STRATEGY RESEARCH PROJECT

SHORT RANGE AIR DEFENSE IN ARMY DIVISIONS: DO WE REALLY NEED IT?

BY

LIEUTENANT COLONEL CHARLES A. ANDERSON
United States Army

USAWC CLASS OF 2000

U.S. ARMY WAR COLLEGE, CARLISLE BARRACKS, PA 17013-5050

USAWC STRATEGY RESEARCH PROJECT

Short Range Air Defense in Army Divisions: Do We Really Need It?

by

Lieutenant Colonel Charles A. Anderson
United States Army

Colonel Carl G. Roe
Project Advisor

U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

ABSTRACT

AUTHOR: Charles A. Anderson, LTC, U.S Army

TITLE: Short Range Air Defense in Army Divisions: Do We Really Need It?

FORMAT: Strategy Research Project

DATE: 1 February 2000 PAGES: 18 CLASSIFICATION: Unclassified

Ever since the Soviet threat collapsed, coupled with the demonstrated, overwhelming, capability of our air forces during numerous operations in the 1990s, the relevance of the Short Range Air Defense (SHORAD) force in Army divisions has been questioned by senior leaders. With a gap growing between requirements and funding, compounded by the recent medium-brigade initiative, options and tradeoffs are being considered for the Division XXI structure. This paper examines the relevance of SHORAD by looking at lessons learned from Desert Storm from the perspective of a hypothetical enemy; it reviews off-the-shelf and evolving technology; and projects the air threat beyond 2015. What is revealed is that we are amateurs at air defense. As an Army, we have grown callus to aerial threats and will go as far to abrogate the responsibility of air defense to the U.S Air Force and Navy.

There will not be another Desert Storm. Current and future threats watched CNN and observed the Abrams tank, Bradley fighting vehicle, and the F-16 aircraft freely destroy Iraqi conventional forces in open terrain. The same future threats watched a deliberate six-month build-up of forces and mountains of supplies and ammunition. Conversely, the next enemy will strike where we are weak and untested. The threat will not be from the main gun of an armored vehicle, but will come from the air in the form of rocket artillery, ballistic missiles, cruise missiles, and unmanned aerial vehicles. The enemy will strike early with the intent on swaying the "will" of the American people with casualties unacceptable when weighed against a national interest that is not real clear to the general public. How will we achieve full spectrum dominance throughout the phases of a campaign against a clever enemy using a wide array of aerial threats?

The goals of Joint Vision 2010 and the operational concepts leading to full spectrum dominance are at risk. Full dimensional protection and dominant maneuver is a difficult task when the enemy can leverage cruise and ballistic missiles and UAVs against forward deployed formations, command and control facilities, safe havens, and logistical bases. If General Shinski's vision is to be on the ground in a timely manner with a relevant combat force is to be realized, then he must consider the deployment of air and missile defense protection.

SHORAD is relevant and should be integrated in the formations of divisions and below. At the expense of declaring a moratorium on either a new tank, an artillery piece, or aircraft; the range, combat identification, and lethality of SHORAD must be addressed. Our deployed forces, their families, and this country should not accept anything less.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

SHORT RANGE AIR DEFENSE IN ARMY DIVISIONS: Do We Really Need It?

General Eric K. Shinseki became the Army Chief of Staff in June 1999. Soon after his appointment, he stated that his overarching goal as the Chief of Staff of the Army is "to provide strategic leadership that will keep the Army the preeminent land warfighting force in the world today."[1] To accomplish this goal, General Shinseki postulates six key objectives: (1) increase strategic responsiveness; (2) develop a clear long term strategy to improve operational joint readiness and to implement the goals of Joint Vision 2010; (3) develop leaders for Joint warfighting as well as change; (4) complete the full integration of the active and reserve components; (5) fill our warfighting units; and (6) provide for the well-being of soldiers, civilians, and family members.[2] The CSA set the azimuth for a more deployable and lethal force, which properly manned and equipped, can accomplish the wide array of tasks in our National Military Strategy. Given the continuous and growing gap between funding and military requirements, this task will require General Shinseki to look critically at competing programs and capabilities with the intent of making difficult decisions on the nature of traditional roles and enduring capabilities of the Army. The ultimate business of the Army is to fight and win our nation's wars, however we have become involved in many activities that are not consistent with this business. In 1997, John T. White, the assistant Secretary of Defense, addressed the Quadrennial Defense Review (QDR) and stated, "we are at a pivotal point in history where the Cold War recedes in the past and a new century rushes toward us."[3] The QDR challenge is to develop a new strategy and new capabilities for an era with fewer resources. Mr. White proclaims that this effort will involve some "hellish choices" and the only sacred cow is a strong defense.[4] For General Shinseki to realize his vision and to fiscally set the course for the Army, he will have to make some hellish choices.

In his book Fighting for the Future; Will America Triumph? Ralph Peters suggests there is a fundamental asymmetry between the kind of military force we have and the kind we need. Peters' underlining theme is that we are "preparing for the war we want to fight..not the conflicts we cannot avoid."[5] The Chief of Staff of the Army is taking the steps to avoid this trap and bring strategic relevance and balance to the Army. Changes in force structure and traditional roles are inevitable. Since Desert Storm, exacerbated by the Commission on Service Roles and Missions in 1994, the role of Army Air Defense Artillery has been a continuous target for budget and personnel cuts. The dogmatic objectives of reducing the size of Army Divisions and enhancing strategic mobility while maintaining lethality and survivability, attracts the force structure scalpel waived by Army senior leaders toward mission areas such as Short Range Air Defense (SHORAD) Artillery. The fundamental question this paper addresses is whether SHORAD should be in an Army Division? In other words, does the threat and existing Joint capabilities suggest we keep the Air Defense Battalion in divisional warfighting formations?

THE ARGUMENT

He who is skilled in attack flashes forth from the topmost heights of heaven.

Sun Tzu

Why do we have air defense artillery in Army divisions? The last hostile aircraft shot down by ground based Air Defense was in 1950. During the Korean War, as in World War II, antiaircraft gunners were the first U.S troops in action. History reflects that the 507th Automatic Weapons Battalion shot down two of four hostile, North Korean, planes in June 1950. The Korean air threat was quickly neutralized by a combination of antiaircraft and air force fighters.[6] Most recently, after 40 days of an air war and a 100-hour ground campaign, the U.S lead coalition defeated a heavily armored and well-entrenched opponent. Desert Shield and Desert Storm resulted in significantly fewer casualties than expected and not one soldier was targeted or attacked by an air-breathing platform.

Today, the United States Air Force is the most technologically advanced air force in the world. The U.S is second only to China in terms of gross numbers of air frames,[7] Further, a combination of Marine and Naval air power constitutes the third largest and most technological airforce in the world. As expected, U.S. training readiness is higher than any other air force. "Air Force and Navy pilots conduct training missions at an average of 220 hours per year. The NATO average is 170 hours. Air forces of potential enemies often train only about 50 hours per year."[8] We can boast that U.S pilots are better trained at flying any mission and posses the technological and training edge to win the air battle.

Without a single SHORAD round or missile fired in anger since the Korean War, and the current and future air battle being dominated by U.S and/or NATO air power, the argument against SHORAD in Army Divisions becomes clear. However, it may be presumptive to suggest that air power will protect U.S land forces throughout the phases of a campaign, and that high costs associated with training and maintaining a sophisticated air force will curtail potential enemies from acquiring a competitive air force.

In his last threat assessment of the 20thcentury before the Senate Arms Services Committee, George J. Trent, Director of Central Intelligence, said, "future challenges to U.S interests will flow from new factors such as the increasing availability of sophisticated technology and the ease and speed with which it can be applied by those hostile to the United States."[9] The Joint Strategy Review (1998) supports this notion and maintains that lesser states and non-state actors will be able to leverage niche positions acquiring more capability than their size, economy and capability would suggest.[10] In essence we are experiencing a time in history where the past and future are colliding. Today we must deal with the rogue nations, declining states, terrorists, and insurgents who have hundreds of years fueling their causes. However, today they will be better armed with more sophisticated weaponry than their predecessors could ever imagine. [11] With the advent of global commerce making technology increasingly available, and with decreasing budgets for a large military, the threat prediction requires further analysis.

LESSONS LEARNED – WHAT WILL THE ENEMY DO NEXT?

It never troubles a wolf how many the sheep be.

Virgil

The U.S. Army has taken on an array of new responsibilities and challenges. In addition to preparing for two nearly simultaneous major contingencies, the Army has faced a significant increase in other activities ranging from humanitarian and relief operations to a major deployment in Bosnia and Kosovo. The United States military deterred aggression in the Arabian Gulf, restored democracy in Haiti, and stopped war in Bosnia. Peace is maintained on the Korean peninsula and the Yugoslavian army pulled out of Kosovo. [12] The world is a safer place, but current and future enemies are watching and taking notes.

Potential adversaries are pondering how to prevent the conditions precipitating a dominant victory for U.S and Allied forces in the Persian Gulf War. Perhaps the next adversary will not allow the United States to build such a robust lodgment for the generation of combat power and logistical support. The most direct method to deter the use of U.S military force is to increase the probable casualty rate with the intent of influencing American opinion or "will" to fight. The invested lives of sons and daughters may not justify the alleged national interest (s) at stake. Leaders in rogue nations, terrorist groups and failing states are not overly concerned with their casualties. Also, they watched the United States pull their forces out of Somalia and Beruit because of unexpected casualties. In the later part of the twentieth century, the U.S public expected very low casualties. There is no doubt that we have come a long way since Vietnam (47,367 killed in action). In Desert Storm, we suffered 97 killed in action where 28 (29%) were killed by one SCUD.[13] The challenge will be to sustain the political will and continue to fight in remote places where the threat to our national interests is not crystal clear to the masses. However, what seems crystal clear is that you can stop the United States by striking early and creating casualties for CNN to broadcast to every home with cable TV.

"We are at our best fighting organized soldiers that attempt a symmetrical response. But warriors respond asymmetrically, leaving us in the role of redcoats marching into a Indian-dominated wilderness."[14] Our potential enemies operate in environments of moral and practical freedom and can acquire and employ technologies more swiftly than regulation-bound, struggling nation-states.[15] The use of weapons of mass destruction (WMD) by delivery of a theater missile will present significant challenges for the U.S and allies. Well-equipped conventional forces could be held hostage to the threatened use of WMD. Whatever the warhead, the bottom line is that casualties link directly to our national "will", which from a strategic standpoint is our "center of gravity."

In 1992, the National Research Council identified the advanced technologies most likely to be used against the United States in the next century. Their findings are; (1) improve methods for use of chemical and biological warfare agents; (2) use low-flying cruise missiles; (3) use advanced tactical ballistic

missiles capable of surmounting our current defenses; and (4) attack initially deploying U.S forces before U.S heavy forces can support them.[16] The National Research Council also suggests the air threat will become increasingly diverse and lethal beyond 2010 whereas it will no longer be possible to rely on air superiority as demonstrated during the Gulf War and subsequent conflicts.

However, our ability to anticipate the threat and react accordingly with the appropriate technology is not always first rate. Since 1980, ballistic missiles have been used in six regional conflicts.[17] Dennis M. Gormley, maintains that if "planners respond to the threat of land-attack cruise missiles as slowly as they did to ballistic missile threats, Washington and it's allies may be on a dangerous path."[18] When Iraq attacked Kuwait in August 1990, only three experimental Patriot Advanced Capability Version 2 (PAC-2) interceptors existed in the U.S. inventory. Fortunately, Saddam Hussein gave us 6 months to rapidly improve and mass -produce the PAC-2 missile. When the air campaign began in January 1991, there were an adequate number of PAC-2 missiles to keep Israel out of the war, thereby affording us the opportunity to maintain the coalition. The United States was well aware of the tactical ballistic missile threat in the 1980s and that the Soviet Union sold thousands of SCUDs to Third World clients. Surprisingly, it took over a decade to develop the Patriot air defense system, which was initially intended for only air breathing threats.[19]

The reflections by the National Research Council parallel in many ways the findings of the Defense Science Board study on Cruise Missile Defense in 1994. The Defense Science Board heightened the Department of Defense's awareness of the evolving cruise missile threat against forward-deployed forces and lodgment areas. Wishing away the cruise missile and unmanned aerial vehicle threat is not prudent. We came very close to making that same mistake with ballistic missiles. In 1970, Stefan T. Possony and J.E. Pournelle purport that there are two common fallacies about technology.[20] First, the march of technology can be halted by agreement. This fallacy suggests that arms control measures and policies can prevent Third World nations from acquiring WMD and the means to transport them to military and civilian targets. The second common fallacy is that small advantages are not decisive, and probably not important.[21] History has proven that both Possony and Pournelle were correct in suggesting these common fallacies. For example, Pakistan and India have nuclear weapons and Korea is testing a ballistic missile that can reach the United States. To suggest that rogue nations, terrorists, and declining states will not acquire WMD and an array of delivery means is absurd.

Another lesson learned is that the United States Air Force (USAF) is limited to one major theater of war. During the Kosovo crisis, USAF scrambled to mass pilots, fuelers, and precision munitions to prosecute the many tasks required to interdict targets in Kosovo and Serbia. During Desert Storm the USAF had 20 fighter wing equivalents. When the F-22 replaces the aged F-16 and F-15 fleet, the USAF of the 21st century will be half that size. Additionally, Kosovo demonstrated the importance of "safe havens" to assemble and launch air operations. Safe havens may become more difficult to obtain if adversaries threaten neighbors with WMD. Furthermore, commercial satellite imagery and longer range and more accurate delivery capability will expose safe havens. Kosovo was a major theater of war

(MTW) for the USAF. A flashpoint anywhere in the world, coupled with a Kosovo-like crisis could have placed decision-makers in a resource-constrained dilemma.

If current and future hostile states and non-state actors learn from the past, they will never permit U.S forces to freely establish a lodgment in the area of operations or a "safe haven" in a nearby country. Additionally, their objective will likely be to strike quickly with an array of air and missile threats aimed at forward-deployed Americans. And, if that fails to sway U.S public opinion, then consider the use of WMD. Most importantly, all of the above is best executed when the U.S is already entangled in a Kosovo and Bosnia-like commitment.

FUTURE AERIAL THREATS

> Advanced technologies can make third-class powers into first-class threats.
>
> Dick Cheney, former Secretary of Defense

A controversial topic is and will always be the prediction of what capability a potential enemy may employ. To this end, the Central Intelligence Agency and the Defense Intelligence Agency will seldom present a consensus product thereby revealing the difficulty of such an endeavor. Given the global weapons market, parallel technology, and the decreasing cost associated with high-tech digital systems, the threat projected in 2010 in many cases is the threat we face today. Additionally, a common fallacy is to interpret "no peer threat" as "no threat." [22] As expressed in the Quadrennial Defense Review (QDR), "rather than facing a single, symmetrical threat from a known enemy, as was the case from 1946 until the end of the Cold War, the nation faces a range of multidimensional and asymmetrical threats."[23] This array of threats includes those that target and attack ground targets from the air.

The National Air Intelligence Center (NAIC) maintains that ballistic and cruise missiles are a significant threat to deployed U.S. and allied forces. "A cruise missile is an unmanned, armed aircraft that can be launched from another aircraft, ship, submarine, or ground-based launcher to attack ships (antiship cruise missile) or ground-based targets (land attack cruise missiles)."[24] The land attack cruise missile (LACM) is the threat to the forward-deployed force. LACMs are an attractive option for potential enemies for they are effective evading current air defense systems where a manned aircraft would be at significant risk. Additionally, a manned aircraft requires more maintenance, logistical support, an airstrip, and a trained pilot. Currently, over 25 countries have ballistic missiles systems, and by 2015 the land attack cruise missile market is estimated to be at 6,000-7,000 missiles, not including those purchased by Russia, China, or the United States. The proliferation will expand in the next decade, and the countries producing these weapons will expand from two to nine. [25] One key reason for this change in the air threat is the cost. Figure 1 shows what a potential adversary could possibly buy given 50 million dollars.[26]

FIGURE 1 - COSTS COMPARISON OF AERIAL THREATS

The cruise missile was first used over 50 years ago during the Second World War. The V-1 cruise missile took only one year to develop and was one-hundredth the cost of the Nazi V-2 ballistic missile. During the Second World War about 21,000 V-1s were launched against the Allies causing more than 18,000 casualties in London. [27]

Most land attack cruise missiles have effective ranges from 90 to 190 miles and have the accuracy to impact within a few feet of their targets. Air defenses systems will be stressed because LACMs are difficult to detect, track, and intercept. Cruise missiles are smaller than aircraft and depending on terrain, can fly below radar coverage. For example, an aircraft flying at 10,000 feet can be detected over 150 miles away by ground-based radar. Due to the curvature of the earth, the same ground-based radar detects a low flying cruise missile at a range of only 20 miles.[28]

LACMs are powered by jet engines or rockets and are equipped with an internal computer or remote control for guidance and navigation. The LACM looks like an aircraft with stubby wings; however, cruise missiles move slower than high performance fighter aircraft and will reach their target in a matter of hours rather than minutes. For example, the U.S Tomahawk is 20 feet long with a wing span of approximately 9 feet. The range of the Tomahawk is 1000 miles and the cruise altitude is 50 to 100 feet at a speed of 381-571 miles per hour. At a cost of 1.8 million per Tomahawk, the missile is extremely accurate and has proven to be rather effective in the recent conflicts. [29] A dozen countries today have

Tomahawk quality cruise missiles and 70 countries posses over 75,000 anti-ship cruise missiles with ranges under 100km. [30]

Compared to the ballistic missile, the LACMs stay aloft by aerodynamic lift and are powered and guided to the target. Conversely, the ballistic missile is powered only during the boost phase and follows a ballistic trajectory (except for sophisticated ballistic missiles). As with the U.S Tomahawk, cruise missiles achieve accuracy using cheap guidance and navigation systems based on the U.S. Global Positioning System (GPS). Combined with commercial geographic-information systems and one-meter - resolution satellite imagery, cruise missiles are half the cost of ballistic missiles. [31]

One can easily debate "how" the array of theater missiles, manned fixed-wing aircraft, and rotary wing aircraft can be used in a given contingency. The trend shows that the aerial threat is changing (Figure two).[32] With the growing costs required to maintain aircraft and train pilots, the unmanned aerial vehicle and LACM are an attractive and yet effective aerial platform. This does not suggest the manned aircraft will be extinct from a potential threat's arsenal. In fact, manned aircraft will not increase in numbers, however, they will possibly improve in sophistication.

Another emerging theater missile is the unmanned aerial vehicle (UAV). UAVs are not new to the battlefield. Traditionally UAVs were used in a reconnaissance function; however, they should be regarded as a multi-role aerial platform capable of delivering weapons, providing real-time intelligence, designating targets, collecting signal intelligence, performing decoy, jamming, and performing a role in information warfare. UAVs vary from high altitude, long duration to very small, low radar cross-section, short duration.[33] There are over 100 UAV programs worldwide.

Until recently, many armed forces regarded the UAV as a sensor platform for the purpose of reconnaissance and surveillance. The most recent transition shows UAVs being employed as weapons carriers. Similar to the LACM, armed UAVs are smaller than their manned aircraft counterpart and cheaper to buy and operate. Unmanned air

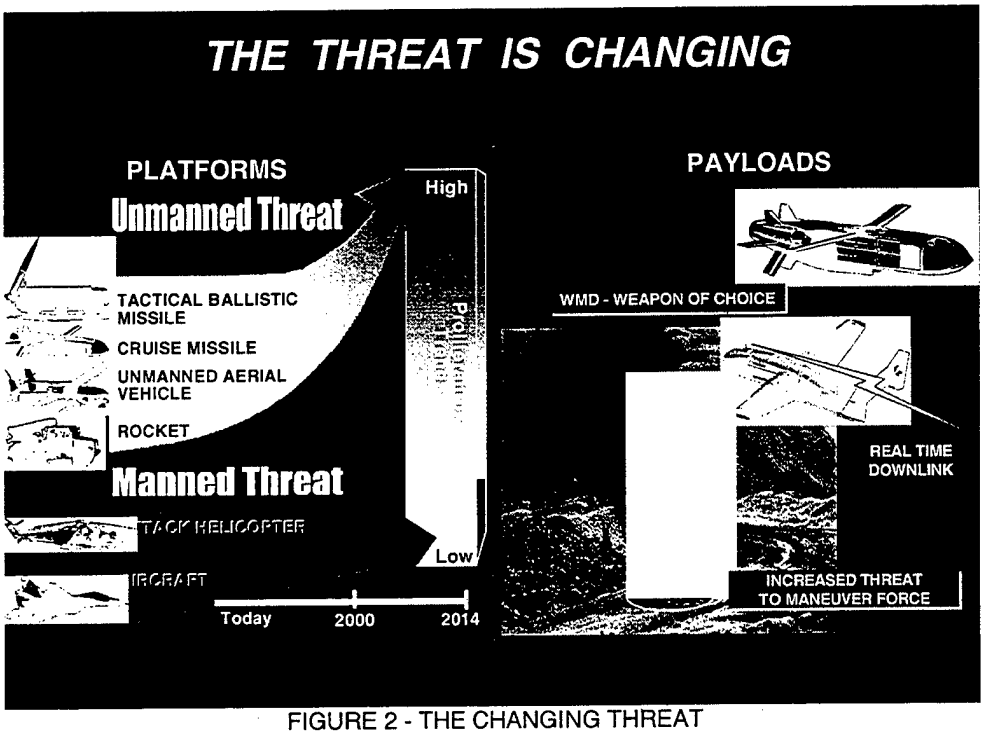

FIGURE 2 - THE CHANGING THREAT

vehicles were flying missions long before the term UAV was coined. During the Second World War, sacrificial unmanned bombers packed with explosives, piloted remotely via a radio link, attacked hardened targets such as submarine pens. This concept is alive today resulting in studies conducted on how to destroy WMD production and storage facilities buried beneath mountains. The concept involved unmanned Boeing 747s containing multiple warhead systems based on shape charges. Israel Aircraft Industries sold Harpy defense-suppression systems to India and the Republic of Korea. This truck-launched drone carries a passive radiation-homing seeker and fragmentation warhead.[34]

From a threat perspective the credibility of our ground-to-air, and air-to-air defensive capability will be challenged. The application of attack or strike operations against short-dwell and fixed launch platforms, supply points, and command and control facilities may reduce or modify the use of theater missiles and other aerial platforms. However, our efforts have slightly improved from Desert Storm in attack operations and with UAVs and cruise missiles requiring a smaller operational and logistical footprint than ballistic missiles, the possibility of interdicting these targets is remote. From a cost and operational perspective the future enemy will gain both an operational and strategic advantage by using a wide array of theater missiles.

FULL SPECTRUM DOMINANCE – DOES SHORAD HAVE A ROLE?

...the U.S. must be prepared to face a wider range of threats, emerging unpredictably, employing varying combinations of technology, and challenging us at varying levels of intensity.

Joint Vision 2010

In July 1996 the Chairman of the Joint Chiefs of Staff (CJCS) issued Joint Vision 2010 (JV 2010) providing the conceptual framework for the armed forces to view and prepare for the future. This framework provided a means to leverage military forces and technology to achieve effectiveness in joint operations. "JV 2010 addresses continuities and changes for joint forces and establishes the intellectual foundation for how they might operate in 2010." [35] The intent of JV 2010 is to provide direction to the military services to jointly achieve *full spectrum dominance* through the application of four operational concepts: full dimensional protection, dominant maneuver, focused logistics, and precision engagement. [36]

Full spectrum dominance is overpowering any adversary and controlling the situation regardless of the operation. [37]The CJCS's Concept for Future Joint Operations (May 1997) maintains that future military trends will most likely include WMD. Significantly, the carriers of WMD may well be ballistic and cruise missiles.[38] This trend implies that all operational concepts in JV 2010 (dominant maneuver, full dimensional protection, precision engagement, and focused logistics) will be challenged. To achieve dominant maneuver and precision engagement, commanders must have freedom of action. Freedom of

action suggests full-dimensional protection which includes protection from asymmetric threats. Full-dimensional protection entails protecting the force from the full range of threats coming from all dimensions across all phases of the operation. A multi-layered defense against a range of threats requires both offensive and defensive actions such as theater missile defense and defensive counter air operations. However, the roadmap to 2010 has a starting point. What is our current capability in providing full dimensional protection against the projected threat?

The current USAF force structure shows 1,440 fighters with projected buys of the F22 dropping USAF force structure to one-half this many fighters.[39] Stretching military resources on numerous missions throughout the world creates situations where we may not have air superiority. Additionally, fighters must be provided ample early warning, positive identification, and be in the area of concern to achieve the air battle geometry to intercept low flying cruise missiles. The smaller the radar cross-section of the cruise missile and UAV, the more challenging the acquisition and combat identification for the pilot. This problem for fighters is further exacerbated by issues such as the availability of enough air frames for both offensive and defensive missions, tankers for refueling operations, availability of command and control platforms, and a safe haven from both ground and aerial threats.

The use of naval protection suggests the AEGIS operate 20-25 kilometers from the shore and assumes that the inland reach of the AEGIS SPY radar is not limited due to terrain[40]. An additional consideration will be whether to detach the AEGIS from it's traditional role of protecting the carrier battle group for a more joint, over-the-land capability. The deployment of Patriot and Theater High Altitude Air Defense (THAAD) are force packages designed to defeat various ranges of ballistic missiles. Patriot has a multi-role capability for it is effective against fixed and rotary wing aircraft, cruise missiles, and ballistic missiles. The strategic reach investment for these systems vary based upon the desired coverage. A Patriot Battery requires 23 C-17 or 15 C-5s and a THAAD battery can be deployed by 29 C-17s or 22 C-5s.[41]

The capabilities of all services' systems vary against the wide array of aerial targets, however given a rapid response requirement, the initial entry forces will rely upon SHORAD as a means in achieving full-dimensional protection. Additionally, as operations become more non-linear, forces will be isolated and subjected to a host of aerial threats. These threats have lower radar cross-sections, are extremely maneuverable, require less logistics than manned airframes, and are extremely difficult to kill on the ground. SHORAD is easier to get into the theater, cost less (PAC III missile is $3 million), and is maneuverable with the ground force.

The current SHORAD force structure includes a ground-based sensor, a command and control architecture, and three platforms that fire the Stinger surface-to-air missile. This "system of systems" engages the air battle with a 24-hour, all-weather radar that can detect low radar cross-section aerial targets and a near-real time automated command and control architecture providing situational awareness to joint and combined forces. The command and control system integrates horizontal and vertical air defense weapons, thereby enhancing situational awareness and reducing fratricide. The

stinger missile is fired from the shoulder of an individual soldier or from wheeled and track vehicles and can accommodate 24-hour, shoot-on-the-move, mobile protection for maneuver forces. [42]

However there are limitations for SHORAD. The fielding of the Forward Area Air Defense Command, Control, Communications, and Intelligence (FAAD C3I) system and the Ground Based Sensor (GBS) were a Herculean step from the days of depending upon binoculars for early warning and voice for tracking and updating the air battle. FAAD C3I and the GBS provides air surveillance, target acquisition, and targeting information. This information is correlated from several Ground Based Sensors, to include joint sensors, and integrates the information so battle management decisions can be made in a timely manner. However, the system does not include a non-cooperative target recognition capability and relies on Identification, Friend or Foe (IFF) or visual identification. In 1995, the Office of the Director of Operational Test and Evaluation maintained that the FAAD C3I and GBS were operationally suitable; however, without enhanced combat identification, FAAD C3I may be useful only in a self-defense role. [43] Their findings, although positive regarding many operational tasks, revealed unacceptable instances of fratricide. The ability to positively identify a manned or unmanned threat as hostile or friendly at a desirable range, in difficult terrain, was not addressed by the OPTEC evaluation. However, the Joint Staff's Theater Air and Missile Defense Organization (JTAMDO) clearly set a course to improve joint air and missile defense.

In 1996, Department of Defense created JTAMDO as the organization to coordinate all DOD theater air and missile defense activities.[44] JTAMDO is the warfighter's focal point for developing and validating joint air and missile defense architectures and operational concepts. JTAMDO's initial assessment sought to uncover shortfalls in air and missile defense since Desert Storm. This joint organization exposed our joint air defense capability as being segmented by service and restricted by procedures and limited interoperability. Additionally, JTAMDO revealed a joint air and missile defense system of systems that lacked a timely air picture and a universal combat identification capability.[45] Most alarming, JTAMDO's findings revealed a joint arsenal of weapons with induced restricted ranges and rules of engagement to satisfactorily meet the threat of 2010 and beyond. The JTAMDO master plan includes a single integrated air picture (SIAP) whereby participating units observe the same digital air battle. Engagement coordination will drastically improve with all services seeing only one track for every airborne object. Combat identification is also improved by having continuous and correctly correlated tracks. A complete, common, and accurate air picture enables a distributed fire control that can use remote data to engage a target.[46]

JTAMDO is also seeking improvements in combat identification. These improvements are germane to engaging theater air and missile threats out to the kinematic ranges of weapons. In the near future if you wait until you can visually see the target it may be too late to engage. The SIAP will keep identification on a track with a single joint force identification. JTAMDO is seeking technologies to build upon the SIAP that will address shortfalls in long-range, wide-area identification. The next major hurdle is to develop a integrated fire control capability that will allow weapons to fire using data provided by

another service sensor. This fire control net will reduce the effects of terrain on ground and sea-based sensors thereby allowing engagements against low flying, low radar cross section targets.

Cruise missile and UAV defense today lacks a common air picture, a reliable combat identification (CID) system, and adequate airborne platforms to see low flying threats. By 2010, the benefits of SIAP, combat identification, and integrated fire control will provide early and long range detection, continuous tracking, long range engagements, 360 degree capability, and tactical flexibility supported by less restrictive rules of engagement.

Of all the joint air and missile defense systems, SHORAD is out front in terms of command and control and reliability regarding a common air picture. SHORAD will significantly benefit from improvements in CID and the SIAP because SHORAD already fuses joint sensors within the internal ground based sensor net. SHORAD's shortfall will remain missile range and the inability to engage short-range ballistic missiles.

The threats of the next decade will include ballistic and cruise missiles and UAVs. Equipped with WMD these threats need to be engaged at ranges beyond the existing kinematic ranges of the Stinger missile. Currently, force developers are examing alternatives to achieve an engagement range beyond 20 kilometers. Additional experimentation is being conducted on a suitable, reliable, and survivable airborne sensor for both acquisition and fire control.

The goals of JV 2010 and the operational concepts leading to full spectrum dominance are at risk. First, the USAF cannot be all things for the Joint Force Commander. The decreasing force structure of the USAF will challenge their prosecution of defensive and offensive air missions. The Navy's carrier battle group and thin-skinned AEGIS will be at risk if employed close to the littoral. Full dimensional protection and dominant maneuver is a difficult task when the enemy can leverage cruise and ballistic missiles and UAVs against forward deployed formations, command and control facilities, safe havens, and logistical bases. If General Shinski's vision is to be on the ground in a timely manner with a relevant combat force is to be realized, then he must consider the deployment of air and missile defense protection. The Patriot force is heavy and will require an investment of strategic lift. Additionally, as ground forces move to forward operating bases so should the air and missile protection. This protection will be provided by SHORAD.

SHORAD's force structure is suitable against the cruise missile, UAV, fixed wing, and rotary wing threat; however, as the unmanned threat becomes more lethal, the need for a longer-range system becomes evident. Extending the kinematic range of the SHORAD missile will provide for engagements of unmanned systems carrying WMD warheads at safe ranges beyond the location of the protected force. The Stinger missile is a reliable missile for manned aircraft; however, it lacks the range and lethality to counter more sophisticated airborne threats.

A mobile, ground-based system with a 360-degree coverage against all aerial threats would be an appropriate follow-on system. This system should be linked to an elevated sensor to gain over-the-horizon engagements. Additionally, the system should have the ability to engage short-range ballistic

missiles and rocket artillery. The ability to engage rocket artillery leads the developer to laser technology. Given the shortage of funds, another SHORAD system would not be a justifiable investment, just as another Bradley, Abrams tank, or helicopter could not be justified. But continued research and development on laser technology will eventually produce a lightweight, lethal, ground-based laser capable of providing inexpensive, multiple engagements against all aerial threats. When the SHORAD force brings anti-rocket capability to the maneuver formation, their relevance will never again be questioned. The critics will then be silenced.

In conclusion, full spectrum dominance can only be achieved by force protection against all aerial threats. Responsive, mobile, and lethal formations projected on hostile terrain will require air and missile defense to guarantee freedom of maneuver. Maintaining the air defense battalion in Army divisions must be a priority when assessing force structure for the Army of the 21st century.

FINAL THOUGHTS

We will not get the opportunity to fight another Desert Storm. Our next opponent will not grant a six-month build-up of forces and supplies, and he will not exhaust his limited defense budget on tanks and manned aircraft that will eventually fail against western capability. If our Nation's center of gravity continues to be the "will" of our people in supporting a conflict marginally related to our national security interests, then rogue nations, warrior leaders, and declining states will use inexpensive military "means" that have an increased probability of killing American soldiers. All intelligence projections suggest the threat to forward-deployed forces will not come from the main gun of an armored vehicle, but from the air. For over 50 years we have not been tested from the air, and assessments of our current capability makes a case that we are amateurs at performing joint air and missile defense.

The proliferation of unmanned platforms, technology, and the availability of commercial satellite imagery and GPS will change the nature of future wars. A war in the next century will be conducted in cities and not on open plains and deserts. The hypothetical scenario for the next war would show enemy command and control facilities co-located with hospitals and schools. Therefore, precision munitions will be of little value. Aerial platforms such as cruise missiles, ballistic missiles, rockets, and unmanned aerial platforms will be projected into the sky from mobile launchers cloaked from aerial detection. UAVs, sending real-time information to enemy forces equipped with rocket artillery and short-range, GPS-enhanced ballistic missiles, will target soldiers and equipment. Ports and airbases abroad will be untenable due to attack or the threat of attack, and the Navy will be forced away from brown water by mines and low-tech submarines denying deployed forces the benefits of Navy theater ballistic missile protection and fighter support for strike missions. Patriot forces will be over-tasked by protection of ports and coalition population centers. Additionally, the enemy will use "dummy" aerial threats to deplete Patriot and THAAD missile inventories. Last, the threatened use of WMD on allied nations may deny U.S entry and use of ports, airbases, and safe-havens.

The hypothetical decision in 1999 to cut air defense out of the Army division and relinquish aerial protection of forward-deployed forces to the Air Force generated casualties in the next war that far exceeded the U.S threshold. Why did we take air defense out of the force structure? The argument that air defense has not shot down an aircraft since the Korean War and that our air forces are the best in the world did not comfort the families of U.S casualties and satisfy the armchair quarterbacks on CNN. Unfortunately, we fielded a force to fight the wars we wanted to fight and not the ones we would fight.

Change is on the horizon as our Army prepares to enter the next century. This change will require our Chief of Staff to make some tough decisions on force structure and traditional roles and missions. As we debate the relevance of air defense in the division, we must consider the protection of our soldiers against aerial threats. Our soldiers and our Nation will not accept nor do they deserve anything less.

Word Count = 5928

ENDNOTES

[1] Eric K. Shinseki, "Beginning the Next 100 Years," Army, October 1999, 28.

[2] Eric K. Shinseki, "Beginning the Next 100 Years," Army, October 1999, 28.

[3]Earl H. Tilford, Jr., Strategic Studies Institute Special Report. National Defense Into the 21st Century: Defining Issues. 6 June 1997, 8.

[4] Ibid, 16.

[5] Ralph Peters, Fighting for the Future; Will America Triumphy? (Mechanicsburg, PA: Stackpole Books, 1999), 22.

[6] Mark K. Megeehee, A Pocket History of Air Defense Artillery (Fort Bliss: Texas,), 14.

[7] Earl H. Tilford, Jr., Strategic Studies Institute Special Report. National Defense Into the 21st Century: Defining Issues. 6 June 1997, 18.

[8] Richard A. Chilcoat, Lieutenant General, 1998 Strategic Assessment, Engaging Power for Peace. (Washington D.C.: U.S. Government Printing Office, 1998), 143.

[9] George J. Trent, Current and Projected National Security Threats, Statement presented to Senate Arms Services Committee. (Washington D.C.: Public Affairs Staff, February 1999), 1.

[10] Henry H. Shelton, General, Joint Strategy Review. (Washington D.C.: U.S. Government Printing Office, 1998), p.?????

[11] George J. Trent, Current and Projected National Security Threats, Statement presented to Senate Arms Services Committee. (Washington D.C.: Public Affairs Staff, February 1999), 1.

[12] Earl H. Tilford, Jr., Strategic Studies Institute Special Report. National Defense Into the 21st Century: Defining Issues. 6 June 1997,12.

[13] Department of the Army, Force Development bringing slide.

[14] Ralph Peters, Fighting for the Future; Will America Triumph? (Mechanicsburg, PA: Stackpole Books, 1999), 39.

[15] Ibid., 23.

[16] Board on Army Science and Technology, Commission on Engineering and Technical Systems, National Researcg Council, Star 21, Strategic Technologies for the Army of the Twenty-first Century. (Washington D.C: National academy Press, May 1992, 244.

[17] "Why Ballistic Missile Defenses" available from Ballistic Missile Defense Home page http://www.acq.osd.mil/bmdo/bmdolink/html/threat.html; Internet; accessed 8 October 1999.

[18] Dennis M. Gormley, "Hedging against the Cruise Missile Threat," Survival, International Insititute for Strategic Studies, Spring 1998; available from http://www.ceip.org/programs/npp/gormley%20survival.htm Internet; accessed 8 October 1999.

[19] Ibid., 1.

[20] Stefan T. Possony and J.E. Pournelle, The Strategy of Technology; Winning the Decisive War. (Cambridge Mass : University Press of Cambridge Mass, 1970). 37.

[21] Ibid.,37.

[22] Earl H. Tilford, Jr., Strategic Studies Institute Special Report. National Defense Into the 21st Century: Defining Issues. 6 June 1997,18.

[23] Ibid., iii.

[24] United States General Accounting Office, Report to the Chairman, Subcommittee on Military Research and Development, Committee on Armed Services, House of Representatives, Cruise Missile Defense, Progress Made But Significant Challenges Remain , March 1999, 1.

[25] National Air Intelligence Center, "Ballistic and Cruise Missile Threat," Wright Patterson Air Force Base, Ohio, 1999.

[26] Briefing slide presented by the United States Army Air Defense Artillery Center, 24 August, 1999.

[27] Dennis M. Gormley, "Hedging against the Cruise Missile Threat," Survival, International Insititute for Strategic Studies, Spring 1998; available from http://www.ceip.org/programs/npp/gormley%20survival.htm Internet; accessed 8 October 1999. 2.

[28] United States General Accounting Office, Report to the Chairman, Subcommittee on Military Research and Development, Committee on Armed Services, House of Representatives, Cruise Missile Defense, Progress Made But Significant Challenges Remain , March 1999, 3.

[29] Eas Bokhari, "Cruise Missile technology, The Tin God that failed against the Holy Warriors of Afghanistan", Defense Journal; available from http://www.defense journal.com/oct 98/cruise-missile-tech.htm

[30] Ibid., 2.

[31] Dennis M. Gormley, "Hedging against the Cruise Missile Threat," Survival, International Insititute for Strategic Studies, Spring 1998; available from http://www.ceip.org/programs/npp/gormley%20survival.htm Internet; accessed 8 October 1999.

[32] Briefing slide presented by the United States Army Air Defense Artillery Center, 24 August, 1999.

[33] Department of the Army, United States Army Theater Air and Missile Defense Master Plan, 15 June, 1999, 2-6.

[34] Mark Hewish, "Coming Soon: Attack of the Killer UAVs," Jane's International Defense Review, September 1999, 1.

[35] Chairman of the Joint Chiefs of Staff, Concept for Future Joint Operations: Expanding Joint Vision 2010. May 1997, 2.

[36] Ibid., 2

[37] Ibid., 2

[38] Ibid., 9.

[39] Phone conversation with Branch Chief Air Defense Artillery Force Development, Department of the Army Staff. September 1999.

[40] Phone Conversation with Joint Theater Air and Missile Defense Organization, Joint Staff. November 1999.

[41] Joint Theater Air and Missile Defense Organization, Joint Staff, Capabilities briefing, 1999.

[42] United States Army Air Defense Artillery School, "Air Defense Capabilities" Briefing, 1999.

[43] Department of Defense, Office of the Director Operational Test and Evaluation, "Forward Area Air Defense Command, Control, Communications, and Intelligence (FAADC3I) and the Ground Based Sensor (GBS) Systems. October 1995, i-iii.

[44] United States General Accounting Office, Report to the Chairman, Subcommittee on Military Research and Development, Committee on Armed Services, House of Representatives, Cruise Missile Defense, Progress Made But Significant Challenges Remain , March 1999, i-iii.

[45] Joint Theater Air and Missile Defense Organization, Joint Staff, Capabilities briefing, 1999.

[46] Ibid.

BIBLIOGRAPHY

Ballistic Missile Defense Home, "Why Ballistic Missile Defenses," http://www.acq.osd.mil/bmdo/bmdolink/html/threat.html; Internet; accessed 8 October 1999.

Board on Army Science and Technology, Commission on Engineering and Technical Systems, National Research Council, Star 21, Strategic Technologies for the Army of the Twenty-first Century. Washington D.C: National Academy Press, 1992

Bokhari, Eas "Cruise Missile technology, The Tin God that failed against the Holy Warriors of Afghanistan", Defense Journal; available from http://www.defense journal.com/oct 98/cruise-missile-tech.htm

Chairman of the Joint Chiefs of Staff, "Concept for Future Joint Operations: Expanding Joint Vision 2010" Washington D.C: U.S Government Printing Office, 1997.

Chilcoat, Richard A., Lieutenant General, 1998 Strategic Assessment, Engaging Power for Peace. Washington D.C.: U.S. Government Printing Office, 1998.Shinseki, Eric K., "Beginning the Next 100 Years," Army, (October 1999), 28.

Department of the Army. United States Army Theater Air and Missile Defense Master Plan, Washington D.C: U.S Government Printing Office, 1999.

Department of Defense, Office of the Director Operational Test and Evaluation, "Forward Area Air Defense Command, Control, Communications, and Intelligence (FAADC3I) and the Ground Based Sensor (GBS) Systems", Washington D.C: U.S Government Printing Office, 1995.

Gormley, Dennis M., "Hedging against the Cruise Missile Threat," Survival, International Insititute for Strategic Studies, Spring 1998; available from http://www.ceip.org/programs/npp/gormley%20survival.htm Internet; accessed 8 October 1999.

Hewish, Mark, "Coming Soon: Attack of the Killer UAVs," Jane's International Defense Review, (September 1999), 1.

Joint Staff, Joint Theater Air and Missile Defense Organization, "Joint Air and Missile Defense Capabilities" briefing, 1999.

Megeehee, Mark K., A Pocket History of Air Defense Artillery Fort Bliss: Texas, United States Army Air Defense Artillery School.

National Air Intelligence Center, "Ballistic and Cruise Missile Threat," Wright Patterson Air Force Base, Ohio, 1999.

Peters, Ralph, Fighting for the Future; Will America Triumphy? Mechanicsburg, PA: Stackpole Books, 1999.

Possony, Stefan T. and Pournelle, J.E., The Strategy of Technology; Winning the Decisive War. Cambridge Mass : University Press of Cambridge Mass, 1970.

Shelton, Henry H., General, Joint Strategy Review. Washington D.C.: U.S. Government Printing Office, 1998.

Tilford, Earl H. Jr., "National Defense Into the 21st Century: Defining Issues", Strategic Studies Institute Special Report (June 1997), 8.

Trent, George J., "Current and Projected National Security Threats", Statement presented to Senate Arms Services Committee. Washington D.C.: Public Affairs Staff, 1999.

United States Army Air Defense Artillery School, "Air Defense Capabilities" Briefing, 1999.

United States General Accounting Office, Report to the Chairman, Subcommittee on Military Research and Development, Committee on Armed Services, House of Representatives, Cruise Missile Defense, Progress Made But Significant Challenges Remain , March 1999, 1. (Start Entries here).