STRATEGY RESEARCH PROJECT

TRANSITION TO THE VERTICAL DIMENSION: ADVANCED AIRFIGHTING VEHICLES – THE ARMY'S FUTURE FIGHTING FORCE

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

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Executive Summary

Thesis Question:

Should the US Army of the early twenty-first century transition from a ground maneuver force centered on armored vehicle brigades to faster, more lethal, maneuverable, and survivable air platform brigades?

Hypothesis:

On the battlefield of the twenty-first century, air platform brigades will be faster, more lethal, more maneuverable, and have greater survivability than ground maneuver forces.

The current Army After Next (AAN) report proposes that the army ground maneuver force of 2010 and beyond must exploit new systems to enhance rapid maneuver, increase lethality and improve survivability in the asymmetrical battle

scenarios of the future. The catastrophic event of the Japanese attack on the US fleet docked at Pearl Harbor during World War II actually revolutionized naval warfighting tactics. With the bulk of the US Pacific fleet battleships destroyed or severely damaged, the Navy was forced to rely on her carrier fleet to attack and ultimately defeat the Japanese navy. Because army maneuver forces remain land-bound, they lack speed due to terrain restrictions, both natural and man-made. An evolution in concept is needed to elevate the maneuver elements above the friction of close combat and exploit the added speed, agility, observation/communication and survivability that comes with transition to the vertical dimension.

U. S. forces enjoy tactical and technical advantages in today's uni-polar world

Advances in weapons systems, their battlefield employment and the tactics to use them have made US maneuver forces uncontested in this century. We have become so effective at what we do as a maneuver force that we are forcing potential adversaries to resort to other tactics, such as combat in urban areas or asymmetrical forces, to combat our battlefield dominance.

History provides evidence of the increase in weapons lethality and expansion of the "kill zone"

The ability of an individual soldier with a low-cost, shoulder-fired, long-ranged lethal anti-tank weapon has increased at a pace greater than the ability of ground-based maneuver forces to defend armored systems. The lethality and effectiveness (increased range, penetration and reduced signature) of soldier-launched anti-armor weapons has increased factorially in the past ten years without a similar increase in armored vehicle speed, agility or survivability. Armored brigades and their maneuver

vehicles are placed at increasingly greater tactical risk when faced with the enemy capability to reduce armored mobility (counter-mobility obstacles), employ anti-armor land mines and soldier directed, laser guided "smart," "very smart," and new "brilliant" munitions. Close combat in urban, industrial or other built-up areas favor the asymmetrical force and place the limited mobility and survivability of armored brigades at even greater risk.

Vertical maneuver in a three-dimensional battlespace will be the focus of future combat

Elevating US forces into the third (vertical) dimension will yield certain tangible benefits and ensure those forces remain viable and uncontested into the twenty-first century and beyond:

- increased maneuverability, survivability and lethality.
- rapid deployment/redeployment.
- increased sustainability of maneuver forces.
- reduced signature produced by a maneuver element.
- possible reduction in the size of tactical forces needed to accomplish the mission and economies in logistics to support the force.

U. S. maneuver forces need to transition to advanced airfighting vehicles to keep the tactical edge

A true Revolution in Military Affairs (RMA) needs to occur for ground-based maneuver forces to achieve the unprecedented battle tempo that the vertical velocity of attack can produce. This "revolutionary" transition needs to happen in an evolutionary manner now to avoid a crisis similar to that change which was thrust on our naval

forces in the Pacific in World War II. With the bulk of the US Pacific Fleet battleships sunk, destroyed or severely damaged at Pearl Harbor, the US Navy was forced to rely on her carriers to carry the battle. This began a revolution in naval affairs that saw the battleship replaced by the carrier task force as the dominant form of sea warfare.

Advanced airfighting vehicles will enable maneuver forces to move at greater speeds, by-pass obstacles and difficult terrain, provide increased intelligence and protect more of the force by maneuvering and fighting above the ground. A more lethal but smaller force will also benefit from reduced logistics.

General Recommendations

- Exploit every advantage to transition our maneuver forces into the vertical dimension:
- Base the structure of the *future force* on the *future land fighting requirements*
- Continue work with the Army After Next to forecast the tactical needs of the maneuver forces for the early twenty-first century.
- Research, develop and employ advanced rotor and hover-craft designs.
- Develop new advanced air fighting vehicle brigades.
- Employ Vertical Take Off and Landing (VTOL) and Vertical Short Take Off and Landing (VSTOL) Vehicles.
- Research and exploit the speed, increased lift capacity, increased survivability and other maneuverability derived from tilt-rotor and vertical-lift-off-to-horizontal-flight vehicles (similar to the new U.S. Marine Corps OV-22 "Osprey").
- Build and deploy advanced air fighting vehicles that employ new nap-of-the-earth flight capabilities.

LIST OF FIGURES

Transition to the Vertical Dimension:

Advanced Airfighting Vehicles—The Army's Future Fighting Force

by

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INTRODUCTION: Five Keys to Improved Warfighting Capabilities

As we enter the twenty-first century, the United States Army must focus on maintaining technological dominance in land warfare. Several areas where we could improve our warfighting capabilities are; survivability, lethality, maneuverability, battlespace awareness and deployability. We question whether armored vehicles should be the primary maneuver system of the twenty-first century. Although armored vehicles dominated the second half of the 20th century, they have become extremely vulnerable due to their size, weight, relative slow speed and most importantly, the significant increase in the lethality of both man-portable and air delivered anti-tank weapons. By 1991 it took only an average of two anti-tank rounds fired by an infantryman to kill a tank at 2,400 meters.[1] During the ten years of fighting in Afghanistan the Soviets lost an estimated four thousand armored vehicles to anti-tank weaponry, more than a six-to-one ratio when compared to the significantly smaller number of Soviet aircraft lost to ground fire in the same war.[2] Today, anti-tank systems provide a high volume of extremely lethal, relatively inexpensive and accurate missile

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[1] Department of the Army (Knowledge and Speed) A-2.

fire that is effective against heavily armored systems at ranges exceeding those of tank main gun systems. Kinetic energy missile systems such as line-of-sight anti-tank (LOSAT) provide an unprecedented ability to defeat all anticipated future armored vehicles.[3] It is hardly cost effective to spend $7.3 billion dollars to upgrade 1,000 M-1 tanks that are not survivable in the battlespace of the twenty-first century.[4]

FUTURE COSTS vs FUTURE CAPABILITIES

Army weapon systems of the twenty-first century must be capable of maneuvering rapidly over the ever expanding "deadly zone" of future battlespace. Their speed will be measured not in tens but in hundreds of kilometers per hour. These systems must be unencumbered by terrain, minefields and other natural or manmade obstacles which impede movement. They must be capable of destroying armored and non-armored targets beyond visual sight ranges and well beyond the range of current tanks.

What we are proposing is a change to the US Army's fundamental fighting platform which will consequently require a change to the organization of army units from corps level and below. These organizational changes in army structure will necessitate significant doctrinal changes. If we use the existing 101st Airborne (Air Assault) Division as the model for a future Advanced Air Fighting Vehicle Division, we are aware that the current air assault division is the most costly of maneuver divisions for the army to field. However, we believe that with an investment in advanced air

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[2] Collins 150.
[3] US Army 207.
[4] Wilson 24.

fighting vehicles the army will be able to realize economies in the individual size and total number of future divisions.

Additionally, we are aware of the many ground-to-air systems, either currently fielded or planned for production, that pose a real threat to any type of aerial platform. We will illustrate both the current and historical evidence that gives operational advantage to advanced airfighting vehicles over their ground-bound counterparts in speed, maneuverability, flexibility and survivability.

We are aware that there are a broad array of potential future conflicts that range from domestic terrorism, to light intensity conflicts, to major theater war, and even to nuclear proliferation. The purpose of this study is to investigate the possibilities and illustrate the potential flexibility of units based on advanced airfighting vehicles in whatever future conflicts our nation may encounter.

Future maneuver systems will need increased battlespace awareness. Our current armored vehicle systems experience significantly reduced battlespace awareness as a consequence of terrain and man-made object line-of-sight restrictions. These limitations include restricted target acquisition and impact on the line-of-sight characteristics of our command, control, communications and intelligence systems. To win in the twenty-first century battlespace our Army must possess exceptional mobility across inhospitable terrain, the ability to observe the enemy with exceptional clarity, and the ability to maneuver and strike with great precision over ranges beyond those of our current tank and gun tube artillery systems.[5]

As a force projection Army in the twenty-first century we must also become much more deployable than our heavy forces are today. Although the US possesses

[5] Department of the Army (Knowledge and Speed) 21.

the largest sealift fleet in the world, *we require it* to project our uni-polar political muscle in today's world. However, moving our heavy force this way could take weeks and months. There are ninety-six vessels in the Ready Reserve Force yet many have no crew and can take 20 days to sail to ports of embarkation. Military Sealift Command has eight Fast Sealift Ships (FSS) which require 96 hours' notification before moving to embarkation ports. The Department of Defense projects that by 2001 we will have an additional fifteen large-medium RO-ROs (LMSRs) for a total of nineteen LMSR RO-ROs, which have a response time similar to the FSS. [6] However, to illustrate the limited capacity of our sealift capability, it took all eight Fast Sealift Ships (FSSs) and two additional ships to deploy the 24th Infantry Division to Desert Storm.[7]

When the first FSS, the Capella, arrived in Savannah, the navy objected to the 24th Infantry Division combat loading its vehicles with ammunition and fuel. Not since World War II had the navy loaded an army heavy division for immediate combat.[8] Another FSS, the Antares, broke down and drifted disabled for two days in the mid-Atlantic. The division, already in Saudi Arabia, had to defend without its maintenance and supply system and the fire power of its aviation brigade. "Thirty-one days into the operation, two heavy brigades were (finally) in field assembly areas en route to their defensive sectors."[9]

In contrast to the 24th Division, the 101st Airborne (Air Assault) Division deployed 117 helicopters from its aviation brigade by C-141 and C-5 transports. However, it deployed two infantry brigades on old Ready Reserve Fleet ships that "were in poor repair and required an average of 23 days to make the voyage to Ad-

[6] Harris and Stewart 69.
[7] Harris and Stewart88.
[8] Harris and Stewart 87-88.
[9] Harris and Stewart 87-88.

Damman."[10] Some of those ships were the same ones that had taken the division to Vietnam![11] An additional problem looming on the horizon that impacts on our sealift capabilities is the critical shortage of as many as 2,600 qualified and licensed merchant mariners to sail the ships.[12]

WHAT NEEDS TO BE DONE

In the future, we should rewrite the Services' roles and missions. The Army should be given the role of satisfying operational and tactical missions "at land" with a full range of air and surface systems, like the US Navy does "at sea." The new battlespace for the twenty-first century will literally be "in space." Advanced weapons and C3I systems for many nations will operate in space. The current US Air Force should change its role to focus on missions at the strategic level *and* assume the daunting responsibility of dominating the battlespace beyond our atmosphere. Space Command tracks objects in space. Future warfare requires the development of a national military strategy and decisive capability to fight *in* space and attack *from* space. Army air power coupled with an agile and lethal surface force for seizing and holding objectives is the key combination in dominating combat operations in the twenty-first century.

Some have proposed that the Army already has an "air arm" -- rotary aviation. However, just as the marines and the navy, the army needs its own fixed wing combat aircraft and unmanned air vehicles. Similarly, we should not have to rely on the US Air Force to be our "air arm." The air force sees the army's fight as a tactical subset of

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[10] Harris and Stewart 89.
[11] Harris and Stewart 89.
[12] Harris and Stewart 80-82.

their broader strategic and operational fight. As a separate service their focus is on air superiority and deep target attack, at operational and strategic levels, not close air support to army maneuver forces. Therein lies the problem and the solution. The army, like the navy and the marines, must develop its own fully functional airpower to accomplish its tactical and operational missions.

Although the US Air Force promises tactical air (TACAIR) support, its delivery is inadequate. During Desert Storm, the 72-hour Air Tasking Order (ATO) used by the air force to support army operations was unresponsive to battlefield commanders. This was particularly true for the two army corps commanders "in both the early air operations and in the frustrating last-day effort to destroy the Republican Guard inside of Kuwait... Generals Luck and Franks were continually frustrated by their inability to influence target selection for the ATO." Ironically, during World War II and the Korean and Vietnam Wars, the preplanned mission cycle to support army deep operations only required 24 hours to complete - one-third of the time imposed during Desert Storm.[13]

This paper suggests that nothing less than a technological and cultural metamorphosis is required for our tactical army. The army must rid itself of the limiting title of "land or ground force" – it is much more than that. Our intention here is to illustrate how the US Army must improve the speed of army operations while it simultaneously increases lethality, survivability, maneuverability, battlespace awareness, and deployability. Like the navy, the army must dominate vast areas with a relatively small force. We feel the army must redesign its warfighting organizational structure by establishing a true "air arm." It must increase maneuver speed and fire support across the "deadly zone" and better leverage the increased range and accuracy of precision guided missiles over ballistic bullets and artillery rounds. A more

balanced mix of army air and armored power, coupled with airborne, air assault, and light forces will provide the twenty-first century army the speed, agility and lethality to dominate the full spectrum of conflict.

WHAT ADVANCED AIR PLATFORMS WILL LOOK LIKE

To build advanced airfighting vehicles that will dominate the tactical battlespace of the twenty-first century, the US Army must go beyond just building improved attack helicopters and bigger cargo helicopters. The army, just as the marines did, must explore and exploit all of the advantages of close air support. Tilt rotor MV-22 Osprey and VSTOL (vertical and short take-off and landing) AV8-B Harrier aircraft should be incorporated into our combat divisions. To provide combat units with the immediate battlefield support that they demand, the army needs to acquire tactical air combat, intelligence and logistical systems such as the A-10 Thunderbolt II, JSTARS (Joint Surveillance Target Attack Radar System), the C-17 transport, and unmanned aerial vehicles (UAVs), all of which were designed to support army tactical maneuver but are not in the army force structure. Additionally advanced micro-air vehicles 20 cm in length, 100 grams in weight, with a 40 mph cruise speed, a 10 km range and a 60 minute duration of flight need to be futher developed by the Department of the Army Research and Procurement Agency (DARPA) and the US Air Force for use by army platoon, company and battalion commanders to reconnoiter treelines, buildings and defensive postions. Army units with advanced airfighting vehicles will possess battlefield awareness so complete, and precision weapons so effective, that enemy ground-based combat systems will not be able to survive in land warfare. The army

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[13] Scales 368-369.

must adopt the US Navy and Marine Corps methodology of employing air power by creating its own fully capable "air arm." Air power is not just US Air Force power.

CHAPTER I: US Military in a Uni-Polar World

"We cannot expect the enemy to oblige by planning his wars to suit our weapons; we must plan our weapons to fight war where, when, and how the enemy chooses." - Vice Admiral Charles Turner Joy[14]

The United States has accepted a position of global military leadership that is historically unprecedented. Our overwhelming military success, characterized by the Gulf War victory in 1991, was born of dedicated professionals who learned from past mistakes and implemented new training and operational concepts with technological advances. To achieve the greater mobility, speed, stealth, and strike ranges that the next generation of warfighting will demand, the US Army must transition now from ground-based maneuver platforms to advanced airfighting vehicles that exploit all of the advantages of combat in the vertical dimension.[15]

We must assume that our past enemies and future adversaries have learned from the Gulf War. They are not likely to confront us in areas of overwhelming US strength such as air superiority forces or deep-water fleets. They will seek ways to match their strengths primarily against the weaknesses of our armored force. They will look for asymmetrical paths to combine unconventional methods to achieve a combat synergy.[16]

The principle of applying simple, inexpensive, and effective asymmetrical counters to armored forces is not new. In the 10th century BC, the Philistines

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[14] Dunlap 28.
[15] Odeen 11.

leveraged a tremendous advantage over the Israelites both in terms of military technology and weapons production. They fielded a heavily armored "Goliath" with state-of-the-art equipment comprised of a helmet of brass, a coat of mail, and brass shields on his legs. His offensive mission was to hurl a heavy brass javelin and cut with an iron spear. Although he lacked mobility and speed, he was considered to be invincible. However, the Israelites countered the "Goliath" with an asymmetrical weapon system called "David." David was a radically new weapon system that lacked armor and consisted of an inexpensive and simple firing mechanism -- a sling and five smooth stones. Yet David had the advantage of mobility, speed, range, and accuracy. Consequently, the Israelites defeated the Philistines by changing military doctrine and adopting a revolutionary weapon system. The lessons learned from the Israel-Philistine War are relevant today.[17]

As LTC Ralph Peters, USA (ret.), points out, we have become victims of our own success. We have become so dominant at traditional modes of warfare that we have driven our potential adversaries to adopt asymmetrical counters to our technological superiority.[18] Let us not forget that during the Korean War the US enjoyed tremendous technological and organizational advantages over North Korean and Chinese forces. However, modern weapons, excellent logistics, and complete air and sea power could not stop the communists from counterattacking US forces and pushing them from the Yalu River to 40 miles south of Seoul. Much of the communist success was due to asymmetric infiltration tactics which took advantage of mountainous terrain to encircle and destroy our forces and interdict reinforcements

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[16] Odeen 11.
[17] Friedman 20-25.
[18] Peters 53.

moving on narrow roads.[19] Vietnam was not much different: Where were the "lessons learned"?

As we "fast-forward" into this next millennium, US Army forces must find lasting methods to ensure combat viability and battlefield survivability against a dissimilar enemy operating in environments that will enhance his combat capabilities while diminishing ours. Many military missions will continue to require seizure and occupation of key terrain and objectives through the direct and concentrated physical presence of our soldiers. This will be particularly so in urban concentrations, jungles, and dense forests both during war and in operations other than war.

Unlike other periods in our history, when we shared military leadership in a multi- or bi-polar world, "...the United States currently enjoys unrivaled military supremacy."[20] This view of US military dominance, shared by the American people and the world, is repeatedly expressed in the media as a reminder to the military leadership of its increased responsibilities. George Melloan states in the Wall Street Journal, "...in a nutshell, the world's sole superpower peace keeper is America...."[21] Edith M. Lederar emphasizes in a Washington Times article, "The United States has no challengers to its military dominance...."[22] Even some National Security scholars at the Massachusetts Institute of Technology have acknowledged that not only can the US not be "out-gunned," but that we can mobilize, deploy and sustain more combat power faster, farther and longer than anyone else.[23] This view of US military invincibility has compelled our government to deploy the US Army into unexpected and hostile regions such as Iraq, Somalia, Haiti, and Bosnia. It is unlikely that the US will renounce this

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[19] Antal 26-32.
[20] Department of the Army (Knowledge and Speed) 4.
[21] Melloan 23.
[22] Lederar 16.

leadership role. Doing so could create a power vacuum resulting in unchecked regional conflicts around the globe. This global military dominance, coupled with the regional commitments through our many alliances, clearly indicates a continued increase in army employment in a full range of operations. These operations include:

- anti-terrorist operations
- humanitarian aid
- drug interdiction
- peace-making operations
- peace-keeping operations
- regional wars

OVERWORKED-UNDERSIZED ARMY

The unfortunate outcome of this uni-polar world is an attitude of a "one-size-fits-all" army called upon to resolve any crisis unresolved by the US State Department. There are some who think that the demise of the Soviet Union decreased the likelihood of military conflict. There are others who still believe that the US is the sole military, economic and political superpower in a uni-polar world and that this fact decreases the requirement for, or use of, a large military force. However, the fact is we are entering the twenty-first century engaging in more military operations with fewer forces than during the Cold War. Although there is only one military superpower, the world is becoming more, not less dangerous. In 1997 there were 68 countries and regions affected by war, civil strife or other major forms of violence. "We're not a world at

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[23] Sapolsky and Shapiro, Parameters 119.

peace, we're a world in conflict," said Andy Messing, Jr., executive director of the National Defense Foundation, which keeps track of all instances of hostilities worldwide.[24] Since October 1996, the army has maintained an average of 31,000 soldiers deployed in 91 different countries, not including permanently stationed troops.[25] However, since 1985 America has reduced the defense budget by 38 percent, force structure by 33 percent, procurement programs by 63 percent, and overseas forces by 60 percent. [26] Indeed, the army has been cut in size to one of its lowest levels in the 20th century. General Reimer, Army Chief of Staff, points out that in the last eight years the total army (active, guard, reserve, and civilian force structure) has been reduced in size by over 600,000 people and has closed over 700 bases worldwide.[27] With fewer forces and overseas staging bases, our challenge is to build a force focused on increased deployment speed and tempo of combat operations. We must not simply arrive in a region rapidly (before the adversary is able to consolidate his strength and await our arrival), but also quickly gain positional advantage on the battlefield and decisively defeat the enemy while sustaining few casualties.

Joint Vision 2010, the report on the future posture for US forces developed by the Joint Chiefs of Staff, provides a perspective of the environment for the employment of our forces in support of US national interests in the year 2010. While affirming that "currently our Armed Forces are the best trained, best equipped and the most ready force in the world,"[28] the report continues by stating, "we anticipate the probability of facing technological or operational surprise will increase in the period ahead."[29] One view of why our forces may experience these military surprises is built on the premise

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[24] Messing A18.
[25] Greenbook 21.
[26] Cohen 8.
[27] National Security Studies Quarterly 24.
[28] Shalikashvili 5.

that our adversaries will acquire state-of-the-art technologies to provide asymmetrical counters to our strengths and exploit our vulnerabilities. Our future opponents will not need to compete in the traditional sense of arms escalation in numbers, types and quality of weapons. They can easily acquire "off-the-shelf" cheap and simple technologies which will sufficiently counter our armored technological superiority. Future adversaries may employ inferior yet massive field armies. Additionally, a research report by the Army After Next (AAN) Project suggests that future foes will threaten U.S. superiority by employing such asymmetrical methods as psychological operations, weapons of mass destruction, and mobile, dispersed and decentralized forces through constricted and channelizing terrain.[30]

However, in spite of enemy asymmetrical efforts, we must defeat future military competitors rapidly, decisively, and with fewer friendly casualties while fighting in *the adversary's* region and on the battlefield of his – or her – choice. This must occur whether the enemy is a less sophisticated one, employing asymmetrical tactics, or an advanced military force on a semi-symmetrical battlefield. We must carefully plan and employ our forces, and not allow the enemy to disrupt our high-tech offensive firepower. In the final outcome the army must maintain the capability to isolate, seize or otherwise control enemy and friendly terrain - for land is the natural habitat of man.[31] The army's mission to control the land remains unchanged in this "Revolution of Military Affairs." While the Information Age may revolutionize the battlefield, just as the Industrial Age did, Somalia and Vietnam proved that we must still be ready to win against an Agrarian Age enemy.

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[29] Shalikashvili 11.
[30] Department of the Army (Knowledge and Speed) 4.
[31] US Naval War College.

FORCE PROTECTION

At a time when the pace of technology is racing by leaps and bounds, our army is clinging to the past and living on the laurels of Just Cause, Desert Storm and the success of our other NATO and United Nations interventions. As Ralph Peters suggests, we have developed a policy of "don't mess with success," in spite of the fact that the world is changing.[32] Some critics of the military have implied that the army is likely to resist any major fundamental changes in warfighting until a sizable number of our service members have been killed in battle and our nation embarrassed.[33] This would have a disastrous effect on our army and our country. America's enduring goals include protecting the lives and securing the safety of her citizens both at home and abroad. Politicians gain public support for military intervention by promising the public that there will be few or no casualties. Consequently, military operations focus on protection of the fighting forces above all else.[34] The American populace expects the military to win in any engagement, but it also expects their army to be increasingly more efficient in protecting lives and resources while accomplishing "the mission." An example of the effort and attention the US military expends to reduce battlefield fatalities is evident in its focus on medical personnel. During the Gulf War, one tenth of the more than 500,000 troops deployed were medical personnel.[35] Dr. Sapolsky of MIT affirms that "American military commanders must be prepared to explain every American casualty."[36]

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[32] Peters 56.
[33] Peters 56.
[34]"Sapolsky MIT 5.
[35] Sapolsky MIT 3.
[36] Sapolsky MIT 6.

This close scrutiny of risks and losses increases the stress on battlefield commanders and may reduce their willingness to be bold and audacious and increase their caution and predictability.

"We have grown ever more sensitive about casualties -- our own military casualties, opponent and neutral civilian casualties, and even enemy military casualties -- and we seek to avoid them. This limits our ability to exercise the tremendous power we possess and makes us susceptible to pressures others can ignore... the lesson that Grant taught America -- that war is about death, pure and simple -- appears to have been forgotten by the inheritors of his office... it is impossible to fight a war applying American civil liberty standards. We may call for a crusade to expand tolerance and democracy in the world, but we do not have the stomach for the slaughter that such a crusade requires."[37]

The effort to make the army smaller may have much of its political rationale grounded in reducing the number of mass casualties associated with ground warfare. The navy fights 300 nautical miles offshore, which reduces the risk of enemy attack. The air force fights a high-speed "surprise" battle with low-volume casualty (one pilot) air vehicles thousands of feet above the enemy. The army cannot avoid the head-knocking area of modern combat and the comparatively large number of casualties that come with it.

In spite of future military requirements, characterized by broad uncertainty, complexity, and ambiguity, the army must be prepared to operate in geographically diverse and unfamiliar areas. It must be prepared to perform missions it has never performed before, be overwhelmingly successful in the first attempt, and suffer low

[37] Sapolsky and Shapiro 119, 121,126.

casualties while avoiding excessive harm to the adversary or the natural environment.[38] It must continue to provide our nation with a rapid-response force that is persuasive in peace, compelling in crisis, and capable throughout the full range of conflict.[39]

The US Army must reassess its warfighting strategy and those requirements for maintaining land warfare dominance. Joint Vision 2010 identifies four operational concepts which are designed to provide a focus to build a structure for combat operations in the twenty-first century:

- dominant maneuver
- precision engagement
- full dimensional protection
- focused logistics

Joint Vision 2010 also emphasizes that a key factor in future warfare will be long-range precision fire resulting in increased combat power, enhanced economy of force operations, and a vital higher tempo of operations.[40] Our army needs improvement in speed, mobility, fire power, and ability to deliver fire from well beyond an opponent's reach. Our current "ground-bound" army, centered around the Abrams Main Battle Tank (M1A2) and the Bradley Infantry Fighting Vehicle (M2/M3), lacks the speed, maneuverability, survivability, range of fire power, and reduced level of logistics necessary to fight and win in the twenty-first century battlespace. A shift upward, away from the two-dimensional, horizontal battlefield, to the third and vertical dimension, will provide our army with an asymmetrical advantage over our potential adversaries and their ground-bound armies.

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[38] Barnett 3.

During this century, we have witnessed the decline of international surface travel on commercial transatlantic passenger ships and transcontinental railways. This decline can be attributed to the increased variety and availability of high-speed air travel options at equal or lower cost. Stephen Rosen's article, "New Ways of War," notes that one of the major "examples of successful military innovation [is] the transition of the US Navy from a battleship-dominant navy to one in which aircraft carriers had an independent and decisive role...."[41]

The AAN Report fails to focus on the use of army advanced air vehicles to enhance the vertical velocity of ground maneuver forces and fire support systems but instead emphasizes their use for logistical and intelligence support. From a military perspective, in this century we have seen the US Navy replace the battleship, its equivalent to the main battle tank, with the aircraft carrier. We have also seen long-range precision missiles replace naval guns and begin to replace army field cannons. Aircraft have proven their devastating effect on armored formations, command posts, logistical support formations, and a full range of fixed and mobile targets. However, the army has overlooked the full potential that army airpower can contribute to twenty-first century warfare.[42]

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[39] Department of the Navy 2.
[40] Barnett 11.
[41] Rosen 151.
[42] Department of the Army (Knowledge and Speed) 25.

CHAPTER II: Historical Evidence and Future Potential Advantages of Army Maneuver in the Third Dimension.

> "The traditional role of conventional armed forces equipped with infantry, tanks, and artillery is virtually eliminated...[and]...the revolutionary change in military art leading to the 'future war' concept...is beginning." Gen.-Col. Igor Rodinov, Commandant of the Military Academy of General Staff, USSR [43]

The future of the army, like that of the navy, lies in dominating battlespace with advanced air vehicles. Just as the "super tanks" of the high seas succumbed to air attacks by American carrier-based attack aircraft, so another generation of improved tanks and infantry fighting vehicles with bigger guns and thicker armor is not the solution to maneuver dominance in future ground conflicts. The US Army need not endure a combat disaster on the magnitude of Pearl Harbor to transition from a land-based armored force to one centered on army air power and advanced airfighting vehicles. We must recognize that the technology is here now to do this.

Military science, "the applied science of killing," has undergone a fundamental change in the "information age of warfare."[44] Historically, cycles of change in warfare have been slow due to limited advancements in weapons technology. In addition, military organizations have been reluctant to adapt their warfighting doctrine and unit structures to capitalize on technological innovations. This has resulted in evolutionary, rather than revolutionary, changes in warfighting. In the case of the US Army, institutional friction created an environment where it was difficult to accept the transition from horse cavalry to armored cavalry and eventually to air cavalry. The navy

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[43] Hallion and Irish 90.

underwent a similar reluctance when electing to adopt the aircraft carrier over the battleship.

To appreciate the evolutionary effect of technology on warfighting, the "Agrarian Age of Warfare" took centuries before advancing technology influenced changes in the art of war. During the "Industrial Age of Warfare" this period of time was reduced to generations. In today's "Information Age of Warfare," the technological revolution has created accelerated advancements in warfighting and has reduced the period of change to decades, years, or in some cases, months.[45] *(See Figure 1, "Changes in the Art of War")*

[44] Department of the Army (Knowledge and Speed) A-1.
[45] Department of the Army (Knowledge and Speed) A-1.

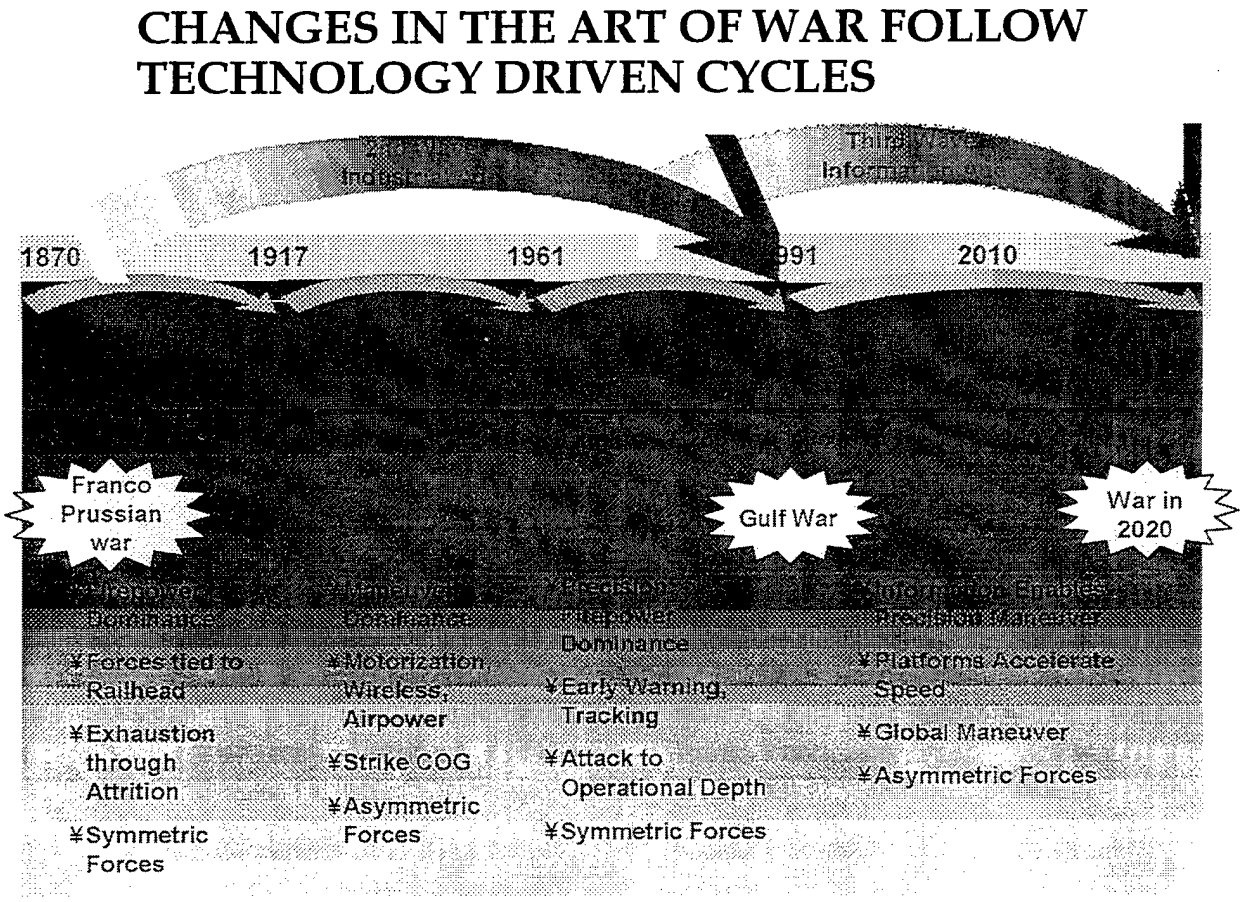

Figure 1, "Changes in the Art of War," *Knowledge and Speed,* the Annual Report, Army After Next Project, p 9.

However, it is not "information dominance" alone which gives the US the greatest advantage over potential adversaries. In the twenty-first century battlespace, it is vertical maneuver coupled with virtual reality of friendly and enemy movements that holds the key to army success. Warfighters transitioned from "ground-bound" aides and couriers to using air waves and electronically transmitted messages to establish and maintain unit command and control. It is third- dimension technology which now enables the army to break contact with ground-bound fire and maneuver systems. This allows our forces to avoid the slow speeds caused by obstacles such as rivers, mountains, and swamps, to increase the range of observation and fields of fire, to reduce enemy opportunities to ambush our forces through the use of minefields and

anti-armor weapons keyed to the terrain and to allow our forces to gain rapid and decisive positional advantage over our potential adversaries. As Lt. Gen. Paul K. Van Riper, former Commanding General of Marine Corps Combat Development Command, has stated, "To suggest that such concepts as information dominance will now somehow make all the military doctrine that came before it irrelevant is ludicrous. We had information dominance in Somalia."[46] The US Army must be willing to recognize, exploit and integrate a full range of these third dimension technologies. For example, the US Air Force and the US Marine Corps have integrated unmanned aerial vehicles (UAVs) into their operations for intelligence purposes. The US Army was originally on the cutting edge of this technology and well ahead of her sister services in UAV development but, in spite of pleas from tactical units for UAV support, has not fielded one active system for our tactical warfighters. We must stop being parochial and squandering opportunities to integrate other services' third dimension technological advantages.[47]

The National Defense Panel in its December 1997 Report, "Transforming Defense: National Security in the 21st Century," cites the technological revolution as the next revolution in military affairs and indicates that the US Army can no longer rely upon the traditional experience in war and in the process of long-term equipment development and acquisition as the methods of determining change in our force structure.[48] This approach will lead to disaster in our next "first battle." Fortunately, Advanced Concept Technology Demonstrations (ACTDs) have accelerated the process of determining state-of-the-art capabilities to support military operations. The army must not wait for a strategic disaster on the magnitude of Pearl Harbor to move its

[46] Kitfield 2264.
[47] Department of the Army (Knowledge and Speed) 18, 24.

warfighting structure to the third and vertical dimension. As Douglas A. McGregor states in his book, Breaking the Phalanx: A New Design for Landpower in the 21st Century, "... attempts to graft large-scale technological change onto old thinking and old structures can only be a temporary expedient; new capabilities demand their own organizations and operational culture."[49] The Army After Next experiment also makes it clear that the character of warfare is focusing on speed and knowledge as a consequence of the effects of technological advances. The impact of these new characteristics of warfare, which will focus on achieving an unprecedented vertical velocity of attack, require the army to make revolutionary changes in our current doctrine and unit organization.[50]

The "Rotorblitz" Air Mech Concept proposed by MAJ Chuck Jarnot suggests army divisions composed of light armored vehicles, either sling-loadable or carried internally by helicopters, to increase the tempo and combat radius of ground operations. Better use of aviation attributes is key to improving future army operations. However, the twenty-first century army requires more air-combat and logistical aircraft than attack helicopters and air-assaulting light armored vehicles with utility/cargo helicopters.[51]

The recently published Report of the National Defense Panel (NDP) also addresses how we should organize our forces to successfully deal with the broad range of threats in the twenty-first century. The NDP Report is not a document in defense of the status quo. It makes a compelling argument that a "fundamental" not "incremental" change is essential for the American armed forces, noting that since the Cold War their

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[48] Odeen 5.
[49] Hoffman 119.
[50] Department of the Army (Knowledge and Speed) A-4, A-5.
[51] Jarnot 1996.

structure has remained essentially the same. The NDP report concludes that our combat forces face greater risk in the future and recommends shifting the emphasis to developing future capabilities through a structure different from current army divisions.[52] The NDP report also challenges the army's modernization investment strategy of providing new equipment for large armor-against-armor battles.[53] We should construct fixed and rotary wing, manned and unmanned advanced airfighting vehicle brigades and divisions and have fewer armored units.

HISTORICAL EVOLUTION OF THE "DEADLY ZONE"

As we study the impact of evolving technology on the history of warfare, we see a cyclical pattern emerge. This pattern often favors either offensive or defensive operations.[54] Improvements in weapon rate of fire, range and accuracy, without a commensurate increase in speed and mobility, tend to create conditions that favor the defense. Mid-nineteenth century precision weapons such as the small-bore repeating rifle and improved field artillery extended the "deadly zone" that soldiers had to cross to gain positional dominance and push the enemy out of their defense. This "deadly zone" increased from 150 meters in Napoleon's day to over 1000 meters by the close of the American Civil War.[55] Today's army divisions can fire their Multiple Launch Rocket Systems (MLRS) beyond 30,000 meters and the Army Tactical Missile System (ATACMS), Block II to ranges in excess of 280,000 meters with the Brilliant Antiarmor (BAT) Submunition.[56]

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[52] Report of the National Defense Panel 23.
[53] Komarow 21.
[54] Department of the Army (Knowledge and Speed) 2, A-1.
[55] Department of the Army (Knowledge and Speed) A-1.
[56] Army Green Book 97-98 249, 253.

In 1898 at the Battle of Omdurman, the lethal power of six Maxim machine guns accounted for over 11,000 casualties among the attacking Dervishes while the British suffered only 48 dead.[57] During World War I, advances in weapon technology again favored the defense. Battles during the "war to end all wars" bore dramatic testimony to the terrible slaughter brought about by such improvements in technology as land mines, machine guns, field artillery and chemical munitions. As author Price T. Bingham notes, "Only after sustaining immense casualties while attempting to cross the killing zones on the battlefields of 1914-1918, made possible by developments in firepower such as the machine gun, did armies make dramatic changes in warfighting."[58]

During World War II the speed of movement across the "deadly zone" improved dramatically and restored the offense as the dominant form of warfare. Radios, armored plating, and the combustion engine were combined to create agile, durable, and effective armored vehicles which increased command, control, and maneuver speed and safely transported troops across the "deadly zone."[59] This gave ground forces the capability to rapidly envelop enemy defenses, while simultaneously dashing to the enemy's rear and collapsing his logistical support, negating his command and control, and destroying his will to fight.[60] An important point illustrated here is that technology alone is not the answer to the future challenges facing the US Army. All of the western nations prior to WW II had access to the internal combustion engine, armored vehicles and the radio but it was left to the Germans to realize their tactical advantage when employed in military oraganizations which significantly altered their method of warfighting.

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[57] Bingham 88.
[58] Bingham 89.

The German *Blitzkrieg* combined advances in weapons technology that capitalized on improving speed, mobility, lethality and survivability to enable forces to rapidly seize decisive objectives before the enemy could adequately prepare his defenses. As a counter to these rapidly maneuvering forces, weapons technology again focused on increased range, accuracy, and rates of fire to destroy armored formations. Consequently, the "deadly zone" continued to broaden. "What was once a theater area for a field army now became the area of operations for a division or corps. Just as an army moving at two miles per hour could not cross a killing zone dominated by long-range, rapid-firing rifled weapons in 1914, the 'precision revolution' made it prohibitively expensive for an army moving at seven times that speed to cross an infinitely more lethal space a hundred times as large."[61]

Later, tactical air vehicles operating in the third dimension so dominated the battlefield that Nazi commanders, including Field Marshal Erwin Rommel, complained of "being fixed in place, denied the ability to maneuver and forced to endure battlefield paralysis that prevented them from fulfilling their strategic and tactical plans."[62] This same paralysis of future enemy maneuver forces can be achieved by the US Army of the twenty-first century by moving into the third dimension of battle maneuver.

In the four decades following World War II, tactical forces needed defensive killing power, not for the German-styled *Blitzkrieg* but for Soviet-styled "lighting war" operations. These combat operations combined shock with long-range precision weapons to move rapidly across northern Europe. Tactical weapons technology focused on destroying large armored formations, with killing distances measured in

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[59] Department of the Army (Knowledge and Speed) 2; Friedman 124-125.
[60] Department of the Army (Knowledge and Speed) 2.
[61] Bingham 88.
[62] Hallion and Irish 88.

miles instead of meters, further extending the "deadly zone." By the mid-1980s, in Europe and the Middle East the tactical "deadly zone" once again surpassed former operational and strategic areas of operation. The advantage shifted to the defender.[63]

Desert Storm, characterized by armored and mechanized units, demonstrated that the dynamics of the battlefield have again dramatically changed. US Army forces traveled farther, faster, and with a greater degree of survivability over more "deadly zone" than ever before. Airpower from several sources, including army aviation, conducted strike operations weeks in advance to prepare the battlefield so that a ground force with close air support was able to sweep the enemy off the battlefield in less than 100 hours.

THE NAVY'S TRANSITION TO THE THIRD DIMENSION

Today, the army's primary instrument of maneuver is the armored vehicle. Armored fighting vehicles and armored troop carriers have served the army well in decisive battles from World War II to Desert Storm. Although the tank will continue to make contributions to future battles, bigger, more heavily armored, faster tanks with larger guns and greater range are not the solution to success in twenty-first century warfare. The ground-bound tank is the army's parallel to the navy's battleship, and it too must ultimately make the transition to warfighting in the third dimension.

Prior to World War II, the US Navy's battleships were the undisputed rulers of the seas, enforcing "battleship diplomacy" and solving political, commercial, and military problems around the globe, sometimes by their mere presence. The navy employed them much as the army now employs the M-1 Abrams in Kuwait, Korea, and Bosnia. Similar to the Abrams and other armored vehicles of today, the old dreadnoughts were

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[63] Department of the Army (Knowledge and Speed) A-2.

big, relatively fast, and immensely destructive. With their thick armor plating and large guns, they were considered capable of delivering and sustaining massive punishment.[64] However, in 1942, when the Japanese First Air Group sunk the battleships *Repulse* and *Prince of Wales* off the coast of Malaya, "... decisive proof existed that the day of the battleship was passing.... "[65]

After the Japanese air attack at Pearl Harbor, the battleship *Arizona* had been blown up, the *Oklahoma* had capsized, *Nevada* was beached, *West Virginia* had sunk and the *California* was sinking. Counting the *Utah,* an old target ship that had been mistakenly attacked, six battleships had been taken out of the fight. For the first time in history a battle fleet had been destroyed from the air. The dreadnoughts of "battleship row" were in reality hollow symbols of national power, not effective fighting machines. Even with the loss of these capital ships, a case could be made that their destruction and the ultimate result of the attack on Pearl Harbor was to produce a more capable US Navy. It allowed the warship construction program to be reoriented in a more modern direction -- toward the development of aircraft carriers.[66]

The dominance of naval air power over surface ships was demonstrated beyond doubt during World War II and repeatedly since then.[67] The Battle of Midway halted the tide of the Japanese naval and land advance in one day and is typically regarded by military historians as one of the decisive confrontations in the Second World War. There the Japanese presented against the American fleet the largest, most heavily armed and armored battlewagons ever constructed. The *Yamato* and *Musashi* displaced 69,000 tons and fired 3,240 pound projectiles -- about the weight of a Ford

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[64] Shaw 44-45.
[65] Padfield 25; Hough xvi.
[66] O'Connell 315.
[67] Padfield 312.

Mustang -- from 18-inch guns to hit targets 25 miles away. The defeat of the Japanese battleships was accomplished by deploying some 230 attack aircraft and dive bombers from three US carriers of contemporary design.[68]

Midway became Japan's final and critical lesson in capabilities of naval air power. Directly linked to the Japanese defeat at Midway, the third of Japan's *Yamato* class giants, the battleship *Shinano*, was refitted on the docks to be completed as an aircraft carrier, as were the hybrid carrier-battleships, *Ise* and *Hyuga*.[69]

This new style of naval warfighting was foreseen as early as the 1920s by military prophets who were preaching the attributes of naval air power. The prophecy was made possible by the development of naval air power in the 1930s. After a brief period of transition, there began a new era of sea power, in which the navy's former main battle tank of the ocean gave way to the aircraft carrier. The demoted battleship was then relegated largely to carrier defense.[70] Today, heavily armored battleships, with big guns, long considered the embodiment of naval power, have disappeared from the oceans of the world, victims of technological progress.[71]

LIMITATIONS OF ARMOR IN THE 21st CENTURY

Although a force to be reckoned with in the twentieth century, armored vehicles become extremely vulnerable in the twenty-first century battlespace. Modern anti-tank systems are extremely lethal, simple to operate, and so effective that a small number of anti-tank systems can significantly alter the balance of forces and negate American technological advantages. *(See Figure 2, "Reduced Tank Survivability")*

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[68] Shaw 44-45.
[69] Padfield 283.
[70] Padfield 312.
[71] Shaw 44-45.

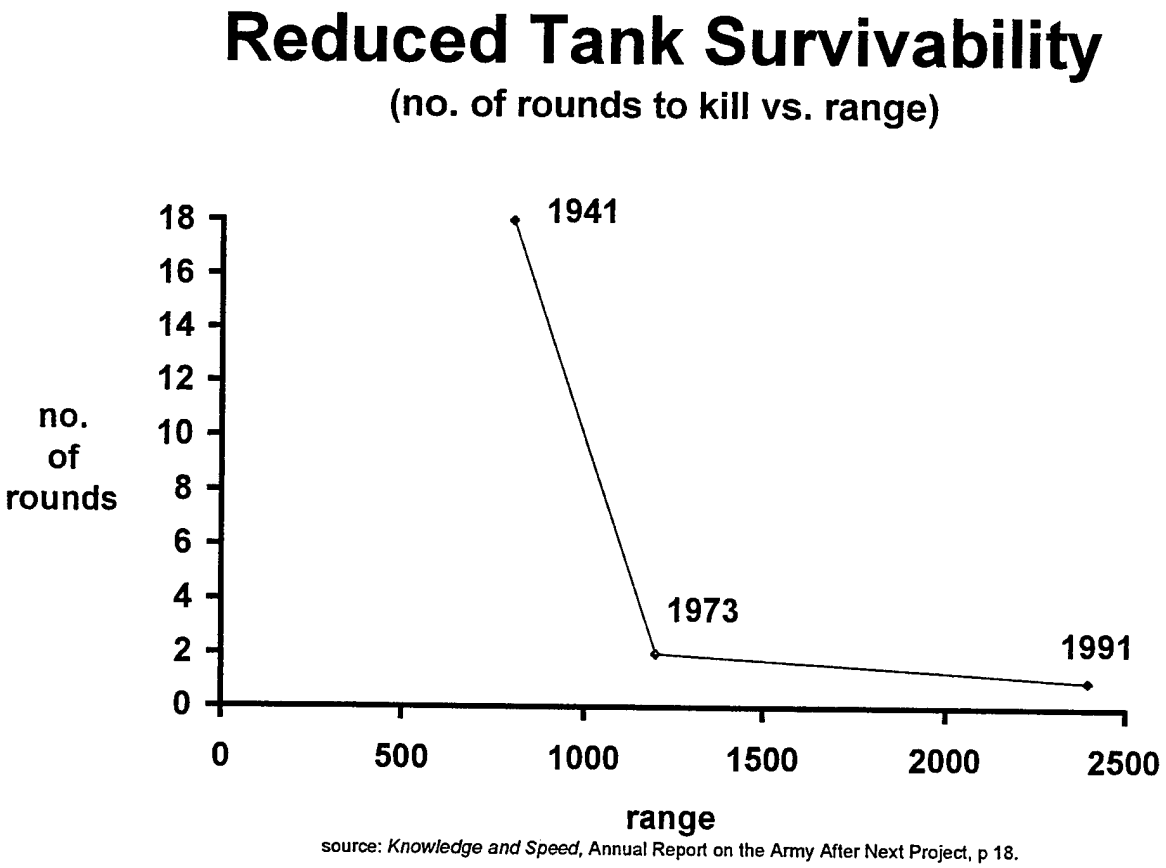

Figure 2: "Reduced Tank Survivability"

The size and weight of armored forces inhibit rapid deployment. Short-range communications and limited line of sight contribute to a general lack of integrated battlefield awareness. The mobility of armored vehicles such as tanks is limited by the very terrain that it must maneuver upon. These vehicles are limited by their inability to climb hills, cross ditches, ford rivers, transit bridges built to accommodate vehicles the weight and size of automobiles, negotiate forests and swamps and maneuver through urban areas. Tanks reduce their survivability by moving across the "deadly zone" at relatively low rates of travel. Tanks lack the speed, multi-directional visibility, and long-range target acquisition capability of an advanced airfighting vehicle. They must travel by hugging the earth's contours which limits their line-of-sight and optimizes their

vulnerability to enemy counter-mobility measures such as blown bridges, log abatis, minefields, and other natural or manmade obstacles.

In the future, large numbers of heavy main battle tanks will nearly vanish from the battlefields of the world, having become victims of their great size, great weight and continuous need for logistical support. Heavy vehicles in constant contact with the surface of the earth require excessive amounts of fuel, frequent repair parts, and forces to provide mobility assets such as temporary bridging to cross bodies of water and improved or cleared roadways to facilitate the advantage of their speed and shock effect. These requirements have resulted in large divisions made up primarily of combat support and combat service support units. To build and maintain roads and bridges, the army has put large engineer brigades in heavy divisions -- with a transition to air vehicles we can eliminate many of these requirements from the force structure. Similarly, by putting air-to-air missiles on tactical aircraft we can reduce the need for air defense battalions.

An army as small as ours, particularly in proportion to its global responsibilities, must increase the speed, lethality and survivability of its primary combat systems. A recent Pentagon study showed that only 14 percent of the military have combat-related jobs while the other 86 percent are personnel operating in support of combat operations. We must reverse the trend of letting our fighting teeth be overcome in size and scope by our logistical tail.[72]

Military forces may employ several viable methods to reduce the logistical "tail":

- seek alternative power sources to reduce fuel consumption and frequent fuel replenishment

- decrease the size of the force within close combat range of enemy weapon systems
- exploit the vertical dimension of combat to achieve positional dominance over the enemy

Although an armored vehicle's main gun is able to engage targets at a distance of six kilometers, it is clearly a short-ranged weapon compared to the long-ranged precision capabilities of the new generation of guided missiles. The success of the Multiple Launch Rocket System (MLRS) has demonstrated the potential for rapid transition from fire support guns to missiles. Current and new generation tactical missiles including MLRS, ATACMS (Army Tactical Missile System), ALCM (Air Launched Cruise Missile), HARPOON, TOMAHAWK, JSOW (Joint Standoff Weapon), JDAM (Joint Direct Attack Munitions), and SLAM-ER (Standoff Land Attack Missile Expanded Response) now incorporate precision engagement technology. Potential adversaries may soon have the capability to engage our armored forces from well beyond current ground defense capabilities. These new anti-armor "smart," "very smart," and "brilliant" fire-and-forget weapons may operate while visually obscured by smoke, fog, dust, and during both day and night in adverse weather.

For the past five centuries, ballistic weapons which fire uncontrolled projectiles have dominated warfare. Desert Storm set the stage for ending the "Age of Ballistics" with the successful employment of precision-guided munitions whose projectiles' path can be directed after being fired. In the future, precision fire will replace ballistic fire as the primary means of destroying enemy units and fortifications. Consider that an M1 Abrams tank costs about three million dollars per system and fires a high explosive

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[72] Blazar 8.

anti-tank (HEAT) round that costs $1,033, while a laser-guided Hellfire anti-tank missile only costs $50,000. At a unit cost of $30,000, the LOSAT (line-of-sight anti-tank) missile, the planned successor to the TOW anti-tank missile, can kill a tank at two miles in less than 1.5 seconds and transmits course corrections by laser. Undoubtedly, the tank with its limited weapons range, lack of maneuverability, reduced survivability, and high unit cost is, as one critic stated, "a weapon too costly to risk and not deadly enough to accomplish the mission."[73]

Precision missiles with their greater range produce the same or greater level of lethality as guns with reduced collateral damage and less risk to the force. Hundreds of rounds fired from gun tubes are often required to achieve what single precision munitions can accomplish in one round. Even now, a whole generation of comparatively inexpensive, mass produced, shoulder-fired anti-tank missile systems (DRAGON, JAVELIN, AT-4, Karl Gustav, Panzerfaust) can immobilize and destroy expensive armored vehicles and their crews. Although the world is full of surface-to-air missiles, advanced combat aircraft protect themselves with anti-missile technology, long-range stand-off fires, maneuver speed and terrain masking.

Improved missile accuracy and speed will ultimately result in fewer weapon systems, fewer tactical units, and reduced logistical requirements. It should not be forgotten that not only do armored forces require a large logistical support system to keep them operating in a high-friction environment but they are also heavily dependent upon air and sealift to deploy around the globe. Air vehicles can rapidly self-deploy over long distances, water obstacles, and steep roadless terrain. Some army aviation units self-deployed along a northern route from the US to Desert Storm. Today, we can

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[73] Friedman 3, 139, 157.

take advantage of large commercial airports for refueling and maintenance. *(See Figure 3, "Current Airlift Capability")*

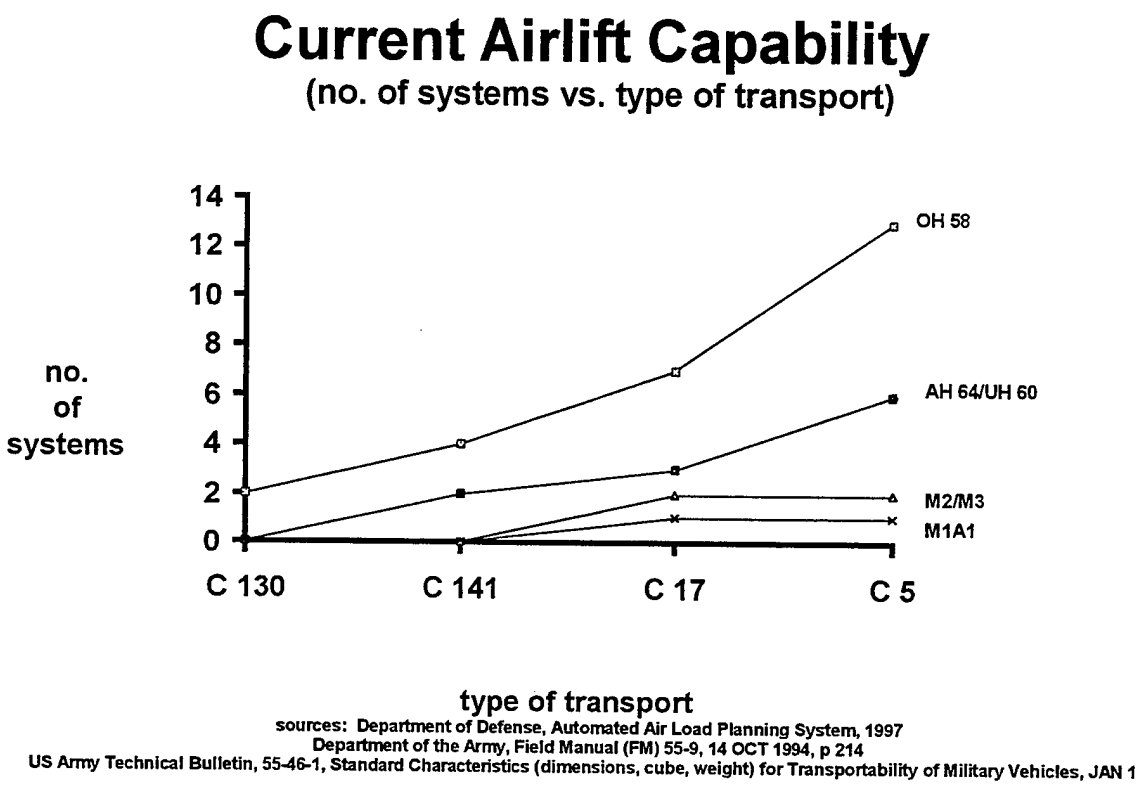

Figure 3: "Current Airlift Capability"

In the future, battlespace armored forces will be outmoded as the principal maneuver force of the US Army. They lack the speed, maneuverability, increased range, lethality, long range fires, survivability, and deployability required of the force projection army of the next millennium. "Smart" mines and air-launched missiles, in concert with simple and nearly inexhaustible numbers of shoulder-launched anti-tank weapons have made modern armored vehicles as vulnerable as the battleship. As nations expand the edge of the tactical range "envelope" to destroy armored formations with unprecedented accuracy and rapidity at comparatively low cost, we must transition our traditional land tank to a "flying tank." There should also occur a simultaneous

transition from cannons and field artillery to missiles and mount those systems on advanced aerial platforms creating "flying artillery."

"Flying artillery" is not a concept new to army operations. During the Second World War the Germans used "flying artillery" in the form of the *Stuka* aircraft to secure the flanks of armored penetrations and destroy enemy blocking positions in an effort to accelerate the offensive tempo. General Patton also used "flying artillery" to secure the flanks of the Third Army as it rapidly advanced in land from Normandy.

In 1959, the navy converted the USS Albany from a gun carrier to a missile cruiser. Today, navy on-board missiles such as the Harpoon (range 60 nautical miles) and the Tomahawk (range 250 nautical miles) provide significantly greater fleet strike capability and security than their old guns through increased range, lethality and accuracy.[74] The army of the early twenty-first century does not need to draw out the transition from ground-based brigades and divisions to air-based platforms in a manner similar to the last days of the horse cavalry. Our army can now enjoy an evolution in the way we fight that will yield revolutionary speed, agility, maneuverability, lethality and survivability. We must transition now from a ground-based maneuver force to advanced airfighting platforms. Now is our opportunity to seize the initiative and embrace a new concept in maneuver warfare.

The army will benefit from examining the navy's experience in designing its current force structure. The navy focus on broad area, non-linear battlespace, over-the-horizon intelligence and strike operations, long-haul logistical support, and reduced "tail-to-tooth" structure encompasses many of the battlespace requirements for our future army.

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[74] Breemer 13.

Information technology provides distinct advantages to a defending force, allowing it to mass fires, concentrate forces, collect and disseminate intelligence, all while operating on internal lines of support. These advantages, coupled with precision weapons, are the harbingers of disaster for a force projection army that relies on ground armored vehicles that are fraught with so many vulnerabilities and limitations. The AAN Report states that "...unless the speed of movement increases substantially, these improvements in detection and precision fire delivery will make offensive action infinitely more difficult....[I]ncreasing the speed of movement across all three levels of warfare must become the driving imperative of future military development."[75]

Fundamental changes in the nature of warfare, some already adopted by the US Navy and the US Marines in the twentieth century, make it imperative that we reshape the army to be prepared for the changing demands of the twenty-first century. The US Navy's transition to third dimensional primacy and the subsequent dominance of maritime warfare set the standard for the US Army to follow. In 1947, Congress created the US Air Force when it recognized the strategic value of the third dimension and its many advantages. Those advantages included rapid deployment, increased velocity of attack, range, and strategic lift. The US Marine Corps developed its own rotary, fixed wing air and UAV force to fully exploit the tactical advantages of the vertical velocity of attack. During the Korean War, the army medical community broke contact with the ground by exploiting the advantages of rotary wing air evacuation to increase the tempo of ambulance operations to new levels. This is a military standard that injured service members have come to expect: rapid evacuation by aircraft. Army forces in Vietnam enjoyed the vertical speed and mobility advantages of airmobile

[75] Department of the Army (Knowledge and Speed) 11.

operations to achieve surprise, mass and a higher offensive tempo than was attainable in ground operations.

More recently, Desert Storm demonstrated the speed, range, mobility, and lethality of the AH64 Apache attack helicopter. At 0726 on the 24th of February 1991, the 101st Airborne Division (Air Assault) began their attack into Iraq with 200 helicopters to seize an objective 200 kilometers deep into the Euphrates River Valley. The infantry soldiers climbed aboard UH-60 Blackhawks for a "40-minute ride into battle" to seize Forward Operating Base Cobra 100 kilometers from the Line of Departure. Within 31 hours the 101st had cut Highway 8 and most of the Iraqi support to the Kuwaiti Theater of Operations. As the army's Report on Desert Storm states, "only an air assault division could have delivered such a lightning strike."[76]

The 24th Infantry Division (Mechanized) however, secured their portion of Highway 8, on the right flank of the 101st, at 0110 on the 27th of February, about 58 hours after they launched their attack. Distance, vehicle speed averaging 25 kilometers per hour, and rough terrain slowed the armored forces of the 24th Infantry Division. These restrictions were not significant problems for air assault forces.[77]

If the army is to maintain its dominance in land warfare, it must accelerate its maneuver speed across the "deadly zone" by a greater order of magnitude than it is currently capable of doing with the tank and the Infantry Fighting Vehicle (IFV).[78] The American method of warfighting must rely on its capability to conduct offensive operations. This is especially true if this nation intends, as a point of foreign policy, to

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[76] Scales 148, 218, 220.
[77] Scales 255, 259.
[78] Department of the Army (Knowledge and Speed) 2.

remain the uncontested global military power with an army that maintains the capability to strike rapidly and finish wars quickly with minimal loss of life to all belligerents.[79]

As Ralph Peters illustrates, "Armored vehicles will be around for a long time to come. But their shapes, sizes, weights, armor, armaments, propulsion, connectivity, battlefield awareness, and crewing will change profoundly."[80] Additionally, the nature of armored vehicles will have to evolve to enable them to elevate into the vertical dimension to survive the immensely more hostile arena of future combat. The army of the early twenty-first century must adopt the US Marine Corps "air arm" MAGTF (Marine Air Ground Task Force) concept of operations. They can accomplish this in part by incorporating into the force structure Harrier-like VSTOL aircraft that do not rely on fixed and improved airstrips for take off and landing. Although the navy's three operational arms (surface warfare, aviation, and submarine forces) can all engage land targets, they rely on the marines to provide the ground assault capability necessary to physically seize and hold objectives on land. Army armored forces, focusing on the enemy main effort, can block, delay and disrupt the enemy timetable creating more compressed enemy formations which will provide greater targets for long ranged precision fires. Likewise, the army must retain the capability to maneuver a ground assault force to destroy or capture the enemy and to seize and hold the objective.

Yet, overall, we must increase the velocity of attack at a rate unachievable on the linear battlefield. We must dramatically change the dynamics of maneuver warfare by internalizing a revolutionary change in focus. We must field current fixed-wing and UAV aircraft and develop advanced airfighting vehicles to replace many of our tanks and armored vehicles. These changes will exploit the advantages of speed,

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[79] Department of the Army (Knowledge and Speed) 3.
[80] Peters 50.

maneuverability, lethality, and survivability inherent in the vertical velocity of attack. Army air power, similar to naval air power, will allow our maneuver forces to remain dominant in land warfare, ensuring full combat capability for US forces well into the next century.

CHAPTER III: Vertical Maneuver in a Three-Dimensional Battlespace

"In the future, formations will operate far more swiftly and in smaller increments than in even the most successful divisional attack during Desert Storm, but this is the reborn paradigm: Go fast, hit the enemy's weaknesses, keep on hitting him, and don't stop moving. This is very old military wisdom. Somewhere, somehow between the National Training Center and Carlisle, many of us forgot it. Too often, we elevate safety of decision over decisiveness. We may admire Jackson, but we imitate McClellan."

- LTC Ralph Peters, USA (ret.)[81]

The Army will be extremely cautious about making an audacious change in principal maneuver systems; advanced air vehicle dominance over armored vehicles. Ralph Peters points out that we are driving our potential adversaries into battlefield environments where our efficiency and effectiveness will drop to levels unacceptable to the American public, the press, and our political-military authorities.[82] The fear is mounting that we are heading for another Vietnam where we will again be beaten by asymmetrical forces.

Extending the battlespace of the Land Component Commander (LCC) provides army units with greater operational flexibility for weapons employment. It also potentially reduces risk to the force by putting the bulk of Combat Support and Combat Service Support assets out of the range of enemy tactical weapons. The army must be prepared to engage in the free prosecution of offensive operations while simultaneously conducting force protection by leveraging all battlespace dimensions -

space, air, sea and land. This provides it the freedom to operate; not only the freedom *from* attack but the freedom *to* attack.[83]

The army of the early twenty-first century, like the navy and the marines, must transition its combat forces into the third dimension. Our traditional dominance of "horizontal" ground warfare will force the enemy to rely on new methods to extend battle time and increase casualties as a strategy to win conflicts. To counter this, we must shift our focus to the vertical dimension to decrease casualties and accelerate the time in battle required to accomplish our objectives. Our ability to dominate this dimension of the tactical battlespace is increasing at a rapid pace as technology provides the tools to exploit this opportunity.

In 1997, the US Army Training and Doctrine Command (TRADOC) conducted a series of futuristic war games focused on the year 2020. This effort recognized that in order to thwart the enemy's technological advances in defensive precision fire and improved battlefield information we must achieve order-of-magnitude increases in maneuver speed. It determined that the only way to accomplish this was to "rotate the traditional two-dimensional orientation of land forces upward into the atmosphere...."[84] *(See Figure 4, "Operational and Tactical Speed")*

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[81] Peters 51.
[82] Peters 51.
[83] Hallion and Irish 90.
[84] Department of the Army (Knowledge and Speed) 11.

AAN - FROM LINEAR TO VERTICAL

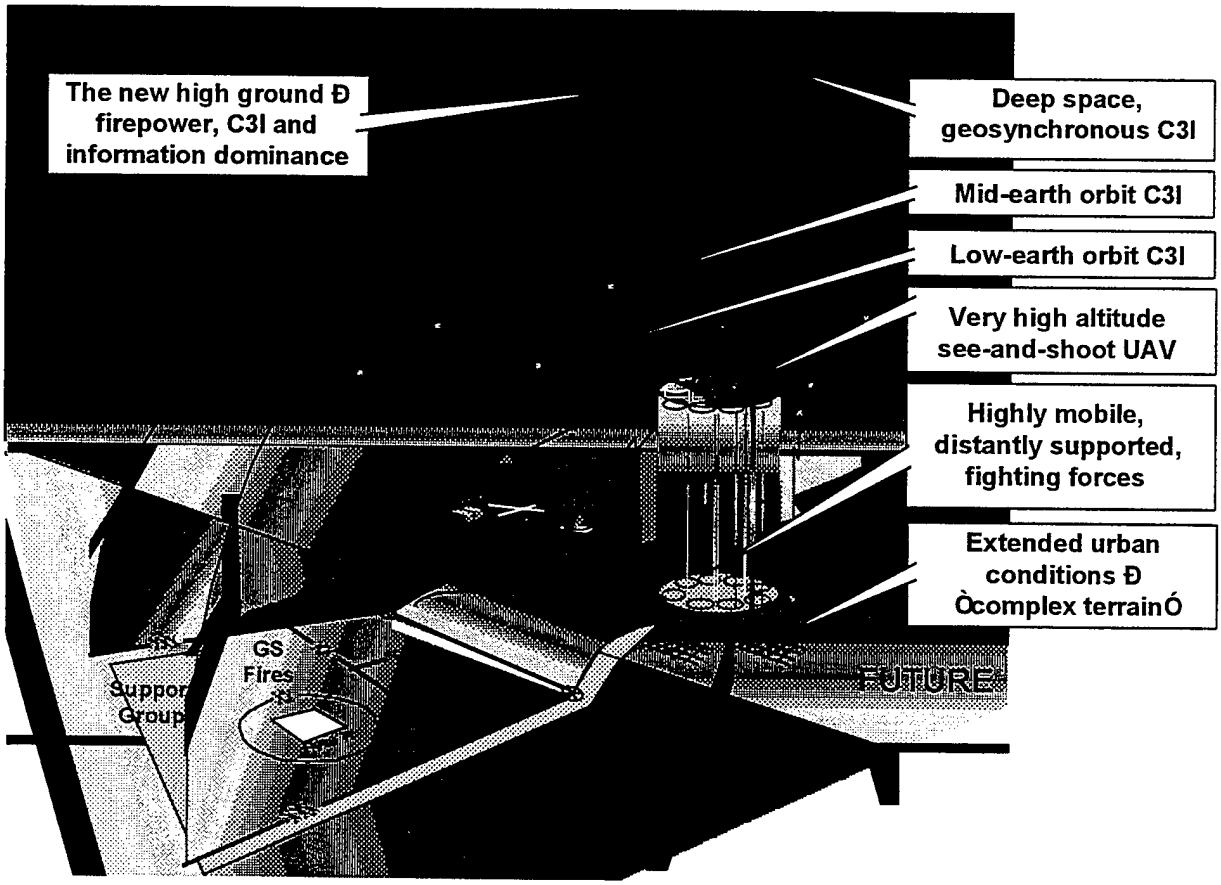

figure 4, "Operational and Tactical Speed," *Knowledge and Speed,* Annual Report, Army After Next Project, p 12.

TRADOC demonstrated the advantages of third-dimensional warfighting by employing Blue Forces--who, in these war games represent the Allied Forces under US command--with advanced air fighting vehicles. They were able to achieve "immediate and dramatic disintegration" of enemy forces.[85]

By relying on more extensive use of the vertical battlespace to achieve a greater velocity of attack, the terrain, rather than restricting mobility, serves to conceal, protect and facilitate rapid air maneuver. The AAN study found that mine fields were ineffective against the employment of advanced air vehicles. Their increased

[85] Department of the Army (Knowledge and Speed) 12.

maneuver speed resulted in greater survivability. The enemy's ability to target and maneuver against Blue Forces was significantly degraded resulting in uncoordinated attacks and defeat in detail.[86]

As stated in the Army After Next Report, "the principal finding of the Leavenworth Games was that mobility, characterized predominately by speed of maneuver, proved to be the most important factor contributing to battlefield success."[87] Therefore, the key to future battlefield dominance lies in improving the army's vertical velocity of attack while simultaneously leveraging precision munitions and information dominance. The Leavenworth games revealed that although the advantages of Blue Force's precision firepower and information dominance were effective in the early stages of combat, they eroded over time as the enemy found asymmetrical responses which offset these advantages.[88] The precision-fire shock effect of US combat power which achieves "surprise" over the enemy tends to dissipate over time as the enemy gains a greater understanding of our capabilities and tactics and lessens their destructive effects through more asymmetrical approaches.[89] We must therefore decrease battle time by increasing maneuver speed.

The same shock effect of the precision combat fire power which produces casualties and equipment losses compels the arriving US forces to avoid major airfields and seaports as areas likely to be targeted by adversaries using similar weaponry. The Leavenworth Games demonstrated that if the enemy possessed even the most primitive weapons of mass destruction (WMD), the risk of major casualties and the loss of equipment would cause US forces to avoid major airfields and ports. This scenario

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[86] Department of the Army (Knowledge and Speed) 13.
[87] Department of the Army (Knowledge and Speed) 12.
[88] Department of the Army (Knowledge and Speed) 14.
[89] Department of the Army (Knowledge and Speed) 19.

also encourages US forces to disperse to locations well beyond the range of enemy forces. Consequently, speed becomes even more essential as we concentrate disparate forces from distant staging areas.[90] *(See Figure 5, "Air Ground Maneuver")*

Air-Ground Maneuver Uses the Ground Tactically Without Relying on It for Mobility. In the Leavenworth Games, an AAN Battle Force Was Able to Catch and Defeat Two Moving Enemy Divisions in a Remarkably Short Time.

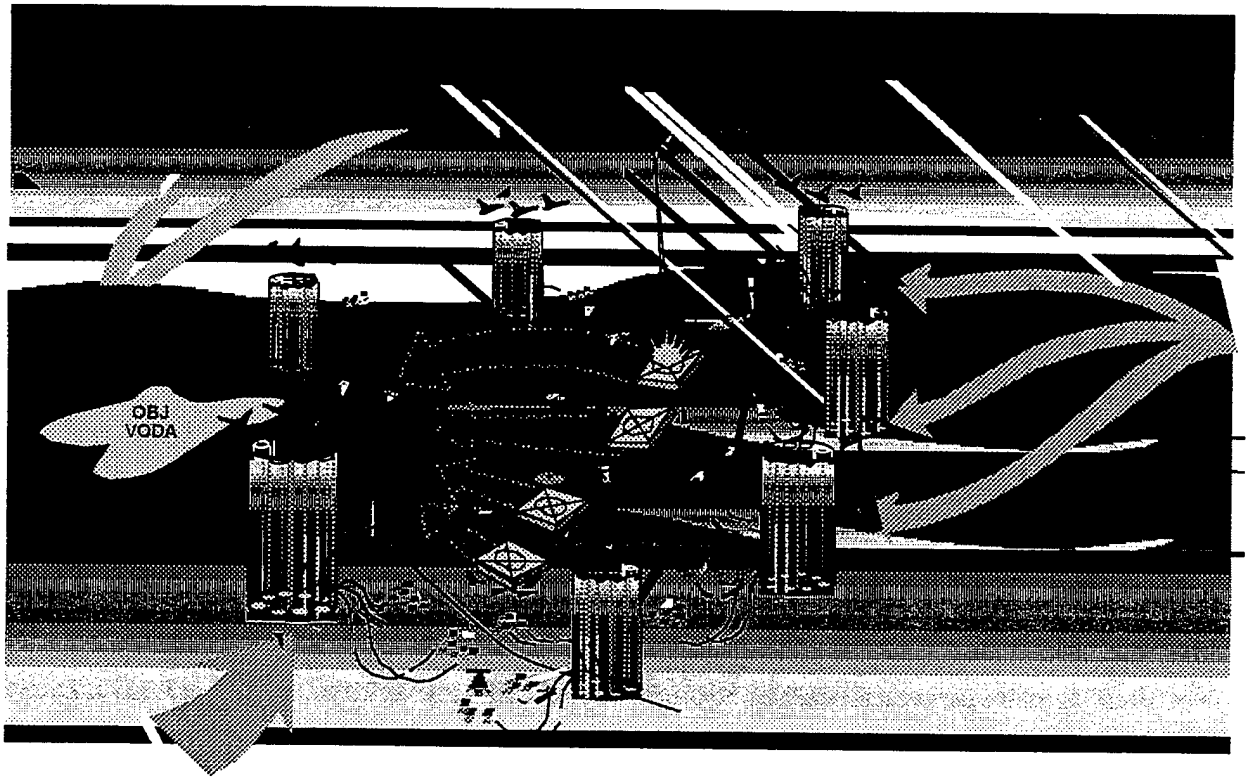

figure 5, "Air and Ground Maneuver," *Knowledge and Speed,* Annual Report on the Army After Next Project, p 14.

The army's Winter War Games (WWG) in 1997 also focused on waging war in the year 2020. A principal recommendation was that the army will need to field a force much more deployable than the armored forces of today.[91] The findings of the WWG also noted that, as in the Leavenworth Games, speed and rapid deployment of forces were the dominant factors in preventing enemy establishment of a cohesive defense in

[90] Department of the Army (Knowledge and Speed) 15-16.

a theater.[92] Due to the geo-strategic position of the United States, the WWG emphasized that the army must rely on rapid strategic deployment to win wars on the ground.[93]

The Army After Next Report suggests that the current emphasis on firepower, instead of rapid maneuver, will result in protracted conflicts with increased loss of life. Shifting our emphasis to rapid maneuver will bring a battle to a rapid closure not by the physical destruction of enemy systems but rather by gaining positional advantage to ensure the destruction of sequential defensive centers of gravity. Consequently, we must achieve a balance of firepower and maneuver that maximizes the attributes of precision weaponry and the vertical velocity of attack to win quickly and decisively with low casualties and loss of equipment.[94]

Clearly, the advantages of third dimensional maneuver for army forces are a tremendous force multiplier, providing an exponential increase in combat power. And, aside from the obvious advantages of maneuver speed and increased weapons range, the restrictions imposed by difficult or impassable terrain are greatly reduced. The adversity of forests, swamps, rivers, minefields, channelizing terrain are all minimized. Large units are not further encumbered by attempting to pass through terrain that taxes ground vehicles and exposes the force to possible ambush and destruction. Due to the stand-off capabilities of air-launched weapon systems and the benefits they derive from a reduced signature, the element of surprise is greatly enhanced when they are directed from the third dimension upon an unsuspecting enemy.

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[91] Department of the Army (Knowledge and Speed) 15.
[92] Department of the Army (Knowledge and Speed) 15.
[93] Department of the Army (Knowledge and Speed) 16.
[94] Department of the Army (Knowledge and Speed) 4-5.

Because tanks and armored vehicles currently dominate our maneuver force does not necessitate their being the solution for our future force. The strategy and formation of the force structure of the Army After Next should be based upon *future requirements* and not on *current capabilities.*

Emphasis on advance airfighting platforms deployed, on a grand scale, in tactical units will dramatically alter the nature of warfare not only in our army, but around the globe. It is a technology applied to a style of warfighting that no known adversary or potential adversary possesses. Advanced tactical airframes can achieve high sortie generation rates that will rapidly provide substantial amounts of firepower. They will have the range, speed, deployability and flexibility to engage or disengage quickly and survive.

Advanced air vehicles will provide some other unique attributes for the force:

- decreased proximity of the launcher to the target, reducing the time of flight of the weapon to its target and thereby increasing the probability of a first-round hit. This aids in compressing the sensor-to-shooter-to-target sequence and minimizes the amount of pre-launch time the sensor must track the target;[95]
- decreased likelihood that friendly forces will sustain casualties by attacking enemy offensive systems before they can target friendly forces;
- create battlespace awareness that improves situational awareness, decreases response time and makes the battlefield more transparent through better battlefield visibility;[96]

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[95] Department of the Army (Knowledge and Speed) 17.
[96] Department of the Army (TRADOC) 13.

- provide a greater ability for rapid deployment with fewer transport requirements;
- provide increased dispersion in a lethal battlespace decreasing risk to the force;
- increase the range of robust line-of-sight communicating systems.

Advanced airfighting vehicles with decisive speed over the ground, dominant maneuver, increased survivability, greater battlespace awareness and greater agility will also provide the army commander with:

- over-the-ground maneuver unconstrained by physical limitations and obstacles in the terrain;
- a basis for rapid supply, reinforcement and reengagement capabilities with decreased risk;
- the ability to allow army forces to gain a decisive advantage by rapidly controlling the depth, breadth, and height of the battlespace;
- an opportunity to achieve asymmetrical superiority over current ground-based maneuver systems through positional advantage, clearly producing a more decisive force;
- a synergy which enhances the army's ability to achieve the benefits of mass while simultaneously enabling the force to remain dispersed.

These improved capabilities and technologies are liberating ground forces from fighting a "horizontal" battle. This is particularly significant given that our future adversaries may possess or have access to several, if not all of the following:

- biological, chemical or nuclear weapons of mass destruction;
- mobile, dispersed and decentralized forces;
- capability to exploit public opinion to force us to conduct operations prematurely with expectations of a decisive and rapid victory with few casualties;
- a greater ability to field more combat systems in a region.

The driving requirement to increase weapon range is to achieve risk reduction to the force. By increasing the distance between friendly and enemy forces, we reduce casualties at a time when the loss of a single soldier in combat is scrutinized by the American public and the media. Future Army doctrine, strategy and tactics should focus on the *deep,* not the *close,* fight. The use of long range fires to decisively weaken and reduce enemy forces for final destruction by a small maneuver force will be the rule, not the exception. Technologically advanced weapons such as Comanche and ATACMS make deep operations possible while reducing the risk of casualties on an ever-shrinking Army. This battle strategy for future conflicts was demonstrated in Desert Storm. The enemy center of gravity was pounded with long range strike assets and then rapidly destroyed by ground forces with minimal loss to friendly forces. To increase the tempo of our operations, we must reduce the restrictions and hindrances imposed by maneuvering literally *on* the terrain. This strategy of using advanced airfighting vehicles, possessing greater speed, range and mobility, contributes to the increased survivability and lethality that our forces will require to dominate and win in the future battlespace.

Advanced airfighting vehicles, much as rotary-wing aircraft do now, will enable the future Army to react faster than the enemy. They will provide the army a greater

agility, which is a prerequisite for seizing and holding the initiative.[97] Additionally, advanced air fighting vehicles will, by directing fire and conducting attacks on the enemy's flanks and rear, ensure that the ground commander is resourced to conduct attacks simultaneously throughout the depth of the battlespace. The ability to accomplish these forms of vertical maneuver degrade the enemy's freedom of action and reduce his flexibility and endurance while upsetting his plans and coordination.[98] In a force-projection army, the demands for versatility to adapt to different missions, tasks, environments and changing enemy tactics increase. Greater speed and improved maneuverability are essential to future combat forces.

Historically, landpower poses the threat of one form of maneuver--horizontal. Elevation of ground forces into the vertical dimension, slightly above the earth, poses an asymmetrical problem for our future adversaries from a different domain. To oppose maneuver forces in advanced air fighting vehicles, the enemy must disperse, hide, conceal and dig in. If our potential adversaries optimize their advantage of fighting in their own backyard and concentrate their land forces to attack us, our advanced airfighting vehicles will enjoy a target rich environment and destroy them. If, on the other hand, they elect to disperse and fight in small groups in a more unconventional and less exposed fashion, our air and ground forces will locate and destroy them. Together the assets of ground maneuver forces and forces in advanced airfighting vehicles, supported by ground maneuver systems, will be the most formidable force in the twenty-first century.[99]

Ten years ago many proclaimed the Soviets, with their arsenal of tens of thousands of tanks and an extensive offensive maneuver doctrine, the preeminent

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[97] Department of the Army (TRADOC) 2-7.
[98] Department of the Army (TRADOC) 2-7.

leaders of armored warfare. This doctrine espoused rapid rates of advance across rivers and plains. The United States even began changing its own army's operational doctrine to resemble theirs. But then came the Russian experience of Grozny. As Ralph Peters states, "Our reaction was to mock Russian incompetence and repeat the old sin that you don't send armor into cities." Army divisions that rely on ground-based combat systems for fire power and maneuver will not survive on the battlefields of the twenty-first century.[100]

[99] Hallion and Irish 21.
[100] Peters 57.

CHAPTER IV: Transitioning Future Forces to a Three-Dimensional Battlespace (Maintaining the Tactical and Technical Edge)

"... By 2025 the army must have shifted upward from its traditional two-dimensional spatial orientation of land forces into the vertical or third dimension." - *Knowledge and Speed*, the Annual Report on the Army After Next Project[101]

In the era of predominant land warfare, typified by the Roman model of warfare, forces moving on foot could control 30 percent of the earth's surface at a mobility rate of approximately 1.5 mph. In the era of predominant seapower, forces afloat could control 70 percent of the earth's surface and coastal regions by moving across the ocean at a mobility rate of approximately 20 mph. In the era of predominant air power, forces operating through the air can control virtually 100 percent of the earth's surface at mobility rates in excess of 500 mph.[102]

Our army must capitalize on its ability to conduct military operations in three dimensions, simultaneously, globally and in concert with our other services. We can and will do this through the use of advanced air systems, both manned and unmanned, fixed-wing, rotary-winged and tilt-rotary-winged platforms, employing guns and missile systems from above. Our army must develop a constellation of advanced aerial vehicles capable of performing all the traditional functions of the seven battlefield operating systems (command and control, intelligence, indirect fire, air defense, maneuver, logistics, mobility/counter-mobility and survivability). This vertical component of the army formed at the tactical level should contain both manned and

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[101] Department of the Army (Knowledge and Speed) 18.
[102] Halloran and Irish 89.

unmanned vehicles developed with a focus on speed, maneuverability, survivability and improved functionality.[103] By conducting split-based operations with what the Army After Next Report describes as "reach-out" communications, intelligence and fire support, combined with "just-in-time" and "just-what's-needed" logistics, we will reduce the size of the tactical force and "eliminate all baggage not directly related to closing with or gaining positional advantage over the enemy."[104] *(See Figure 6, "AAN Operations")*

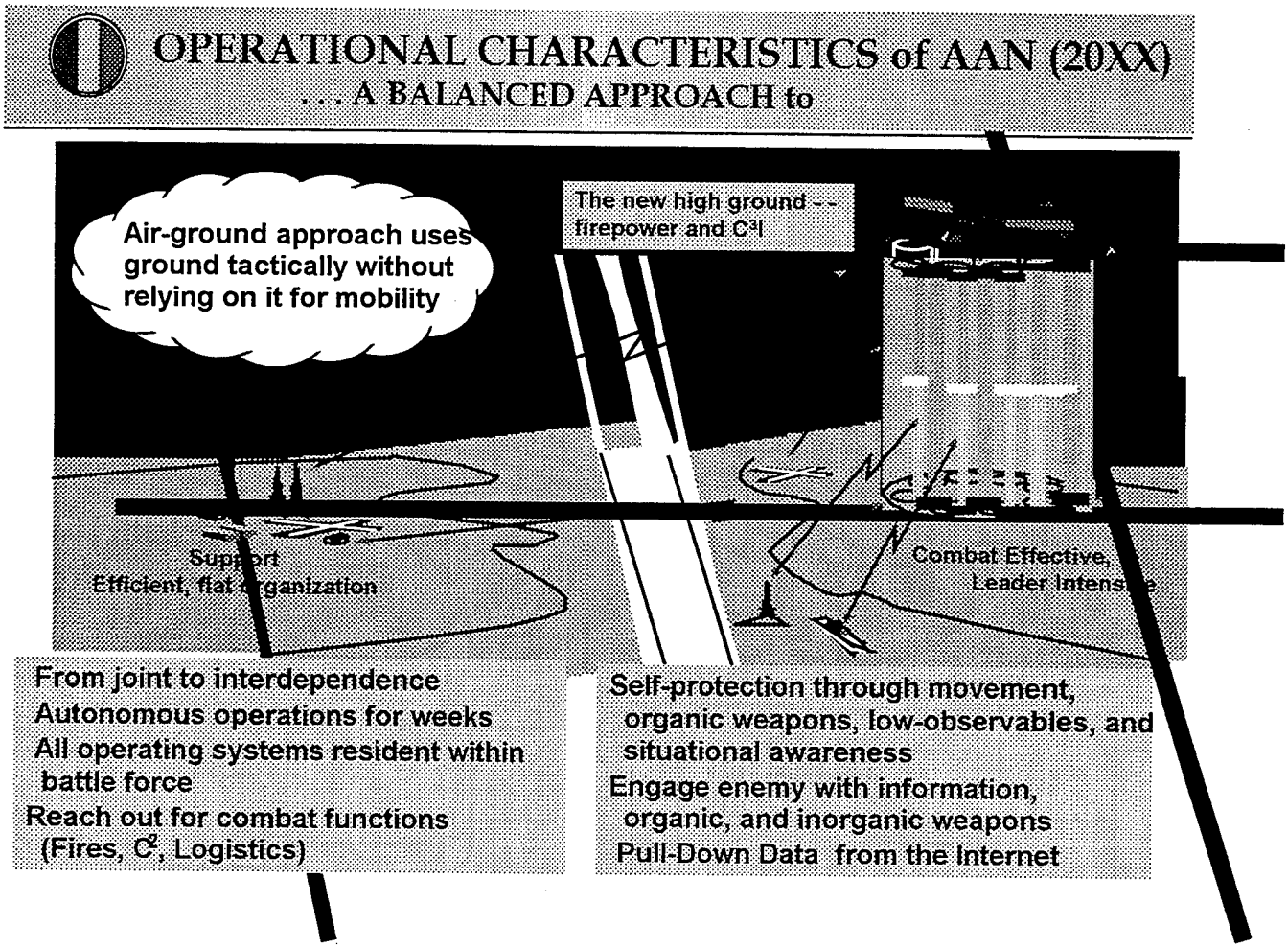

figure 6, "Army After Next Operations," *Knowledge and Speed,* Annual Report, the Army After Next Project, p 19.

[103] Department of the Army (Knowledge and Speed) 18.
[104] Department of the Army (Knowledge and Speed) 19.

Warfare of the recent past has fixated on emphasizing the ability of a force to kill in a quantitative fashion with greater and greater efficiency. However, the object of modern war is not to kill the enemy so much as it is to break his will to resist.[105] Future conflicts must be won quickly and decisively with few friendly casualties in a timeframe which makes simple attrition methods of warfighting obsolete. We must focus the paralytic effect of firepower on the psychological collapse of the enemy. Future adversaries will be more likely to concede defeat based on our repeated ability to gain destructive positional advantage over his forces rather than our ability to simply achieve greater firepower. For us, the "tall pole in the tent" means we must have the ability to maneuver rapidly, turning inside of the enemy's decision cycle, and increase our own survivability over a broad, deep, and lethal battle space that is familiar to the enemy. We must understand that for the enemy to "win" he has only to create a stalemate that produces enough American or allied casualties to cause public opinion "to tire of the contest first."[106]

Currently, the US Army is not prepared to fight and win the deep operations associated with prosecuting and achieving the vertical velocity of attack. We do not have any doctrine such as "Field Manual XXX, Deep Operations," nor is the US Army structured and resourced for a Deep Operations cell at the division, corps and army level. In order to effectively plan, coordinate and execute rapid, simultaneous and decisive operations, to the full depth of the Land Component Commander's area of responsibility, the army must establish an organization similar to the US Air Force's Air Staff Operations Center (ASOC). Currently there is no Land Component corollary.

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[105] Department of the Army (Knowledge and Speed) A-3.
[106] Department of the Army (Knowledge and Speed) A-4.

To date, we have overlooked the real potential that army airpower can contribute to the three-dimensional battlespace. Shifting the army's tactical focus to three-dimensional warfare moves our concept of warfighting from battlefield to battlespace. It will lead to a fundamental change in the nature of army warfighting in the twenty-first century. It will provide the army of the next millennium an unmatched capability to achieve an unsurpassed battle tempo hinged to the vertical velocity of attack. Advanced airfighting vehicles will lead to a fundamental change in the nature of army warfighting, just as the tank did in the *Blitzkrieg* operations of World War II. In reality, there are no "offensive" weapons, only "offensive or aggressive" tactics and weapons operators.[107]

Army vertical maneuver units must also have the aerial platforms that can perform intelligence functions. Finding and tracking the *right target* continues to be the most difficult and most important action in warfare. Yet, in order to find and track the right target, commanders will have the need to *stare,* not merely to look. Ultimately, our ability to reduce the adversary's capability to maneuver in the future will depend on the quality of our Intelligence, Surveillance and Reconnaissance (ISR) Systems.[108]

According to the draft version of Army Strategic Planning Guidance, 15 OCT 1997, the most serious threat to the US is not a *direct* challenge from an adversary, but through an *indirect* conflict which draws the US into a regional contest among a state or a group of states.[109] We can win the next global contest but lose the regional war. These "wild card" wars, brought about in a crisis rather than in a deliberate fashion, stress and challenge the army's capabilities to a greater extent than a conflict we specifically train and equip our army to fight (the "Cold War Paradigm"). The most

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[107] Lynn-Jones 684.
[108] Barnett 9-10.

recent Quadrennial Review (QDR-1997) suggests the prospect of a theater-level "peer" competitor by 2014. This seems overly optimistic given the regional dominance of countries such as Russia, China and India with their large conventional forces and nuclear arsenals.

"The fact of the matter is that the next war, if it's a regional war, is almost certainly not likely to be a lot like Desert Storm..."[110] Unlike Iraq, our future adversaries will not give us six months to assemble our forces in the region. Additionally, the US will no longer have a monopoly on space reconnaissance and precision weapons like we did in Desert Storm. This means large fixed targets within the region that are close to our adversaries, such as airfields, ports, supply dumps and troop concentrations will be watched, targeted and hit.[111] Without access to nearby ports and airfields how will the army get its heavy divisions to trouble spots? Moving armored units slowly along roads over long distances is exactly what an adversary will want our forces to do so that he can employ mines and anti-tank ambushes. Why are we spending 7.3 billion dollars to upgrade one thousand M1A1 tanks and 12 billion dollars to purchase 824 Crusader self-propelled artillery systems with 824 resupply vehicles?[112] As Dr. Krepinevich, member of the National Defense Panel, says, "you're beating a dead horse" by spending billions on the M1A1. These vehicles are too heavy for many bridges; are too hard to get into theater; are limited by their short ranged line-of-sight fires and require intensive logistical support.[113]

Winning regional conflicts anywhere on the globe will require a force extremely agile and deployable while simultaneously capable of the speed and lethality to bring

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[109] Department of the Army (DCSOPS) 8-10.
[110] Wilson 24.
[111] Wilson 24.
[112] Wilson 24.

about rapid closure of the conflict. No one would have guessed we would deploy to Somalia, Haiti, or Bosnia. However, we have, and all three of those actions resulted in "mission creep," tying down large portions of our shrinking army while producing or contributing to the risk of friendly casualties. We need battlefield speed not only to out-maneuver the enemy, but to keep ahead of the short timeline that our politicians, the media and public opinion demand of the army and her sister services. Our current adversaries are not as concerned with competing with us on a global scale as much as within their region. Success for them will be measured by their ability to achieve military dominance within their own region.

If we subscribe to the QDR proposal that the United States may have a regional peer by 2014, we must confront the possibility that these states will have sufficient capability to compete with, if not defeat, the United States and her allies within their own theaters.[114] However, our worst enemy on the future battlefield may be *time*. The longer it takes to arrive in theater, the more defensive preparation the enemy enjoys. The longer we linger on the battlefield, the greater the risk of casualties, equipment loss, and the opportunity for the enemy to split our future allied coalitions. Coupled with that is the constant potential for "mission creep" and increased requirements for personnel, equipment and logistical support. We must, therefore, develop a force capable of rapid deployment and, once in theater, capable of the speed, lethality and information dominance that will enable us to conduct decisive operations where "... the enemy's will to resist collapses when he finds himself surrounded everywhere by maneuver forces occupying positions of advantage."[115]

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[113] Wilson 24.
[114] Cambone.
[115] Department of the Army (Knowledge and Speed) 20.

The greatest challenge in this scheme will be to ensure a proper fit of advancements in vertical maneuver that combines speed and exceptional precision strike weapons that can be mounted on "flying tanks and artillery vehicles."[116] Another concern, one that is more traditional than technological is the reluctance that our army or any army has in changing its doctrinal principles and organizational structure. However, institutional conservatism coupled with the "failure to adapt ultimately results in squandered lives and military defeat."[117]

The price you pay to have an army more oriented to the offense is the likelihood of more conflict. Sean M. Lynn-Jones emphasizes that "... international conflict and war are more likely when offense has the advantage, while peace and cooperation are more probable when defense has the advantage."[118] He further illustrates that "...international politics will become more competitive and less peaceful when the offense-defense balance shifts toward offense [and] foreign policies will be more confrontational, crisis will be frequent...[and] war will become more probable."[119] However, Mr. Lynn-Jones also states that weapons cannot be usefully categorized as either offensive or defensive. These weapon systems are useful on both offense and defense. Tanks provide mobility and firepower for deep penetrations, but also provide defense with the mobility to respond to multiple attacks across a wide defensive perimeter.[120] A historical example of this is Germany's defensive use of tanks in World War II to delay and impose heavy losses on Soviet forces on the Eastern Front.[121]

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[116] Department of the Army (Knowledge and Speed) 21.
[117] Department of the Army (Knowledge and Speed) 5.
[118] Lynn-Jones 661.
[119] Lynn-Jones 670.
[120] Lynn-Jones 672-673.
[121] Lynn-Jones 673, Mearsheimer 26.

The relative small size of the US Army of the early twenty-first century may make commanders more cautious and less decisive. As the army reduces in size, greater emphasis will be made on both reducing casualties and risk to the force. As previously stated, this emphasis on casualty reduction will tend to make some commanders more cautious as they attempt to avoid becoming decisively engaged. The result may be that a commander chooses to lose a battle outright with few or no casualties rather than win the battle but suffer large equipment and personnel losses. The latter may reduce the force so much that it will be ineffective for future employment. We will have won the battle but lost the war. A historical comparison can be made between cautious British commanders in Portugal and Belgium during the Napoleonic Wars and in World Wars I and II in Europe. In each case the British only had one army at the onset of hostilities. Employment of the force was predicated on maintaining access to a rapid retreat to the coast of France (or Belgium) for a withdrawal across the channel to prevent total destruction of the force. The evacuation of the British Army at Dunkirk in 1940 serves as an excellent illustration.

There are multiple constraints affecting the army's transition to the future. No one can guarantee that the next war will be sometime after 2010 -- it may start next week. We must not only address the problem of balancing near- and long-term risks and requirements, but must improve defense industry support in developing new capabilities. Unfortunately, the army does not own the "big ticket items" like the air force and the navy which not only result in the defense industry's rapid development of new aircraft and ships, but also garner the political clout in Washington to put the "big bucks" in their bucket. Moving our maneuver force to the third dimension will solve much of this problem for the US Army. As General Reimer states, "During the almost fifty years of the Cold War, the military was used ten times. Since 1989, the military

has been used twenty-eight times in operations around the world. The army has performed sixty percent of the heavy lifting in those operations while receiving (only) about twenty five percent of the resources provided to the Department of Defense."[122]

President Clinton's defense budget for 1999 seeks $48.7 billion for new weaponry. His plan calls for $54.1 billion in procurement funds for 2000 and the number rises to $63.5 billion by 2003. The biggest portion of the money is planned to be spent on upgrading aircraft ($50 billion) and improving the navy's fleet ($30 billion).[123]

Expensive materiel associated with digitization and precise weaponry have assumed paramount importance to our forces to ensure that they remain "the best-equipped force" well into the twenty-first century. Consequently, we must wrestle with options in spending limited resources to maintain our technological edge while not critically undermining the quality, if not the quantity, of our excellent soldiers. How frequently in the next century we as a nation chose to "go to the military well" as a source of solution for international conflict will bear directly on the continued effectiveness of our army. Our future national leaders must judiciously weigh the economic, political and military merits of cooperation over confrontation, consultation in place of conflict and the careful employment of economic policies that are mutually beneficial to the nations involved instead of economic sanctions. A spirit of mutual respect and trust may serve future generations better than a policy of discrimination, suspicion and military conflict. But in the final analysis, the army must be prepared to fight and win.

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[122] Reimer.
[123] Messing A4.

As stated in the Annual Report on the Army After Next Project, "...imperatives for innovation and change are overdue. We need to begin now to forge a new marriage between battlefield knowledge and unprecedented landpower speed."[124] This is an investment we must begin today. We must seek cost efficiencies by redesigning our combat forces with an emphasis on deployability, maneuverability, battlespace awareness, lethality and survivability. We must take an organizational and technological leap into the next century by developing army air power just as the marines and the navy did, by transitioning our maneuver forces into advanced airfighting platforms. Budget constraints will no doubt continue to challenge us to create and maintain the correct balance between current and future readiness. However, in spite of these constraints, we need to take stock of the investments needed now to provide a flexible force well into the next millennium. Future generations, and those of the entire world, will hold all of us responsible for the effectiveness of the fighting forces we begin to build today.

[124] Department of the Army (Knowledge and Speed) A-7.

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