

19951031 087

NAVAL WAR COLLEGE
Newport, R.I.

FLOAT LIKE A BUTTERFLY, STING LIKE A BEE
MIDDLEWEIGHT UNITS AND THE U.S. ARMY

by

Bradley M. Jacobs

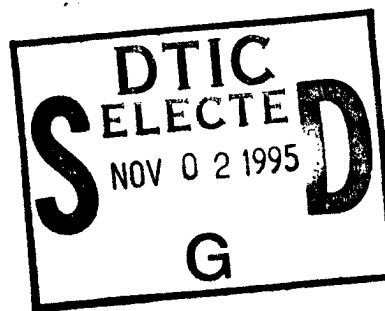
CDR, USCG

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

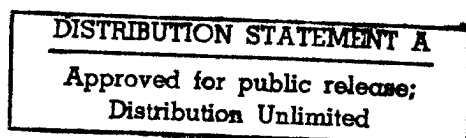
Signature:



05 May 1995



DTIC QUALITY INSPECTED 8



REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLAS			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT <i>if unlimited</i>		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION DEAN OF ACADEMICS	6b. OFFICE SYMBOL (If applicable)		7a. NAME OF MONITORING ORGANIZATION		
6c. ADDRESS (City, State, and ZIP Code) NAVAL WAR COLLEGE NEWPORT, RI 02840			7b. ADDRESS (City, State, and ZIP Code)		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (If applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
8c. ADDRESS (City, State, and ZIP Code)			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
			WORK UNIT ACCESSION NO.		
11. TITLE (Include Security Classification) FLOAT LIKE A BUTTERFLY, STING LIKE A BEE: Middleweight Units and the U.S. Army					
12. PERSONAL AUTHOR(S) CDR Bradley M. Jacobs					
13a. TYPE OF REPORT FINAL		13b. TIME COVERED FROM _____ TO _____		14. DATE OF REPORT (Year, Month, Day) 1995 May 05	
15. PAGE COUNT 39					
16. SUPPLEMENTARY NOTATION ADM Richard G. Colbert Memorial Prize (Honorable Mention)					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP			
19. ABSTRACT (Continue on reverse if necessary and identify by block number) With the end of the Cold War, the U.S. Army faces a dynamic world of shifting threats and challenges. To support the National Military Strategy of selective engagement, the Army's conventional warfare force structure must accomplish its missions of power projection, combat operations on land, and operations other than war anywhere, in any conditions, and in the face of an uncertain set of well-armed potential adversaries. Overall, none of the Army's heavy or light divisions provide a rapidly deployable but combat powerful force. Heavy divisions have tremendous combat power but lack deployability. Light divisions are deployable but lack combat power. A middleweight corps created by converting both light infantry divisions into light motorized infantry divisions and two armored cavalry regiments into light armored cavalry regiments will provide a force to fill that gap. Such a corps will be highly deployable, tactically-operationally mobile, and have sufficient firepower and survivability to successfully engage adversaries across the entire spectrum of conflict. This paper examines					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION UNCLAS		
22a. NAME OF RESPONSIBLE INDIVIDUAL DEAN OF ACADEMICS			22b. TELEPHONE (Include Area Code)		22c. OFFICE SYMBOL

19. the strengths and weaknesses, organization, and uses of such a middleweight corps.

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification _____	
By _____	
Distribution / _____	
Availability Codes	
Dist	Avail and/or Special
A-1	

TABLE OF CONTENTS

	PAGE
"FLOAT LIKE A BUTTERFLY, STING LIKE A BEE".....	1
APPENDIX 1:Equipping the Middleweight Corps	17
APPENDIX 2:Light Motorized Infantry Division Organization ...	20A
APPENDIX 3:Light Motorized Infantry Division Lift Requirements	24
APPENDIX 4:Light Armored Cavalry Regiment Organization	26A
APPENDIX 5:Light Armored Cavalry Regiment Lift Requirements ..	29
NOTES	30
BIBLIOGRAPHY	35

Standing at the threshold of the 21st century, the U.S. Army faces a dynamic world of shifting threats and challenges. The days of familiar bipolar competition with the Soviet Union are in the past. Security issues are more complex and increasingly regional in nature.¹ In this changing environment, a versatile and balanced Army with capabilities that range across the entire spectrum of conflict is essential to back our National Military Strategy of selective engagement. Today's Army does not have the full range of forces in its heavy and light conventional units to meet this requirement. The Army of 2000 needs a middleweight corps of light motorized infantry divisions and light armored cavalry regiments to provide the combat power missing in light infantry divisions and the strategic deployability lacking in heavy divisions.

To support the National Military Strategy, the Army is tasked with power projection, combat operations on land, and operations other than war.² These missions must be accomplished anywhere, in any conditions, and in the face of an uncertain set of well-armed potential adversaries. Once the sole province of highly industrialized nations, anyone from regional powers to small states may now possess sophisticated arms. There are 26 non-NATO countries with more than 1000 main battle tanks, seven with more than 500, and many others capable of fielding multi-battalion size armored units.³ It is difficult to envision a scenario in Southwest or Northwest Asia which doesn't involve significant amounts of armor. It is a near certainty that an adversary almost anywhere in the world will have some armored force.⁴ Though most of these armored vehicles are older designs

whose organization and doctrine is not equal to that of the major powers, they are still lethal threats.

Future opponents who use their arsenal of modern weapons to advance interests contrary to ours will do so rapidly. Reductions in forward deployed U.S. forces have shifted the majority of our land forces home. As such, power projection is now the primary means of deploying combat units to wherever a conflict threatening U.S. interests arises.⁵ Recognizing our dependency on the ability of strategic lift to rapidly deploy forces, intelligent adversaries are unlikely to provide us with the luxury of months to mass heavy offensive units. Indeed, they are unlikely to even allow us the few weeks presently needed to deploy a credible defensive force.⁶

In order to quickly project credible power against well-equipped adversaries, the Army needs a strategically deployable and powerful rapid reaction force. To be successful, it must operate effectively on the tactical and operational levels against forces that range from regular military establishments with sophisticated and significant heavy forces, to military and paramilitary arms of political movements.⁷ Current plans envision an active Army combat force structure of six heavy armor/mechanized divisions, one airborne division, one air assault division, two light infantry divisions, and three armored cavalry regiments by fiscal year 1999.⁸ The synergism of combat power generated by these units, measured in terms of firepower, survivability, mobility, deployability, sustainability, and versatility, will determine if the Army can meet the demands placed on it.

Armored and mechanized infantry divisions, along with armored cavalry regiments, provide tremendous amounts of firepower, survivability, mobility, and versatility in their battalions and squadrons of heavy tanks, infantry fighting vehicles, and attack helicopters. They can conduct operations ranging from sweeping armored flanking moves to dismounted infantry assaults. However, they require sealift or a phenomenal amount of airlift to move to a crisis area, take weeks to months to deploy, absorb massive amounts of supplies to sustain themselves, and have extensive restrictions on their operations in rough or constricted terrain. In most crisis situations, heavy divisions will not provide an adequate rapid reaction power projection force. The region may be inaccessible by sea, it may not have the port facilities to offload heavy divisions, it may not have the roads and bridges to support movement of heavy armor, its terrain may be unsuitable for offroad movement by heavy armor, or it may be located too far from the U.S. for significant amounts of heavy armor to arrive quickly.⁹

Despite these disadvantages, it is important to retain strong heavy elements in the force structure. Though not suitable as rapid reaction power projection forces, they are the follow-on support necessary to conduct offensive combat operations. The currently envisioned level of six heavy divisions provides the second echelon combat power essential to sustain operations and achieve military victory in an extended major regional conflict.

The 82nd Airborne Division gives the Army the ability to rapidly deploy a major forced entry unit worldwide. Airborne troops do not need secure airfields or ports for introduction

into an area. They can seize a lodgement in the face of enemy opposition to permit the introduction of the remainder of the combat force. On the ground, they have minimal logistics requirements and are easy to sustain. However, the division is restricted in firepower by the load its troopers can carry on their backs, protected only by individual body armor, and restricted in speed to the rate of a marching soldier. Once it completes the initial forced entry, it is lacking in firepower, survivability and mobility against all but the most poorly armed opponents.

The 101st Air Assault Division provides unmatched tactical and operational mobility. Using its 195 transport helicopters, the airmobile infantry can conduct far-reaching combat operations on the battlefield. Unlike most light infantry, the division has substantial firepower in its 191 attack/scout helicopters. On the negative side, the sheer numbers of helicopters attached to the division and the support train required to maintain them make it difficult and slow to deploy. Once they exit their helicopters, its light infantry battalions are restricted in mobility to marching speed. Like the heavy divisions, the air assault division also consumes large amounts of supplies to sustain itself in combat.

It is important to retain the Army's airborne and air assault divisions in the force structure for their unique capabilities. However, neither division has the right mix of firepower, deployability, mobility, survivability, or sustainability to serve as a holding force in the critical initial weeks of a crisis.

The Army's two light infantry divisions offer excellent deployability. An entire division can be moved in only 162 C-5 sorties.¹⁰ Capable of moving through rough or constricted terrain with ease, they are especially designed to conduct low-intensity conflict operations. They are also capable of carrying out zone reconnaissance, holding critical positions in difficult terrain, and securing routes of advance for heavy forces.¹¹ Lightly equipped like the airborne division, they too have minimal logistics requirements and are easy to sustain.

Possessing few heavy weapons, light infantry divisions have little firepower and are capable of prolonged engagement only against similarly armed adversaries. Even in the low-intensity conflict environments of Panama and Somalia, deployed light infantry units needed extensive adhoc adjustments to compensate for their lack of combat power.¹² Faced with the armored forces present in many regions, light infantry units are likely to be overrun long before the heavy follow-on force can arrive. Even in restricted terrain, unsupported light infantry can be defeated by the superior firepower and mobility of mechanized units as numerous examples from World War II to Vietnam illustrate.¹³

Light infantry divisions are also lacking in operational and tactical mobility. Relying on the legs of their infantry to move them about the battlefield, they cannot hope to keep up with the operational tempo of a mechanized opponent. Once the light infantry occupies a battle position it is essentially fixed in place and can be easily located and bypassed. As a result of their limited mobility, light infantry divisions cannot execute the Army's doctrine of continuous, decisive maneuver operations. The smaller Army of the future must be capable of executing

maneuver warfare from the onset of a crisis. It cannot afford attrition warfare where light infantry's lack of mobility would not be as important.¹⁴

Although it can fill some limited roles in mid-intensity conflicts, the light infantry division's design as a low-intensity conflict force has limited its applicability. It does not have the combat power to serve as a rapid reaction force capable of holding against significant heavy threat forces. Since it is not jump capable, it cannot compete with the airborne division for forced entry. Not equipped with the helicopter resources to make it airmobile, it cannot compete with the air assault division in the deep penetration role. In all but the specific event of a large-scale, long-term low-intensity conflict, its counterinsurgency role can be better performed by Special Operations Forces who are well-versed in local languages, customs, and terrain.¹⁵ With the Army facing worldwide commitments and a shrinking budget, light infantry divisions are too specialized to be effective in the broad spectrum of conflict and not specialized enough to provide a unique capability which must be maintained.

Overall, neither armored/mechanized, airborne, air assault, or light infantry divisions provide a rapidly deployable but powerful land combat force. A number of alternatives exist for creating a force to fill that gap. These alternatives include augmentation of light infantry divisions, reliance on prepositioned heavy brigades, reliance on the U.S. Marine Corps and its Maritime Prepositioning Ships, use of air power to substitute for land combat forces, and creation of a middleweight corps of light motorized units.

Augmentation of light infantry units consists of attaching additional units to the division for deployment to a crisis situation. Known as "corps plugs", these additional forces come from the pool of units normally under the control of a corps commander. As an adhoc arrangement, "corps plugs" offer the advantage of being very easy to create whenever there is a need. However, there are a two disadvantages. First, and most importantly, augmentation units do not habitually train with the light infantry forces they will support. Combat experience has shown that without such training, particularly when supporting units provide a quantum jump in combat capability, the resulting combined force will have difficulty fighting together cohesively and effectively.¹⁶ Secondly, there is no assurance that the "corps plug" units will be available. They may very well be involved in another crisis or required to support another unit.

Prepositioned heavy brigades offer the advantage of having the bulkiest and most effective equipment already in place when a crisis breaks out. Since only personnel must be flown in, strategic lift requirements are greatly reduced. However, these duplicate sets of equipment are expensive to maintain and for the most part unused. Since they are costly and provide little day-to-day use, only a few of the many potential hot spots in the world can be covered. In addition, we need the host nation's permission to access the equipment. If the host nation feels differently about the crisis situation than we do, the U.S. may not be able to get to the preposition site.

The Marines and their Maritime Prepositioning Ships have the advantage of being mobile. As long as the crisis is accessible by sea, they can place powerful forces ashore. However, only

three afloat brigade sets exist. Scattered throughout the world, only a single brigade is likely to be close at hand to a crisis. The remainder of the brigades have to transit across thousands of miles of sea. This creates a slow response time similar to that faced by Army heavy forces moving by sealift. Since the ships are costly to acquire and maintain, placing sets close to every potential crisis spot would be prohibitively expensive.

The creation of a middleweight corps offers a number of significant advantages including deployability, mobility, firepower, survivability, and versatility. Infantry and armored cavalry units equipped with light armored vehicles would be very deployable by strategic airlift. For example, eight LAV-25 light armored vehicles can be airlifted on a single C-5 versus only two M1 tanks (see Appendix 3). Having an entire brigade of infantry and light armor arriving in theater in only 56 C-5 sorties gives middleweight units tremendous strategic mobility (see Appendix 3).

Once on the ground, motorized transport gives infantry the mobility to block enemy forces whatever their avenue of approach is. It allows them to withdraw quickly under pressure rather than being overrun or bypassed. Being able to ride instead of walk also conserves the light infantry's endurance for dismounted assaults. This mobility is possible with much less consumption of fuel and supplies than a heavy division, a critical benefit in an immature theater.¹⁷

The substantial firepower available on modern light armor adds significantly to light infantry's combat power. The presence of light armor forces the enemy to mass against it, thus increasing his exposure to attack by U.S. air and artillery

assets.¹⁸ Using maneuver and covered routes, light armor can flank enemy penetrations and break up attacks with missile and cannon fire. In direct support of the light infantry, light armor can assist in its maneuver by overwatch and direct fire to destroy enemy positions and troops.¹⁹

Motorized light armored transport increases light infantry's survivability. They are protected by armor from artillery fragments which can decimate an infantry unit moving forward on foot. Having a vehicle for transportation allows them to carry more ammunition, organic support weapons, and entrenching equipment, and makes them harder to kill.²⁰

Light motorized infantry units have greater versatility than "pure" light infantry. Light armored vehicles allow them to use mechanized techniques to conduct fast paced maneuver warfare. The lower maintenance and training burden of wheeled light armor allows motorized infantry to maintain high levels of infantry skills so they can readily operate as foot soldiers.²¹ With the flexibility to operate mounted and on foot, middleweight units offer an excellent means of bolstering allied forces who are resisting an aggressor's initial advance. Their mobility, firepower, and ability to defend rough ground make them well-suited to playing the role of a "fire brigade", rapidly shifting from one area to another to stiffen allied forces until U.S. heavy units can arrive.

On the negative side, light motorized infantry costs more to create and more to operate than existing light infantry. It also requires additional funds to convert heavy armored cavalry regiments to light armor. This is an important consideration given the shrinking military budget. However, many families of

light armored vehicles are available "off the shelf."

Procurement cost would be low since the Defense Department would not need to front research and development costs. For example, equipping a division with light armored vehicles would only cost between \$280 to \$440 million.²² This is a relatively small amount of money, especially when one considers the cost of other major weapons systems. The money saved by the planned decommissioning of two heavy divisions could pay for acquisition and operation of light armored vehicles.²³

Light motorized infantry is also less deployable than light infantry. However, the penalty is not extreme, especially given the exponential increase in combat power attained. The added vehicles and support personnel to convert a light infantry division into a light motorized infantry division would only add 131 C-5 sorties to division lift requirements (see Appendix 3). In the case of the light armored cavalry regiment, it is far more deployable than a heavy armored cavalry regiment.

The light motorized infantry division and light armored cavalry regiment are definitely less capable of engaging main battle tanks than their heavy counterparts. Indeed, they are not intended to face heavy armor in a head-to-head tank battle. Instead, they must use reconnaissance, C4I technology, mobility, terrain, and combined arms attacks in conjunction with aircraft, artillery, and attack helicopters to control the battle and make the enemy fight on their terms. Middleweight units do not have to destroy an enemy armored unit. They only have to disrupt and delay the advancing armor until U.S. airpower and reinforcing heavy divisions can kill it.²⁴

A light motorized unit tasked with dual roles will have less expertise at both the armor and infantry tasks than a pure armor or light infantry unit. On the other hand, our current mechanized infantry units, equipped with the complex M2 infantry fighting vehicle, operate in both the mechanized and infantry roles. They performed very well in exercises at the National Training Center and during combat in Panama and Desert Storm. Units equipped with the less complex light armored vehicles should serve skillfully as both light infantry and light armor.

The issue of the light infantry division's superiority in forced entry, low-intensity conflict, and "operations other than war" is arguable.²⁵ Light infantry actually has very little forced entry capability since they are not jump trained as a unit. Our forced entry capability rests with the 82nd Airborne Division, the Ranger Regiment, and the Marines. In the event more "pure" light infantry is needed to immediately support a forced entry by airborne forces, light motorized infantry battalions can easily be dismounted, flown in, and have their vehicles follow later. During low-intensity conflicts, the light motorized infantry division could again be dismounted and serve the same function as the light infantry division. They would have the added benefit of being able to take along a portion of their vehicles for armored support.²⁶ During "operations other than war", a motorized light infantry unit is superior to a light infantry unit. The motorized unit's light armored vehicles provide the mobility lacking in a light infantry unit to shift troops to scattered trouble spots. The vehicles also provide increased fire power, making it a more credible peacekeeping and humanitarian assistance protection force than "pure" light

infantry.²⁷ At the same time, its substantial amount of light infantry still gives it the infantry forces needed for these operations.

The final argument against creating a middleweight corps is that U.S. air power alone is sufficient to serve as the initial reaction force. There are a number of factors which make unsupported aircraft inadequate in this role. First, land-based tactical aircraft are dependent on local base facilities. These will not be available unless taken by ground forces in a forced entry or nearby nations consent to use of their airfields. Even when a friendly nation is available, it may not be capable of supporting large numbers of aircraft. We cannot rely on the luxury of having the same access to ample, modern air bases we had in Saudi Arabia during the Gulf War. Without those air bases, the few carriers the U.S. can get on scene quickly can only generate enough combat power to inconvenience a large, determined enemy force. In addition, rugged terrain and bad weather will force aircraft to get in close to find and strike their targets. The resultant increased vulnerability to air defense systems will decrease airpower's ability to kill enemy forces and increase aircraft loss rates. Future adversaries may also wield their air defenses with more flexibility and skill than Iraq. Competent resistance, even if eventually overwhelmed, will degrade the ability of U.S. aircraft to halt advancing enemy ground forces, especially in the first critical days of battle.

In the final balance, the many advantages of a middleweight corps outweigh its disadvantages. To provide the force structure necessary to close the gap in the Army's power projection capability, the middleweight corps should consist of two light

motorized infantry divisions and two light armored cavalry regiments. They will be formed from the Army's two light infantry divisions and two of its three armored cavalry regiments. This force structure allows deployment of one light motorized infantry division and one light armored cavalry regiment to a major regional conflict while keeping the same capability on reserve. The reserve can react to a second near simultaneous conflict or reinforce the initial force.

Brigades that vary in composition will form the light motorized infantry divisions (see Appendix 2). One brigade will consist of one assault gun battalion and two light armored infantry battalions. A second brigade will consist of one assault gun battalion and two light motorized infantry battalions. The final brigade will consist of three light motorized infantry battalions. The division base structure of artillery, aviation, and other support units will remain the same. Asymmetrical brigades provide greater flexibility than the current structure of identical light infantry brigades. Having battalions composed of differing mixes of equipment and personnel allows the force to be tailored to the situation.

The assault gun battalions will contain a mix of assault gun, command, ammunition and recovery versions of a light armored vehicle (see Appendix 2). On the offensive, it can move from one sector to another to reinforce success or provide firepower for an attack. Joined with the aviation battalion, it can enhance the divisional covering force's firepower and frontage. The battalion will also cross-attach to support infantry attacks, much like the classic tank-infantry teams of World War II, Korea, Vietnam, and Panama. On the defense, the battalion provides the

brigade or division counterattack force. The infantry takes the initial shock of the enemy attack, forcing him to commit reserves, define his main attack, and open himself for counterattack by fire from the assault guns. A key point to remember is that an assault gun is not a tank and shouldn't be used as one. Its main purpose is to provide close support for the infantry, much like the German assault gun units of World War II.²⁸

The light armored infantry battalions will contain a mix of troop carrier, antitank, command, mortar, ammunition, and recovery versions of a light armored vehicle (see Appendix 2). Light motorized infantry battalions will be organized in the same manner except they will use High Mobility Multi-Purpose Wheeled Vehicles as troop carriers and antitank vehicles (see Appendix 2). Capable of dismounting between 407 to 469 infantry, these battalions fill the same role as traditional light infantry battalions. They will be trained to fight as infantry, not as mounted troops. The transport vehicles serve only to move the infantry between fights at mechanized speed, protect them from small arms and artillery while on the move, and provide fire support during an infantry attack. On the offensive, the battalions provide infantry assault forces to take enemy positions in rough or urban terrain, serve as flank guards for advancing heavy divisions, and conduct economy of force missions. On the defensive, they can hold blocking positions or range forward, to the flanks, and to the rear to delay or deflect enemy forces.²⁹

The light armored cavalry regiments will be very similar to the 2nd Armored Cavalry Regiment (Light). Like the 2nd Cavalry,

M8 Armored Gun Systems will replace M1A1 tanks. Unlike the 2nd Cavalry, wheeled light armored fighting vehicles rather than Humvees will replace M3 cavalry fighting vehicles. Regiments will consist of three light armored cavalry squadrons, one aviation squadron, one artillery battalion and regimental support units (see Appendix 4). On the offensive, light armored cavalry performs the traditional cavalry roles of reconnaissance, flank guard, economy of force, and raid.³⁰ On the defensive, it provides an expanding reconnaissance and security zone around the lodgement area as the contingency force arrives, and serves as a defensive screen to strip off enemy reconnaissance and advanced guard elements before collapsing in on the main element.³¹

The formation of a middleweight corps organized on the light motorized infantry-light armored cavalry format will close the gap in our power projection capabilities. When middleweight forces are deployed as the initial elements of a contingency corps, their light armor and motorized infantry provide the essential firepower, mobility, and survivability to serve as the foundation of a joint, combined arms force. Using divisional-regimental artillery equipped with evolving "smart" ammunition, organic light attack/scout helicopters with sophisticated targeting sensors and antitank missiles, Air Force and Navy aircraft armed with existing and future generations of precision guided munitions, and advanced C4I technology to multiply their combat power, middleweight units will be able to engage and defeat opponents across the entire spectrum of conflict. The future of the Army lies in its U.S.-based power projection of both rapid reaction and sustainment forces. We already have the sustainment forces. The time is right to create a middleweight

force which will give us a substantial and credible rapid reaction force.

APPENDIX 1

EQUIPPING THE MIDDLEWEIGHT CORPS

The primary vehicle equipping the light armored infantry battalions, assault gun battalions, and light armored cavalry regiments should be wheeled light armored vehicles. They offer mobility, reliability, versatility, and cost-effectiveness equal to or superior to tracked LAVs.

Wheeled light armored vehicles have excellent mobility. When kept under 40,000 pounds in an 8x8 wheel configuration, their cross country performance is nearly identical to similar sized tracked vehicles and their road mobility is far superior.³² They are also less vulnerable to immobilization than tracked vehicles. Modern tires and suspension systems allow the wheeled vehicle to keep moving after being hit by small arms fire, shell fragments and even some mines which would destroy delicate tracked systems.³³

Wheeled vehicles are substantially more reliable than tracked vehicles. Because of their simpler systems, they suffer fewer breakdowns and are easier and quicker to repair. Test results indicated that wheeled light armored vehicles were 57% more reliable than light armored tracked vehicles.³⁴ The less complex wheeled vehicle also requires less crew training time, keeping the training burden more manageable.

The overall cost of acquiring and operating wheeled vehicles is substantially less than tracked vehicles. Acquisition costs run about 5-10% less.³⁵ The major savings come during the wheeled vehicle's service life. Total operations and maintenance costs run about 67% less than for a tracked light armored vehicle.³⁶

Finally, wheeled light armored vehicles are both versatile and available. Numerous families of wheeled light armored vehicles are in production. They offer a full range of armament including 25mm-105mm guns, antitank guided missiles, mortars, and antiaircraft missiles. Add-on armor kits are available to increase their survivability against small-caliber cannons and shoulder-launched anti-tank weapons. Many combat support and combat service support variants are also available including command, cargo, ammunition, ambulance, and armored vehicle recovery models. Acquiring a family of vehicles using the same basic chassis also saves maintenance costs, training costs, and training time. With the Bottom-Up Review focus on near-term modernization of existing platforms rather than research and development of new equipment, acquisition of off-the-shelf wheeled light armored vehicles makes sense.

Already funded and in production, the new M8 Armored Gun System also has a place in the middleweight units. Equipped with a 105mm gun, three levels of modular add-on armor protection, and an easy maintenance engine, this tracked LAV is capable of being air-dropped from aircraft as small as the C-130. The air-droppable M8 provides initial airborne elements making a forced entry with a force multiplier. Equipping the light armor battalion of the 82nd Airborne, the M-8 will serve to block heavy threat forces' avenues of approach to the drop zone and react quickly to penetrations threatening the lodgement area.³⁷ The M8 should also equip the light cavalry regiments where its edge in tactical mobility over rough ground is needed in the cavalry unit's role of screening and reconnaissance.

The ubiquitous High Mobility Multi-purpose Wheeled Vehicle (Humvee) will serve to outfit the light motorized infantry battalions. The Humvee offers excellent cross-country mobility. The latest model, the up-armored "heavy Humvee", provides light armored protection against small arms fire and artillery fragments. It is also capable of mounting a heavy machine gun, gatling gun, grenade launcher, small caliber rapid-firing cannon, or antitank guided missile launcher. At only a fraction of the cost of a more "traditional" light armored vehicle, the "heavy Humvee" offers an inexpensive way to provide mobility, increased firepower, and a degree of protection to motorized infantry units. Although it is inferior to larger light armored vehicles, its low cost makes it attractive in an atmosphere of tight budgets. If money becomes available, more combat power could be obtained by converting Humvee-mounted light motorized battalions to light armored vehicle-mounted light armored infantry battalions.

The attack and scout helicopter units of both the light motorized infantry division and the light armored cavalry regiment should be outfitted with the OH-58D Kiowa Warrior light helicopter. This armed version of the OH-58 scout helicopter offers the firepower of four antitank guided missiles, four air-to-air missiles, two 70 round rocket pods, or two heavy machine guns in a small, light package which is highly deployable.

Future developments in technology also hold promise for equipping middleweight units with impressive combat power. The Lightweight Line-Of-Sight Antitank Vehicle (LOSAT) will mount 12 hypervelocity antitank guided missiles on a light armored vehicle chassis capable of being carried on a C-130. The hypervelocity

missile uses a kinetic energy penetrating rod to defeat armor. It is much more effective against reactive and composite armor than existing chemical energy high explosive antitank guided missiles. The LHX Comanche will give aviation units a light attack/scout helicopter with anti-tank capabilities far greater than the present armed version of the OH-58 scout helicopter.

The High Mobility Artillery Rocket System (HIMARS) will mount a single Multiple Launch Rocket System "six pack" on a wheeled vehicle capable of being carried on a C-130. Able to launch both the standard rocket and the ATACMS missile, the HIMARS provides a lightweight source of lethal, long-range firepower. The M119 lightweight 105mm towed howitzer now entering service offers about 25% greater range than the present system along with the new ability to fire advanced munitions. The lightweight 155mm towed howitzer under development will provide the same capabilities of the present 155mm howitzer at only half the weight.

Developments in hunter-killer standoff technology will allow future light armored vehicles equipped with sensors to provide targeting data to HIMARS, lightweight 155mm and 105mm howitzers, the LHX helicopter, and close support aircraft. The sum of these developments will make future light armored forces even more lethal than they are today.

74. 4



LIGHT MOTORIZED INFANTRY DIVISION ORGANIZATION³⁸

1. DIVISION HEADQUARTERS:

206 personnel 47 Other

2. COMBAT AVIATION BRIGADE:

Headquarters & Headquarters Company (1)
Attack Helicopter Battalion (1)
Reconnaissance Helicopter Battalion (1)
Assault Helicopter Company (2)

1,040 personnel 60 OH-58D 50 UH-60 3 EH-60
132 Other

3. DIVISION ARTILLERY BRIGADE:

Headquarters & Headquarters Battery (1)
General Support Howitzer Battery
Direct Support Howitzer Battalion (3)

1,556 personnel 8 M198 54 M119 238 Other

4. DIVISION SUPPORT COMMAND:

Headquarters & Headquarters Company (1)
Medical Battalion (1)
Transportation Battalion (1)
Maintenance Battalion (2)
Aircraft Maintenance Company (1)

1,802 personnel 2 UH-60 514 Other

5. AIR DEFENSE ARTILLERY BATTALION:

227 personnel 18 LAV-ADA 3 LAV-CC 1 LAV-R
53 Other

6. ENGINEER BATTALION:

314 personnel 24 SEE 6 EST 32 Other

7. SIGNAL BATTALION:

470 personnel 135 Other

8. MILITARY INTELLIGENCE BATTALION:

295 personnel 53 Other

9. MILITARY POLICE COMPANY:

77 personnel 27 HVY HMMWV

10. 1st LIGHT ARMORED INFANTRY BRIGADE:

a. Headquarters & Headquarters Company (1)

100 personnel 4 LAV-CC 20 Other

b. Assault Gun Battalion: (1)

1. Headquarters & Headquarters Company (1)

100 personnel 2 LAV-AG 2 LAV-CC 4 LAV_AMMO
2 LAV-R 25 Other

2. Assault Gun Company (3)

42 personnel 14 LAV-AG

c. Light Armored Infantry Battalion: (2)

1. Headquarters & Headquarters Company (1)

169 personnel 3 LAV-CC 6 LAV-25 6 LAV-MTR
6 LAV-AMMO 4 LAV-R 10 Other

2. Light Armored Infantry Company (4)

153 personnel 14 LAV-25 5 LAV-AT 1 LAV-CC

Brigade Total:

1,888 personnel 44 LAV-AG 124 LAV-25 40 LAV-AT
12 LAV-MTR 16 LAV-AMMO 10 LAV-R
20 LAV-CC 65 Other

11. 2nd LIGHT MOTORIZED INFANTRY BRIGADE:

a. Headquarters & Headquarters Company (1)

100 personnel 4 LAV-CC 20 Other

b. Assault Gun Battalion: (1)

1. Headquarters & Headquarters Company (1)

100 personnel 2 LAV-AG 2 LAV-CC 4 LAV_AMMO
2 LAV-R 25 Other

2. Assault Gun Company (3)

42 personnel 14 LAV-AG

c. Light Motorized Infantry Battalion: (2)

1. Headquarters & headquarters Company (1)

169 personnel 3 HMMWV-CC 12 HVY HMMWV 20 Other

2. Light Motorized Infantry Company: (4)

153 personnel 1 HMMWV-CC 14 HVY HMMWV 5 HVY HMMWV-AT

Brigade Total:

1,888 personnel	44 LAV-AG	6 LAV-CC	4 LAV-AMMO
	2 LAV-R	136 HVY HMMWV	40 HVY HMMWV-AT
	14 HMMWV-CC	85 Other	

12. 3rd LIGHT MOTORIZED INFANTRY BRIGADE:

a. Headquarters & Headquarters Company (1)
100 personnel 4 HMMWV-CC 20 Other

b. Light Motorized Infantry Battalion: (3)

1. Headquarters & headquarters Company (1)
169 personnel 3 HMMWV-CC 12 HVY HMMWV 20 Other

2. Light Motorized Infantry Company: (4)
153 personnel 1 HMMWV-CC 14 HVY HMMWV 5 HVY HMMWV-AT

Brigade Total:

2,443 personnel	204 HVY HMMWV	60 HVY HMMWV-AT
	25 HMMWV-CC	80 Other

13. LIGHT MOTORIZED INFANTRY DIVISION TOTAL:

12,206 personnel	88 LAV-AG	124 LAV-25	40 LAV-AT
	18 LAV-ADA	12 LAV-MTR	29 LAV-CC
	20 LAV-AMMO	13 LAV-R	340 HVY HMMWV
	100 HVY HMMWV-AT	60 OH-58D	52 UH-60
	3 EH-60	8 M198	54 M119
	24 SEE	6 EST	1414 Other

NOTE: Other = Trucks, HMMWVs, trailers, etc.
OH-58D = OH-58D Kiowa Warrior attack/scout helicopter
EH-60 = EH-60 electronic warfare helicopter
UH-60 = UH-60 utility/transport helicopter
M198 = M198 155mm towed howitzer
M119 = M119 105mm towed howitzer
LAV-ADA = Light armored vehicle - air defense
LAV-CC = Light armored vehicle - command
LAV-R = Light armored vehicle - recovery
LAV-AG = Light armored vehicle - assault gun
LAV-AMMO = Light armored vehicle - ammunition
LAV-25 = Light armored vehicle - troop carrier
LAV-MTR = Light armored vehicle - mortar
LAV-AT = Light armored vehicle - antitank missile
SEE = Small Emplacement Excavator
EST = Engineer Support Tractor
HMMWV-CC = Humvee - Command
HVY HMMWV = Humvee - troop carrier with light armor
HVY HMMWV-AT = Humvee - antitank missile with light armor

APPENDIX 3
LIGHT MOTORIZED INFANTRY DIVISION LIFT REQUIREMENTS³⁹

Table 1:

C-5 GALAXY STRATEGIC TRANSPORT CAPABILITIES⁴⁰

Equipment	Quantity
M1	2
M2/M3	4
M8	4
LAV	8
M198	8
M119	10
MTV (5 ton truck)	10
LMTV (2.5 ton truck)	10
HMMWV	14
SEE	10
EST	10
OH-58D	13
UH/EH-60	6
TRAILERS	16
CARGO	870 Metric tons

Table 2:

1st LIGHT ARMORED INFANTRY BRIGADE LIFT REQUIREMENTS

C-5 Sorties	Cargo Carried
33	264 LAVs
2	20 MTVs
1	10 LMTVs
1	13 HMMWVs
1	16 Trailers
1	2 MTVs, 4 Trailers
17	Cargo Pallets
56	

Table 3:

2nd LIGHT MOTORIZED INFANTRY BRIGADE LIFT REQUIREMENTS

C-5 Sorties	Cargo Carried
14	196 HMMWVs
7	56 LAVs
3	29 MTVs, 1 LMTV
1	10 LMTVs
1	11 HMMWVs, 2 Trailers
1	16 Trailers
1	2 MTVs, 8 Trailers
17	Cargo Pallets
45	

Table 4:

3rd LIGHT MOTORIZED INFANTRY BRIGADE LIFT REQUIREMENTS

C-5 Sorties	Cargo Carried
21	294 HMMWVs
3	28 MTVs, 2 LMTVs
1	10 LMTVs
1	11 HMMWVs
1	16 Trailers
1	8 Trailers
17	Cargo Pallets
45	

Table 5:

DIVISION HEADQUARTERS LIFT REQUIREMENTS

C-5 Sorties	Cargo Carried
2	28 HMMWVs
1	10 MTVs
1	6 MTVs, 4 LMTVs
1	14 Trailers, 2 HMMWVs
1	3 LMTVs, 7 HMMWVs
6	

Table 6:

BRIGADE CS/CSS SLICE LIFT REQUIREMENTS

C-5 Sorties

13
6
5
5
3
2
1
1
1
1
1
1
1
6

Cargo Carried

130 MTVs
96 Trailers
50 LMTVs
70 HMMWVs
17 UH-60, 1 EH-60
20 OH-58D
7 LAV
10 M119
8 M119
8 SEE, 2 EST
6 LMTVs
14 Trailers
3 M198, 4 HMMWV
Cargo Pallets

47

Table 7:

DIVISION LIFT REQUIREMENTS

C-5 Sorties

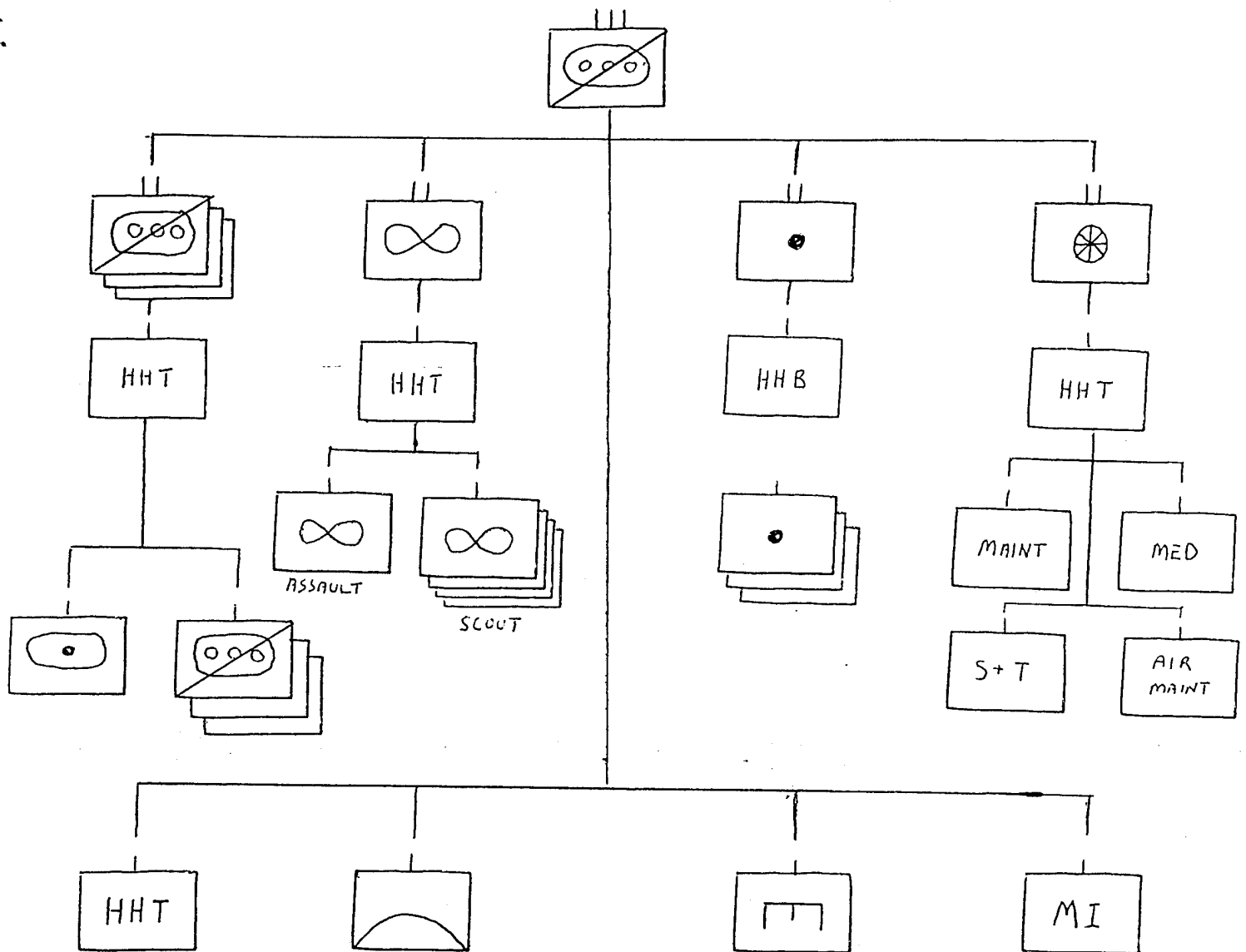
6
56
47
45
47
45
47

Unit

Division Headquarters
1st Brigade
1st Brigade CS/CSS Slice
2nd Brigade
2nd Brigade CS/CSS Slice
3rd Brigade
3rd Brigade CS/CSS Slice

293

APPENDIX 4
LIGHT ARMORED CAVALRY REGIMENT ORGANIZATION



LIGHT ARMORED CAVALRY REGIMENT ORGANIZATION⁴¹

1. REGIMENTAL HEADQUARTERS:

128 personnel	2 LAV-25	4 LAV-CC	1 LAV-R
	33 Other		

2. COMBAT AVIATION SQUADRON:

Headquarters & Headquarters Troop (1)
Scout Helicopter Troop (4)
Assault Helicopter Troop (1)

480 personnel	49 OH-58D	18 UH-60	3 EH-60
	52 Other		

3. REGIMENTAL ARTILLERY BATTALION:

Headquarters & Headquarters Battery (1)
Direct Support Howitzer Battery (3)

420 personnel	24 M119	80 Other
---------------	---------	----------

4. REGIMENTAL SUPPORT SQUADRON:

Headquarters & Headquarters Troop (1)
Medical Troop (1)
Supply & Transportation Troop (1)
Maintenance Troop (1)
Aircraft Maintenance Troop (1)

930 personnel	6 LAV-R	262 Other
---------------	---------	-----------

5. AIR DEFENSE ARTILLERY BATTERY:

184 personnel	12 LAV-ADA	2 LAV-CC	1 LAV-R
	22 Other		

6. ENGINEER COMPANY:

198 personnel	12 LAV-L	1 LAV-CC	1 LAV-R
	13 SEE	6 EST	16 Other

7. MILITARY INTELLIGENCE COMPANY:

222 personnel	64 Other
---------------	----------

8. LIGHT ARMORED CAVALRY SQUADRON: (3)

a. Headquarters & Headquarters Troop (1)
 170 personnel 4 LAV-CC 3 LAV-25 4 LAV-R
 60 Other

b. Light Armored Cavalry Troop (3)
 151 personnel 4 M8 18 LAV-25 3 LAV-MTR
 1 LAV-CC 3 LAV-AMMO

c. Assault Gun Company (1)
 42 personnel 14 M8

Squadron Total:
 665 personnel 26 M8 57 LAV-25 9 LAV-MTR
 7 LAV-CC 9 LAV-AMMO 4 LAV-R
 60 Other

9. LIGHT ARMORED CAVALRY REGIMENT TOTAL:

4,557 personnel	78 M8	173 LAV-25	27 LAV-MTR
	12 LAV-ADA	28 LAV-CC	27 LAV-AMMO
	21 LAV-R	12 LAV-L	24 M119
	49 OH-58D	18 UH-60	3 EH-60
	13 SEE	6 EST	709 Other

NOTE: Other = Trucks, HMMWVs, trailers, etc.
 OH-58D = OH-58D Kiowa Warrior attack/scout helicopter
 EH-60 = EH-60 electronic warfare helicopter
 UH-60 = UH-60 utility/transport helicopter
 M119 = M119 105mm towed howitzer
 M8 = M8 Armored Gun System assault gun
 LAV-ADA = Light armored vehicle - air defense
 LAV-CC = Light armored vehicle - command
 LAV-L = Light armored vehicle - cargo
 LAV-R = Light armored vehicle - recovery
 LAV-AMMO = Light armored vehicle - ammunition
 LAV-25 = Light armored vehicle - troop carrier
 LAV-MTR = Light armored vehicle - mortar
 SEE = Small Emplacement Excavator
 EST = Engineer Support Tractor

APPENDIX 5
LIGHT ARMORED CAVALRY REGIMENT LIFT REQUIREMENTS⁴²

Table 1:

C-5 GALAXY STRATEGIC TRANSPORT CAPABILITIES⁴³

Equipment	Quantity
-----	-----
M8	4
LAV	8
M119	10
MTV (5 ton truck)	10
LMTV (2.5 ton truck)	10
HMMWV	14
SEE	10
EST	10
OH-58D	13
UH/EH-60	6
TRAILERS	16
CARGO	870 Metric tons
-----	-----

Table 2:

LIGHT ARMORED CAVALRY REGIMENT LIFT REQUIREMENTS

C-5 Sorties	Cargo Carried
-----	-----
37	296 LAVs
25	248 MTVs, 2 LMTVs
19	76 M8s
13	208 Trailers
10	100 LMTVs
10	140 HMMWVs
4	49 OH-58Ds
3	18 UH-60s
2	20 M119s
1	10 SEE
1	6 EST, 3 SEE
1	3 EH-60s, 2 M8s
1	4 LAVs, 4 LMTVs
1	4 M119s, 2 HMMWVs, 5 trailers
13	Cargo Pallets
-----	-----
141	
-----	-----

NOTES

¹John M. Shalikashvili, National Military Strategy, (Washington, DC: Joint Chiefs of Staff, 1995), p. 20.

²William J. Perry, Annual Report to the President and the Congress, (Washington, DC: U.S. Government Printing Office, 1995), p. 169. Power projection includes forced entry to seize an adversary's key facilities and a rapid build-up of land combat forces in theater. Combat operations on land run the gamut from large-scale armored operations to small-scale infantry operations, in any kind of weather or in any kind of terrain. Operations other than war range from peace enforcement to humanitarian assistance.

³John Luddy and Baker Spring, "Keeping America Safe and Strong: A New U.S. Defense Policy," in A Safe and Prosperous America: A U.S. Foreign and Defense Policy Blueprint, ed. Kim R. Holmes, (Washington, DC: The Heritage Foundation, 1994), p. 61. The proliferation of modern weaponry results from its increasing availability. A number of developing countries are now designing and manufacturing their own modern weaponry. As NATO and former Warsaw Pact militaries shrink, the world also has access to the most modern western and former Soviet armaments. This equipment is often available at bargain prices, particularly armaments from the cash-starved states of the former Soviet Union.

⁴William W. Hartzog and John D. Howard, "Heavy-Light Operations." Military Review, April 1987, pp. 15-16.

⁵Craig B. Whelden, "Light Cavalry: Strategic Force for the Future." Military Review, April 1993, p. 16. In the words of General Sullivan, the Chief-of-Staff of the Army, "...the Army is a strategic force trained and ready to fight and achieve decisive victory wherever and whenever America calls...As a strategic force, the Army must have global reach."

⁶Michael J. Mazarr, "Middleweight Forces for Contingency Operations." Military Review, August 1991, p. 35.

⁷Thomas R. Rozman, "Thoughts on Medium Motorized Forces." Infantry, January/February 1991, p. 22.

⁸Perry, Annual Report to the President and the Congress, pp. 172-173. The focus of this examination is on the conventional force structure of the Army. Special Operations units are discussed only as they apply to filling portions of the assignments of conventional divisions and regiments. An examination of the Special Operations force structure would be an excellent topic for an entirely separate study.

⁹Whelden, "Light Cavalry: Strategic Force for the Future." Military Review, April 1993, pp. 16-17.

¹⁰Stan DeGeus, Joint Military Operations Reference Guide: U.S. Armed Forces... Basic Training. (Newport, RI: US Naval War College, 1994), p. 69.

¹¹Russell W. Glenn, "Give Me a Heavy-Light." Armor, September-October 1990, p. 36.

¹²Peter F. Herrly, "The Army's Light Divisions: Where Next?" Military Review, January 1994, p. 78.

¹³Michael K. Robel, "Operational Mobility for the Light Infantry." Military Review, July 1989, p. 42.

¹⁴Stephen L. Melton, "The Future of Armor." Armor, May-June 1990, p. 40.

¹⁵Peter J. Boylan, "Power Projection, Risk and the Light Force." Military Review, May 1982, 1982), pp. 7-8.

¹⁶Peter F. Herrly, "Middleweight Forces and the Army's Deployability Dilemma." Parameters, September 1989, p. 54.

¹⁷Rozman, "Thoughts on Medium Forces." Infantry, January/February 1991, p. 25. During training deployments, the experimental motorized 9th Light Infantry Division sustained itself with much less difficulty and required significantly less tonnage to support operations than a heavy division.

¹⁸"The Armored Gun System." Armor, March-April 1992, p. 14.

¹⁹Martin N. Stanton, "Assault Gun Battalion 96." Armor, September-October 1994, p. 38.

²⁰Herrly, "The Army's Light Divisions: Where Next?" Military Review, January 1994, p. 78.

²¹Ibid., pp. 78-80. Equipped with motorized transport, the experimental 9th Light Infantry Division was able to employ the Army's AirLand Battle doctrine to score victories in training exercises against both armor and other light infantry units.

²²The cost of equipping the division was calculated using a cost of approximately \$50,000 for the additional HMMWVs needed and the range of costs given for light armored vehicles from the article by Francis Tusa, "Light Armored Vehicles Outpacing the Big Guys.", Armed Forces Journal International, October 1990, p. 62. Using the same figures, the cost of equipping the entire middleweight corps would run between \$1.1 to \$1.6 billion.

²³According to a speech by Senator Sam Nunn, "The Defense Department Must Thoroughly Overhaul the Services Roles and Missions," presented on the Senate Floor in Washington, DC, 2 July 1992, the Army will save \$3.5 billion annually by decommissioning two divisions. Given the costs of equipping the middleweight corps in note 22, this would more than pay for the expense.

²⁴In the near future, advancing technology may provide the combined arms team of light armored units, Air Force fighters and bombers, and Navy carrier aircraft with the ability to destroy opposing heavy armor. Sensor equipment such as Joint Surveillance Target Attack Radar and Unmanned Aerial Vehicles will be able to fix the enemy's location with precision. C4I systems like the Army Tactical Command and Control System will be able to process sensor and intelligence information, assist the commander in formulating plans based on that information, and get those plans out to the combat troops for action, all in nearly real-time. Joint Stand-Off Weapons and Joint Direct Attack Munitions equipped Air Force long range bombers will be able to exercise "global reach" to disrupt and strip off enemy ground forces as they advance to contact with U.S. middleweight forces. Sensor Fused Weapons and Wind-Corrected Munitions Dispenser equipped Air Force and Navy tactical aircraft will have increased capability to disable or destroy multiple armored vehicles in a single pass. Brilliant Anti-Tank, Sense And Destroy Armor, Wide Area Mine, and Army Tactical Missile System equipped artillery organic to the force will increase its effectiveness in long range disruption and destruction of the enemy. When the depleted and disrupted enemy units finally make contact, middleweight units equipped with Line of Sight Anti-Tank hypervelocity guided missile-armed light armored vehicles, Javelin fire-and-forget anti-tank guided missile-armed infantry and LHX Comanche light helicopters will serve as the *coup de grace*. Although the death knell of the heavy tank has been sounded many times since the end of the Second World War, the advances in technology discussed above may finally send the main battle tank the way of the armored knight. If this is the trend of the future, then the Army's future force structure should replace heavy divisions entirely with light motorized infantry units. Infantry will always be needed to take and hold ground. Some sort of armored vehicle will still be needed to provide operational-tactical mobility, and give weapons systems and infantry protection from light weapons and shell fragments. A light armored vehicle will fill this role as well as heavy armor, at a fraction of the cost.

²⁵The key to light motorized units' effectiveness in both low-intensity conflict and "operations other than war" is that they are primarily designed and trained as a mounted infantry force. The light armored vehicles serve a supporting role, not a primary role as in heavy divisions. As an infantry force, the light

motorized infantry divisions will retain a high proportion of infantry in their structure (around 3160 as compared to 3850 in the current light infantry division). The flexibility to perform in a dual role is important, especially if the scenarios of the Bottom-Up Review have not accurately forecast the threat. If future adversaries are astute enough to refuse to refight Desert Storm, the U.S. will face an environment involving more Somalias, Panamas and Haitis than it does Iraqs. Middleweight units will be capable of effectively operating in either security environment.

²⁶Scott Womack, "The AGS in Low-Intensity Conflict: Flexibility is the Key to Victory." Armor, March-April 1994, pp. 42-43. The use of small units of armor for direct artillery support, building clearance, blocking forces, and convoy security proved its worth in Vietnam and Panama where the shock effect of even a lightly armored vehicle often had a terrific impact.

²⁷The need for armored vehicles in "operations other than war" became evident in Somalia, where the on scene commander urgently requested a battalion of armor to provide his lightly armed infantry with a rapid reaction force capable of extricating them from dangerous situations. When the Rangers were trapped in Mogadishu under heavy attack, Malaysian armored personnel carriers were essential in allowing the 10th Mountain Division's Rapid Reaction Force to penetrate the clan positions and extract the Rangers (see Charles P. Ferry, "Mogadishu, October 1993: Personal Account of a Rifle Company XO," Infantry, September-October 1994, pp 26-30).

²⁸Stanton, "Assault Gun Battalion 96." Armor, September-October 1994, pp. 40-42.

²⁹Rozman, "Thoughts on Medium Forces." Infantry, January/February 1991, p. 24.

³⁰David L. Nobles, "Light Armored Cavalry - The Right Force at the Right Time." Armor, January-February 1995, p. 18.

³¹Jon H. Moilanen, "The Light Cavalry Regiment in Contingency Operations." Military Review, October 1992, p 68.

³²Clifford D. Bradley, "Wheels Versus Tracks." Armor, May-June 1981, p. 25.

³³Ibid., p. 26.

³⁴Ibid., p. 29.

³⁵Ibid., p. 28.

³⁶Ibid., p. 29.

³⁷"The Armored Gun System." Armor, March-April 1992, p. 14.

³⁸Information concerning the organization, personnel, and equipment of the present light infantry division, upon which the light motorized infantry division is based, was obtained from the U.S. Naval Institute's "Periscope" computer database. Information concerning the organization, personnel, and equipment of a motorized infantry brigade was obtained from the article by Tiffany, "Proposed Rapidly Deployable, Tactically Mobile, Motorized Infantry Brigade," Military Review, February 1994, pp. 75-76.

³⁹The category of "Other" was broken down into Medium Tactical Vehicles (5 ton trucks), Light-Medium Tactical Vehicles (2.5 ton trucks), High Mobility Multi-purpose Wheeled Vehicles, and trailers based on the percentage breakdown in a sample armored cavalry unit from the article by A. J. Bacevich and Robert R. Ivany, "Deployable Armor Today," Military Review, April 1987, pp. 20-21. The amount of containerized cargo required for the unit was derived from the pamphlet by L. Pengue ed., A Case Study for Naval Expeditionary Warfare Littoral Applications, (Newport, RI: U.S. Naval War College, 1994), p. J-2.

⁴⁰Tiffany, "Proposed Rapidly Deployable, Tactically Mobile, Motorized Infantry Brigade." Military Review, February 1994, p. 75. Information concerning vehicles not listed in the article was calculated from specifications obtained from the U.S. Naval Institute's "Periscope" computer database and various Jane's publications listed in the bibliography.

⁴¹Information concerning the organization, personnel, and equipment of the present armored cavalry regiment, upon which the light armored cavalry regiment is based, was obtained from the U.S. Naval Institute's "Periscope" computer database. Information concerning the organization, personnel, and equipment of a light armored cavalry squadron was obtained from the article by Nobles, "Light Armored Cavalry - The Right Force at the Right Time," Armor, January-February 1995, p. 16.

⁴²See note 39.

⁴³See note 40.

BIBLIOGRAPHY

- Adams, John A. "Heavy versus Light Forces: A Middle Ground." Military Review, October 1986, 64-73.
- Bacevich, A. J. and Ivany, Robert R. "Deployable Armor Today." Military Review, April 1987, 14-23.
- Bell, Raymond E. Jr. "The Brigade: When Flexibility is Vital." Army, February 1993, 29-32.
- Boles, John K. III and Schmoll, Vincent C. "The Regional Threat." Armor, July-August 1990, 30-35.
- Bonder, Seth. "Defense Planning in the New Global Security Environment." Army, August 1993, 16-26.
- Boylan, Peter J. "Power Projection, Risk and the Light Force." Military Review, May 1982, 62-69.
- Bradley, Clifford D. "Wheels Versus Tracks." Armor, May-June 1981, 24-29.
- Broom, John T. and Bruno, Thomas A. "A New Day for Armor or the Last Glimmer of Sunset?" Armor, September-October 1990, 7-11.
- Crist, Stanley C. and Spurgeon, Harold L. "Armor in the 21st Century." Armor, January-February 1994, 12-14.
- DeGeus, Stan. Joint Military Operations Reference Guide: U.S. Armed Forces... Basic Training. Newport, RI: U.S. Naval War College, 1994.
- Eden, Steven J. "Light Infantry is Too Light!" Military Review, February 1991, 86-88.
- Elder, Donald. "Force Projection and Combined Arms." Armor, November-December 1993, 17-20.
- Ferry, Charles P. "Mogadishu, October 1993: Personal Account of a Rifle Company XO." Infantry, September-October 1994, 23-31.
- Foss, Christopher F., ed. Jane's Armour and Artillery 1994-95. London: Jane's Information Group Ltd., 1994.
- Jane's Military Vehicles and Logistics 1994-95. London: Jane's Information Group Ltd., 1994.
- Glenn, Russell W. "Give Me a Heavy-Light." Armor, September-October 1990, 35-37.

Goodman, Glenn Jr. "Army Revamps Armored Vehicle Plans." Armed Forces Journal International, November 1992, 12-14.

Gourley, Scott R. "Might for Light." Army, March 1994, 30-34.

Herrly, Peter F. "The Army's Light Divisions: Where Next?" Military Review, January 1994, 78-80.

----- "Middleweight Forces and the Army's Deployability Dilemma." Parameters, September 1990, 46-59.

Holder, L.D. "Offensive Tactical Operations." Military Review, December 1993, 48-56.

Jeffries, Lewis L. "A Blueprint for Force Design." Military Review, August 1991, 20-33.

Luddy, John and Spring, Baker. "Keeping America Safe and Strong: A New U.S. Defense Policy." In A Safe and Prosperous America: A U.S. Foreign and Defense Policy Blueprint, ed. Kim R. Holmes, 51-62. Washington, DC: The Heritage Foundation, 1994.

Ludvigsen, Eric C. "Armor's Future: From One, Many." Army, May 1991, 32-42.

Mazarr, Michael J. "Middleweight Forces for Contingency Operations." Military Review, August 1991, 32-39.

Melton, Stephen L. "The Future of Armor." Armor, May-June 1990, 37-40.

Moilanen, Jon H. "The Light Cavalry Regiment in Contingency Operations." Military Review, October 1992, 65-75.

Nobles, David L. "The Light Armored Force: An Urgent Need, A Ready Solution." Armor, May-June 1990, 8-13.

----- "Light Armored Cavalry - The Right Force at the Right Time." Armor, January-February 1995, 15-18.

Nunn, Sam. "The Defense Department Must Thoroughly Overhaul the Services Roles and Missions." Speech presented on the Senate Floor in Washington, DC, 2 July 1992.

Olson, William J. "Light Force Initiative." Military Review, June 1985, 2-17.

Pengue, L. ed. A Case Study for Naval Expeditionary Warfare Littoral Applications. Newport, RI: U.S. Naval War College, 1994.

Perry, William J. Annual Report to the President and the Congress. Washington, DC: U.S. Government Printing Office, 1995.

Robel, Michael K. "Operational Mobility for the Light Infantry." Military Review, July 1989, 41-48.

Rozman, Thomas R. "Making Light Forces More Flexible and Responsive." Armor, January-February 1991, 18-20.

----- "Thoughts on Medium Motorized Forces." Infantry, January-February 1991, 22-26.

Shalikashvili, John M. National Military Strategy. Washington, DC: Joint Chiefs of Staff, 1995.

Stanton, Martin N. "Assault Gun Battalion 96." Armor, September-October 1994, 38-43.

Tiffany, Allen L. "A Light Infantry Division with More for the Fight." Military Review, August 1991, 40-55.

----- "Proposed Rapidly Deployable, Tactically Mobile, Motorized Infantry Brigade." Military Review, February 1994, 74-77.

"The Armored Gun System." Armor, March-April 1992, 13-14.

Tusa, Francis. "Light Armored Vehicles Outpacing the Big Guys." Armed Forces Journal International, October 1990, 61-62.

Vermillion, Steven D. "Motorized at the NTC." Infantry, March-April 1989, 11-14.

Vuono, Carl E. "Armor and the Future Army: The Challenges of Change and Continuity." Armor, May-June 1990, 28-32.

Whelden, Craig B. "Light Cavalry: Strategic Force for the Future." Military Review, April 1993, 13-20.

Womack, Scott. "The AGS in Low-Intensity Conflict: Flexibility is the Key to Victory." Armor, March-April 1994, 42-44.