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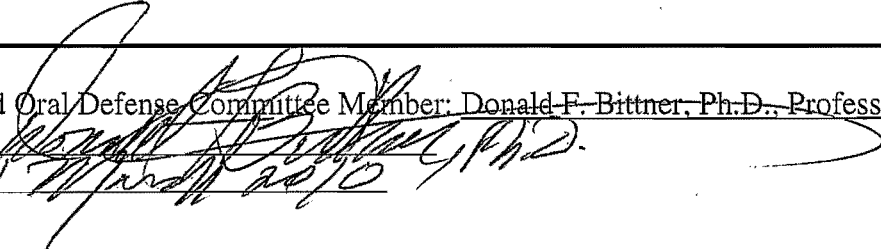
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**LIGHT ARMORED RECONNAISSANCE:
MISUNDERSTOOD AND UNDEREMPLOYED IN DEEP OPERATIONS**

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

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United States Marine Corps

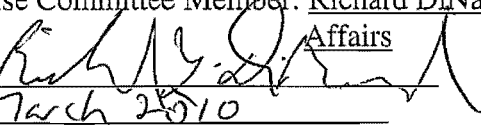
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Executive Summary

Title: Light Armored Reconnaissance Units: Misunderstood and Under Employed in Deep Operations

Author: Major Ladd W. Shepard, United States Marine Corps

Thesis: Light Armored Reconnaissance units are misunderstood and under employed in deep operations.

Discussion: In 1973, the Marine Corps began its search for a mobile protected weapon system to provide mobility and firepower to its smaller and lighter infantry. On March 31, 1980 MajGen Alfred Gray testified before the Senate Armed Services Committee that Marine Corps forces were specifically tailored to rapidly respond to any crisis area using either equipment deployed with them or prepositioned equipment. MajGen Gray continued his testimony by pointing out that while an amphibious or rapid deployment force needed to be light enough to be strategically deployed, it also needed to be heavy enough in firepower and tactical mobility to win.

On 12 July 1983, Co A, 1st LAV Battalion was activated at the Marine Corps Air Ground Combat Center, 29 Palms, California. Its mission was to develop the tactics and doctrine for the employment of the LAV. Over a period of 11 years, the light armored vehicle battalions were renamed twice, in conjunction with the maturation of their doctrine and concepts of employment. In 1994, they officially became known as Light Armored Reconnaissance Battalions. The primary mission of the battalions was to conduct reconnaissance and security missions in support of the MAGTF or GCE commander. They were also capable of limited offensive and defensive missions, and possessed a significant deep projection capability. However, commanders have ignored the deep projection capability due to a lack of understanding of how best to employ LAV units.

Since 1989, LAV units have participated in every major combat operation and distinguished themselves due to their mobility, speed, firepower, long-haul communications, and logistics self-sustainability. In 1996, then LtGen Anthony Zinni, established a Deep Operations Working Group on the I MEF staff in order to explore the Marine Corps' capability to offer a geographic combatant commander a deep strike capability of which deep maneuver was a viable option. Based on Soviet Operational Maneuver Group doctrine, the Deep Operations Working Group experimented with deep maneuver. The 1st LAR Bn took the lead in designing a series of exercises in which all four LAR battalions would participate along with a number of Marine attachments, as well as Army, Navy and Air Force personnel and equipment. The concept proved viable with some adjustments and was operationally applied during Operation IRAQI FREEDOM in 2003 and during Operation ENDURING FREEDOM in 2009.

Conclusion:

The paper concludes with lessons learned through the research that provide objective truths to be subjectively applied to a competing future concept of LAR employment for the next 10 to 20 years during which the Marine Corps will be engaged primarily in irregular warfare. It offers a way forward for the LAR community to realize its maximum potential and advocate to break away from unimaginative, and doctrinally incorrect, modes of employment while still maintaining a solid grounding in providing its supported commander a tactically and operationally mobile reconnaissance asset capable of fighting for information.

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PREFACE

As a Second Lieutenant at The Basic School, I remember anxiously awaiting my Military Occupational Specialty (MOS) assignment. At the time, I hoped that I would be assigned to the infantry and wondered where I would be headed next. Curiously enough, at the moment that I experienced great joy upon being informed I was indeed to be an infantry officer, I also felt a certain sadness when I learned that I would be assigned to 1st Light Armored Reconnaissance (LAR) Battalion (LAR Bn). I wondered, was I somehow deficient? How could it be that I was not assigned to a rifle battalion? Little did I know at that time how fortunate I was to be a Light Armored Vehicle (LAV) officer.

That assignment sparked an infatuation with the platform, the community, and the mission sets. I have served as a Platoon Commander, Company Executive Officer, Company Commander, Battalion Logistics Officer, and Battalion Operations Officer during two separate assignments to LAR Battalions. During those postings, I participated in the Amphibious Warfighting Experiment HUNTER WARRIOR, conducted a Western Pacific deployment with the 13th Marine Expeditionary Unit (Special Operations Capable), and three times deployed in support of OPERATION IRAQ FREEDOM. Thus, I have obviously gained a greater appreciation for my assignment as an LAV officer than I was capable of understanding while attending The Basic School.

There are three main armor platforms in the United States Marine Corps inventory. These are the Assault Amphibious Vehicle (AAV), used primarily to transport Marines from ship to shore; the M1A1 Abrams, our main battle tank; and the Light Armored Vehicle. The later is a family of mission role variant, lightly armored, wheeled vehicles assigned traditional light

cavalry type missions during conventional warfare and a wide variety of mission sets during irregular warfare.

This paper is designed to explain the capabilities of the LAR battalion, and how it can be used to operate for an extended period behind enemy lines or in denied enemy territory in order to shape the battlefield for commanders. I will begin with briefly covering the emergence of the light armored vehicle platform into the Marine Corps' inventory and the various initial concepts of employment as identified by the naming conventions of the battalion. I shall then cover the current organization of the battalion, followed by a description of the current doctrine as published in MCWP 3-14, signed 17 September 2009. I will then cover the deployment and combat operation employment of LAR units. I will then discuss the origins of modern operational maneuver groups and how LAR tested a concept of a deep maneuver element as represented by Operation DEEP STRIKE. Next, this essay will then cover the employment of LAR as a deep maneuver element in Iraq and Afghanistan. This paper concludes with a discussion of objective lessons learned from the research and provides a subjective competing concept for future employment of LAR in irregular warfare deep operations.

This essay will not attempt to provide all of the answers to the questions that it will raise. It is intended to spur creative thinking within the community as to how the battalion or its companies can further exploit their capabilities to contribute to the accomplishment of the supported commander's mission. It is also intended to advertise a deep battle capability as a ground option in deep operations, a role that has rarely been exploited over the last nine years of combat operations in Afghanistan and Iraq. This does not suggest the community should stray from its fundamental reconnaissance and security missions. Rather, this paper discusses what has been and can be achieved with current technologies and not what future technologies can do

to enhance the capabilities of the platform. In short, the paper will look at how the platform / community came into being, how it has been used, and how it can be used in the near future. See Appendix A for contemporary views of LAR in deep operations.

Work remains for future researchers to further explore and explain LAR's role in Afghanistan, and how it was appropriately employed under the command and control of the MAGTF commander. Additional work remains to ascertain what changes to the table of organization and equipment can do to add more infantrymen and troop carrying LAVs to provide greater depth in the execution of limited objective attacks. Research should also focus on increasing the lethality of the main weapon system to a 30mm chaingun that also provides commonality with the AAV, increasing the lethality and hit probability of anti-tank missiles with a saddlebag turret similar to the Army's Bradley Infantry Fighting Vehicle, and increasing the lethality of the mortars to the 120mm mortar. Closely related to weapon system upgrades is a need for research focusing on increasing the armor protection while reducing the weight of the vehicle with composite materials in order to ensure the LAV retains its strategic deployability. Research also needs to be conducted on whether the air-defense variant needs to be brought back in service in light of future threats in order to provide force protection to an LAR unit operating in both the close and deep fights. In reference to this thesis, future research needs to focus on improving the organic ability of the LAR Bn to directly link into higher-level intelligence and joint fires capabilities, and to research the capability of LAR to provide support to deep reconnaissance and special operation forces.

I have contacted individuals I know to be good primary sources. This list of Marines interviewed is only a sampling of authorities whose thoughts, ideas, and experiences with which I am primarily familiar and from which I received input. Additionally I researched the Archives

of the Marine Corps for command chronologies, studies, and operations orders. Furthermore, I was able to locate and research congressional testimony concerning the acquisition of the LAV. Additionally, the Historical Division of the Marine Corps University provided access to the battalion Lineages and Honors. Secondary source books are very limited, as few have been written specifically concerning the light armored reconnaissance battalions. However, I was able to find a number of articles and papers that shed light on different ideas and experiences; these, I have attempted to scour for relevant information.

In closing, I would like to acknowledge my wife, Donna, and extend my sincere gratitude for her dedication and support over the years and numerous deployments, which contributed to my professional development and ultimately this paper. I would like to thank Dr. Donald F. Bittner for his mentorship throughout this academic year in not only the preparation and editing of this document, but also during our seminars. I also want to thank those persons who provided their input via interviews and peer reviews. Specifically, LtGen Paul K. VanRiper, USMC (Ret); MajGen John A. Toolan, USMC; and BGen Joseph J. McMenamain, USMC (Ret) provided valuable historical insight, which assisted in the development and review of this paper. I must also acknowledge my Marine Officer Instructor, the late Colonel Joseph Molofsky, from my college days. He inspired all of the midshipmen from the University of North Carolina and North Carolina State University during his tenure to seek the zenith of professionalism in all of their assignments, to be happy in heart and soul, and to boldly press the fight until the enemy was finished. Finally, I want to thank all of the officers and men with which I have served in the LAR Battalions. Were it not for their instruction, mentorship, confidence, and undaunted courage I would not be who I have become today.

Introduction

The light armored vehicle (LAV) is a family of vehicles manufactured by General Motors of Canada. Those vehicles serve as the platform employed by light armored reconnaissance units to accomplish their mission. From the LAV's unorthodox acquisition through the battalion's extended concept of employment development, a lack of understanding of the capabilities inherent in Light Armored Reconnaissance (LAR), and how to apply the asset in conflict has contributed to LAR being misunderstood and underemployed in maneuver warfare. These units are specifically misunderstood and under employed in deep operations.

This paper will first examine the LAV acquisition and concept development in an historical overview, and then review the current doctrine for the employment of LAR Battalions, followed by a brief overview of its deployment and combat experience. A shift to a discussion on the origin of the modern Operational Maneuver Group (OMG), and how LAR tested a concept for deep operations in which it provided a viable Operational Maneuver Element (OME), is essential to understand better why LAR is a viable ground option in deep operations. Next comes a brief overview of the employment of LAR as an OME in conventional deep operations during Operation Iraqi Freedom (OIF) in 2003 and then the employment of LAR as a deep maneuver element in irregular warfare in Afghanistan during the summer and fall of 2009. Finally, it will conclude with objective lessons learned from the research conducted, and offer subjective recommendations for future employment of LAR in deep operations. See Appendix A for contemporary views of LAR in deep operations.

Historical Overview

In 1973, the Marine Corps, based on a study conducted by the Marine Corps Development and Education Command (MCDEC) at Quantico, began a search for a mobile

protected weapon system to provide mobility and firepower to the infantry. It was not until the fall of the Shah of Iran and the tragic Iranian hostage rescue mission in 1979 that the Marine Corps was able to validate the requirement for a mobile protected weapon system. It did so with convincing testimony under the auspices of providing a capability to President Carter's Rapid Deployment Force, now known as Central Command.

In 1978, a requirement for a mobile protected weapons system with greater emphasis on anti-tank capability and greater detail for the characteristics desired to meet the needs of the 1973 MCDEC study was promulgated.¹ In 1979, the Commandant of the Marine Corps ordered a force structure review "to develop an optimum infantry battalion for the eighties."² Part of this study focused on reconnaissance units. It noted a need for:

A small, highly skilled organization which is not an exclusive intelligence gathering reconnaissance unit but one which must move on the battlefield to see the enemy first...and one which also can perform the whole spectrum of security operations; in essence, when task organized, a unit which can provide the ground commander with an additional maneuver element, hence, an economy of force (emphasis added).³

The study looked at the possibility of adding the LAV to the reconnaissance battalion as part of the mobile reconnaissance company to provide the above stated requirement. The study also looked at the LAV as an Armor Protected Mobility capability to "provide enhanced *firepower, mobility*, and light armor protection for elements of the Marine Division (emphasis added)."⁴ This section of the study noted in its analysis summary that "the flexibility of the LAV adds enhanced *tactical and strategic mobility* as a result of helicopter transportability and the capability of flying, worldwide, large numbers of armored vehicles to the battlefield (emphasis added)."⁵

On March 31, 1980, then MajGen Al Gray, Director, Development Center, Marine Corps Development and Education Command, testified before the Senate Armed Services Committee

that Marine Corps forces were specifically tailored to rapidly respond to any crisis area using either equipment deployed with them or prepositioned equipment. He noted that Marine forces were capable of serving as part of a joint task force. MajGen Gray continued his testimony pointing out that while an amphibious or rapid deployment force needed to be light enough to be strategically deployed, it also needed to be heavy enough in firepower and tactical mobility to win.⁶ He pointed out that the mobile protected weapon system and light armored vehicle would *provide the force multiplier to operate over great distances with significant firepower*. MajGen Gray stated to the Senate Armed Services Committee that there was an “intuitive need” perceived during the 1970s for a mobile protected weapons system because of diminished naval surface fires, increased enemy air capabilities, and the retirement of the Corps’ small tracked anti-tank vehicle, the ONTOS, with its 106mm recoilless rifle and 3.5in rocket launchers. Furthermore, in his prepared statement he highlighted that the enemy threat possessed highly mechanized and heavily armored units, which the Marine Corps needed to be capable of defeating.⁷

In July 1980, Decisions and Designs, Incorporated, prepared a Summary of Meeting report which stated the revised concept of operations for the LAV. This included providing “direct fire against lightly armored material and personnel targets,” and “self-supporting maintenance for a limited number of days.”⁸ Decisions and Designs, Incorporated submitted an additional report in September 1980, which provided the statement of requirement as:

The immediate requirements of the Marine Corps demand weapons systems with *greater operational range, agility, firepower, and mobility* than those presently available. These systems must be capable of being projected both strategically and tactically to any crises area of the world as rapidly as possible to provide fire support and maneuverability to combat the continually increasing mobility and firepower of threat forces (emphasis added).⁹

Furthermore, it stated that an infantry battalion was limited to the speed of the foot mobile rifleman and its firepower was provided by limited organic weapon systems. Hence, the operational deficiency was due to the Marine Corps' "combined arms task forces lack[ing] the mobility and firepower combination necessary to effectively conduct Rapid Deployment Force (RDF) missions / maneuver warfare." The original concept of employment for the LAV became to provide additional "fire support for the assault elements of the combined arms task forces."¹⁰

On July 12, 1983, Co A, 1st Light Armored Vehicle Battalion (LAV Bn) was activated along with a skeleton headquarters at the Marine Corps Air Ground Combat Center, 29 Palms, California, with Major Wiley H. Pearson as the first company commander. On January 13, 1984, Major Pearson wrote in the narrative of his command chronology, "The Company was established in part to assist in the development of light armored employment and tactics to fulfill the Marine Corps' needs for balanced, flexible, and mobile offensively oriented fire and maneuver force for all types of combat operations."¹¹

On May 23, 1984, the first six operational LAV-25s were accepted and on 1 June, the first LAV Crewman's Course graduated. Colonel Joseph Lance, then a captain, was the 1st LAV battalion operations officer at the time. He stated that the priorities of the battalion were to, "receive the vehicles, develop tactics and doctrine, and employ the vehicles in support of MAGTF ops," support 29 Palms exercises, support the 7th Marine Amphibious Brigade, and support "other missions as necessary."¹² Furthermore, the battalion was responsible for deciding the maintenance schedule for the vehicle and determining a sustainable operational tempo. The Army's cavalry manuals and Marine Corps reconnaissance doctrine heavily influenced initial development of LAV doctrine.¹³

In 1983, *The Marine Corps Gazette* published an article by MajGen Robert B. Neller, then a captain, on what the LAV could do. He stressed that the LAV is not a tank and therefore cannot, “move across open terrain with the impunity of a tank or conduct a high speed frontal assault against anything other than the most lightly armed defensive position.” He also noted that it was a weapon platform, which offered, “*mobility, speed, and flexibility* (emphasis added).” He opined that the “LAV experiences its greatest limitations in offensive combat. Due to its light armor and lack of overwhelming firepower, its use as an assault vehicle is questionable.” Captain Neller felt that the LAV was best able to leverage its advantages executing defensive missions. He stated that, “as part of a covering force, LAV units will be able to screen the elements in the main battle area.” Furthermore, Captain Neller felt that “reconnaissance/cavalry” type missions were “perfectly suited for LAV units.” Finally, he argued that LAVs could be used as part of a counterattack force. He emphasized the need to task organize the unit with sufficient firepower and to appropriately assign it a mission which “emphasizes striking deep against infantry units moving forward or against the enemy’s advanced command, control, and logistic elements.” He closed with the statement that LAVs should be used only “when a significant decision can be reached on the battlefield.”¹⁴

On April 4, 1985, 2d LAV Bn was activated at Camp LeJeune, North Carolina. On May 31, 1985, 1st LAV Bn was activated at Camp Pendleton, California. A Co (REIN), 1st LAV Bn, 27th Marine Regiment, 7th Marine Amphibious Brigade, originally activated on July 12, 1983, became A Co, 3d LAV Bn in January 1985, and then on September 11, 1986, 3d LAV Bn was activated at Twentynine Palms, California. As the three active duty battalions of light armored vehicles became operational, they put their vehicles through multiple exercises to determine the capabilities and limitations of the vehicles, the best methods of employment, and the

development of LAV doctrine. Finally, one reserve battalion, 4th LAV Bn, finally was activated on September 23, 1987.

In 1988, the battalions were re-designated Light Armored Infantry (LAI). Though some consider it just a name change, LAI formalized how the Marine Corps envisioned employing the unit and moved away from a focus on just the vehicle.¹⁵ With the designation Light Armored Infantry, the battalions formally gained organic scouts to operate in conjunction with the vehicles in the execution of LAI missions, which had evolved to more traditional cavalry-type missions.¹⁶

In 1991, the Marine Corps was again facing force structure cuts. Thus, a Force Structure Planning Group convened to propose a reorganization of the Marine Corps. Part of this restructuring included a number of changes to the Marine Corps' reconnaissance units. In 1994, the LAI battalions were re-designated Light Armored Reconnaissance (LAR). This name change reflected yet again, the maturation of a concept of employment. It was now envisioned that the LAR battalions would tactically, and operationally, maneuver on the battlefield to see the enemy first with the capability to *fight for information* for the ground combat element (GCE), "on the flanks, rear, and deep rear of an opponent."¹⁷ Since 1994, the battalions have remained designated as light armored reconnaissance units. Their methods of employment and tasks have varied over the years due to interpretations of, and minor adjustment to, the doctrinal mission statement. Nonetheless, after 24 years of concept development, the community had a doctrinal statement, which provided the framework to maximize the capabilities of the Marines and their platforms.

The above helps shape an understanding of why light armored vehicle employment has been the topic of much discussion and misunderstanding since its inception. First, it points out that a mobile protected weapon system was a capability that the Marine Corps sought since the early 1970s. However, the Corps could not justify its acquisition until its concept of

employment could be a “packaged sell” to Congress as a capability inherently required for the then Rapid Deployment Force. Second, once the authorization was received to purchase an “off the shelf” technology, the Light Armored Vehicle, the Corps struggled to identify what it wanted LAV units to do, how they would be structured, and to whom they would belong for organizational and tasking purposes. Third and finally, twenty years passed from the initial concept of employment to a generally accepted concept of employment. Thus, for some Marines an entire career was spent trying to ascertain what capabilities the LAV actually possessed and how it was going to be employed.

Organization and Current Doctrine

With regard to current structure, an LAR battalion is led by a *Headquarters and Service Company*, which contains the normal staff sections and special staff. The battalion headquarters has four LAV-25 variants, four Command and Control variants (LAV-C2), four logistic variants (LAV-L), and two recovery variants (LAV-R). A major difference between an infantry battalion S-4 and an LAR battalion S-4 is the size of its motor transport platoon with more than 80 pieces of rolling stock and, of course, its light armored vehicle maintenance platoon. The light armored vehicle battalion maintenance platoon can conduct second and limited third echelon repairs on the vehicles. Additionally, the communications platoon is significantly larger.

In addition to the headquarters company, the battalion is composed of *five line companies*. Each line company is composed of a headquarters platoon with two LAV-25s, an LAV-C2, an LAV-R, and two LAV-Ls. There are three line platoons in a company which possess four LAV-25 variants, each carrying a crew of three Marines (MOS 0313) and three scouts (MOS 0311). There is also a weapons platoon in a line company which is composed of four Anti-Tank variants (LAV-AT) with a crew of two 0313s and two 0352 TOW anti-tank

missile-men, and two 81mm mortar variants (LAV-M) with a crew of two 0313s and four 0341 mortar-men. Thus, the battalion possesses a tremendous amount of firepower wielding everything from an M-4 rifle, to AT-4s, SMAWs, TOWS, .50 cal machine guns, 218 medium machine guns, seventy-four 25mm bushmaster chainguns, 40mm grenade launchers, and 81mm mortars. For details on LAV variants and Tables of Organization, see Appendix B and C respectively.

As for current LAR doctrine, Marine Corps Warfighting Publication (MCWP) 3-14, *Employment of the Light Armored Reconnaissance Battalion*, states:

The LAR battalion performs combined arms reconnaissance and security missions in support of the GCE. Its mission is to conduct reconnaissance, security, and economy of force operations, and, within its capabilities, limited offensive or defensive operations that *exploit the unit's mobility and firepower*. The LAR battalion may function as an independent maneuver element or as an element of a larger unit such as a regimental combat team, or its subordinate companies may support other tactical units in the GCE (emphasis added).¹⁸

This mission statement articulates the unit's capabilities made possible by the platform and the Marines. It is essential to understand that the Marines and the vehicle are a single system.¹⁹ The vehicle is not complete without its complement of scouts. The vehicles provide security for the scouts, and the scouts provide security for the vehicle. This system composes a unique unit charged with being the "eyes and ears" for the supported commander and *exists to shape the battlefield*. The LAR battalion shapes the battlespace by conducting reconnaissance and security missions as well as other operations. It provides the supported commander essential information identifying where the enemy's surfaces and gaps are located. *It can exploit those gaps* with "deep projection potential" to attack where the enemy is weak, or it can gain and maintain contact with the surfaces causing the enemy to deploy and engage at a point and time not of his choosing. This buys time for the main body of the GCE to orient on the enemy and attack or prevent enemy interference with its movement to its primary objective.²⁰

In Operational Maneuver from the Sea, LAR launches from over the horizon via Landing Craft Air Cushioned (LCAC). *As a highly mobile, self-sustaining unit, LAR can rapidly move long distances cross country to attack objectives or shape the battlespace.*²¹ In MAGTF operations, the battalion operates as part of a Marine Division, a MAGTF, or a SPMAGTF. It can directly support regimental combat teams or it can detach its subordinate companies to support infantry battalions. The LAR battalion is capable of conducting offensive operations such as, “movement to contact, hasty attacks, deception operations, defend [sic], raids, other special purpose operations.” It also can perform supporting missions such as route, zone, or area reconnaissance operations, and screen or guard operations.²² Additionally, it can serve as the nucleus of a counterattack force, in either the offense or defense. In defensive operations, the battalion executes predominately security missions to screen or guard the GCE.

Of particular note are two important considerations. First, LAR’s *strengths are speed, mobility, firepower, and long distances communication.* This must be considered when deciding on LAR’s employment. It should operate as far forward, or to the flanks, as possible, across a wide frontage to shape the battlefield. It is best suited to perform reconnaissance and security missions in support of the GCE or MAGTF, to enable decisive closure of infantry battalions and/or armor with the enemy.²³ Any task organization or tasking which does not capitalize on these strengths wastes the battalion’s unique capabilities. Second, the base unit for “chopping” to another tactical unit should be the LAR company. The LAR company possesses the command and control, and the logistics sustainability to *capitalize on the unit’s strengths in order to provide the depth of reconnaissance and security necessary to achieve maximum potential for the supported commander.* Furthermore, it is the smallest unit organically task-organized to conduct independent operations.²⁴

Finally, this section addresses reconnaissance and security missions and common mistakes made in LAR employment. Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, defines reconnaissance as, “A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area.”²⁵ The Marine Corps Warfighting Publication 3-14 defines Security Operations as those conducted to “obtain information about the enemy and to provide reaction time, maneuver space, and protection to the main body.” Furthermore, it states that they are characterized by, “aggressive reconnaissance to reduce terrain and enemy unknowns, gaining and maintaining contact with the enemy to ensure continuous information, and providing early and accurate reporting of information to the supported force.”²⁶

With regard to *reconnaissance operations*, the LAR battalion is uniquely different from other reconnaissance units because of the LAV’s maneuverability, firepower, and logistics sustainability. Those capabilities enhance its ability to *gain and maintain contact, further develop the situation after initial contact, and fight for information* to assist the supported commander at the tactical and operational levels of war by determining where and when to engage or not to engage in battle.²⁷ LAR units can conduct limited objective attacks and perform security missions in conjunction with reconnaissance operations.

With regard to *security operations*, the LAR battalion is typically assigned a *screen* or *guard* mission. It can also be assigned a *cover* mission, but this generally entails providing significant additional firepower by either task organizing the battalion or placing dedicated air and logistic elements in direct support. It can also be assigned an *area security* mission to protect designated units or locations as well as to defeat or neutralize an enemy in a particular area.

Screening missions seek to observe, identify, and report enemy disposition to the supported commander. The unit assigned a *screening* mission fights only to protect itself and avoids decisive engagement. Guard missions are used to protect the main body of the supported commander by fighting a delaying action, while reporting information to the supported commander, in order to gain time for the main body to orient for attack or continue to its primary objective. *Guard* missions are normally conducted within the range of friendly artillery. If not, dedicated air must provide close air support. Acting as a covering force, the unit operates independent of the main body of the supported commander in order to intercept, engage, delay, disorganize, or deceive “the enemy before he can attack the force.”²⁸ *It implies decisive close battle.* Guard and cover missions can be conducted in support of stationary or mobile forces to the front, rear, or flanks of the main body. A route, zone, or area reconnaissance mission is more appropriate than a screening mission in front of a moving force, and a screening mission is more appropriate for a stationary force.²⁹

All too often, supported commanders do not understand the fundamentals of reconnaissance and security operations and their applicability to LAR units. Four common mistakes demonstrate this lack of understanding and under-employment of LAR.³⁰ The most common is poor choice of terminology. An example would be directing an LAR unit to conduct a screening mission in front of a mobile force while tasking it to defeat the enemy forces in zone in order to provide time for the main body time to deploy for attack. A screen is not conducted in front of a mobile force; “defeating enemy in zone” is more of an area security mission; providing time for the main body to deploy for attack is essentially a guard mission.³¹ Another common mistake is providing multiple priority tasks during the conduct of route, zone, or area reconnaissance missions. Only one priority task should be assigned. Closely linked to this is not providing enough time and space for the route, zone, or area reconnaissance to be conducted.

Finally, the fourth mistake is the conduct of reconnaissance to support the plan of attack vice using reconnaissance to develop the plan of attack. LAR units are rarely tasked in forethought as an asset to conduct reconnaissance-in-force missions, which often provide the opportunity for exploitation by either the LAR unit or the force of the supported commander.³²

Deployment and Combat Experience

Light Armored Reconnaissance units began their operational deployments in 1987. This began with their employment on Marine Expeditionary Unit (MEU) Special Operation Capable (SOC) deployments around the world. The LAV units eventually replaced the tank platoon that traditionally deployed in support of the MEU as the Marine Corps transitioned to the M1A1 Abrams. In 1997, both elements were reintegrated on MEU deployments. LAVs required less space for more vehicles, consumed less fuel, and were employable in more missions and environments than the tank platoon. While it suffices to say LAR units conducted their normal missions of reconnaissance and security for the GCE commander while deployed with the MEU, they were also extremely well suited for the litany of MEU special operations missions. Examples of the SOC missions in which the LAR units were ideally suited would be Tactical Recovery of Aircraft and Personnel (TRAP), Noncombatant Evacuation Operation (NEO), Humanitarian Assistance Operations (HAO), amphibious raids, limited objective attacks, demonstrations, show of force operations, Military Operations in Urban Terrain (MOUT), and civic action operations.³³

Since that time, LAV units have been employed in almost every irregular warfare operation including Operations NIMROD, DANCER and JUST CAUSE in Panama, the Special Purpose MAGTF (SPMAGTF) that supported local police departments during the Los Angeles riots, Operation RESTORE HOPE in Somalia, multiple operations in the Balkans, and the later

stages of Operations ENDURING (Afghanistan) and IRAQI FREEDOM. They also participated in every major conventional battle during Operations DESERT STORM (Kuwait), ENDURING FREEDOM, and IRAQI FREEDOM. In many cases, the LAVs were the most mobile asset available to conduct operations without further damaging infrastructure while still providing the firepower and communications necessary.³⁴ See Appendix D for a chronology of significant events.

Employment during these operations focused primarily on the core mission sets of reconnaissance, security, and offensive action. Included in the reconnaissance set of missions were route, zone, and area reconnaissance with scouts mounted on the vehicles as well as dismounted. Also included were missions to support intelligence collection. Included in the security mission set were convoy escort, rear area security, lines of communication security, support to civic action, disarmament, and other counter insurgency missions. Offensive operations included show of force demonstrations (on land, at sea, and crossing rivers), limited objective attacks, raids (independently, as part of large task forces, and in conjunction with allied forces), movement to contact as an advanced guard, quick reaction force missions as a reserve, and support to both special operations forces and psychological warfare operations.

During these operations, the degree of proper employment by various commanders can be debated, but there are two objective truths to be realized. First, LAV units were successful during every operation regardless of the mission set, geography, or duration. Second, LAR provided *flexible and mobile firepower and advanced communications* that unit commanders recognized and attempted to employ as best they could accord their individual situations.

Operational Maneuver Group and LAR's Operational Maneuver Element

Essential to understanding the evolution of LAR in deep operations is an understanding of where the concept originated and how LAR began to test its ability to conduct similar missions. Though units operating to attack operational level targets is not new, the Soviets are credited with the origin of the modern Operational Maneuver Group (OMG) as part of a restructuring of the Group of Soviet Forces Germany (GSFG).³⁵ More importantly, the theory behind the OMG concept was rooted in almost 100 years of Russian and Soviet military study on conducting war at the operational level.³⁶ The Soviet military, during the 1920s and 1930s, dedicated a significant amount of study to bring about a theory for what they called "operational art." This assisted them in their development of a concept for "deep operations."³⁷

The introduction of battlefield nuclear weapons and the massive mechanization of the Soviet Army in the 1950s and 1960s altered Soviet operational thinking. It was very clear that the Soviets needed to exploit NATO's weaknesses prior to the outbreak of war and, once a war started, they needed to win quickly before NATO could build its combat power. In the 1970's the Soviets dedicated much thought "to the study of conventional tactics, operations and strategy, with the added incentive of finding some way to neutralize NATO's nuclear trump card."³⁸ The OMG would serve that strategy by increasing the tempo of operations from the advance through the penetration of rear areas.

Though the concept was essentially an improvement on the tank mobile groups used during World War II, the creation of the OMG was a revolution in how Soviet front line troops would fight as a high speed, task organized, self-sustaining, tank-heavy forward detachment raiding force that operated at the operational level of war. See Appendix E for a Task Organization of an OMG. The OMG was to deploy in advance of operational-sized elements.³⁹ The "primary purpose of the OMG is to rapidly shift the focus of combat to NATO's rear area

and thereby maintain the rapid tempo of advance required by Soviet offensive doctrine.”⁴⁰ The OMG was to accomplish the following missions:

- Exploit deep into the enemy rear, destroying or disrupting their nuclear weapons and logistic support, C3 network, logistic system and lateral communications.
- Destroy, in meeting engagements, enemy reserves moving up to the main lines.
- Establish blocking positions on the defense’s withdrawal routes or attack the enemy defense from the rear.
- Pursue and destroy withdrawing enemy forces.
- Seize enemy defensive lines in the rear before they can be occupied or key economic or political objectives.⁴¹

The idea was that hastily established NATO defenses could be shattered by the OMG and, with little to no reserves available to stop the OMG, it would be free to interdict and disrupt NATO forces throughout their rear areas. The OMGs were not an end of themselves, but rather a means to assist in the rapid advance of Soviet forces. Therefore, the OMG operated as part of a central overall plan. They were not tied to tactical boundaries but operational boundaries; hence, they sought to attack operational objectives.⁴²

This revolution in Soviet doctrine spurred intense controversy amongst Western analysts.⁴³ It was highlighted as a justification for the procurement of weapons systems and technologies. Furthermore, the emerging military problem spurred creative thinking amongst many leaders in the Department of Defense. In April 1996, LtGen Anthony Zinni, then Commanding General, I Marine Expeditionary Force (MEF), created a Deep Operations Working Group within his staff. He tasked them to investigate current capabilities within the Marine Corps to conduct deep operations, of which deep maneuver was a subset, in support of a Warfighting Commander in Chief (CINC).⁴⁴ LtGen Zinni sought to identify:

A unique capability that the Marine Corps offers which would be attractive to a Warfighting CINC – a combined arms, joint capable, highly maneuverable, and air-sustainable force that when employed with other services' capabilities, gives the CINC a new and viable option to achieve a decision at the operational level of war.⁴⁵

The staff study led to the potential use of LAR in deep operations at the operational level of war to attack enemy centers of gravity, critical capabilities, and critical requirements. This was a natural fit due to its *strategic deployability, tactical and operational maneuverability, long-range communications, firepower, and self-sustaining task organization*. This study consisted of numerous exercises designed to test a variety of concepts with current technologies. An article from the *Marine Corps Gazette* in May 1997 reported, “The goal of these experiments is to develop additional capabilities for the versatile LAV, but not to steer the community away from its currently recognized reconnaissance and security roles.”⁴⁶ During these exercises, LAR demonstrated the ability to *deploy rapidly via strategic lift* to a theater of operations in order to *project power by conducting deep operations* for an extended period behind enemy lines.

Planning for such deep maneuver exercises began in the summer of 1996. Milestones were established to conduct the necessary preparatory training which included an at sea command and control exercise in July and August, a strategic mobilization exercise in November, and a resupply exercise in December which leveraged aerial resupply by the U.S. Air Force.⁴⁷ In January 1997, 1st LAR Bn, elements of 3rd and 4th LAR Bns, augmented by reconnaissance and engineer attachments from the 1st Marine Division, conducted Operation LONG BALL. LONG BALL was a training exercise that tested strategic airlift of LAVs from California to NAS Fallon, Nevada; use of long-haul communications; forward refueling of LAVs via airlift; consolidation of joint forces; and a 400-mile road march. In March, 1st LAR Bn and its attachments conducted Operation DESERT SCIMITAR - a fire support training exercise. This included the overland movement from Camp Pendleton to Twentynine Palms, a live fire

tactical exercise without troops (TEWT), screening operations, a passage of lines, breaching operations, defending and delaying operations, a counterattack, and a retrograde movement back to Camp Pendleton.⁴⁸

In August 1997, elements of 1st, 3rd, and 4th LAR Bns, supported by Marine armor, air, CSS, and Army, Navy, and Air Force attachments, conducted Operation DEEP STRIKE in California, Arizona, Nevada, and Utah.⁴⁹ DEEP STRIKE had objectives as far north as China Lake, California, as far south as Yuma, Arizona, and as far east as the Colorado River. The exercise used a Military Operation Other Than War setting for a SPMAGTF to conduct deep maneuver in support of a unified or joint task force commander in which insurgent forces could not be attacked with indirect fires due to a complex politically charged situation.⁵⁰ It covered 60,000 square miles, and employed three methods of arriving in the notional theater of operations: a ship to objective amphibious landing in southern California, a strategic airlift from Quantico, VA, and a 700-mile overland movement from Utah. Near simultaneous attacks took place at China Lake, 29 Palms, and Yuma. Then a 300-mile “Military Exclusion Zone,” essentially a screen line, was established from Boulder City, Nevada to Yuma, Arizona along the Colorado River. Carrying only 48 hours worth of supplies, the task force was resupplied by nine rapid ground refuels (RGR) using KC-130s and CH-53s. Other classes of supply were brought in via rotary wing assets or were air delivered.⁵¹ The units typically traveled at night and established “safe havens” or harbor sites during the day in order to decrease their ability to be detected by enemy forces and maximize their strength in operating at night with superior optics. Links to theater intelligence assets were critical while occupying the “safe havens” in order to provide early warning of hostile force locations and intentions.

DEEP STRIKE validated that the Marine Corps possessed a deep maneuver capability at the mid-to-lower end of the conflict spectrum. It also revealed that the task force, as organized

for the exercise, was not robust enough for operations at the higher end of the conflict spectrum. The exercise also demonstrated that while LAR units were essentially equipped for the tactical level of war, with augmentation in command and control, links to theater intelligence for better situational awareness, joint fires capabilities, and aerial sustainment, the LAR unit could easily be optimized to operate at the operational level of war.⁵²

It is also essential to understand the relative value of deep maneuver over deep strike, the later an attack on a deep target by aircraft or missiles. Major Bradley H. Shumaker, in his 1998 paper, *The Marriage of Deep Maneuver and Marine Light Armored Reconnaissance*, listed three advantages of the deep maneuver force over deep strike capabilities. First, “The commander has a human decision maker on the ground capable of reacting to a changing enemy situation.” Second, “the commander can create asymmetric engagements...that require enemy reaction.” Finally, the deep maneuver force has a greater “psychological effect on an enemy.”⁵³ He also pointed out that while a deep maneuver force has a greater chance for victory attacking enemy weaknesses than a frontal assault into enemy strengths, it comes with great risk and a greater potential for failure. Furthermore, he poignantly reaffirmed what Clausewitz noted, “Forces sent to operate against the enemy’s rear and flank are not available for use against his front.”⁵⁴ Thus, the tactical, or operational, situation must be worth the risk of committing LAR to deep operations thereby losing a significant asset in the main battle area. Finally, Shumaker cautioned that an attack in the rear of an enemy has no value in and of itself, but must be tied to the overall plan and is dependent on other factors that will make the effect either “positive or negative.”⁵⁵

Iraq and Afghanistan

In addition to the I MEF operational exercises, two actual LAR deep operations occurred in combat. During Operation Iraqi Freedom in 2003, BGen John Kelly, the 1st Marine Division

Assistant Division Commander, assembled a task-organized unit and assumed command of Task Force Tripoli in response to an “unofficial” inquiry from the White House via tasking from I MEF.⁵⁶ Task Force Tripoli’s mission was to seize Tikrit, 150 kilometers north of the 1st Marine Division main battle area in Baghdad. Task Force Tripoli was composed of three LAR battalions, an infantry company, an artillery battalion, a SEAL team, a Human Exploitation Team, engineers, and a combat service support element.⁵⁷ Air from the 3rd Marine Aircraft Wing was dedicated for close air support. This was the first time in combat that the battalions formed an operational maneuver element for a deep mission. The Task Force succeeded in cutting off the escape of organized resistance, isolating Tikrit, restoring order to the city and its surrounding areas, preventing the Kurds from further southward expansion, and rescuing seven American prisoners of war.

On May 4, 2009, 2d LAR Bn (-) deployed to Afghanistan in support of Marine Expeditionary Brigade - Afghanistan (MEB-A). The Battalion consisted of Company C (C Co) and a Headquarters and Service Company (H&S Co) detachment. The small number deployed was the result of approximately a 200-person cap.⁵⁸ In June, the cap was increased to approximately 400 persons and on June 11, Company D (D Co) and another H&S Co detachment deployed to Afghanistan to join the remainder of the Bn (-).⁵⁹ The Commanding General MEB-A, BGen Larry Nicholson, desired that the Marine forces in Afghanistan focus their efforts on counter insurgency operations and the development of Afghanistan National Security Forces (ANSF).⁶⁰ LtCol Thomas Grattan, Commander 2d LAR Bn, stated that because “the political considerations outweighed the military considerations,” BGen Nicholson decided to task 2d LAR Bn to seize Khaneshin, the capital of Rig District, Helmand Province, which had been under Taliban control for the past eight years. The Area of Operation assigned was carved out of the MEB security area and due to the distances involved (it was the southernmost MEB

objective), the LAR Bn remained under the direct command and control of the MEB-A vice attaching it to a regimental combat team.⁶¹

The area of operations assigned to MEB-A was a non-linear, non-contiguous battlespace. Due to the classified nature of the operational graphics, they are not included in this paper. Therefore, an attempt is made to describe the non-contiguous battlespace. At the MEB-A level, there was a clearly defined deep or security area, a main battle area, and a rear area. At the individual infantry battalion level, there were deep, close, and rear areas all contained non-contiguously within the MEB-A main battle area. Therefore, with BGen Nicholson maintaining command and control of 2d LAR Bn, he committed them to deep operations in the MEB-A security area in order to disrupt enemy forces along the length and width of his battlespace. Thus, he was able to force the enemy to commit fighters and assets prematurely and divert them from the main battle area (consisting of the most heavily populated areas).⁶² This method of employment *maximized the strengths of the battalion's firepower, mobility, and long-haul communications*. With the single battle concept in mind, 2d LAR Bn (-)(REIN), otherwise known as TF Mameluke (See Appendix F for Task Organization), departed Camp Leatherneck, located in Helmand Province, Afghanistan, on June 28. It was tasked from MEB-A to:

Conduct counter-insurgency (COIN) operations in partnership with ANSF to defeat enemy in zone, prepares [sic] ANSF to assume security responsibilities by improving ANSF capacity and capability through training, mentoring and partnering; and establishes the conditions for successful introduction of follow-on forces in zone in order to support the expansion of stability and legitimate governance.⁶³

The battalion operated as the southern most unit in Afghanistan and penetrated deeper into Taliban controlled territory than any other unit previously had.⁶⁴ LtCol Grattan saw the enemy's center of gravity as his, "ability to conduct attacks at a time and place of his choosing." He stated that their critical capabilities included their "freedom of movement, access to

weapons, and financial support.”⁶⁵ Grattan’s mission statement to his battalion for their initial operation was to, “Attack to seize Khaneshin in order to extend the Government of the Islamic Republic of Afghanistan authority and legitimacy within its border.”⁶⁶ Khaneshin was selected as the target due to its political and perceived historical significance (It had remained in Taliban hands throughout the initial invasion of Afghanistan), and the fact that it is the capital and economic center of the District.⁶⁷ LtCol Grattan also stated that the Helmand Provincial Governor requested BGen Nicholson to return Khaneshin to the provincial fold. Culturally, it was also the home to Afghanistan's Baluch people, stretching south to Pakistan's 'Baluchistan'. This operation was as much an operational necessity as it was a culturally symbolic operation to wrestle an objective from the Taliban, striking a psychological blow to signify the Taliban rule was ending throughout Afghanistan.

The 2d LAR Bn employed several techniques tested during DEEP STRIKE on its movement to its objective, such as traveling the approximately 150km at night and using lager sites or “safe havens” during the day to cover their movement and maintain the element of surprise. On July 2, the TF commenced its attack of Khaneshin by isolating the city, conducting “soft-knock”⁶⁸ operations, and clearing the city of Taliban insurgents. On July 8, with the city secured, the governor of Helmand Province visited Khaneshin and raised the flag of the Government of the Islamic Republic of Afghanistan above the castle.⁶⁹ One company established a combat outpost at the castle, another company remained mobile, and the battalion headquarters, attachments, and H&S Co established a combat outpost along the Helmand River securing a fording site by observation and fires for follow-on movement south to the border of Pakistan, some 60 miles away.

During the month of July, 2d LAR conducted the first combat swim of the LAVs since Panama in order to conduct interdiction operations 40 kms south of Khaneshin.⁷⁰ Throughout

the month, it conducted reconnaissance in force operations, raids on arms bazaars, and security operations. In August, the battalion transitioned from kinetic operations to counterinsurgency operations, while integrating Afghan National Army, Police, and Border Patrol into its operations.⁷¹ During the remainder of its deployment, the battalion conducted counterinsurgency operations throughout their operating environment by expanding their outposts, focusing civic action in the city of Khaneshin and its surrounding areas, and conducting offensive operations while partnered with ANSF. These operations were aimed at tactically attacking the enemy's critical capabilities (freedom of movement, and access to weapons and financial support) to operationally destroy his center of gravity (his ability to conduct attacks at a time and place of his choosing).

The 2d LAR Bn achieved phenomenal success due to a method of employment that maximized the *maneuverability, firepower, communications, and self-sustaining task organization* of the battalion. Many of the tactics, techniques, and procedures used by 2d LAR in Afghanistan were concepts tested during Operation DEEP STRIKE. They also reflected improved execution of the Warfighting functions. With regard to Command and Control, the battalion directly reported to the MEB-A commander. This is relatively unusual, but in this case, it maximized the MEB-A commander's combat power throughout his battlespace while providing the LAR Bn the appropriate mission and appropriate space in which to conduct its mission. Although the battalion already possessed satellite communication assets to talk directly to the MEB, it was supported with additional assets that connected it digitally to the MEB architecture. Finally, the battalion was task organized with additional attachments that enabled it to accomplish its mission.⁷²

With regard to the fires function, the battalion already possessed a significant amount of organic firepower with its 25mm chainguns, 240G machineguns, 81mm mortars, and TOW

missiles. However, it was provided an artillery attachment, employed armed UAVs, and was supported by Marine and Air Force aviation assets, to include a B-1 bomber close air support mission. The MEB invested the battalion with significant intelligence assets to enable it to operate at the tactical and operational level of war. The non-organic intelligence assets included personnel from Other Governmental Agencies (OGA), a platoon of reconnaissance Marines, a detachment from 3d Radio Battalion, a detachment of Human Exploitation Team (HET) Marines, and a detachment of psychological operations soldiers. Additionally, the battalion possessed the capability to receive live-feeds from UAVs and a Mobile Surveillance Target Acquisition and Reconnaissance System (MSTARS), and was provided “Backscatter” vans and handheld technology, which produced x-ray like pictures of vehicles and personnel.⁷³

The most notable application of DEEP STRIKE concepts by 2d LAR Bn was in the logistics resupply. Though the battalion received its fuel via ground lines of communication, it received 68 tons of Class I, III, and V via C-130 and C-17 air delivery.⁷⁴ With regard to Force Protection, the battalion was provided a Ground Based Operational Surveillance System (GBOSS), which is a tower mounted MSTARS, a medical Shock Trauma Platoon (-), and conducted its operations within the “golden hour” ring – the circumference in which a casualty can be transported from the point of injury to a medical facility with resuscitative capabilities.⁷⁵ It was in fact this “golden hour” that limited the battalion’s push south and constrained their maneuver in Southern Afghanistan.

Finally, with regard to the maneuver function, the battalion’s battlespace maximized the maneuverability of the LAVs. Long distance overland movements were conducted by its tactical and logistics elements, usually cross-country, and often under the cover of darkness for security and surprise. One element missing from the battalion that would have enabled it greater mobility to push further in the MEB-A security area was an infantry company. Without

this asset, the battalion had to dismount one of its two companies in order to maintain Combat Outpost Castle (Khannesin Castle) and conduct operations in and around Khaneshin; this thereby neutralized the mobility of one company of the battalion.⁷⁶

Conclusion: Lessons Learned and Future Employment

There are five objective lessons learned from this study. First, LAR is more than the “eyes and ears” of the battlefield. It is a shaping tool. It is not an exclusive intelligence gathering reconnaissance unit, but one that moves on the battlefield to see the enemy first, can fight for information, and can perform the whole spectrum of security operations with the caveat that it must be reinforced for a cover mission. Second, LAVs provide enhanced firepower; tactical and operational mobility that can be strategically deployed by land, sea, or air; possess organic long haul communications; and are relatively self-sustaining. Third, LAR’s primary function is to conduct reconnaissance and security missions, but possess deep projection potential to conduct reconnaissance in force missions, “recon-pull,” or limited objective attacks on enemy centers of gravity, critical vulnerabilities, critical capabilities, and critical requirements. Fourth, LAR should be employed as far forward or to the flanks as the tactical or operational situation allows, thus leveraging the unit’s strengths and maximizing the potential for depth of reconnaissance and security. Fifth, and finally, in order to prosecute deep maneuver, LAR must be given detailed commander’s intent, provided the right command and control linkage to higher headquarters, augmented with intelligence and joint fires links, and reinforced with non-organic intelligence and medical personnel.

A subjective competing future concept of LAR employment holds that for the next 10 to 20 years the Marine Corps will be engaged primarily in irregular warfare.⁷⁷ This concept views the security environment of the future as one in which America’s enemies will seek to increase

their relative superiority by mixing with the civilian population. The threat includes guerilla or irregular forces as well as regular forces mixed with the population operating out of safe havens where they possess at least tacit support. The political-strategic environment in the near future will require greater emphasis on reducing non-combatant deaths and damage to civilian property. This means deep strike operations with aircraft, missiles, and unmanned aerial systems will be severely restricted, and in many cases require on-scene positive target identification and collateral damage assessment. The LAR battalion's mobility, firepower, long-haul communications, and self-sustaining logistics capabilities make it a unique unit for deep power projection. By employing LAR against deep targets, an on-scene human decision maker with three dimensional situational awareness can ensure greater compatibility with the strategic environment.

This concept applies to Operational Maneuver from the Sea⁷⁸ with its ship to objective maneuver, distributed operations⁷⁹, irregular warfare in general, and specifically to the current fight in Afghanistan. It does not cover conventional operations in which an enemy with a credible armor threat diminishes the probability of success without creating an LAR task force with infantry, artillery, tanks and direct support air and combat service support (CSS) assets. As currently configured, the LAR battalions exhibit limitations to the success possible under this concept. Major urban areas and densely wooded or jungle terrain, as well as craggy mountainous terrain, are geographic environments which pose significant threats and risks which outweigh the benefits to be gained. Additionally, the supported commander will have to make assumptions as to what is lost by committing the LAR assets to deep battle. Specifically, he will have to consider what LAR can do that shaping fires cannot do to attack the enemy's center of gravity, critical capabilities, or critical requirements.

Under this concept, LAR units can perform a variety of missions to shape the battlefield and achieve success for the supported commander. First, the LAR battalions can *own battlespace at an operational depth*. Second, the LAR battalions and companies can *perform security cooperation missions as the nucleus of a task force*. Third, the battalions or companies can *serve as a raid force* for the supported commander *against targets with significant operational or strategic importance*. Finally, the LAR battalions or companies can *serve in general or direct support of special operations forces* for insertion or extraction, as a reserve, or as a supporting effort. The objective may be an attack on a limited objective that is located deep in the supported commander's battlespace, such as securing critical infrastructure (key terrain), destroying command and control nodes, destroying indirect fire or anti-air capabilities, or interdicting enemy logistic support. LAR may also be used to conduct a demonstration or a show of force. Reconnaissance taskings may include route, zone, or area reconnaissance, which might serve as a means for the commander to find the enemy's gaps in order to press beyond initial objectives to primary objectives.⁸⁰ It is essential to remember that the LAV has the capability to fight for information, and can locate and test enemy dispositions in order to identify how that enemy is arrayed in depth.

The synopsis of the central idea is that LAR units should operate subordinate to the Marine Air Ground Task Force (MAGTF) or Joint Task Force (JTF) commander, vice operating subordinate to the GCE commander. As such, LAR can achieve greater penetration maximizing its projection potential and its gains for the supported commander. Furthermore, the MAGTF or JTF commander can better support LAR units with offensive air support and logistic sustainment. The aim of this concept is to use the inherent strengths of LAR units (speed, mobility, firepower, long-haul communications, and self-sustaining logistics) to deny safe havens to the enemy, cause the enemy to deploy early and trade space for time in the MAGTF or

JTF main battle area, engage key individuals and villages, and eliminate operational targets. In other missions, LAR supports the close fight through deep maneuver operations by landing a devastating psychological blow to destroy enemy centers of gravity, critical capabilities, and critical requirements that cannot otherwise be destroyed due to their proximity to sensitive sites or population concentrations, or because they simply cannot be located for strike operations. The success mechanism of this concept is persistent pressure across the depth and width of the MAGTF or JTF commander's battlespace.

LAR is uniquely equipped and manned to carry out the various warfighting functions and requires only slight adjustments to make this concept feasible. The most important function is command and control (C²). The concept itself adjusts the C² responsibility from the GCE to the MAGTF or JTF commander to maximize the strengths of the LAR battalion. Most important, due to the tyranny of distance and constant friction inherent in war, is a detailed commander's intent within mission type orders. Command and Control is executed up and down the chain of command through a mix of dedicated SATCOM channels down to the company level, and UHF, VHF, and HF nets throughout the battalion. Organic direct and indirect fire capabilities as well as joint fires enable the fires function to support the maneuver. Maneuver is executed through the organic lift of the LAVs and the battalion's rolling stock. The LAR battalion is logistically self-sustaining for missions limited in duration but can operate for extended periods with aerial or ground resupply. The intelligence function is enabled by the organic unmanned aerial system (UAS), as well as access to joint intelligence assets and the attachment of signals and human exploitation teams. The speed and tactical mobility of the LAV provides force protection. As well, the use of UAS and Joint Surveillance and Target Attack Radar (JSTAR) in over-watch, and the use of harbor sites provide additional force protection during multi-day movements and

raids. These functions enable the cohesive execution and accomplishment of the mission within the strategic context of future irregular warfare operations.

Necessary to ensure the success of this concept are four primary capabilities. First, the LAR battalion must have access to joint intelligence assets, via either a direct link to the asset or an intermediary. What is important is that the LAR unit possesses the intelligence to sense its operating environment. Second, the LAR battalion requires access to joint fires to maximize its impact and defeat the enemy when necessary. Third, the LAR battalion, operating at extended distances for extended periods, requires aerial resupply. Though ground resupply is an option, aerial resupply can enhance accomplishment of the mission with less risk to the units involved in the resupply. Finally, the battalion requires a more robust infantry presence. This can be achieved either by a table of organization change, or by the attachment of Marine, coalition, or host nation infantrymen for the duration of the deployment.

With regard to the LAR battalion owning battlespace, it is desirable the MAGTF or JTF commander push the battalion as far ahead of the main battle area as feasible to interdict the enemy forces and gain more time to shape the deep battle. The LAR battalion is capable of owning the battlespace for the duration of the mission or campaign with appropriate support. In all other potential missions (e.g. raids, show of force, supporting effort to SOF, etc), duration is limited by logistic resupply and the distance is limited by logistic support including urgent casualty evacuation and treatment.

In conclusion, this concept proposes that a change in the C² level for an LAR battalion can maximize the potential of the MAGTF or JTF to achieve tactical success with operational and strategic implication within the context of future irregular warfare. The LAR battalion's inherent strengths are currently under-employed when operating solely under the C² of the GCE. Denying safe havens and maintaining persistent pressure against the enemy are key capabilities

to success in irregular warfare and the LAR battalion is the MAGTF or JTF commander's mechanism for success within the strategic context of future irregular warfare.⁸¹ This future concept of employment offers a way forward for the LAR community to realize its maximum potential and advocate to break away from unimaginative, and doctrinally incorrect, modes of employment while still maintaining a solid grounding in providing its supported commander a tactically and operationally mobile reconnaissance asset.

Endnotes

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³ Force Structure Study Group, II-77.

⁴ Force Structure Study Group, II-98.

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¹³ Joseph M. Lance, January 17, 2010.

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¹⁶ D. R. Miller, Maj USMC, "LAV: Time For A Real MOS," (Masters Thesis, Marine Corps University 1992): 3.

¹⁷ John F. Kelly, LtCol USMC, "Redesigning Recon," *Marine Corps Gazette*, (April 1994): 46.

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²⁰ MCWP 3-14, 1-1.

²¹ MCWP 3-14, 1-2.

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- ²² MCWP 3-14, 1-3.
- ²³ MCWP 3-14, 3-1.
- ²⁴ MCWP 3-14, 3-1.
- ²⁵ The Joint Chiefs of Staff. *Department of Defense Dictionary of Military and Associated Terms*. Joint Publication 1-02, (Washington, D.C.: 12 April 2001 as amended through 19 June 2009), 326.
- ²⁶ MCWP 3-14, 3-6 to 3-7.
- ²⁷ MCWP 3-14, 3-2 to 3-3.
- ²⁸ MCWP 3-14, 3-9.
- ²⁹ MCWP 3-14, 3-7 to 3-9.
- ³⁰ This section is derived from the author's personal experience as well as input provided by Marines interviewed during research for this paper.
- ³¹ LtCol William Nemeth recounted during a peer review of this paper that when he served as a platoon commander with 2d LAR Bn, the battalion received a tasking from the 2d Marine Division during a capabilities exercise to, "Screen and Guard in order to Cover the Division's movement." This is a perfect example of poor terminology usage, which causes confusion up-and-down the chain of command.
- ³² Frederick R. Kienle, MAJ USA, "Reconnaissance-Pull' – Seeking the Path of Least Resistance," (Monograph, School of Advanced Military Studies, 1991): 1 to 43. Major Kienle aptly discusses the process of "recon-pull" which is elementary to the fundamental purpose of conducting reconnaissance.
- ³³ Norman L. Cooling, Capt USMC, "LAI in the MEU (SOC)," *Marine Corps Gazette* (August 1991): 20 to 24.
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- ³⁶ Richard W. Harrison, *The Russian Way of War Operational Art, 1904-1940*, (Lawrence, KS: University Press of Kansas, 2001), 1.
- ³⁷ Bruce W. Menning, "Operational Art's Origins." In *Historical Perspectives of the Operational Art*, edited by Michael D. Krause and R. Cody Phillips, 3-21, (Washington, D. C.: United States Army Center of Military History, 2005), 1 to 9.
- ³⁸ "Operational Maneuver Group," 5.
- ³⁹ "Operational Maneuver Group," 1.
- ⁴⁰ "Operational Maneuver Group," 16.
- ⁴¹ "Operational Maneuver Group," 12.
- ⁴² "Operational Maneuver Group," 5 to 7.
- ⁴³ "Operational Maneuver Group," 1.
- ⁴⁴ Bradley H. Shumaker, Maj USMC, "The Marriage of Deep Maneuver and Marine Light Armored Reconnaissance," (Manuscript, Marine Corps University 1998), 2.
- ⁴⁵ Thomas B. Sward, LtCol USMC. "Deep Maneuver Concept and Proposal." Point Paper. Author's personal collection. (1996), 1.
- ⁴⁶ Anonymous, "1st LAR Bn Releases Deep Maneuver Report," *Marine Corps Gazette* (May 1997), 8.

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⁴⁸ “*Command Chronology For the Period 1 January to 30 June 1997.*” Thomas B. Sward, LtCol USMC. Archives and Special Collections Branch, Library of the Marine Corps. Collection: 1st LAR Bn Command Chronology. Box 1487, Folder January to June 1997.

⁴⁹ “*Exercise Deep Strike 3-9 Aug 97,*” Memorandum from Operations Officer 1st Light Armored Reconnaissance Battalion to Deputy G-5, I MEF, D. E. Villarreal, Capt USMC, Archives and Special Collections Branch, Library of the Marine Corps. Collection: 1st LAR Bn, Command Chronology, Box 1487, Folder July to December 1997, 1 to 4.

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⁵⁴ Carl von Clausewitz, as quoted in: Shumaker, “The Marriage of Deep Maneuver and Marine Light Armored Reconnaissance,” 13.

⁵⁵ Clausewitz, as quoted in: Shumaker, “The Marriage of Deep Maneuver and Marine Light Armored Reconnaissance,” 13.

⁵⁶ Bing West and Ray L. Smith, MajGen USMC (Ret), *The March Up: Taking Baghdad with the 1st Marine Division* (New York: Bantam Dell-Random House, 2003), 247.

⁵⁷ West, 247-248.

⁵⁸ M. E. Barnett, Capt USMC, “*Command Chronology for the period 1 May to 31 May 2009.*” 2d Light Armored Reconnaissance Battalion. (31 May 2009), 6.

⁵⁹ M. E. Barnett, Capt USMC. “*Command Chronology for the period 1 June to 30 June 2009.*” 2d Light Armored Reconnaissance Battalion. (30 June 2009), 5.

⁶⁰ Larry D. Nicholson, BGen USMC. “*Annex B to MEB-A Operation Order.*” Afghanistan, 7 June 2009), B-2.

⁶¹ Thomas E. Grattan, LtCol USMC. Commanding Officer, 2d Light Armored Reconnaissance Battalion. Interview by author, January 13, 2009.

⁶² Grattan, interview by author on January 13, 2009.

⁶³ Larry D. Nicholson, BGen USMC. “*Annex C to TF Leatherneck OpOrd 1-09.*” Afghanistan, (7 June 2009), C-1.

⁶⁴ Barnett, “*Command Chronology for the period 1 June to 30 June 2009,*” pg. 7.

⁶⁵ Thomas E. Grattan, LtCol USMC. “*Task Force Mameluke Operation Order 1-09.*” (Afghanistan, 18 Jun 09), 1.

⁶⁶ Grattan, “*Task Force Mameluke Operation Order 1-09,*” 3.

⁶⁷ Grattan, interview by author on January 13, 2009.

⁶⁸ “Soft knock” operations refers to a tactic employed in counterinsurgency operations during which patrols will knock on doors, wait for them to be answered and then engage in a discussions with the occupants or announce their intention to search the home. “Hard knock” operations are a tactic where a suspect house is targeted and forcibly entry is made in order to catch the occupants by surprise, presumably to capture / detain a known targeted individual or to search for contraband.

⁶⁹ M. E. Barnett, Capt USMC. “*Command Chronology for the period 1 July to 31 July 2009.*” 2d Light Armored Reconnaissance Battalion. (31 July 2009), 13.

⁷⁰ Grattan, interview by author on January 13, 2009.

⁷¹ M. E. Barnett, Capt USMC. “*Command Chronology for the period 1 August to 31 August 2009.*” 2d Light Armored Reconnaissance Battalion. (31 August 2009), 7.

⁷² Grattan, interview by author on January 13, 2009.

⁷³ Grattan, interview by author on January 13, 2009.

⁷⁴ Classes of Supply: Class I - Food, rations, and water; Class II – Clothing and Batteries; Class III - Petroleum, oils, and lubricants; Class IV - Fortification and barrier materials; Class V – Ammunition; Class VI - Personal Items; Class VII - Major End Items (e.g. vehicles); Class VIII - Medical supplies; Class IX - Repair Parts; Class X - Miscellaneous supplies.

⁷⁵ Grattan, interview by author on January 13, 2009.

⁷⁶ Grattan, interview by author on January 13, 2009.

⁷⁷ The majority of this section is derived from the author’s unpublished paper, *Light Armored Reconnaissance Employment in the Future*, prepared for the Innovation and Future War elective course at the Marine Corps Command and Staff College, 22 Feb 2010.

⁷⁸ Headquarters U.S. Marine Corps, *Operational Maneuver From The Sea*, (Washington, DC: Headquarters U.S. Marine Corps, 1997), 8, lists the principles of Operational Maneuver From the Sea (OMFTS). They are to “focus on the operational objective; use the sea as maneuver space; generate overwhelming tempo and momentum; pit strength against weakness; emphasize intelligence, deceptions, and flexibility; and integrate all organic, joint, and combined assets.” Landing across the force beachhead, as is typically executed by LAR units embarked with MEUs, does not maximize the potential of LAR to execute OMFTS. It degrades the ability of the MEU Commander to rapidly project combat power ashore as LAR waits for the beach to be seized; minimizes their reconnaissance/intelligence role and limits their ability to shape the battlespace; minimizes their speed, maneuverability, firepower, and long-haul communications capabilities; and forces the unit to conduct a forward passage of lines through the enemy’s strength. LAR is a perfect match for Operational Maneuver From the Sea and can better achieve it by providing a ship to objective capability when LAVs are delivered via LCACs. To maximize the strengths and capabilities of LAR, it should land in a pre-assault or initial wave on a flank to conduct an overland movement to secure an objective or accomplish a reconnaissance mission.

⁷⁹ Headquarters U.S. Marine Corps, *A Concept for Distributed Operations*, (Washington, DC: Headquarters U.S. Marine Corps, April 25, 2005), I to II, states that Distributed Operations is a concept of fighting maneuver warfare with the deliberate separation of small tactical units across a large area. It is predicated by the increased situational awareness of the small unit (companies, platoons, and even squads), increased communication capability, increased tactical mobility, and an increased access to non-organic supporting arms, to include joint fires. While the Marine Corps has a long way to go in making this concept reality for the individual rifle squad, it does possess the capability to conduct distributed operations with LAR, and in fact already has during OIF and OEF. With minor additional communication and intelligence assets, joint fires enabler attachments, and air deliverable resupply, LAR companies can conduct distributed operations across a vast battlefield. LAR already possesses the maneuverability, direct fire, and force protection to ensure success.

⁸⁰ C. F. Hamilton, Maj USMC, "LAV and the Amphibious Assault," *Marine Corps Gazette* (October 1983), 68 to 71.

⁸¹ John F. Schmitt, *A Practical Guide for Developing and Writing Military Concepts*, DART Working Paper 02-4, (McLean, VA, December 2002), http://www.dtic.mil/futurejointwarfare/concepts/dart_paper.pdf, accessed 10 Feb 2010. The framework for future concepts discussed by Schmitt in this paper served as the guide for the development of this future concept of LAR employment.

APPENDIX A

CONTEMPORARY VIEWS OF LAR's ABILITY TO

EXECUTE DEEP MANEUVER

The author contacted fifteen Marines experienced in the light armored reconnaissance field. Below is a break out of general demographic information, followed by a review of what these contemporaries consider positive and negative attributes of LAR units. Next is a discussion on contemporary impressions on the ability of a Light Armored Reconnaissance unit to conduct a mission similar to an operational maneuver group; whether that mission is capable with the current organization of and equipment in LAR; and, if not feasible, what organizational or equipment changes would be necessary to conduct such an assignment.

Rank:	Total Respondents:	Avg Years of Service:
BGen – MajGen	2	32.5
Maj – Col	9	19.2
Capt	1	17.2
GySgt – MGySgt	3	26

Occupational Specialty:	Description	Total Respondents:
0302	Infantry Officer	10
0313	LAV Crewman	3
0802	Artillery Officer	1
1802	Tank Officer	1

When the interviewees were questioned as to the positive attributes of a Light Armored Reconnaissance unit, there were diverse responses. There were simple bullets that highlighted *speed, mobility, firepower and command and control*. There were also more detailed responses, but overwhelmingly the most common responses focused on LAR’s versatility and flexibility.

When questioned about negative experiences with LAR, three recurring themes appeared in the majority of the responses. The most common negative, was that *most non-LAR commanders do not understand LAR’s capabilities, the best methods of employing LAR, and believe LAR is a force provider vice a maneuver asset to the supported commander*. This is true from division to battalion commanders. Closely tied to this is an argument that LAR should be “V” coded so that it retains the same priority for staffing as the infantry battalions. Furthermore,

it should maintain an even footing with its “straight leg” infantry brethren when it comes to being provided enablers. Though a number of first generation LAV officers are now general officers, the recurring theme of a lack of understanding by commanders will not be alleviated without continued discussion of this issue. It remains the responsibility of the LAR officer to provide his recommendations for the best employment of his assets, just like any other separate battalion.

Next, a number of responses indicated that *maintenance is becoming an issue*. When the LAV was originally purchased, it was intended to serve until approximately 2005. The current estimate of service life has been extended to 2025 via a Service Life Extension Program, which upgraded many components. Additionally, new LAVA2s have been purchased to replace combat losses, fill out the fifth company in the active duty battalions, and the fifth and six companies in the reserve battalion, and existing platforms are having most components upgraded to LAVA2. Nonetheless, it is and will remain a maintenance intensive platform: generally, for every hour of operation four hours of maintenance needs to be performed. Ironically, the more the vehicles run, the better they perform - as long as proper pre- and post-operation checks and services are completed, as well as proper daily, weekly, monthly and annual services.

Finally, the next most common negative mentioned was that it is a lightly armored vehicle and is *not well suited for direct combat at the “heavy” end of the spectrum*. However, this should not come as a surprise, as it was not acquired under the auspices of being able to kill tanks. That is the job of a tank. However, it does lead to two arguments that have promulgated throughout the community since at least 1996. The first argument being that the Emerson 901 turret on the LAV-AT, which fires TOW missiles, is a dated and unreliable system. The answer many propose is that the discontinued use of the 901 turret and the addition of saddlebag

launchers on the existing LAV-25 turrets, similar to the Army's Bradley Infantry Fighting Vehicle. The second argument is that the LAV needs a lethality upgrade from a 25mm chaingun to a 30mm chaingun. The Improved Thermal Sight System (ITSS) is an incredible leap for the LAV community. That, combined with a 30mm chaingun, would not only improve the first round hit probability, but it would exponentially increase the probability of mobility kill and even significantly improve the probability of a kill shot against a number of threat armored vehicles. However, it will not better the LAV's ability to kill tanks with just a 30mm upgrade. Yet, with a 30mm chaingun and saddlebag anti-tank missiles, the ability to gain and maintain contact to fight for information would significantly increase the survivability of the LAV.

All of the respondents possessed at least some knowledge of the Soviet Operational Maneuver Group. Several were quite familiar with the OMG and its concept of employment. Furthermore, all but one respondent believed that LAR was capable of conducting deep operations similar to an OMG. The obvious caveat is that LAR is nowhere close in size or task organization; hence what can be accomplished in such missions is limited by duration and scope. Major Thomas Garnett, Executive Officer, 2nd Battalion, 8th Marines, stated there "is a lot of potential for hitting the enemy's centers of gravity." Due to today's complex battlefield environment, it seems more likely that methods other than strike operations will have to be conducted to attack centers of gravity in order to minimize collateral damage.

Major David Hudspeth, II MEF Future Operations, pointed out that deep maneuver brings a degree of "higher risk." But he, and the vast majority of the respondents, believes that at the low to middle range of the threat spectrum there is a high probability for success. BGen Joseph McMenamain, USMC (Ret), poignantly pointed out that as a deep maneuver element, "Unless reinforced, then the objectives of the mission need to be defined by the capabilities of

the vehicle and not a wish for success.” By being reinforced, and most importantly properly supported with logistics and fires, the probability for success increases toward the mid to higher end of the threat spectrum. However, it should be noted, that as the risks increase so will the possibility of mission failure. The key is to determine when the right conditions allow for bold exploitation of maneuver warfare in order to deliver a psychologically crushing blow.

With regard to whether or not the LAR battalion can currently conduct deep operations with its current organization and equipment, the majority of the respondents argue that it cannot. There are a variety of recommendations but it suffices to say that the battalion is lacking a credible organic fire support capability (most prefer the 120mm mortar), is deficient in a credible anti-tank capability, and has an insufficient number of scouts. Furthermore, other major themes include increased ISR (UAV and LAV-Recce), engineer attachments (and a credible route clearance capability), logistic resupply capability (air and ground options), intelligence augmentation, and integration with joint fires capabilities. One respondent added that increased SATCOM capability throughout the battalion is desired so that the battalion can infiltrate across a more dispersed axis. Another point should be noted: An increase in bandwidth is needed for a command and control link to the supported commander. Though this is last on the list, it is the most challenging requirement levied. In conclusion, contemporaries believe that LAR is capable of conducting deep operations, with the proper task organization, and dependent on the duration and scope of the mission, as well as the existing threat.

Sources: See bibliography for list of interviewees.

APPENDIX B

LAV FAMILY OF VEHICLES

CHARACTERISTICS COMMON TO THE FAMILY OF LIGHT ARMORED VEHICLES

Maximum Speed:

Land; 62.2 mph

Water: 6.5 mph

Reverse: 10.9 mph

Maximum Grade: 60%

Side slope: 30%

Vertical Step: 19.7 in

Trench Crossing: 68 in

Towed Load: 29,000 lbs

Weight:

Empty: 12.47 tons

Combat Loaded: 14.4 tons*

Fuel: 71 gals (diesel, JP-5, JP-8)

Dimensions:

Height: 8.5 feet

Width: 8.2 feet

Length: 21.05 feet

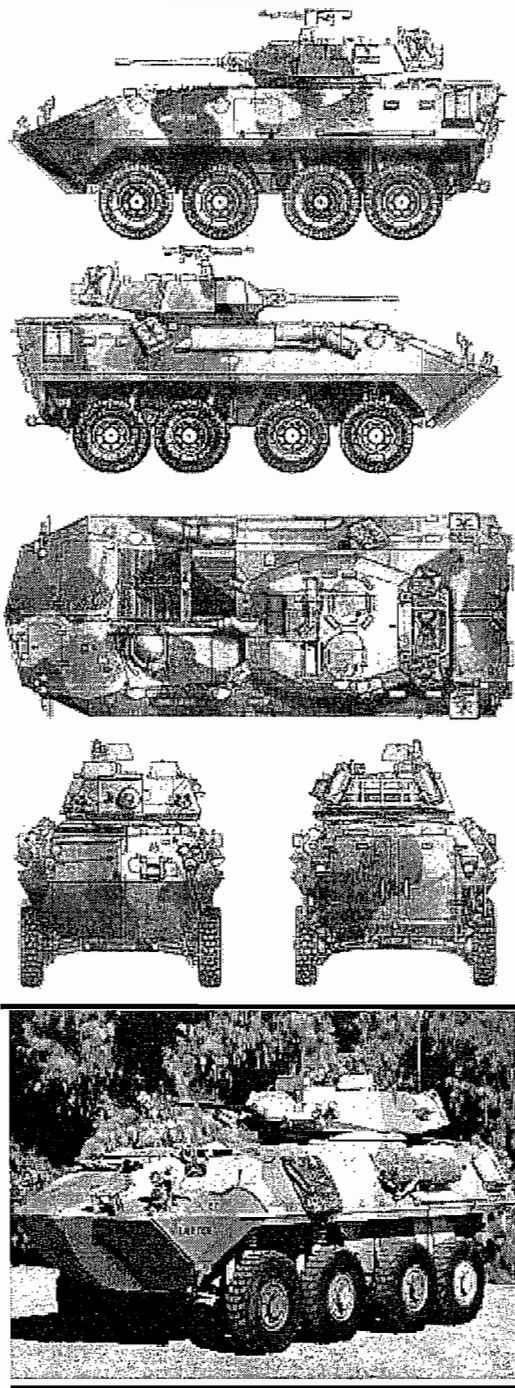
Range: 400 miles[^]

Notes: *BUP Armor adds 1000-3000 lbs

[^]Range varies depending on speed and weight.

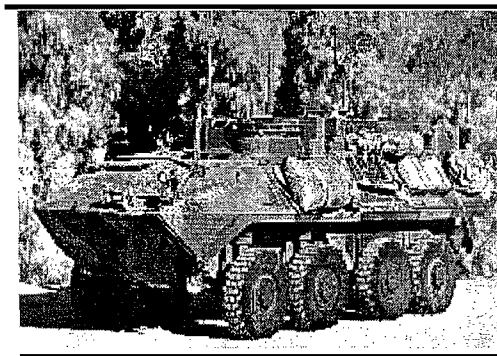
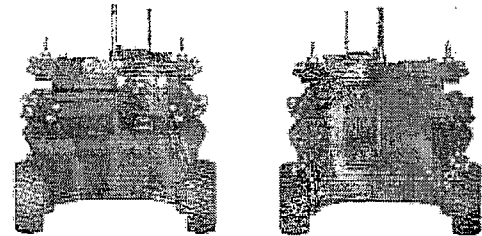
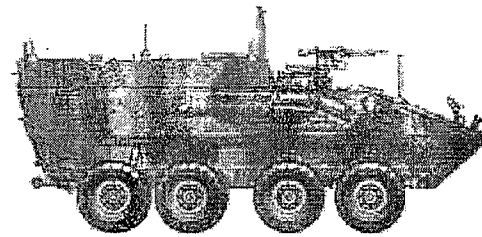
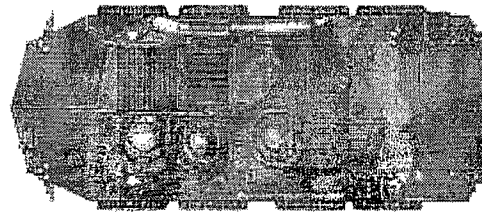
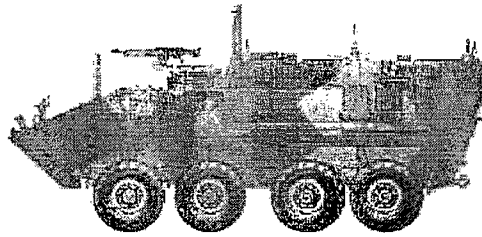
Source: Light Armored Vehicle Company, Infantry Training Battalion, Student Handout, Familiarization of the LAV-25, 8 December 1995. Author's Personal Papers.

LAV-25



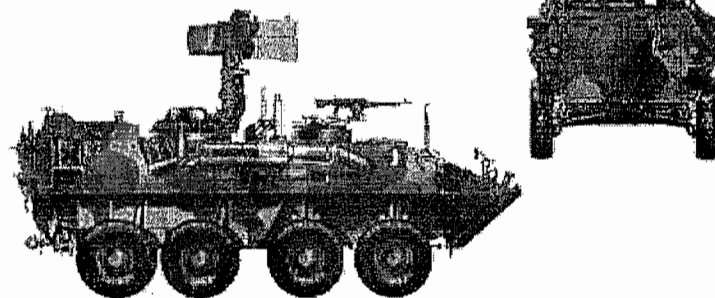
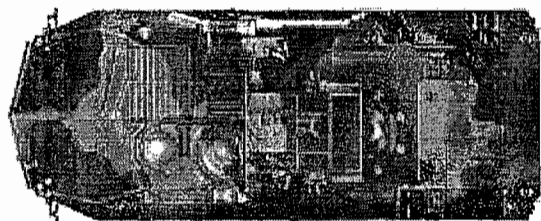
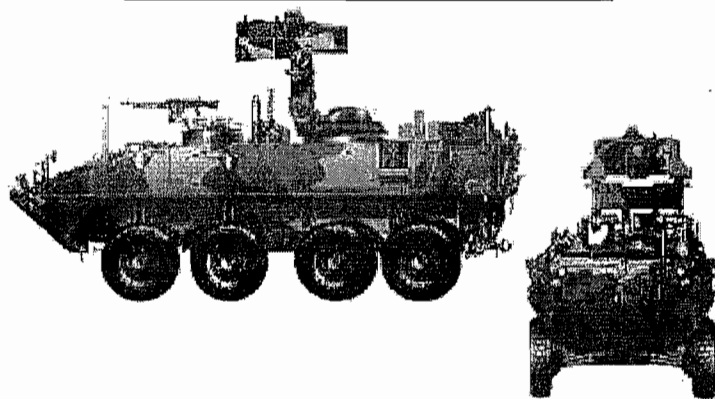
Armament: 25mm Chaingun, 2 x 7.62mm Machineguns

LAV-C² (Command and Control)



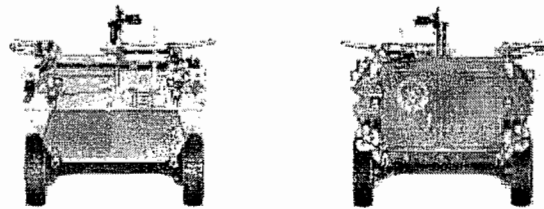
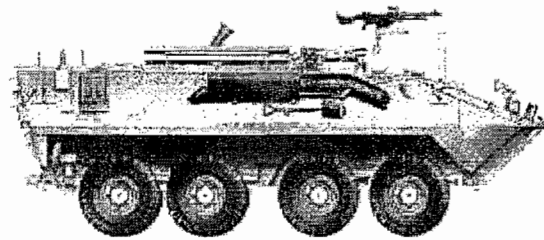
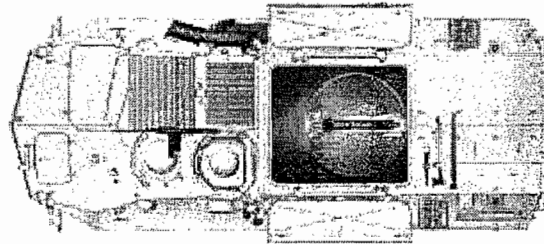
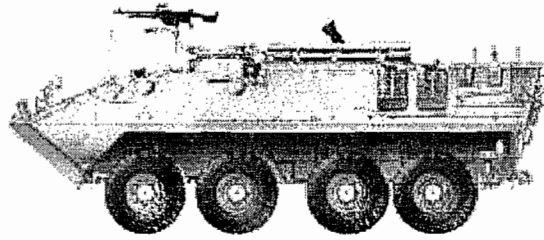
Armament: 7.62mm machinegun

LAV-AT (Anti-Tank)



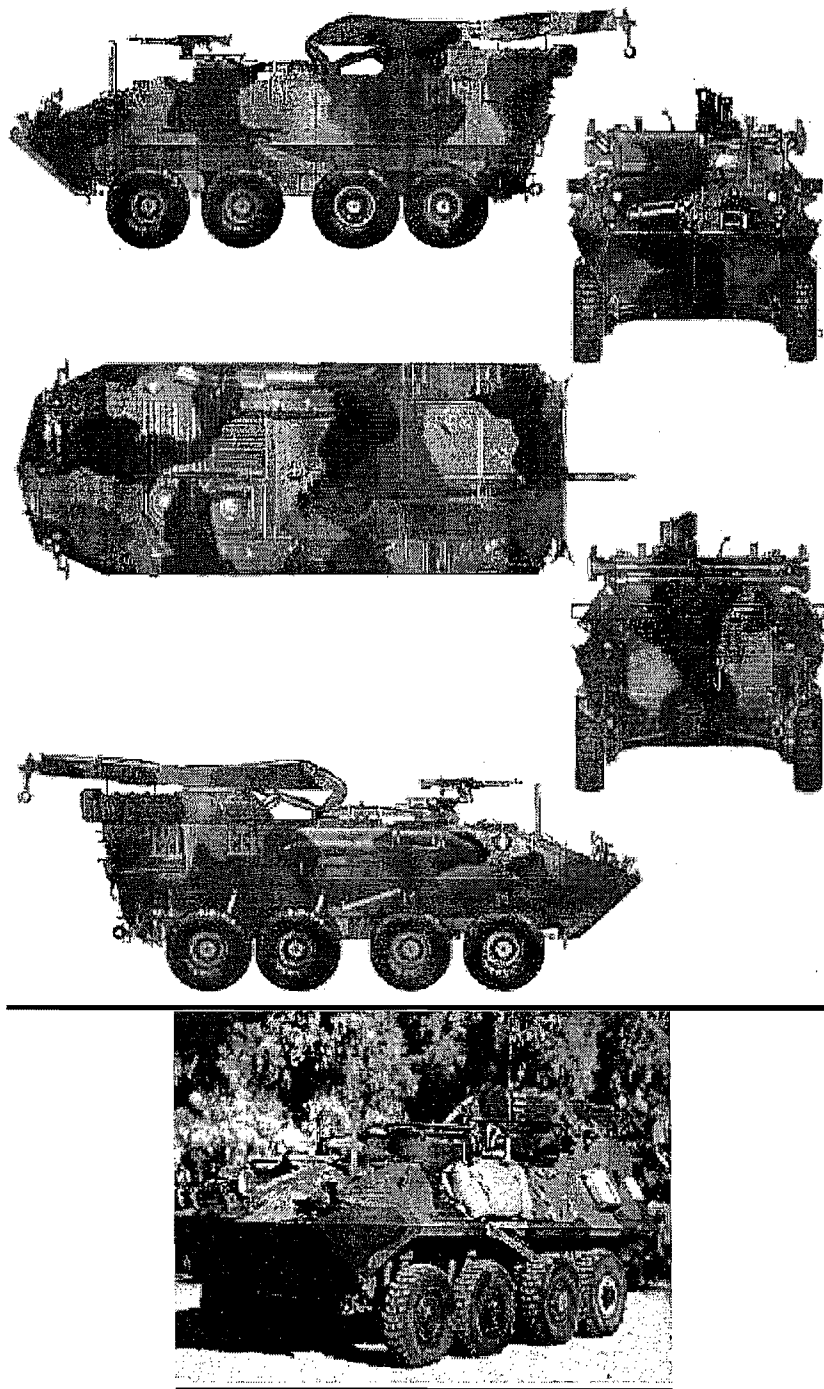
Armament: 2xTOW Missile Launcher, 7.62mm
Machinegun

LAV-M (Mortar)



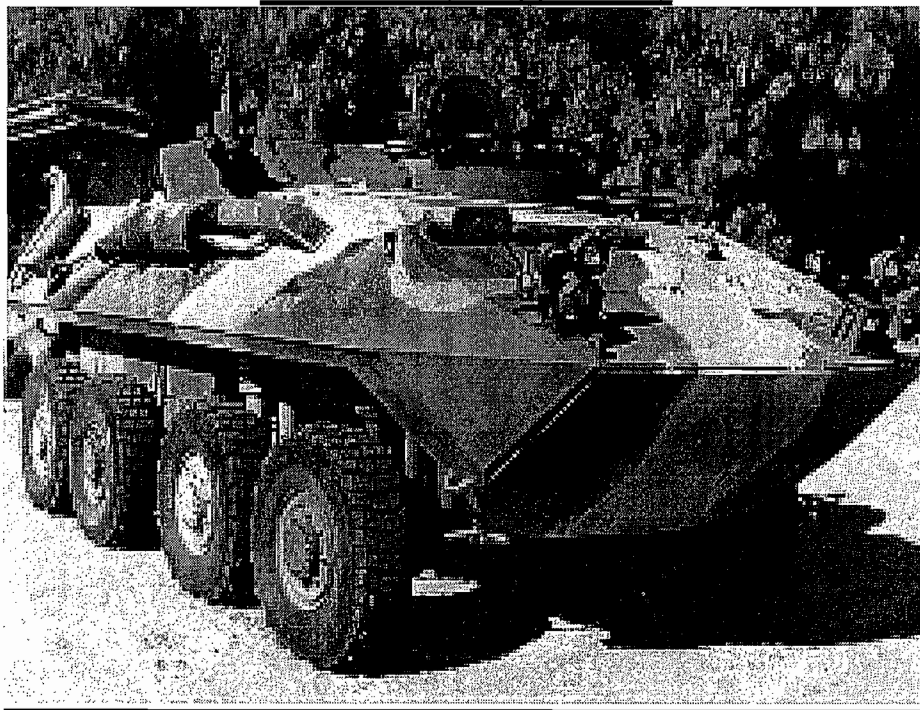
Armament: 81mm Mortar, 7.62mm Machinegun

LAV-R (Recovery)



Armament: 7.62mm Machinegun

LAV-L (Logistics)



Armament: 7.62mm Machinegun

Sources:

Schematic Drawings: Property of The-Blueprints.com

<http://www.the-blueprints.com/blueprints/tanks/tanks-k-1/page/2> (accessed 21 Jan 2010)

Color Photos: Official United States Marine Corps Photos

APPENDIX C

CURRENT LAR BN STRUCTURE

LAR BN
USMC USN
Off Enl Off Enl
39 724 3 66

HEADQUARTERS
AND
SERVICE
COMPANY

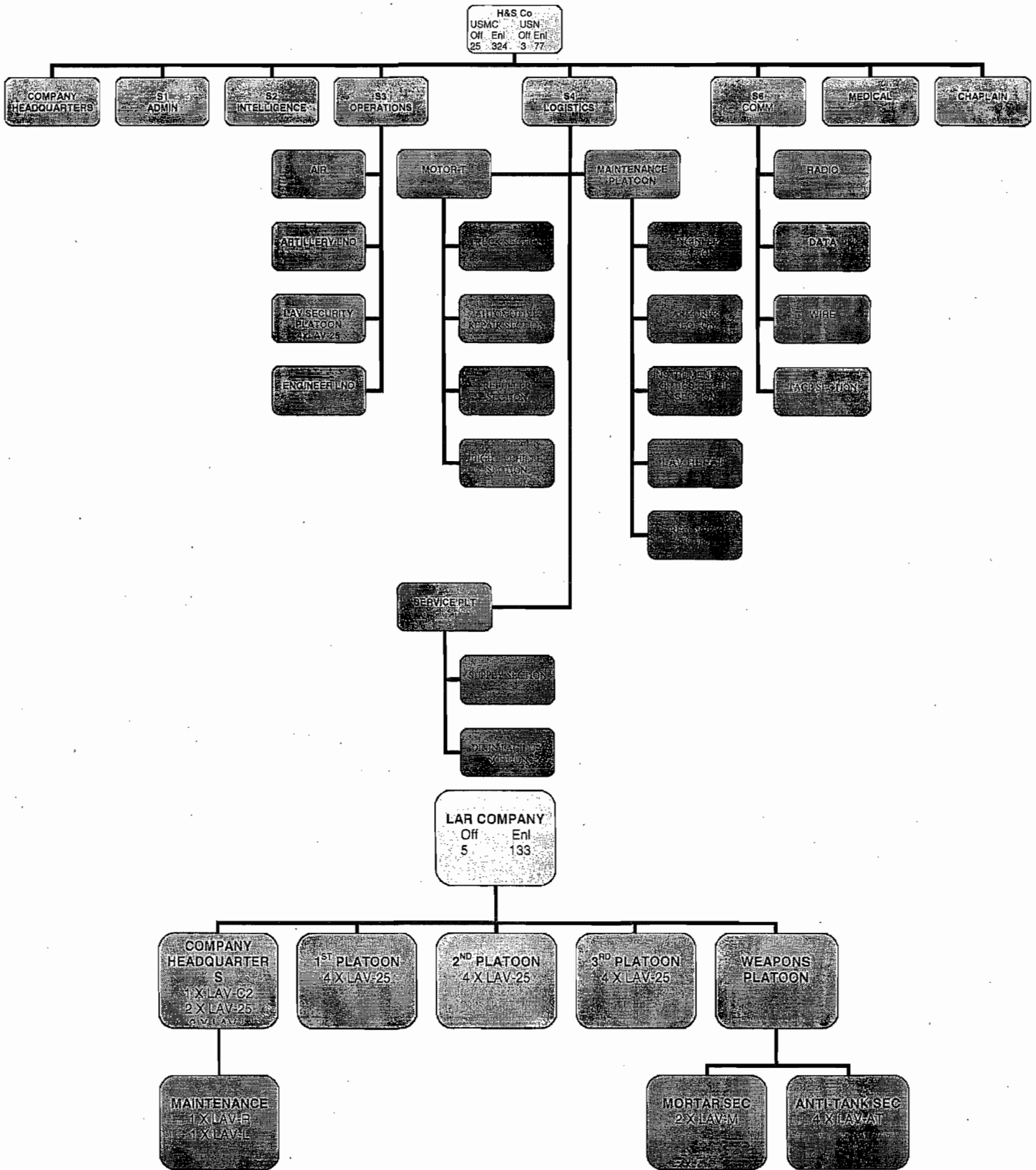
COMPANY
A

COMPANY
B

COMPANY
C

COMPANY
D

COMPANY
E



Source: Headquarters U.S. Marine Corps, *Light Armored Vehicle Employment*, MCWP 3-14 (Washington, D.C.: Headquarters U.S. Marine Corps, September 17, 2009): pgs. 2-2 to 2-3.

APPENDIX D

CHRONOLOGY OF SIGNIFICANT EVENTS

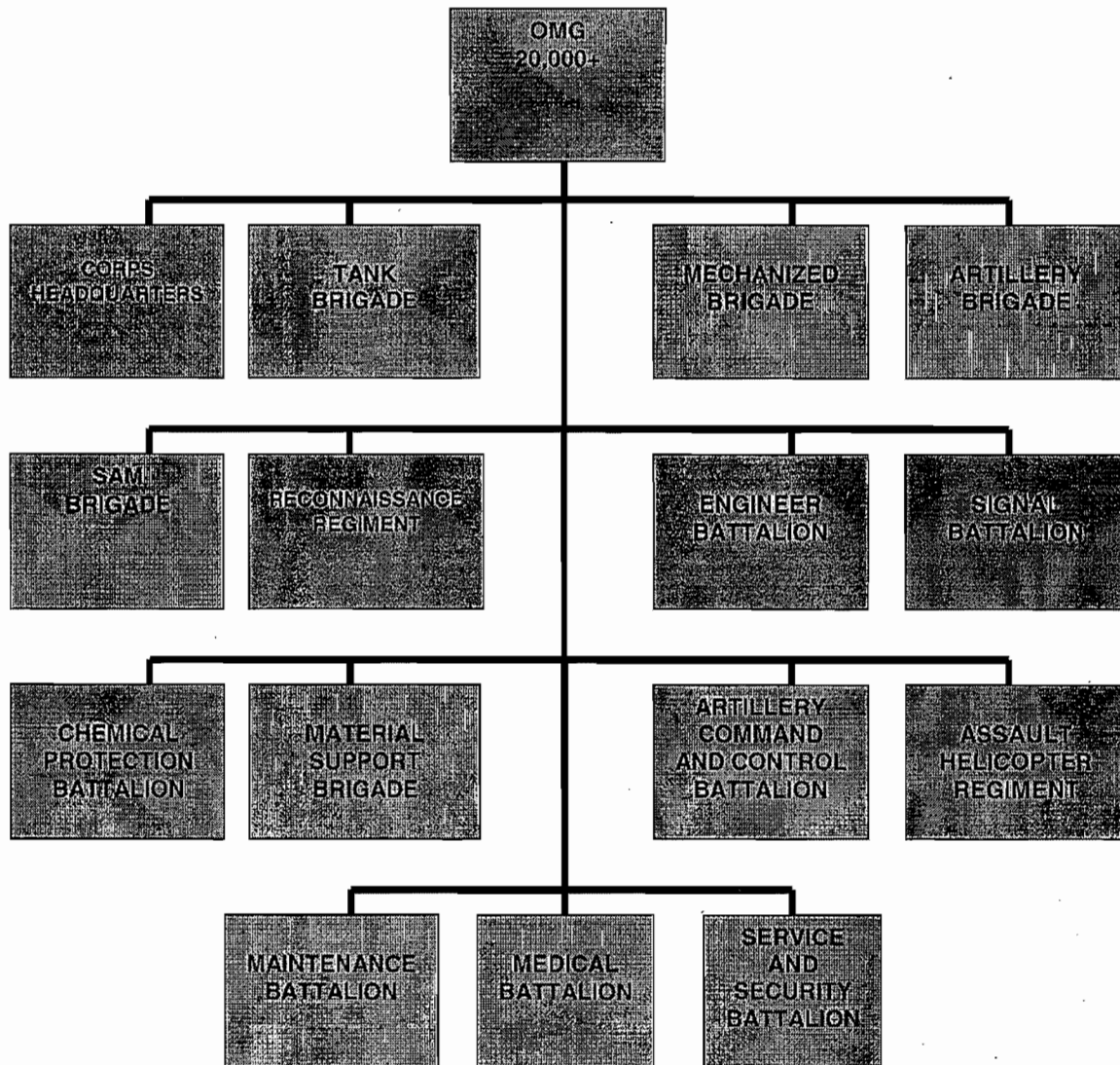
Date	Event
1973	Marine Corps initiates concept development for a mobile protected weapon system to replace retiring equipment
1978	Greater emphasis added to anti-tank capability for mobile protected weapons system
1979	Force Structure Review to "develop an optimum infantry battalion for the eighties"
Mar 1980	MajGen Gray testifies on need for LAV as part of RDF
Jul 1980	Revised concept of operations published by Decisions and Designs, Incorporated.
Sep 1980	Statement of Requirement and Operational Concept of Employment published by Decisions and Designs, Incorporated
12 Jul 1983	Co A (REIN), 1st LAV Bn, 27th Marines, activated at 29 Palms, Ca to test and develop light armored employment tactics
23 May 1984	First operational LAV-25s delivered to Co A, 1st LAV Bn
Jan 1985	Co A, 1st LAV Bn, redesignated A Co, 3d LAV Bn
4 Apr 1985	2d LAV Bn, 2d Marine Division activated at Camp LeJeune, North Carolina
31 May 1985	1st LAV Bn, 1st Marine Division, Fleet Marine Force activated at Camp Pendleton, California
11 Sep 1986	3d LAV Bn, 27th Marines, 7th Marine Amphibious Brigade, Fleet Marine Force activated at Twentynine, California
30 Jun 1987	27th Marines Deactivated
23 Sept 1987	4th LAV Bn, 4th Marine Division, U.S. Marine Corps Reserve activated at Camp Pendleton, California
1987	First MEU deployment
5 Feb 1988	7th Marine Amphibious Brigade redesignated 7th Marine Expeditionary Brigade
1 Oct 1988	1st, 2nd, 3rd LAV Bns redesignated LAI Bns
30 Feb 1989	3d LAI Bn relocates to Okinawa, Japan, and reassigned to the 3d Marine Division, Fleet Marine Force
May 1989	Co A and then Co B 2 nd LAI Bn deploys in support of Operation NIMROD DANCER in Panama
Dec 1989	Co D, 2d LAI Bn deploys in support of Operation JUST CAUSE in Panama
Jan 1990	Co C, 2d LAI Bn deploys in support of Operation Promote LIBERTY in Panama
Aug 1990 - Apr 1991	Elements from 1st and 3d LAI battalions participate in Operations DESERT SHIELD & DESERT STORM in Saudi Arabia and Kuwait
1 Dec 1990	4th LAV Bn redesignated 4th LAI Bn
Dec 1990 - Apr 1991	Elements from 2d and 4th LAI battalion participate in Operations DESERT SHIELD & DESERT STORM in Saudi Arabia and Kuwait
1991	Force Structure Review
Apr - Jul 1991	Element 2d LAI Bn participates in Operation PROVIDE COMFORT in Iraq

Date	Event
July 1991	3d LAI Bn relocated to Twentynine Palms, Ca, and reassigned to the 7th Marines, 1st Marine Division, Fleet Marine Force
May 1992	1st LAI Bn joins SPMAGTF for Los Angeles riots
12 Jun 1992	1st LAI Bn redesignated 1st Reconnaissance Battalion (Light Armored)
Oct - Dec 1992	Elements of 1st Recon Bn (Light Armored) participate in Drug Interdiction Operations in Arizona and Texas
Dec 1992 - April 1993	15 th MEU LAV detachment and fly-in company from 3d LAI Bn, which received its vehicles from pre-positioned ships, participate in Operation RESTORE HOPE in Somalia
Sep 1993 - Mar 1994	Elements 1st Recon Bn (Light Armored) participate in support of Operation CONTINUE HOPE in Somalia
1 Mar 1994	1st Reconnaissance Battalion (Light Armored) and 3d LAI Bn redesignated 1st and 3d LAR Bns respectively
18 Apr 1994	2d LAI Bn redesignated 2d LAR Bn
Aug - Oct 1994	Element 2d LAR Bn participates in Operation UPHOLD DEMOCRACY in Haiti
28 Oct 1995	4th LAI Bn redesignated 4th LAR Bn
Apr 1996	I MEF Deep Operations Working Group established
Jul/Aug 96	1st LAR conducts C ² exercise at sea in support of deep maneuver exercises
Apr - Aug 1996	Element 2d LAR Bn participates in Operation ASSURED RESPONSE in Liberia
Sep 1996 – Mar 1997	Element 1 st LAR Bn participates in HUNTER WARRIOR Advanced Warfighting Laboratory Experiment.
Oct - Nov 1996, & Apr 1997	Elements of 1st LAR Bn participate in Drug Interdiction Operations in Arizona and Texas
Nov 1996	1st LAR conducts STRATMOBEX in preparation for deep maneuver exercises
Jan 1997	Operation LONGBALL exercise in support of Deep Maneuver Working Group
Mar 1997	Operation DESERT SCIMITAR exercise in support of Deep Maneuver Working Group
Aug 1997	Operation DEEP STRIKE capstone exercise in support of Deep Maneuver Working Group
1995-1999	LAR Platoons deployed with various MEUs participate in operations in Bosnia and Kosovo
April 1999 - Jan 2000	Element 2d LAR participates in multiple operations off the Balkan peninsula
Aug 1999	Element 2d LAR Bn participates in Operation AVID RESPONSE in Turkey
Nov 2001 - Present	Various LAR units participate in Operation ENDURING FREEDOM in Afghanistan
Mar 2003 - Oct 2009	Various LAR units participate in Operation Iraqi Freedom in Iraq

APPENDIX E

OPERATIONAL MANEUVER GROUP

TASK ORGANIZATION



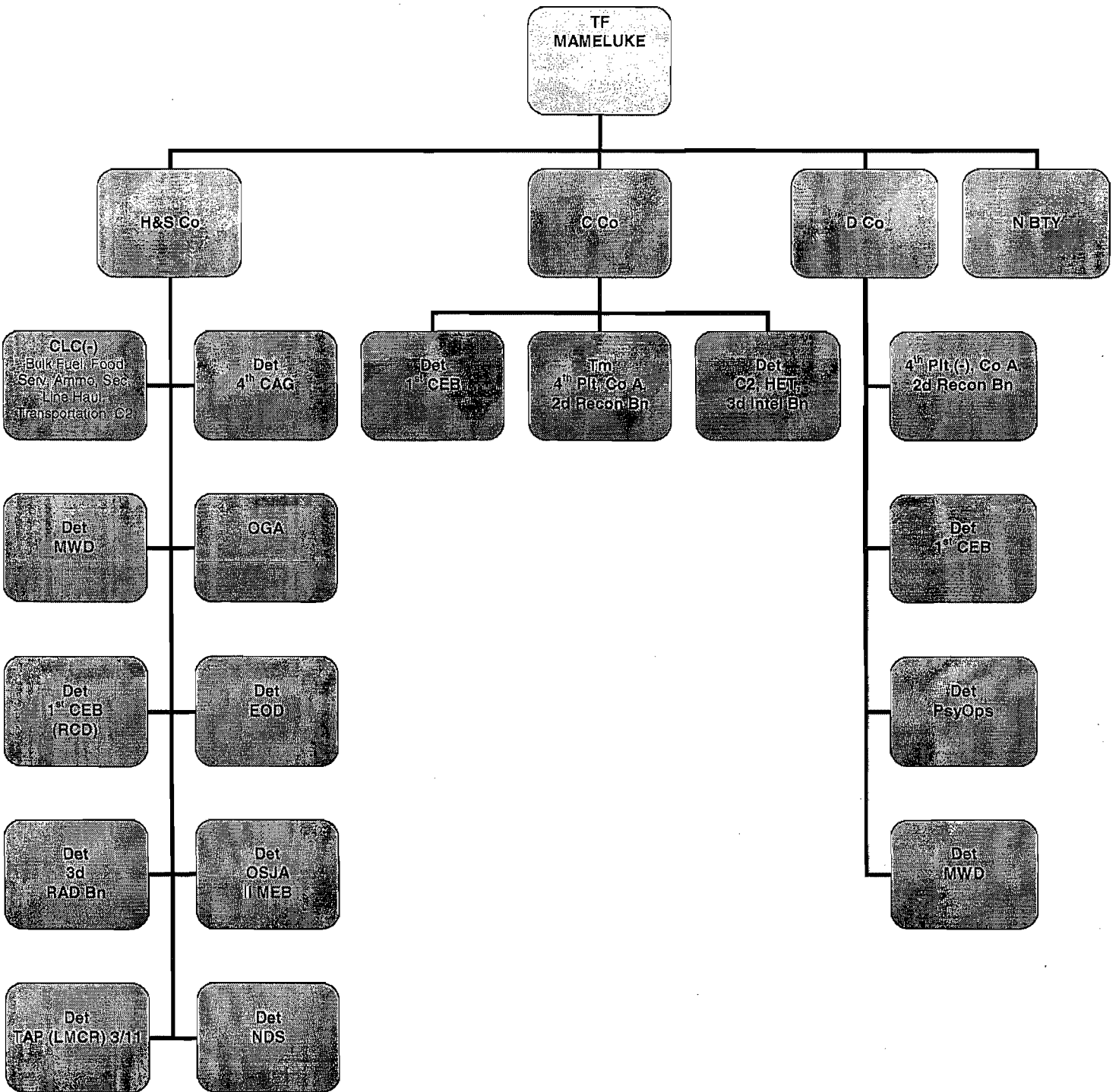
PRINCIPLE ITEMS OF EQUIPMENT

<u>EQUIPMENT</u>	<u>TOTAL(EST)</u>
Medium Tank T-62,72,80	390
BMP 1, 2	757
Mortars 82, 120	80
122mm SP Howitzer 2S1	72
152mm SP Howitzer 2S3	36-48
152 SP Gun 2S5	36-48
122mm Rocket Launcher BM-21	72
220mm Rocket Launcher BM-22	18

APPENDIX F

TASK FORCE MAMELUKE TASK

ORGANIZATION (Afghanistan, Summer 2009)



APPENDIX G

DECISIONS AND DESIGNS, INCORPORATED,

MEETING EXCERPTS

Decisions and Designs, Incorporated, Summary of Meeting report for 8 and 9 July 1980 stated that the revised concept of operations for the LAV included:

- Participate in heliborne operations;
- Transport troops over large distances (500 km) rapidly;
- Provide protection against indirect fire and small arms direct fire;
- Provide direct fire against lightly armored material and personnel targets;
- Conduct operations 24 hours, in smoke, in all weather conditions, in NBC environment;
- Conduct operations in areas with water obstacles;
- Conduct operations in difficult terrain with trafficability equal to the heavy tank;
- Provide self-supporting maintenance for a limited number of days;
- Provide protection against salt water environment during extended storage on prepositioned shipping.

The absolute performance requirements were:

- Family of vehicles (mobility/firepower, command and control, recovery/maintenance)
- Transportable by CH-53E
- Strategically and tactically air-transportable by C130, C141 and c5a
- Compatible with amphibious shipping and maritime environment
- Aided swim capability
- NBC collective protective capability and compatible with established decontamination procedures
- Required ancillary systems

The revised family of vehicles was broken down into two categories; core and follow-on variants. The core vehicles included the "Personnel Carrier, C2, and Recovery Vehicle/Maintenance." The follow-on variants included:

- Mortar Carrier
- Assault Gun
- Anti-Air
- EW
- Engineer (line charges)
- Logistics
- TOW under Armor / AT

Decisions and Designs, Incorporated, Summary of Meetings report for 4 and 5 September 1980 stated the following:

1. Statement of the Requirement. The immediate requirements of the Marine Corps demand weapons systems with greater operational range, agility, firepower, and mobility than those presently available. These systems must be capable of being projected both strategically and tactically to any crises area of the world as rapidly as possible to provide fire support and maneuverability to combat the continually increasing mobility and firepower of threat forces. The planned and projected strategic and tactical aircraft and surface mobility systems will provide

a means to rapidly transport men and equipment. A need exists for a highly mobile weapons system that is helicopter transportable and is capable of providing direct fire support during landing force operations and further operations ashore. In addition, this vehicle, the Light Armored Vehicle (LAV), must be compatible with current and projected amphibious ships and strategic airlift capabilities. It must provide protection from suppressive fires for the embarked infantry and crew, and be capable of engaging and defeating lightly armored vehicles, material and personnel targets. An initial operational capability (IOC) of FY1983 is desired.

2. Threat and Operational Deficiency

a. Threat. Potential enemy threats confronting the United States in the near-to-long-range period are fully developed in the U.S. Marine Corps Long-Range Plan (MLRP) and U.S. Marine Corps Mid-Range Plan (MMRP). An analysis of the threat discussed in these documents reveals the potential enemies' increasing combat capabilities.

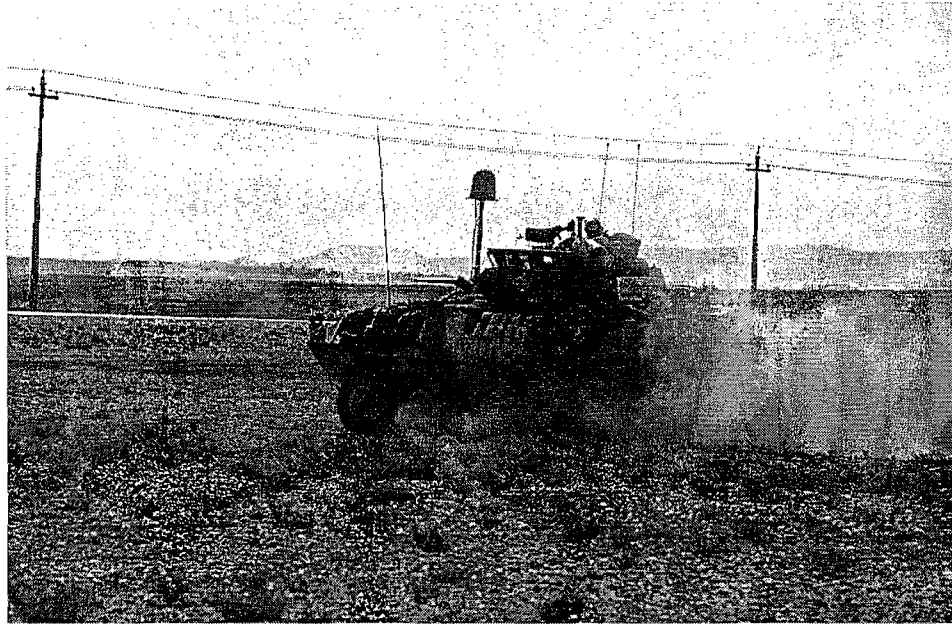
(1) Potential adversaries will take advantage of the availability of sophisticated, highly effective and highly mobile weaponry in all levels of conflict.

(2) The Marine Corps must be prepared to fight under all climatic and terrain conditions.

b. The Operational Deficiency. At the present time, Marine Corps combined arms task forces lack the mobility and firepower combination necessary to effectively conduct Rapid Deployment Force (RDF) missions/maneuver warfare. The basic maneuver element, the infantry battalion, is essentially limited to the marching speed of the infantryman and the firepower of its own light organic weapons. It is evident that a shift in the balance of the combined arms team must be towards greater mobility and firepower for the ground combat forces to ensure success against the increasing capabilities of probable adversaries. The lack of naval gunfire support, the absence of former organic direct fire support weapons, and the lack of mobility of the infantry battalion argue for immediate solutions to increase the combat effectiveness of infantry forces. Current and projected tanks possess the required firepower; however, because of their size and weight, they cannot be transported by current and projected helicopters. In addition, tanks require a large number of strategic aircraft and amphibious landing craft to project them to crises areas. There is an immediate need for an LAV that can provide infantry mobility and direct fire support to combined arms task forces and be effective in all weather and visibility conditions. The LAV must be capable of successfully attacking lightly armored vehicles, material, and personnel targets while providing the embarked personnel protection from small arms fire and antipersonnel devices such as airbursts and antipersonnel mines.

c. Operational Concepts. Fleet Marine Forces will continue to emphasize their readiness for deployment by amphibious means and/or air lift. Improved transportability, mobility, and firepower of these forces will provide the capability of rapidly projecting increased combat power ashore at greater distances inland, to operate more independently, if required. Tactical mobility will be achieved by high speed V/STOL aircraft, and by light armored vehicles. Targets which have been detected, reported, and designated will be engaged and destroyed by highly effective direct and indirect fire support weapons. Additional fire support for the assault elements of the combined arms task forces will be provided by the LAV. The most demanding function of LAV units will be to engage and defeat lightly armored, material, and personnel targets in direct support of infantry assaults. The LAV unit(s) must be capable of acting as the nucleus of and providing support to mechanized combined arms task forces (MCATF). The Marine Corps needs and LAV which is capable of providing increased firepower, greater mobility and effective protection for embarked personnel, in both offensive and defensive operations. Because of these operational requirements, the LAV must be capable of operating in all environmental and terrain conditions likely to be encountered by the landing force. Organizational concepts, logistical support, mechanized infantry tactics, training requirements, and force structure/mix and manpower trade-offs will be the subject of additional studies.

APPENDIX H
PHOTOGRAPHS



“A Light Armored Vehicle from Company D, 1st Light Armored Reconnaissance, tears through a field toward a hardball road here Nov. 12. The LAV has eight wheels, carries a capacity of six riflemen, a three-man crew, and boasts a 25 mm machinegun turret. LAVs can reach out and touch the enemy from a distance, or drive up and drop off Marines for a more in-close-and-personal approach. In short, range and terrain are no obstacles for the LAV. The Marines manning these vehicles, the “Diablos” of Company D, accepted responsibility for battle space in the Nineweh province Nov. 10. The Marines relieved soldiers from the Army’s 3rd Armored Cavalry Regiment. Mission accomplishment for the Diablos is to enable stabilization of Mosul by maintaining presence in towns, villages and along trade routes used by FFF and insurgents. The Marines make up one element of the first Marine Air Ground Task Force outside Anbar in Iraq since 2004. They traveled to the Nineweh province to kick off Operation Defeat Al Qaeda in the North II, an operation aimed at stamping out the insurgency just west of the restive city of Mosul.”

DatePhotoTaken 11/12/2008 1:19:00 PM Byline Sgt. GP Ingersoll VRIN#081112-M-81871-002.jpg Unit Multi National Force – West Dateline NINEWEH PROVINCE, Iraq



An LAV-25 moves through a street in Fallujah. Note vehicle providing security for the scouts and the scouts providing security for the vehicle. Photographer’s Name: Unknown Location: Fallujah, Iraq Date Shot: 11/22/2004



"Yermo Annex. A rebuilt Light Armored Vehicle Mortar (LAV-M) is put through a tough road test by maintenance crews from the Defense Logistics Agency." Photographer's Name: GS-09 Curtis Lambert Location: USMC LOGISTICS BASE, BARSTOW Date Shot: 8/25/1993 Date Posted: *unknown* VIRIN: 930825-M-2375L-001



"Yermo Annex. A rebuilt Light Armored Vehicle Mortar (LAV-M) is run through an inclined road test by maintenance crews from the Defense Logistics Agency." Photographer's Name: GS-09 Curtis Lambert Location: USMC LOGISTICS BASE, BARSTOW Date Shot: 8/25/1993 Date Posted: *unknown* VIRIN: 930825-M-2375L-

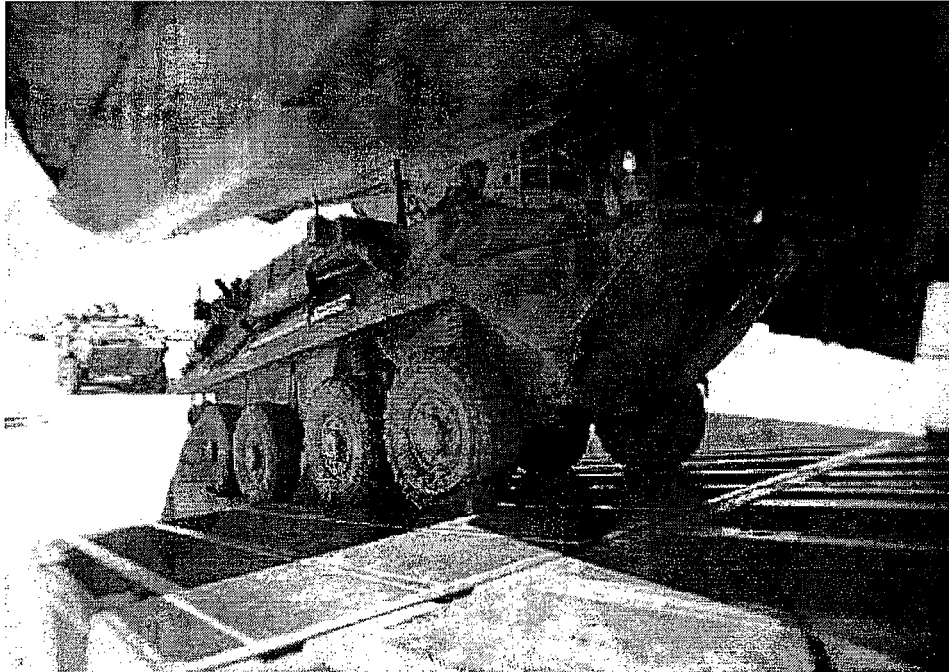
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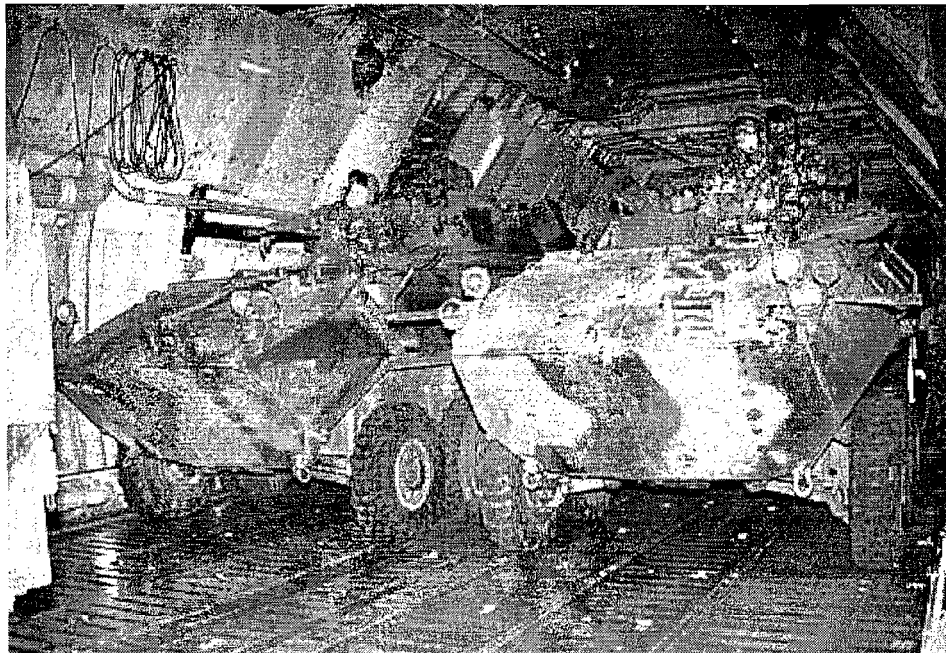
“Marines of Company D, 2nd Light Armored Infantry Battalion, stand guard with their LAV-25 light armored vehicles outside a destroyed Panamanian Defense Force building during the first day of Operation Just Cause.”
Photographer's Name: PH1 Elliott Date Shot: 20 December 1989



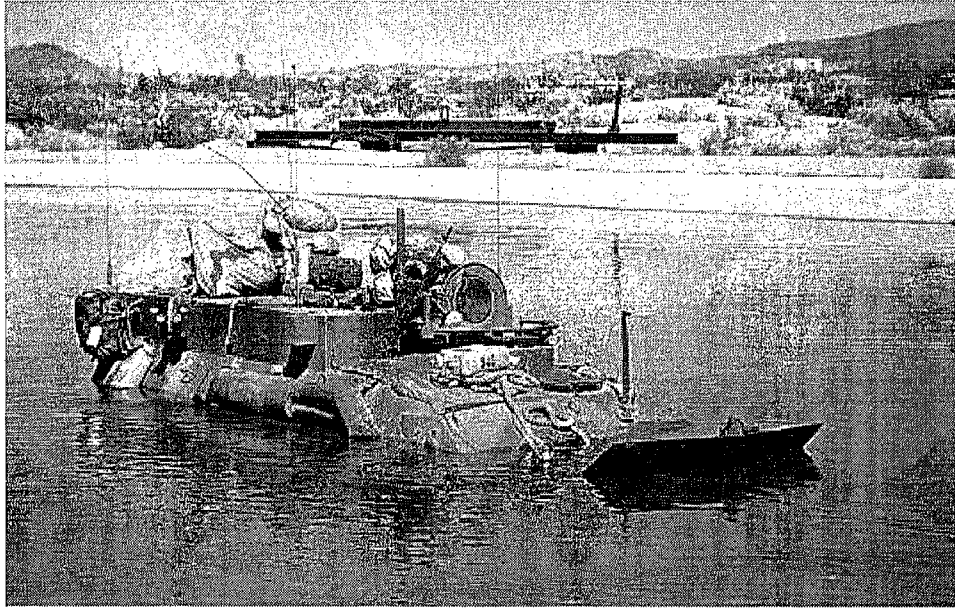
“An LAV-25 light assault vehicle transports Marines through the Norwegian countryside during Operation Cold Winter '87, a NATO-sponsored military exercise.” Photographer's Name: Cpl. D. J. Gonzales Location: *unknown*
Date Shot: 2/1/1987 Date Posted: *unknown* VIRIN: DM-ST-87-10889.



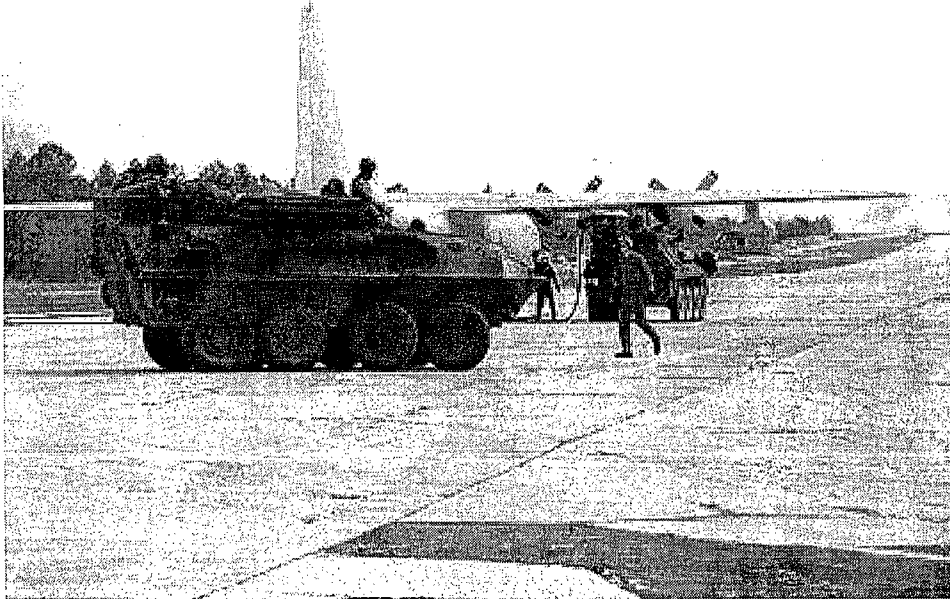
“CPL J. Reimer and LCPL A. Vaughn from Bravo Company, 1st Light Armored Reconnaissance Battalion, drive their Command and Control (C2) Light Armored Vehicle (LAV), into a C-5A Galaxy Transport Jet during embarkation from the air base.” Photographer's Name: SGT D.L. Maes Location: MARCH AIR FORCE BASE Date Shot: 2/15/1998 Date Posted: *unknown* VIRIN: 9802105-M-0557M-002



“CPL Avila J. Gunter (far left), LCPL Standridge (center) and PFC V. Barton (far right) from Bravo Company, 1st Light Armored Reconnaissance Battalion prepare to drive their Light Armored Vehicle-Command and Control (LAV-C2) out of the cargo hold of an Air Force C-5 Galaxy during NORTHERN EDGE.” Photographer's Name: SGT Don L. Maes Location: EILSON AIR FORCE BASE Date Shot: 2/15/1998 Date Posted: *unknown* VIRIN: 980215-M-0557M-005



“1st Light Armored Reconnaissance, Delta Company, Light Armored Vehicle (LAV), stays in the dunk tank to make sure that no water leaks inside during Exercise Broad Sword at Yuma Proving Grounds Yuma, Arizona.”
Photographer's Name: Cesar Loya Location: YUMA Date Shot: 10/5/1999 Date Posted: *unknown* VIRIN: 991005-M-7028L-002



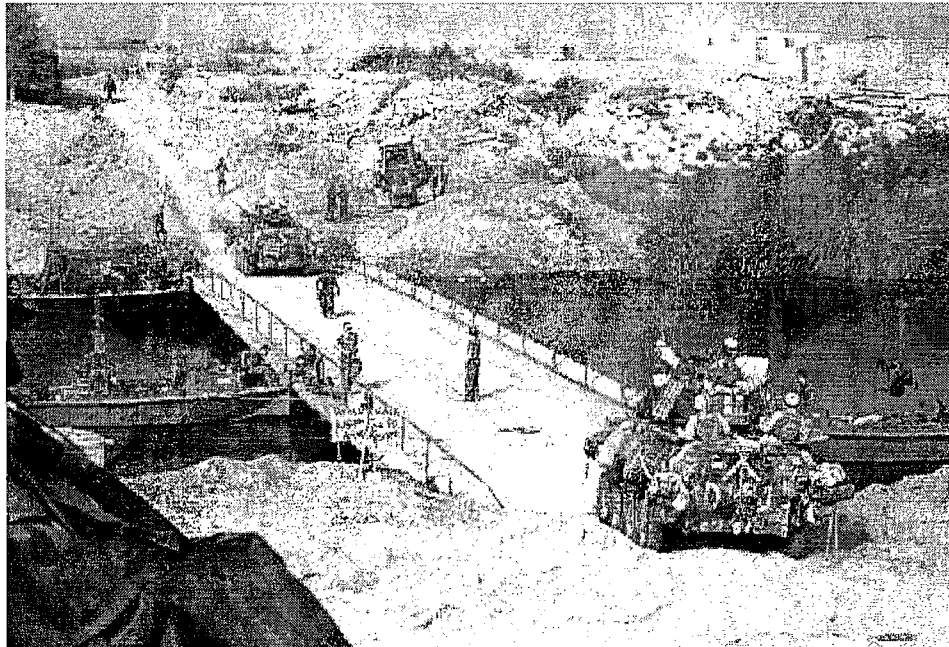
“LAVs conduct rapid ground refuel from a KC-130 at Ft Bragg's Expeditionary Airfield.” Photographer's Name: PFC Paul K. Steinhoff Location: Ft Bragg, NC Date Shot: Unk VIRIN:



“Marines from Alpha Company, 2d Light Armored Reconnaissance Company, attached to the Battalion Landing Team 3/6, 26th Marine Expeditionary Unit (Special Operations Capable), prepare their Light Armor Vehicle (LAV)-25 to conduct a patrol around Khandahar International Airport during OPERATION ENDURING FREEDOM. The Khandahar control tower is in the background. One Marine at the ready manning the 7.62 mm machine gun atop the M242 25mm chain gun in the turret.” Photographer's Name: CAPT Charles G. Grow Location: Kandahar International Airport Date Shot: 1/14/2002 Date Posted: *unknown* VIRIN: 020114-M-9368G-061



LAV-C2 conducts Rapid Ground Refuel (RGR) training with a CH-53 prior to the commencement of Operation IRAQI FREEDOM. Photographer's Name: Ladd Shepard Location: Kuwait Date Shot: March 2003



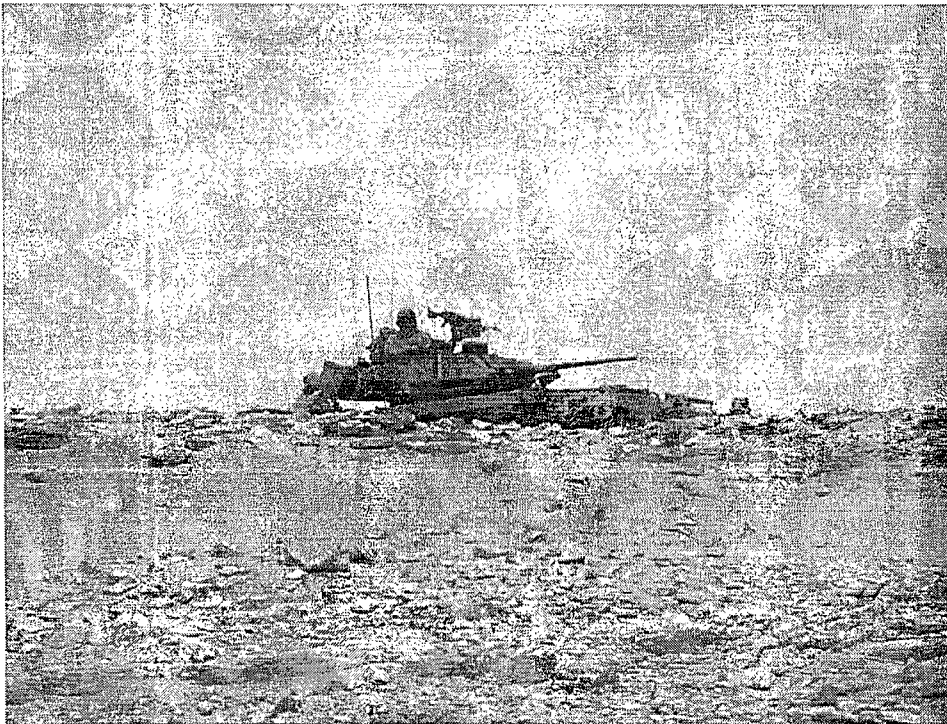
“US Marine Corps (USMC) Light Armored Vehicles (LAV-25) assigned to Delta/Company, 1st Light Armored Reconnaissance Battalion (LARB), 1st Marine Division, cross a Ribbon Bridge operated by US Army Reserve (USAR) Soldiers assigned to the 459th Engineering Company in Northern Iraq, during Operation IRAQI FREEDOM.” Photographer's Name: LCPL Andrew P. Roufs, USMC Location: *unknown* Date Shot: 4/9/2003 Date Posted: *unknown* VIRIN: 030409-M-9124R-013



Capt Shepard, third from left, and the crew of his LAV-C2, the “Sooner Rush,” pose for a photo in front of the “gate” to Saddam’s hometown, Tikrit Photographer's Name: Captain Ladd Shepard, USMC Location: *Tikrit, Iraq* Date Shot: April 2003



Light Armored Vehicles from 2nd LAR Bn (-)(+) traveling cross country from Camp Korean Village to Al Asad.
Photographer's Name: Maj Ladd Shepard, USMC Location: Iraq
Date Shot: 2005



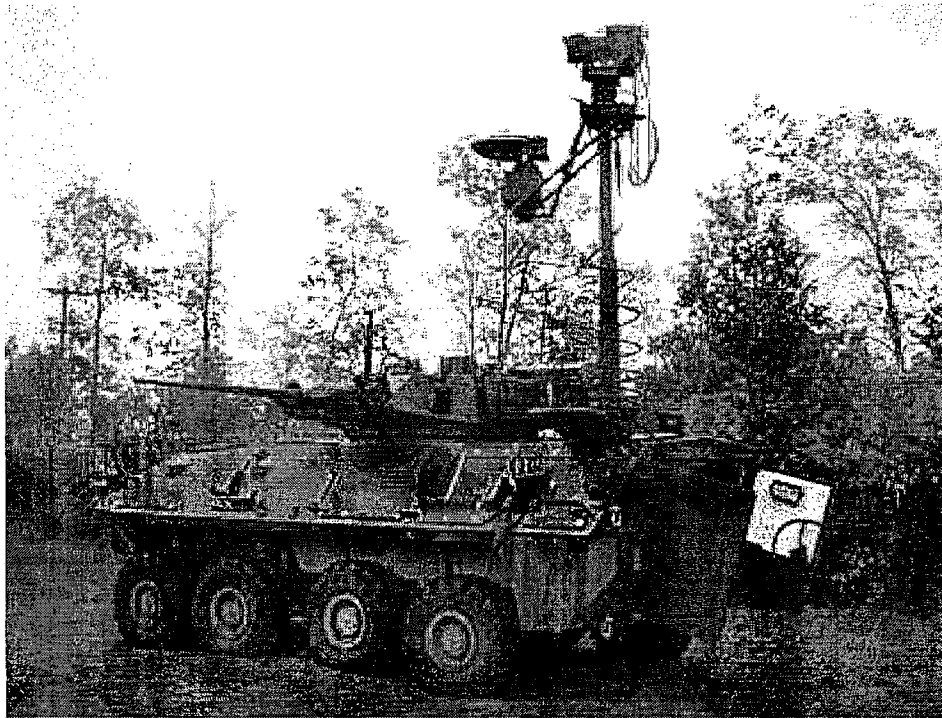
LAV-25 from 2nd LAR Bn (-)(+) provides overwatch during the crossing of a danger area while traveling cross country from Camp Korean Village to Al Asad. Note how the vehicle commander takes advantage of the terrain and positions his vehicle in a hull-down position, exposing only the turret to any possible threat.
Photographer's Name: Maj Ladd Shepard, USMC Location: Iraq
Date Shot: 2005



LAV-AD. Official USMC photograph. Armament: 25mm Gatling gun, 8 x Stinger Missiles.



"A Light Armored Vehicle-Air Defense (LAV-AD) from 4th Light Armored Reconnaissance fires down range with its rapid fire GAU-12/U 25mm Gatling gun during Exercise Highland Thunder aboard Fort Hunter Liggett in Jolon, California." Photographer's Name: Michael Gardner Location: JOLON Date Shot: 3/10/1999 Date Posted: *unknown* VIRIN: 990310-M-4552G-001 Source: DefenseImagery.mil



"Canadian LAV-Recece 'Coyote'. 25mm turret. Surveillance equipment in rear of vehicle with one operator vice scouts. Surveillance equipment includes FLIR, Camera, Laser Range Finder, Next-Generation Image Intensifying, and Radar." Photographer's Name: Unknown Source: Unknown. Author's personal collection.

APPENDIX I

ABBREVIATIONS AND ACRONYMS

APPENDIX I: ABBREVIATIONS AND ACRONYMS

A

AOI	area of interest
AOR	area of responsibility
AT	antitank
AT-4	light anti-tank missile
ATGM	antitank guided missile; antitank guided munition

B

B-1	Lancer – strategic bomber
BCT	Brigade combat team
BLT	Battalion Landing Team
Bn	Battalion
BZ	Buffer zone

C

C-5	Galaxy
C-17	Globemaster III
C-130	Hercules
CAS	casualty; civil aviation security; close air support
CASEVAC	casualty evacuation
CG	commanding general
CHOP	change of operational control
CJSOTF	combined joint special operations task force
CJTF	combined joint task force (NATO); commander, joint task force
Co	Company
CO	commanding officer
COC	combat operations center
COCOM	combatant command (command authority)
COG	center of gravity
COIN	counterinsurgency
CSS	central security service; combat service support
CSSA	combat service support area
CSSE	combat service support element (MAGTF)
CTF	combined task force
CTG	commander, task group

D

DAS	deep air support (USMC)
Div	Division
DZ	drop zone
DZST	drop zone support team

E	
EA	electronic attack
EEFI	essential elements of friendly information
EEI	essential element of information
EPW	enemy prisoner of war
E-UAV	endurance unmanned aerial vehicle
F	
FAC	forward air controller
FAC(A)	forward air controller (airborne)
FARP	forward arming and refueling point
FLIR	forward-looking infrared
FLOT	forward line of own troops
FSA	fire support area
FSC	fire support cell; fire support coordinator
FSCC	fire support coordination center
FSCL	fire support coordination line
FSCM	fire support coordination measure
FSO	fire support officer
FSSG	force service support group (USMC)
FST	fleet surgical team
FWD	forward
G	
GRG	gridded reference graphic
H	
H&S	headquarters and service
HE	heavy equipment; high explosive
HEI	high explosives incendiary
HET	human intelligence (HUMINT) exploitation team
HF	high frequency
HHQ	higher headquarters
HQMC	Headquarters, Marine Corps
HST	helicopter support team
HVA	high value asset
I	
I&W	indications and warning
ICR	Intelligence Collection Requirements
IMINT	imagery intelligence
IPB	intelligence preparation of the battlespace
ISAF	International Security Assistance Force
ISR	intelligence, surveillance, and reconnaissance

J

JFC	joint force commander
JFHQ	joint force headquarters
JOA	joint operations area
JOC	joint operations center
JPOI	joint program of instruction
J-SEAD	joint suppression of enemy air defenses
JSOTF	joint special operations task force
JSTARS	Joint Surveillance Target Attack Radar System
JTF	joint task force

L

LAI	Light Armored Infantry
LAR	Light Armored Reconnaissance
LAV	Light Armored Vehicle
LAV-25	Light Armored Vehicle 25mm Variant
LAV-AT	Light Armored Vehicle Anti-Tank Variant
LAV-C2	Light Armored Vehicle Command and Control Variant
LAV-L	Light Armored Vehicle Logistics Variant
LAV-M	Light Armored Vehicle Mortar Variant
LAV-R	Light Armored Vehicle Recovery Variant
LAV-RECCE	Light Armored Vehicle Reconnaissance Variant
LNO	liaison officer
LOC	line of communications; logistics operations center
LOO	line of operations
LP	listening post
LZ	landing zone

M

MAGTF	Marine air-ground task force
MARDIV	Marine division
MCCDC	Marine Corps Combat Development Command
MCWP	Marine Corps warfighting publication
MEB	Marine expeditionary brigade
MEF	Marine expeditionary force
MEF(FWD)	Marine expeditionary force (forward)
MEU	Marine expeditionary unit
MEU(SOC)	Marine expeditionary unit (special operations capable)
MOUT	military operations in urban terrain; military operations on urbanized terrain
MPF	maritime pre-positioning force
mph	miles per hour

N

NAI	named area of interest
-----	------------------------

NBC	nuclear, biological, and chemical
NEO	noncombatant evacuation operation
NFA	no-fire area
NGFS	naval gunfire support
NGLO	naval gunfire liaison officer
NLT	not later than
NSA	national security act; National Security Agency
NSW	naval special warfare
NSWU	naval special warfare unit
NVG	night vision goggle

O

ODA	operational detachment-Alpha
OEF	Operation ENDURING FREEDOM
OIF	Operation IRAQI FREEDOM
OP	observation post
OPCOM	operational command (NATO)
OPCON	operational control
OT	operational test
OT&E	operational test and evaluation

P

PGM	precision-guided munition
PLS	palletized load system
PLT	platoon
POL	petroleum, oils, and lubricants
PPP	power projection platform
PW	prisoner of war
PZ	pickup zone

Q

QRE	quick reaction element
QRF	quick response force

R

R&D	research and development
R&S	reconnaissance and surveillance
R2P2	rapid response planning process
RC NORTH	Regional Command North (NATO)
RC SOUTH	Regional Command South (NATO)
RCT	Regimental Combat Team
RDA	research, development, and acquisition
RECCE	reconnaissance
RECON	reconnaissance
Reg	Regiment

RLT	Regimental Landing Team
ROE	rules of engagement
RON	remain overnight
RO/RO	roll-on/roll-off
RP	reconstitution priority; release point (road); retained personnel
RSOI	reception, staging, onward movement, and integration

S

SAR	search and rescue
SEAD	suppression of enemy air defenses
SEAL	sea-air-land team
SIGINT	signals intelligence
SINCGARS	single-channel ground and airborne radio system
SMAW	Shoulder-launched Multipurpose Assault Weapon
SOF	special operations forces
SOG	special operations group
SOS	special operations squadron
SRI	surveillance, reconnaissance, and intelligence (Marine Corps)
SRIG	surveillance, reconnaissance, and intelligence group (USMC)

T

T&E	test and evaluation
TAC(A)	tactical air coordinator (airborne)
TACAIR	tactical air
TACON	tactical control
TACP	tactical air control party
TACSAT	tactical satellite
TF	task force
T/O	table of organization
TO&E	table of organization and equipment
TOE	table of organization and equipment
TOW	tube launched, optically tracked, wire guided antitank missile
TRAP	tactical recovery of aircraft and personnel (Marine Corps)

U

UAS	unmanned aerial system
UAV	unmanned aerial vehicle
UFO	ultrahigh frequency follow-on
UHF	ultrahigh frequency
USMC	United States Marine Corps

V

VHF	very high frequency
VTOL-UAV	vertical takeoff and landing unmanned aerial vehicle

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This bibliography contains all of the sources consulted during the conduct of the research for this paper. The most useful material discovered during my research were the primary source materials acquired through the Archives of the Marine Corps, Marine Corps manuals and publications, and the personal interviews conducted with Marines experienced in light armored reconnaissance. The archives provided valuable insight through command chronologies, studies, and operations orders. Additionally, the Historical Division of the Marine Corps University provided access to the Lineages of the four battalions. The list of Marines interviewed is only a sampling of authorities whose thoughts, ideas, and experiences helped in the development of this paper. Challenges encountered in the conduct of research centered on the lack of books written about, or even referencing, light armored reconnaissance units/operations in the Marine Corps. However, print articles and thesis papers were available addressing various ideas, experiences, and concepts. Additionally, congressional testimony provided information on the acquisition of the LAV and its original concept of employment.

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