsurgency training on a primary mission basis. They can be committed to limited and general war operations.

- Second echelon back-up forces to be designated from among the major combat and support type units of the Army. These units will provide large scale reinforcement of indigenous forces engaged in major guerrilla warfare.

In execution, Army aviation assets should be used primarily to advise, train and assist indigenous forces. In the counter-insurgency battle Army aviation should be used to provide fire support, reconnaissance, delivery of supplies, aeromedical evacuation, command and control, leaflet drop, an aerial loud-speaker capability and support of civic action. The Air Force must continue to support long-range unconventional warfare operations.

The variety of tasks which Army special warfare aviation is called upon to perform requires an unusually broad mix of aircraft, a mix which reflects the need for small, slow-flying fixed wing aircraft such as the L-28, attack and transport helicopters of the HU-1 (UH) family, versatile fixed wing transports of the AC-1 (CV-2A) type, and the reconnaissance/strike capability found in the AO-1 (OV-1). The aviation unit should possess a high degree of remote area self-sufficiency.

(C) Command and Control Concepts[1]

An extensive increase in tactical mobility through the use of greater numbers of aircraft, the increased tempo of activity characteristic of air assault units, and the extended reach of these units demand a communications system capable of positive and reliable command and control. A number of possible breakthroughs in this field are foreseen; however, in the meantime, proven equipment can perform the required tasks.

Important conceptual problems arise in the command and control of airmobile operations.

- Primary emphasis on signal communications within airmobile forces will be placed on responsive and reliable point-to-point radio links, links which must ensure that the commander can affect directly the actions of his subordinate commanders and, in turn, be kept informed. Lateral communications will be of near equal priority. Secondary (but considerable) emphasis will be placed on general support communications to logistics echelons.

1 - Annex R, Communications and Electronics

- Air to ground tactical communications will rely on VHF FM aircraft avionics with a "command from the air" capability added by the high frequency single side band radio. The employment of HU-1 (UH-1) Iroquois helicopters will provide the commander with a versatile flying command post. Use of switched communication service from an aircraft to the Radio Center AN/USC-3 subscriber stations was successfully demonstrated during Board field tests.

- Air traffic regulation will be the minimum essential for expeditious aircraft movement. It will normally be employed only during instrument weather and at such other times as air traffic separation is required. Provision is made for an air traffic regulation and identification (ATRI) company at corps level, with flight operation centers (FOC) located at corps and division base areas. Air traffic will not normally be regulated below brigade. Control of aircraft below brigade will be the responsibility of the air assault force commanders.

- The Army concept of tactical navigation in combat areas is sufficiently different from the other services, by virtue of land combat support mission requirements, to warrant a new approach. The only common usage navigational system that can be made available to meet Army requirements for 1962-1968 is the Position Fixing and Navigation System, AN/GRN-14 commonly referred to as PFNS. Any number of aircraft, ground vehicles or individuals properly equipped can use this system simultaneously for navigation and position information. Self-contained navigation systems with desirable weight, size, and accuracy/reliability ratios are expected to become available to a limited extent by 1967-1968.

There are other control problems which need only be listed here:

- Compatibility of control of airmobile operations with control of air defense nets operated by the Army (MSG-4), the Marines (MTDPS) and the Air Force (GPA-73). The identification of friend or foe (IFF) is a major component of this problem.

- Adaptability to a heavy electronic countermeasures (ECM) environment.

- Rapid processing of reconnaissance information.

- Use of computers in the quick readjustment of flight orders, in air traffic control, and in priority assignment of messages according to link and relay point capacities.

- The interaction of Army command nets and those of other services and indigenous forces in joint and combined operations.

It is anticipated that the Army philosophy of assigning aircraft to the lowest level of command where there is a continuing need for these aircraft will be continued in the new organizations. Adequate safeguards will insure the most efficient use of available equipment and the proper employment of aircraft.

Due to time limitations the Board did not attempt to cover possible revisions in presently established joint doctrine regarding control of aircraft and airspace.

(S) V. ORGANIZATIONS AND CAPABILITIES

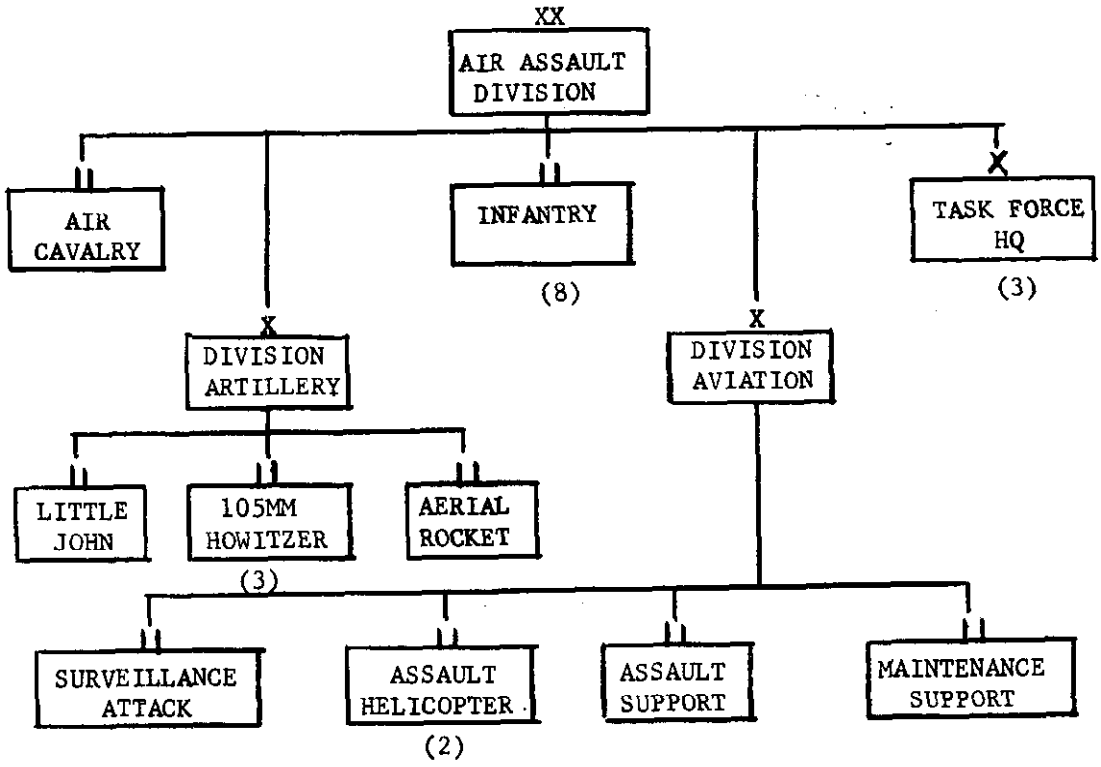
(U) Tactical Organizations

The war games indicated airmobile formations of division size may be employed to great advantage. Their use permits rapid accomplishment of the mission, or alternatively time may be traded for numbers of units, a smaller airmobile force accomplishing the same task as a larger ground organization. Divisional organizations of approximately 14,000 men were examined with aircraft mixes totaling 250 to 1400. An optimum combination, at the present state of the art, was judged to be between 400 and 600; substantially fewer aircraft could not provide the lift and accomplish the missions which should be assigned to a force of that size, while substantially greater began to reduce mobility through the increased requirements for support, control, and particularly for protection of the aircraft bases. As the war games were conducted in progressively more sophisticated areas, the requirement for increased firepower showed that a mix of airmobile and standard ROAD organizations gave the optimum combination. In newly developing areas ROAD units provided a desirable augmentation to base security forces.

(C) Air Assault Division

The Army division is a well established basic unit, being the smallest organization which encompasses all combat arms and services and which, when proper administrative support is provided by higher echelons, is capable of sustained independent operation. It is a traditional unit, thoroughly understood; and its name and honors should be retained regardless of modern reorganizational concepts. This has been done with the new "Air Assault Division" which captures the opportunity for increasing tactical mobility in the battle area through the use of helicopters.

FIGURE I. THE AIR ASSAULT DIVISION



The division will have:

80 Command and Maintenance Helicopters* (OH & UH Types)

6 Fixed Wing Reconnaissance Aircraft (OV Type)

48 Observation and Target Acquisition Helicopters* (OH Type)

24 Fixed Wing Attack Aircraft** (AV Type)

87 Attack Helicopters** (AH Type)

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154 Tactical Transport Helicopters* (UH Type)

48 Assault Support Helicopters* (CH Type)

12 Air Ambulances (UH Type)

459 Total

* Armed with light automatic weapons

** Armed with effective anti-tank or anti-personnel weapons and heavy quantities of ammunition

The air assault division is designed as a collection of type forces which can be arranged quickly into task forces of the size and composition required by the mission. In a theater of operations an airmobile force of division size would be part of a unified command, or a joint task force. Subordinate elements of the division, brigade task forces, may operate out of advanced bases supplied by divisional transport aircraft roughly 100 kilometers forward of the division base. Smaller forces - battalions or companies - would operate at distances of 25-35 kilometers from the brigade base.

To decrease the problem of providing the proper degree of airmobility, combat elements have been relieved, so far as practicable, of every responsibility for support, whether combat support or administrative. These responsibilities are placed on the shoulders of the combat support and combat service support elements, and a high standard of performance may be demanded. Light rifle companies are essential to the concept of airmobility.

In the air assault division each of the essential elements of striking power are present: maneuver forces, reconnaissance, firepower, communications and support. By reason of its facility for task force composition in a wide variety of strengths and with a much reduced response time, the division has the capability for striking a number of widely dispersed targets. Organic air reconnaissance and fire support will permit execution of completely integrated airmobile task force missions.

The provision of aircraft to lift one-third of the combat elements means that the entire division can be committed by air: after one-third is put into combat, the second third may (after only a very short interval) be committed by a second lift;

and the last third may be held in reserve, the aircraft standing by for lifting it on division order. Air transported artillery and mortars permit continuous prosecution of the land battle at night and during non-flyable weather.

The new division represents a rapid acceleration of the ROAD tailoring concept, although considerable organizational surgery was necessary to switch reliance for mobility from ground to air vehicles. The proposed structure has only 1113 ground vehicles as compared with 3452 in the ROAD infantry division. Vehicles retained consist mainly of the lighter air transportable type. Most of the heavier surface transportation still in the division will be used in base areas for logistical and administrative support.

ROAD infantry units are heavily loaded with support equipment, a rifle company having 12 vehicles. The Board proposes that in the new organization rifle companies be relieved of all burdens except those of fighting the battle, the responsibility for combat support and combat service support being pushed as far back in the organization as possible with the division commander insuring that assistance and supplies are delivered when and where needed. The rifle company will employ only direct fire weapons; mortars, ground surveillance radars and anti-tank weapons are centralized at battalion.

The infantry battalion is dependent upon the aviation brigade for tactical airlift. The battalion structure is essentially unchanged from ROAD except for the formation of a combat support company which provides all crew-served weapons and teams to assist the rifle companies. The battalion relies on higher headquarters to provide mechanical mobility, artillery fire support and supply.

The equipment and vehicles of the artillery units of the division are also reduced. Within the artillery brigade each of three direct support battalions has eighteen 105mm howitzers. The current M2A2 howitzer, stripped down to reduce its weight, can be effectively employed until XM102 is available. The loss of the 155mm and 8 inch howitzers in division artillery is

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compensated for by the provision of an aerial rocket battalion of 36 HU-1B (AH-1B) helicopters carrying 96 2.75" folding fin aerial rockets (FFAR) each, the battalion fire capability being 2,592 rockets per mission if 75 percent of the aircraft are available.

A small assault engineer battalion, using division organic helicopters for command and reconnaissance purposes, will have special capabilities in airfield construction, demolitions and mining.

To achieve best utilization of the division's aviation resources, the bulk of the aircraft is found in the assault aviation brigade. The brigade is designed so that it is capable of operating independently, and could, with virtually no modification, be deployed alone to an area such as Southeast Asia in support of indigenous forces.

The Board compared the strategic airlift required to deploy the ROAD infantry division and the ROAD airborne division with that for the air assault division and the air cavalry combat brigade. A most careful and precise comparison of airlift requirements, the study is appended to Annex K as Appendix 16, Strategic Airlift Requirements. It documents the fact that the air assault division required about 75 percent of the airlift needed to deploy the ROAD airborne division, and less than 50 percent of that required by the ROAD infantry division. In these computations advantage is taken of the fact that the HC-1 (CH-47) and AO-1 (OV-1) aircraft are self-deployable via established ferry routes, being able to close at even distant strategic terminals within a few days of the time when the remainder of the division, which is 100 percent air transportable, can complete it strategic deployment.

(C) Air Cavalry Combat Brigade

The air cavalry combat brigade requires only one-third as much airlift to deploy as the air assault division.

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[redacted]