OPTIMIZING ATTACK HELICOPTER MANEUVER USING NAVAL VESSELS AS A FORCE PROJECTION PLATFORM

A MONOGRAPH
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ABSTRACT

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In an effort to rethink how the Army fights, the 1993 FM 100-5 Operations, recognizes the fact that the Cold War has ended and the strategy of the United States has changed. The Army's doctrine reflects a shift to stronger joint operations and incorporates a myriad of changes to include a new Army tenet - Versatility. The versatility of the Longbow attack helicopter battalion is inherent in its ability to deploy from naval vessels, ingress landfall with the purpose of destroying a priority target or group of targets and return to that vessel. This adds a new dimension to Apache warfighting. This monograph takes a look at old facts through new glasses, then makes use of those facts in order to become more innovative and effective in the employment of a Longbow attack helicopter battalion.

An unclassified independent deep attack scenario in Korea against a moving second echelon armor brigade is the focus of this monograph. The deep attack scenario provides a basis for original analysis to evaluate whether or not a Longbow attack helicopter battalion can conduct successful independent deep operations in the Korean context, using naval vessels as a force projection platform. This monograph examines three separate but related areas necessary for a Longbow attack helicopter battalion to execute successfully one type of deep attack, the ambush. It looks at the type of naval vessels that can support a Longbow attack helicopter battalion, the availability of those vessels, as well as what a CINC gains or loses by using these vessels as launch and/or pickup platforms. It also examines the ability of a Longbow battalion to penetrate a North Korean first echelon division air defense system (direct approach) and maneuver 125 kilometers from the FLOT to arrive with sufficient combat power to destroy a second echelon armor brigade compared to employing a coastal penetration (indirect approach) to arrive with sufficient combat power to destroy the same threat in the same engagement area. Finally, it looks at the technical capability of a Longbow battalion to detect, designate, and destroy a second echelon armor brigade in the Korean context.

The monograph concludes that a Longbow attack helicopter battalion can conduct successful independent deep operations using naval vessels as launch and/or pickup platforms. There are three classes of the big-deck amphibious assault ships that can support a longbow battalion, five are promulgated for planning in a major regional contingency such as Korea. Use of the indirect approach (the ability to use unexpected or advantagous air routes) provides increased survivability to the Longbow battalion which is inherent in conserving the fighting potential of a force. In examining the ability of a Longbow battalion to detect, designate, and destroy a North Korean second echelon armor brigade, the monograph concludes that the technical capability of the Longbow system greatly increases the ability to detect and designate a target, however, the Longbow battalion has the capability to defeat an armor brigade, but not destroy it.

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INTRODUCTION

During a period of constrained resources and reduction in the defense budget, the Armed Forces of the United States are still charged with the security of our nation. As the future defense budget is reduced in favor of domestic requirements and the Congress continues to debate the issue of redundancy in capabilities; the Army, Navy, Marines, and Air Force are required to be more innovative and effective in the employment of the forces currently on hand. In order to ensure the continued security of the United States, the individual services must take every opportunity to work together to enhance our overall defensive posture. In an effort to work together, joint doctrine must continue to build on the collective knowledge and wisdom gained through recent operations, numerous exercises, and the deliberate process of informed reasoning throughout the armed forces.

In an effort to rethink how the Army fights, the 1993 FM 100-5 Operations, "recognizes the fact that the Cold War has ended and the strategy of the United States has changed."[1] The Army's doctrine reflects a shift to stronger joint operations and incorporates a myriad of changes to include a new Army tenet - Versatility. Versatility is a characteristic which enables commanders "to shift focus, tailor forces, and move from one role to another."[2] The versatility of Army aviation and specifically the attack helicopter is inherent in its ability to overfly obstacles and operate from a variety of locations and platforms - to include ships. Add to this capability, the advantage of force tailoring for joint operations, and the missions which aviation forces can have application are limited only by the commander's imagination.

The concept of Army aircraft operating from U.S. naval vessels has already proven successful in recent combat operations. With "Operation Earnest Will" and "Operation Uphold Democracy" as historical precedent, coupled with the Army tenet versatility as the stimulus for innovation, the concept of employing Army attack helicopters with the mobility of the carrier can have many scenarios.

An unclassified independent deep attack against a moving second echelon armor brigade in the Korean context is the focus of this monograph. The deep attack scenario provides a basis for original analysis to evaluate whether or not an AH-64 (Longbow) attack helicopter battalion can conduct successful independent deep operations in the Korean context, using naval vessels as a force projection platform. The mission scenario is based upon an opposing force in North Korea that, over the years, has acquired vast amounts of military hardware and training from the former Soviet Union. North Korea represents one of the most significant threats to United States interests for many years to come. However, there are numerous developing countries that have substantial military forces based on the old Soviet model. Thus the implications of the monograph's findings are not limited to the employment of an AH-64 (Longbow) attack helicopter battalion solely on a North East Asia battlefield.

An independent deep attack by an AH-64 (Longbow) battalion occurs in an engagement area 130 kilometers forward of the Forward Line of Troops (FLOT). The attacking force is an AH-64 (Longbow) attack helicopter battalion on-board a naval vessel operating approximately 50 to 100 miles from the coast of North Korea. The penetration occurs along the coast of North Korea and the battalion maneuvers through the coastline

air defenses to a battle position in the vicinity of a moving second echelon armor brigade. For the purpose of this monograph, independent deep operations are defined as: "Operations in depth to secure advantages in later engagements and to protect the force" forward of the division boundary and short of the Fire Support Coordination Line (FSCL).[3]

Typical deep operations include: interdiction by ground and air maneuver and fires, either singly or in combination, deep surveillance and target acquisition, command, control, and communications countermeasures.[4] The payoff is a high-tempo operation that denies the enemy's freedom of action and disrupts or destroys the coherence and tempo of his operation.[5] The interdiction part of the doctrine is the primary subject of this monograph.

The monograph is predicated on three assumptions. First, the Air Force or the Navy will not support this operation with attack aircraft. This assumption is based on competing requirements for both the Air Force and Navy assets. Both services do not have sufficient night attack assets capable of conducting this mission singularly or as a joint deep operation. The night fighting assets the Air Force and the Navy do have, are dedicated to separate air interdiction and defensive counterair missions. The remaining aircraft are apportioned to close air support for the Army and the Marine Corps.

Second, the Army attack helicopter battalion executing the deep operation is shipboard qualified. The procedures and lessons learned are cataloged, and Navy personnel are experienced and trained in supporting the AH-64 (Longbow) battalion.

Finally, it is assumed that an attack helicopter company is organized with five AH-64D Without Radar Apaches and three AH-64D With Radar Apaches. This assumption is based on the organization currently fielded at Fort Hood, Texas as part of the experimental Aviation Task Force.

To answer the research question, this study analyzes three subordinate research questions. Selected criteria are used as standards of evaluation to compare the doctrinal tasks associated with each subordinate question in order to analyze whether or not an AH-64 (Longbow) attack helicopter battalion can conduct successful independent deep operations in a Korean context, using naval vessels as a launch and/or pickup platform. The first subordinate question is: using naval vessels as a force projection platform, does the AH-64 (Longbow) attack helicopter battalion have the ability to penetrate the coastline and maneuver through the North Korean air defense system to a battle position? The method for evaluation is a comparison of the doctrinal tasks the battalion must accomplish to cross the FLOT and maneuver to the battle position with the doctrinal capabilities of the North Korean air defense to acquire and defeat the attack.

Secondly, does the AH-64 (Longbow) attack helicopter battalion have the technical capability to detect, designate, and destroy an armor brigade? The method for evaluation is a comparison of the doctrinal tasks necessary to detect, designate, and destroy the target with the technical capabilities of the AH-64 (Longbow) battalion.

Finally, from what type of naval vessels can an AH-64 (Longbow) attack helicopter battalion operate? What is the likely availability of a ship that can support an AH-64 (Longbow) attack helicopter battalion? What does a commander gain or lose by using

naval vessels as launch and/or pickup platform for an AH-64 (Longbow) attack helicopter battalion? The method for evaluation is a comparison of the number of helicopter assault ships the navy has assigned to support a major regional conflict with the type of assault ships that can support an AH-64 (Longbow) attack helicopter battalion. Criteria used to evaluate this question also involves launch and recovery ranges, dwell time, sustainment, battle command, and force protection associated with conducting independent deep operations from a naval vessel 50 to 100 miles from shore.

Through an analysis of the enemy threat, capabilities of an AH-64 (Longbow) attack helicopter battalion, and attack helicopter independent deep operations in a Korean context, this monograph answers the primary research question and makes recommendations for the employment of an AH-64 (Longbow) attack helicopter battalion using naval vessels as a launch and/or pickup platform. Although focused primarily on the Korean context, the findings of this study may be applied to numerous countries which have substantial military forces based on the old Soviet model and located near a body of water.

ORGANIZATION AND CAPABILITIES

AH-64 (LONGBOW) ATTACK HELICOPTER BATTALION

A great deal has been written by contractors and the Aviation Center about the organization, capabilities, and doctrine of the AH-64 Longbow attack helicopter battalion. With the completion of the AH-64D Initial Operational Test and Evaluation (IOTE) in

April of 1995, the capabilities of the system as well as the organization and doctrine can be confirmed by those who count most: the crews who will fight it.[6]

The Longbow battalion provides the ground force commander a highly versatile and lethal antiarmor, antipersonnel, and air-to-air destruction capability not replicated by other members of the combined arms team. As a combat maneuver unit, it is employed as a battalion. It conducts supporting attacks which aid, protect, and complement actions by other members of the combined arms team. The mission of an AH-64 (Longbow) attack helicopter battalion is to destroy massed enemy mechanized formations, and other forces, with aerial firepower, mobility, and shock effect.[7] By using aerial maneuver and firepower, the Longbow battalion enables the ground commander to mass overwhelming combat power rapidly at the decisive time and place, changing the outcome of a battle.

ORGANIZATION

The organization of an AH-64 (Longbow) attack helicopter battalion assigned to a heavy division, air assault division, airborne division, and corps aviation brigade, consists of a headquarters and headquarters company (HHC), an aviation maintenance company, and three attack helicopter companies.[8] The battalion is commanded by a lieutenant colonel with majors as the executive officer and operations officer (S3). The unit has a coordinating staff with aviation captains serving as the S1, S2, and S4. The force structure of the Longbow-equipped attack helicopter battalion is twenty-four AH-64Ds: nine AH-64Ds With Radar and fifteen AH-64Ds Without Radar.

HHC provides command and control, logistics, and ground maintenance support for the battalion.[9] The company is organized like any other aviation HHC with a supply

section, mess section, automotive maintenance section, medical section and battalion communications section. A platoon within HHC, which is critical to the outcome of all attack helicopter missions, is the Class III/V platoon. The III/V platoon is the largest organization within the company. It provides the organization with fuel and ammunition at the main assembly area and has the ability to operate up to two Forward Arming and Refueling Points (FARP) throughout the breadth, and depth of the battlefield. Successful operations by the battalion depend on the support rendered by the HHC.

Like fuel and ammunition, which are critical to combat operations, the aviation unit maintenance company is the backbone of the battalion. The company consists of a company headquarters, a quality assurance section, an aircraft maintenance section, and an aircraft component repair section.[10] The company conducts preventive maintenance, repair, and parts replacement. It also identifies causes of malfunctions and evacuates modules as necessary to affect repair.

The three attack helicopter companies provide the attack battalion with an antiarmor, antipersonnel, and an air-to-air destruction capability.[11] Each company is organized into two platoons, an aeroscout platoon with three AH-64Ds With Radar and an attack platoon with five AH-64Ds Without Radar. The company commander task-organizes his company for combat based on the factors of METT-T. However, the platoons are normally further subdivided into teams of two or three aircraft depending on the number of aircraft available (lead and wingman).

For mission planning purposes, assume 75% availability, or six aircraft. The company commander has one aircraft, two platoon leaders have aircraft, and there are three other

aircraft. In the event of an odd number of aircraft for a mission, one team simply accepts another aircraft as a "welded-wingman" to the team wingman. AH-64Ds Without Radar are designated as wingman for the AH-64Ds With Radar. The wingman concept provides for mutual security and support, allows flexibility, supports air combat drills, and simplifies command and control and the division of responsibilities.[12]

AH-64D LONGBOW CAPABILITIES

In order for the reader to understand the remaining chapters of this monograph, he or she must become familiar with both the AH-64D (Longbow) Apache With Radar and the AH-64D Apache Without Radar. This section familiarizes the reader with the technical characteristics and capabilities of the Longbow system by explaining the individual components and functions that make up the system. Understanding the Longbow Apache is essential to capitalize fully on the potential effectiveness and lethality of the system.

The AH-64D (Longbow) Apache With Radar and the AH-64D Apache Without Radar are twin engine, tandem seat, aerial weapons platforms. The helicopter is designed as a weapons-delivery platform and is equipped with point target (Hellfire missile), area weapon (30mm chain gun), and aerial rocket (2.75-inch folding-fin type) systems.[13] Both aircraft are remanufactured AH-64A models with leading edge technologies, and have major improvements. AH-64D With Radar is equipped with 701C engines, Fire Control Radar (FCR) and Frequency Interferometer (RFI). There is a requirement for the AH-64D Without Radar to convert to an AH-64D With Radar with the installation of the Longbow system and 701C engines.[14]

The AH-64D Longbow Apache incorporates a number of enhanced modifications to the existing AH-64A system. These include an integrated Millimeter Wave (MMW) Fire Control Radar, Radar Frequency Interferometer (RFI), Radar Frequency (RF) guided Hellfire missiles, Improved Data Modem (IDM), and Data Transfer Unit (DTU) for the Aviation Mission Planning System (AMPS). The AH-64D Longbow retains the AH-64A's target acquisition/designation system (TADS) and the Forward Looking Infrared Radar (FLIR). The enhanced modifications incorporated on the AH-64D Longbow will correct shortcomings found in the AH-64A. The AH-64D Longbow provides the ground commander an enormous tactical advantage in intelligence gathering, lethality during periods of adverse weather, and survivability.

Fire Control Radar

The millimeter wave fire control radar is mounted on top of the Apache's main rotor mast. The FCR enables the Longbow Apache to detect, classify (i.e., tracked, wheeled, air defense, hovering, flying), prioritize, and engage targets with radar frequency (RF) Hellfire Missiles.[15] The FCR has two modes to search for targets, a 360-degree air search and a 90-degree ground search. It also has the ability to search 360 degrees manually and can be used for terrain and obstacle avoidance while flying in poor weather.

The millimeter wave radar provides an active sensor that sees through weather and electro-optical countermeasures.[16] The millimeter wave radar provides excellent resolution and generates one-dimensional target imagery. The imagery is processed by a Very High Speed Integrated Circuit (VHSIC) technology within the Longbow's weapon processors.[17] When the imagery becomes a target, the weapons processors transfer the

target signature and other data to the RF Hellfire missile and the cockpit displays.[18] Incorporated into the millimeter wave fire control radar is the radar frequency interferometer which detects and identifies threat air defense systems.

Radar Frequency Interferometer

The RFI is mounted below the FCR antenna and will detect and identify radar systems and display targeting information on the same screen as the information from the FCR.[19] However, the FCR lacks the ability to distinguish friendly contacts from enemy, other than air defense weapons systems, which have their own distinctive radar signatures detected by the RFI. The RFI gives the Longbow Apache the ability to suppress enemy air defense (SEAD). The RFI is able to sort the incoming enemy radar pulses, determine direction, identify the type of emitter, assign targets, and then prioritize the missile for engagement.[20]

Hellfire Missile

The AH-64D Apache can fire both the Radar Frequency and the Semi-Active Laser (SAL) Hellfire missile. The SAL missile is not a fire-and-forget missile. It requires direct interaction with the laser on board the aircraft (autonomous) or from another laser designator system. However, the Longbow system does provide significant enhancements in the rapid employment of the missile.

The RF Hellfire missile incorporates a millimeter wave seeker that performs terminal homing functions. The FCR provides inertial guidance cues on where to fly, by feeding data through the weapons processor into the missile's on-board guidance system. The

Inertial Navigation System in the missile directs the radar to search a specific location, after the missile is launched. Once the missile radar identifies the target in the specified location, it then provides guidance data until impact.[21] The RF Hellfire missile can also pick up data from the laser rangefinder in the Apache's target acquisition/designation system (TADS) and convert that information to inertial guidance cues. Once launched, the AH-64D Apache firing the missile is free from having to act as a designator and the missile with its seeker truly becomes a fire-and-forget missile. This capability will allow the AH-64D Apache to kill several targets sequentially in an exceptionally short period of time.[22]

Improved Data Modem

The Improved Data Modem (IDM) is a tri-service device which allows for rapid exchange of information between the AH-64D, OH-58D Kiowa Warrior, TACFIRE and the Aviation Tactical Command Post. The modem can transmit by digital data burst, target and threat locations, navigational waypoints, spot reports, battle damage reports, and situation reports. Four channel simultaneous data transmissions are easily accommodated. Combined with the high accuracy of the GPS/INU (inertial navigation unit), precise targeting and attack coordination information, including accurate prediction of target behavior, can be exchanged quickly while minimizing crew workload.[23]

Aviation Mission Planning System

The Aviation Mission Planning System (AMPS) provides a complete planning medium from premission planning through mission debrief. It is a subsystem of the

Maneuver Control System (MCS) and links electronically through MCS to the Army's Tactical Command and Control System. AMPS is not part of the AH-64D, however planning information is transferred from AMPS to a Data Transfer Cartridge (DTC) for subsequent transfer to the aircraft. Data can be loaded into each aircraft or into one aircraft and transmitted via IDM to all other aircraft.[24] Once the mission data is loaded into the aircraft, the system will display the information on the tactical situation or up-front display as appropriate.[25] With the AMPS, each crew begins a mission with exactly the same mission data loaded on a DTC. This capability allows a unit to go into battle with a common set of graphics and control measures displayed consistently between aircraft, without the margin of error created by hand copying graphics from an overlay.[26]

AMPS provides essential planning functions that enable the crew to translate operation plans, intelligence information, operational graphics and control measures, and the commander's intent into the cockpit. Once the mission is underway, any changes to the mission (location of threat and friendly forces, changes to control measures, BDA, no-fire areas, and priority fire zones) can be sent digitally to all members of the battalion or company through the IDM.[27] AMPS also allows a commander, his staff, or AH-64D crew to coordinate the three-dimensional screening of the battlespace with the air defense forces. The result is a level of situational awareness that provides every crewmember with a clear and current understanding of the battlefield.

The AH-64D Longbow Apache incorporates a host of additional enhancements such as an inertial navigation system with an embedded GPS for navigation, a manpower and personnel integration (MANPRINT) glass cockpit with multifunctional displays to ease

pilot work load, an improved fire control computer to upgrade the accuracy of the 30mm gun, and an improved weapons processor to link the Apaches' sensors to the weapons systems. The greatest improvement the AH-64D Longbow has over the AH-64A is the ability to fully understand the mission and see the entire battlefield. The Fire Control Radar of the AH-64D is the heart of the Longbow system. No longer does a helicopter crew have to close with the enemy for visual contact. The AH-64D Longbow sensors enable the crew to maintain contact with the enemy both day and night, through battlefield obscurants and all but the most intense of weather conditions. More importantly, the AH-64D Longbow crew has the ability to know the exact location of other Apache elements. This allows teams to disperse beyond visual range and engage the enemy from different locations. This means that the commander can dominate battlespace over far greater areas, or decrease the time needed to execute a mission.

DEEP OPERATIONS DOCTRINE FOR THE AH-64D (LONGBOW) ATTACK HELICOPTER BATTALION

In order to understand how the AH-64D (Longbow) attack helicopter battalion can help a commander dominate battlespace over far greater areas, it is essential to understand the Army's doctrinal principles for the employment of the AH-64D (Longbow) attack helicopter battalion.

Doctrine has had far reaching effects on the way the Army views the modern battlefield. Most of the attention has been focused on deep operations. Deep operations are those activities which are directed against enemy forces not currently engaged, but

capable of engaging or influencing future close operations. The purpose of these operations is to deny the enemy freedom of action and to disrupt or destroy the coherence and tempo of his operation.[28] The desired effect is to ensure the success of close operations by foiling the enemy's plan and forcing the enemy to react to the unexpected. To plan and synchronize deep operations effectively, the Army has adopted a targeting methodology to ensure effective and efficient employment of deep operation assets. The targeting methodology consists of four separate, but inherently intertwined, functions: decide, detect, deliver, and assess (D3A). Together, these form the process that turns the maneuver commander's intent for deep operations into a specific list of targets that must be acquired and attacked.

The conduct of deep operations is a complex process that involves commanders and staffs in the D3A functions. It involves the coordinated use of artillery, intelligence, Air Force, naval assets, and attack helicopters to engage the enemy. The *decide* function provides the overall focus and prioritizes intelligence collection and attack planning. These decisions not only help identify high-payoff targets (HPT), but also focus the collection effort and enable the commander to identify the most efficient and effective methods of engagement. The second function of the D3A process is *detect*. Detect entails the execution of the G2's collection plan in order to detect and track the HPTs identified in the decide phase. Once the HPTs are located and identified, the *deliver* function of the targeting process executes the target attack guidance and supports the commander's battle plan. *Combat assessment* is the fourth function. It measures/evaluates the overall effectiveness of force employment during deep operations.

D3A is an integral part of the planning process and is a direct influence on a deep attack's success or failure.

Deep attacks by attack helicopters are high risk, high-payoff operations that must be executed with the utmost care. Deep operations occur during both offensive and defensive operations. In offensive operations, the deep operation is fought initially to disrupt, deceive, isolate, immobilize, defeat or destroy key elements of the defense. Later its priorities shift to blocking reserves and preventing the escape of defending units.[29] In the defense, deep operation's aim is to prevent the enemy from concentrating overwhelming combat power at the time and place of his choosing, disrupt his time-sequencing of follow-on echelons, and sever lines of communications.[30]

There are three employment options an attack helicopter battalion can conduct while executing a deep attack. Operations of limited duration are one form of employment which is similar to raids or ambushes. While the destruction of the enemy is the primary objective, timely information, and well-coordinated actions to suppress enemy air defense are essential.[31] Another form of employment is operations to secure deep objectives. The security of deep objectives are deliberate attacks or operations with the goal of occupying terrain in the enemy's rear.[32] In this type of operation an attack helicopter battalion could be given a deliberate attack mission focused on the threat to support a ground maneuver force. Finally, there are operations to continue the attack. These operations exploit successful corps or division offensives. They prevent an enemy force from reconstituting his defenses. Attack helicopters can support this operation by attacking moving targets in front of the mainbody or attacking key choke points and facilities behind the enemy

front.[33] The most frequently planned and executed form of deep attack is operations of limited duration. These are characterized as an ambush; this is the subject under evaluation.

An ambush is defined as a surprise attack by fire from concealed positions on a moving or temporarily halted enemy. The enemy force may be either a ground or air element. Attack helicopter battalions conduct deep ambushes to destroy, attrit, or disrupt enemy follow-on forces that are out of range of divisional assets.[34]

When planning operations of limited duration (ambush), the Longbow attack helicopter battalion's deep attack is conducted in six phases: preparation, penetration, movement to the objective (penetration and movement to the objective are all inclusive of ingress), actions at the objective, return (egress), and restoration. Each phase requires extensive planning and coordination from the battalion level down to the crew.

Premission planning begins with a thorough mission analysis. The premission planning tasks automate information handling for installation of data into the AH-64D Apache through AMPS. To execute a mission, the battalion and crews need certain elements of information. Known or templated enemy locations, primary and alternate routes, known hazards to flight, airspace coordination measures, communications data and net configuration, friendly unit graphics to include the fire support plan, and current or proposed mission graphics.[35] Battle management between the company/team requires prior planning as far as target prioritization tables and target handovers.

The ability to select a target prioritization table is essential to tailoring the Longbow system to the mission requirements. There are three prioritization tables resident in the

FCR which provide the commander a battle management tool. They include moving targets, stationary targets and theater specific targets. There are also three priority schemes imbedded in the aircraft processor. These include air defense unit (ADU), track, and wheeled vehicles. By assigning different prioritization schemes to the team, a commander can reduce the possibility of multiple firings on the same targets.[36]

Attack coordination for the AH-64D company/team, as far as target handover, is a premission planning requirement that must be accomplished. Priority Fire Zones (PFZs) should be prepared during the planning phase of the mission. These provide orientation to the target area. As the situation develops, the company commander retains an ability to shift from a known plan to a new plan as the enemy concentration dictates. The ability to subdivide the battlefield quickly allows the AH-64D commander to respond to changes in the mission planning by orienting on the enemy force, as well as on prepared engagement areas. New engagement areas can be constructed and transmitted from the cockpit as fast as the enemy situation changes. Without specific areas of engagements and PFZs for each aircraft, the problems of effective fire distribution and control, multiple engagements of the same target, and prevention of fratricide would be considerably more difficult.[37]

The ingress phase addresses those actions and procedures planned for or employed while enroute from the assembly area to the release point.[38] An aviation cross-FLOT operation is a combined arms mission that requires support from all arms. Both lethal and nonlethal fires should be planned to support the ingress phase of the operation. The most appropriate method of doing this would be to instruct one of the lead aircraft to call

for and manage the fire support with TACFIRE or secure voice.[39] Lead aircraft more often than not have a better picture of the situation. The lead aircraft should have the data stored to assist in the indirect fire request and its crew is generally in a better position to conduct the engagement by directing the artillery fire.

During ingress, the deep strike mission becomes much more survivable with the Longbow Apache's FCR providing overwatch for the formation. In planning the ingress to maximize survivability, the lead Longbow Apache team could operate their FCRs as the situation, terrain, or as the commander dictates, with left and right sectors of responsibility, or possibly one in the ground mode (with ADU priority table selected) and one in the air mode. The Longbow battalion will fly contour or low level flight engaging ADU, air threats, or circumnavigating any concentration of threat air defenses to arrive at the engagement area. Longbow Apache's will engage only the enemy ADU that poses a threat to the mission.

As the Longbow battalion arrives at the objective, all sensors must be configured to report current activity in the objective area. Target distribution by zones is the preferred method for the initial attack. A Longbow Apache from each company will unmask and scan the engagement area with the FCR. The aircraft will then assign priority target zones to each team member and ADU suppression to another, transmitting to the team via IDM. A minimum of one aircraft will precede the company engagement by several seconds to engage the ADUs. This aircraft would not be assigned a priority zone until after the ADU suppression is accomplished. After receiving respective priority zone target handover, each attack aircraft will engage the targets in their respective zones. During successive

engagements into the same EA, only moving targets or active ADU emitters should be fired upon to prevent wasting missiles on dead targets. If the attack force is close enough and the pilots can verify that a particular target is not dead by visual confirmation, the pilot can then use the FCR and detect, classify, and engage with RF or SAL missiles.

Keeping in mind that the Apaches must return home safely, each aircraft should plan to reserve a pre-determined percentage of their ammunition and fuel for the return flight back to friendly lines. For example two RF missiles and 200 rounds of 30mm. This depends on METT-T, SOP, and conflict intensity.

Return to and reentry through the FLOT differ's from ingress chiefly in the selection and use of different egress routes. The egress phase of the mission possesses some unique requirements for the communications system. The battalion must now coordinate the passage of lines by coordinating the change of friendly air defense weapons status, and aircrews must pass individual status, BDA, and other information to the commander.

Restoration involves the replenishment of stores, preparing the aircraft for future missions, and debriefing the mission. Requirements for this phase of the mission are simply the ability to download the mission data, operations and maintenance data, and video in a timely fashion to enhance the post mission debriefing.[40]

Doctrine for deep attack planning has far reaching effects on the way the Army views the modern battlefield. Doctrinal principles for the employment of an AH-64D (Longbow) attack helicopter battalion do not change based on the environment nor from where the Longbow battalion launches its operation. Attack helicopter battalions are ideally suited to fight on integrated, nonlinear battlefields that are characterized by

extended fronts and multiple operations. Success in deep operations depends on the synergistic efforts of joint and combined arms forces.

NAVAL VESSELS

The tactical environment of the littoral battlespace dictates a dramatic change in the way the Army conducts business today. The ability to strike against a hostile shore from an unexpected or advantageous direction provides the flexibility which is one of the greatest strategic assets that a CINC can have. War from the sea takes the battle to the enemy. It means applying high-intensity, precision strike offensive power at the time and place of our choosing.[41] The role of Army attack helicopters flying from aircraft carriers or amphibious assault ships offers unlimited mobility and a means by which integrated joint operations can help decide the outcome of a war. This chapter examines the type of naval vessels that can support an AH-64D (Longbow) attack helicopter battalion, the availability of these vessels, as well as what a CINC gains or loses by using these vessels as launch and/or pickup platforms.

Pacific Fleet is structured to project power in a Korean contingency and is forward deployed in Japan and the western pacific.[42] The projection of intense, precision offensive power is made possible by the fact that Pacific Fleet has seven battle groups as well as amphibious ready groups postured to react to any scenario.[43] The centerpiece of the Navy's offensive and defensive strategy is the aircraft carrier.

Carriers support and operate aircraft that engage in attacks on airborne, afloat, and ashore targets which threaten our use of the sea.[44] The carrier's most important function

is to establish local air superiority.[45] The carriers assets are also critical in preparing and shaping the battlespace for decisive action. They keep the enemy from massing his forces or maneuvering them effectively, and exploit the windows of opportunity created during the enemy's initial reactions when he is most vulnerable to the firepower and mobility of the naval combined arms team.[46] Although carriers are ideal to support an AH-64D (Longbow) attack helicopter battalion, the CINC would probably not make them available to the Army to use as a launch platform. Amphibious assault ships, however are absolutely critical to our concept and could be made available.

Today's modern amphibious force is one whose proven mobility and flexibility allow it to respond instantly to contingencies around the world. The amphibious force has 20-knot ships capable of keeping a sizable force of helicopters or landing troops at sea for extended periods. The force requires little logistical support and is able to function as self-contained attack units. This is due to the improved vehicle facilities and larger, more comfortable crew spaces of our modernized amphibious fleet.[47] The only drawback to sustainment aboard ship is a Longbow battalion's limited access to additional parts for unscheduled maintenance. Although access to additional helicopter parts (parts not contained in the prescribed load list) may be considered a limitation, it is not a show stopper. A ship has the capability to communicate with the appropriate agencies on shore to requisition the necessary parts which expedites processing for pickup. Scheduled daily runs are made via aircraft back to shore for this purpose.

Amphibious ships are designed to provide warfighting requirements to operate in the three-dimensional maritime environment. In aviation support, the ship provides the

combined benefits of a landing zone, maintenance and work areas, fuel farm, air operations planning facilities, and command and control.[48] Amphibious ships carry assault troops and equipment to enemy beaches and serve as combat support platforms for these forces. They transport and land assault forces ashore by use of Landing Craft Air Cushion (LCAC) vehicles, conventional landing craft, and helicopters.[49] These ships are supported by Amphibious Command Ships that provide command and control in major amphibious operations and could be used to support the planning for a joint precision deep strike.

The Fleet's amphibious ships are always kept stocked, fueled, and ready to get underway within a few hours notice. Personnel and their equipment can be embarked in less than 96 hours from initial receipt of orders.[50] An individual ship or an amphibious task group can go anywhere. It can steam to Korea in seven days from the United States, northern Europe in eight days, or the east coast of South America in five days.[51] Mobility, flexibility and instantaneous response are some qualities that characterize a Fleet's amphibious force. Through the combined efforts of the United States Navy and Marine Corps, today's amphibious force is in the forefront of applied seapower.

Amphibious assault ships are absolutely critical to our concept for optimizing attack helicopter maneuver using naval vessels as a force projection platform. The Navy currently has in its inventory three classes of the big-deck amphibious ships and two amphibious command ships which are the heart of an Amphibious Ready Group. The three classes of assault ships are the Iwo Jima Landing Platform Helicopter (LPH) class ships, of which the Navy has three, the Wasp Landing Helicopter Deck (LHD) class ships, of which the Navy has four, and finally the Tarawa Landing Helicopter Assault (LHA)

class ships, of which the Navy has five.[52] Of the twelve ships suitable and appropriate for use by an AH-64D (Longbow) attack helicopter battalion, only five of the big-deck amphibious ships are allocated for planning against a major regional contingency such as Korea.[53]

Successful joint operations with Navy and Army elements is directly dependent on proper planning. Operators and planners must understand the capabilities and limitations of ship and helicopter interoperability if the maximum degree of safety, flexibility, and effectiveness is to be realized. Planning by an AH-64D (Longbow) attack helicopter battalion is centered around the type of amphibious assault ships that can support their maneuver. Of special interest are Hazards of Electromagnetic Radiation to Ordnance (HERO). Although the AH-64D Longbow is shielded to the Navy's 200 volts per meter electromagnetic vulnerability standard, some of the weapons do not meet the HERO standards. The RF Hellfire missile has a safe-and-arm device in front of the motor to take aboard ship. Likewise, the firing electronics and Mark 66 Modification motor of the Hydra-70 rocket are HERO rated, but the electrically primed 30mm cannon is not. However, the electrically primed 30mm cannon can be modified to a percussion firing weapon system to meet the compatibility standards in accordance with Naval Warfare Publications. Although waivers are issued for provisional clearance for shipboard operations, resolution of this issue requires an additional coordination measure to achieve a routine operational capability.

The capabilities of the three Iwo Jima LPH class ships are diverse and not only provide a launch platform for helicopters, they are equipped with Sea Sparrow surface-to-

air missiles and Vulcan Phalanx close-in weapons support systems that provide close-in anti-air defense capabilities. The ships are powered by a modern, clean burning 600 psi steam system that develops 23,000 shaft horse power and can propel the ship at speeds up to 22 knots. The ships can accommodate up to twenty AH-64D (Longbow) attack helicopters. The flight decks provide for simultaneous takeoff or landing of seven AH-64D helicopters during normal operations with the ability to accommodate an additional five helicopters on the flight deck. The lower deck provides space for eight AH-64Ds, 37,400 cu ft for palletted stores, and workshops to assist in intermediate level maintenance. The ships have two deck edge elevators, one to port opposite the bridge and one to starboard aft of the island. The ships have the capacity to house 1562 troops and store up to 1500 tons of aviation fuel.[54]

The four WASP class LHD ships are the largest amphibious assault ships the Navy has in its inventory. The WASP class is powered by two 600psi engines which develop 70,000 shaft horse power and has a range of 9500 miles at 18 knots. The ship is equipped with combined radar warning, jammer and deception system. Its weapons systems include three 20mm 6-barreled Vulcan Phalanx, eight 12.7 mm machine guns, and 16 Sea Sparrow missiles. The ship is integrated with the Tactical Amphibious Warfare Data System (TAWDS) and the Marine Tactical Amphibious C2 system which can process information in support of the Longbow battalion. The bridge is two decks lower than that of an LHA, command, control and communication spaces having been moved inside the hull to avoid cheap kill damage. The ship has the capacity to accommodate thirty AH-64Ds, 1232 tons

of aviation fuel, and 1870 troops. The ship's flight deck provides for simultaneous takeoff or landing of nine AH-46D helicopters during normal operations, with the ability to accommodate an additional eleven helicopters on the flight deck. The ship also has a well deck (267 x 50 ft), and can accommodate up to ten AH-64Ds. Like the LPH, the LHD has workshops areas and equipment to provide intermediate level maintenance. Unlike the LPH, the LHD is fitted with a 600-bed capacity hospital and six operating rooms.[55]

The five TARAWA class LHA ships are the workhorse amphibious assault ships of the Navy. The Tarawa class is powered by two 600psi engines which develop 70,000 shaft horse power and has a range of 10,000 miles at 20 knots. The ship is equipped with combined radar warning, jammer and deception system. Its weapons systems include three 20mm 6-barreled Vulcan Phalanx, two 12.7 mm machine guns, and 2 GDC RAM launchers with 21 missiles per launcher. The ship is integrated with the Tactical Amphibious Warfare Data System (TAWDS) to provide computerized support in control of helicopters, shipboard weapons and sensors, navigation, and electronic warfare systems. The ship has the capacity to accommodate twenty two AH-64Ds, 1200 tons of aviation fuel, and 1703 troops. The ships flight deck provides for simultaneous takeoff or landing of nine AH-46D helicopters during normal operations with the ability to accommodate an additional nine helicopters on the flight deck. Beneath the full-length flight deck are two half-length hanger decks, the two being connected by two elevators. The two half-length hanger decks can accommodate up to four AH-64Ds and has 33,730 sq ft available for vehicles and 116,900 cu ft for pallettered stores. Like the LPH and LHD, the LHA has workshops areas and equipment to provide intermediate level maintenance.[56]

According to the 1993 FM 100-5, there are four inherent characteristics of battle command: command, control, communications and space-based systems. The author will not address spaced-based systems because there are no distinguishing characteristics between operations conducted from land and those from a ship. Command provides purpose by means of an aim.[57] Control ensures that deviation from the established aim is minimized.[58] Communications ensures that the flow of information through the organizational structure continues to support the command and control elements.[59]

When in command of a deep operation, it does not matter whether or not a unit is using a ship as a launch/pickup platform or taking off and returning to a rear assembly area, a commander must be given the flexibility to lead and make decisions. No single communications or data processing technology, no single system of organization, no single procedure or method, is in itself sufficient to guarantee the successful or even adequate conduct of command in war.[60] As long as the commander in charge of the operation understands the intent two levels higher and the responsibilities of the units supporting the operation, he or she must act freely to accomplish the mission with minimal guidance. However, there is one distinguishing characteristic that increases the complexity of command by using naval vessels. That characteristic is the layering of command.

Normally in a deep operation the attack helicopter battalion commander reports and works directly for the brigade commander. However, when conducting operations from a ship, an initiating directive from the joint commander authorizes the conduct of the operation. This directive is significant because it provides a laundry list of information to include the designation of commanders.[61] There normally are two commanders charged

with the execution of the operation from a ship. They are the commander of the amphibious task force (CATF) and the commander of the landing task force (CLF). The CATF is in command of all assets involved in the operation, while the CLF or in this case the Coprs commander or Joint Task Force (JTF) commander assumes command of his forces once control is passed ashore. In short, the CATF commander will launch the attack and once the Longbow battalion is clear of the ship's control zone (or directed by the CINC) operational control will pass to either the Corps or JTF commander. This results in the attack helicopter battalion commander now reporting to two different chains of command. Every additional link in the chain of command reduces the effect of an order in two ways: by the process of being transferred, and by the additional time needed to pass it on.[62] In any case, the command relationships must be addressed and resolved early on, in order to make the most effective use of all available assets.

Control supports command by removing detail from the commander and giving him the information he needs to decide and lead. Coordination is inherent in control. Skilled staffs work within the commander's intent to direct, coordinate, and control units and resource allocations to support the desired endstate.[63] Coordination and control for all deep operations are cumbersome and complex. From a coordination aspect, using ships for deep operations presents many challenges to the staff, and the disadvantages sometimes outnumber the advantages.

Operating from a ship requires a commander to decentralize the chain of command somewhat and rely on the intelligent initiative at every rank to effect coordination. When using a ship as a force projection platform, carrying out any task requires the cooperation

of more and more personnel belonging to different services. Shipboard operations requires the Longbow battalion to coordinate their mission with more agencies, and communications not only grow arithmetically, but geometrically, everybody having to coordinate with everybody else.

Current doctrine considers the tenuous communications link between the corps main command post and the attack battalion as the single greatest challenge to successful deep operations.[64] Communications abroad ship are central to both control and command. The ship offers a capability to talk directly to the aircraft conducting the mission as well as the brigade or corps back in a rear assembly area. The degree of information superiority the ship offers allows all commanders from battalion to corps to exploit this capability and not only achieve a tactical advantage, but an operational advantage. This means knowledge and understanding of the situation becomes more certain, timely, and more accurate which in turn leads to overall success of the mission.

Force protection is the last criteria used for analyzing what a commander gains or loses by using naval vessels as a launch and/or pickup platform. The Korean peninsula is small relative to other areas of the world U.S. forces operate. There is no distinguishable rear area. The North Koreans can reach our rear areas with artillery from the border, it only takes 3 1/2 minutes by air to bomb rear area targets from North Korean airfields, and their special operating forces are already operating inside of South Korea.

Naval vessels offer not only a force projection platform, but a force protection platform. Although a ship offers little dispersion, the Fleet's air defense protection

through air superiority and "control of the sea is usually a prerequisite for larger strategies involving a land-based objective."[65] The one advantage the Navy has over land-based forces is battle space dominance. The battle space in this case looking at the rear area specifically in which naval forces operate is neither fixed in size or stationary. The rear area is continually moving which helps commanders protect their forces from observation, detection, and destruction. Using ships as a force projection/protection platform in the Korean context not only limits a Longbow battalions vulnerability, it is a prerequisite to ensure the battalion can maintain their freedom of action so that a commander can employ the Longbow battalion at the decisive time and place.

In short, aircraft carriers and big deck amphibious ships are multicapable. They provide a capability to strike against a hostile shore from an unexpected or advantageous direction that provides flexibility, survivability, and mobility when planning deep strike missions. Amphibious assault ships are capable of providing support to a sizable force of Army helicopters at sea for extended periods of time and require little logistical support. The availability of amphibious assault ships to support an AH-64D (Longbow) attack helicopter in a major regional conflict such as Korea, could be, and would be ordered by the CINC if the need arose.

KOREAN SCENARIO

This chapter has two distinct sections. The first section describes the simulation to include capabilities and limitations, as well as the methodology, to include how the simulation is conducted. The second section depicts a mission scenario based upon a possible North Korean threat that an AH-64D (Longbow) attack helicopter battalion

could encounter. The Korean scenario is an unclassified simulation combining the effects of a North Korean threat against the capabilities of the AH-64D (Longbow) attack helicopter battalion.

SIMULATION

Computerized simulations of combat are being used increasingly by the Department of Defense, the Joint Chiefs of Staff, overseas commands, and the military Services for policy formulation, for planning, for training, and for forecasting. However, no model can or should be relied upon to provide results that influence important military decisions unless the reader of those results is confident that the particular simulation can reflect what actually has happened on real modern battlefields. It is true that wars of the future will have new weapons that were not present on past battlefields, and for which, therefore, historical experience may be irrelevant. At the same time, there will be a number of similarities between historical combat in terms of weapons used, battle circumstances, and--particularly--in terms of the human beings involved. If a model is able to represent historical combat with reasonable accuracy, it may be able to represent hypothetical future combat with comparably reasonable accuracy and realism.[66]

JANUS version 6.3 is a computer simulation used for the conduct of this monograph. JANUS is a computerized brigade and battalion simulation which aides commanders in the tactical decision making process. It is an interactive, six sided, closed, stochastic combat simulation. Interactive refers to the interplay between the military personnel who decide what to do in crucial situations during simulated combat and the systems that model that

combat. Up to six sides may be simulated. Closed means that the disposition of opposing sides is largely unknown to the players in control of a side. Stochastic refers to the way the system determines the results of actions like direct fire engagements, according to the laws of probability and chance. Combat means that the principal focus is on ground and air maneuver, although JANUS also models artillery units, weather and its effects, obscuration (smoke and dust), day and night visibility, Line of Sight (LOS), engineer support, resupply, and a chemical environment.[67]

The simulation uses digitized terrain, developed by the Defense Mapping Agency, displaying it in a form familiar to military users with contour lines, roads, rivers, vegetation, and urban areas.[68] Additionally, terrain realistically affects visibility and movement (both air and ground). Air movement has two flight modes, nap of the earth and terrain flight. JANUS also offers a combination of the two.

Besides its value as a training vehicle, JANUS offers a unique capability for battle analysis. Battle results are available for review and analysis in two ways. First, JANUS provides the capability to replay the battles exactly as they ran during the simulation. JANUS records all manual actions the users make. Using the recorded data avoids the changes that users' actions could introduce. Secondly, JANUS offers the selective retrieval and graphic display of simulation results like time and location of direct fires.

The JANUS database describes systems extensively and in detail. Individual fighting systems have distinct properties: dimensions, weight, carry capacity, speed, weapons, and weapons capabilities like range, type of ordnance, and ammunition basic loads.[69]

JANUS replicates and provides solutions on the threat and friendly forces from the brigade level down to the individual aircraft or soldier on the ground. One of the main contributions to the model is the assignment of specific weapon systems with probabilities of detection, recognition, and identification at given ranges for day and night. JANUS provides valid feedback and was used by the aviation community during Desert Storm to plan and rehearse actual missions.

The scope of the simulation is to replicate North Korean land forces and their associated weapons systems (ground and air defense systems) with the capabilities of the AH-64D (Longbow) attack helicopter battalion. The simulation will not replicate U.S. naval vessels being interdicted by long range missiles nor is it concerned with the resupply of combat service support assets. Its drawbacks are limited, but what limitations there are such as the play of friendly electronic warfare, can be manipulated by the observer controller. The simulation is a tool to validate and test the primary research question however, the results from the simulation along with the criteria described above will only be used to assess the survivability and capabilities of the AH-64D (Longbow) attack helicopter battalion.

Using JANUS for practical experimentation serves two critical functions. First, it keeps us all honest. It also prevents the monograph author from being a champion simply because he believes in this concept. Often, our linear language and defensive ways of presenting our thinking lead to perceiving false dichotomies and irreconcilable differences.[70] Secondly, JANUS provides a means to test the idea of using naval vessels

as a force projection platform. By analogy, some of the most interesting learning's that come out of microworlds come from discovering implications of the future.[71]

Human beings learn best through firsthand experiences. We can not actually conduct this mission in real life and receive feedback from our actions. JANUS enables warfighters to begin learning through doing. It captures sufficiently the main feature of the real situation. In particular, JANUS compresses time and space so that the mission becomes suitable for experiment to learn the consequences of our decisions in the future.
The second section of this chapter is a Korean scenario portraying an attack by North Korea.

SCENARIO

Following several days of heightened tension, North Korea launches a coordinated full scale attack against South Korea. North Korea's decision to launch an unprovoked attack on the Republic of Korea (ROK) draws worldwide condemnation and alienates it from its traditional allies. SCUD strikes against ROK/US airfields mark the initiation of hostilities. Minutes later, the first wave of North Korean Air Force aircraft cross the border, followed by a massive artillery barrage.

North Korea's attacks take a heavy toll during the early days of the war on both military and civilians located north of the Han River. The North Korean Army (NKA) ground advance is hampered by an inability to establish and maintain breech lanes through the DMZ, and their inability to stabilize a bridgehead across the Imjin River. On D+4, the NKA commit the 111th Mech Corps into a breakthrough in the Central Approach. The

111th's lead brigades move fairly rapidly through the DMZ, but then stall 15 kilometers (KM) inside South Korea. A combined counterattack by the ROK/US takes the NKA by surprise and destroys the bulk of their forces, causing the NKA to go into hasty defensive positions. North Korea's operational center of gravity is its capability to employ reserve forces. North Korea's remaining mechanized and armor units are the key forces available that have the flexibility to react to major penetrations across the FLOT. Destroying or fixing these units is essential to a successful advance into North Korea. With no ability to counterattack against forward penetrations of its forward defensive belt, North Korea will not be able to stop the momentum of a ROK/US attack and their defensive scheme is doomed.

The NKA is defending with three infantry corps' deployed along the FLOT, one corps defending the southwestern coastal region and one corps defending the southeastern coastal region. Infantry divisions in the 1st tactical echelon are approximately 40-50% strength. 212th Armor brigade remains in the Wonsan area and is the only 2d echelon tank-heavy counterattack force available that can play an important role in the NKA's defense.

The 212th Armor brigade has not been committed into the fight, but is expected to begin movement within the next 24 hours. The brigade remains under limited air defense protection of the Army. Approximately 20% of the North Korean Air Force's (NKAF) SA-2 and SA-3 sites remain operational, with very few sites functioning along either coast. Approximately 60% of the radar guided AAA sites (220) providing air defense for North Korea remain operational. Although the ROK/US attrited the radar guided AAA

sites in the Pyongyang and Wonsan port areas, there are still significant numbers of these systems remaining. Optically guided AAA is still active throughout North Korea and with ground force units. The number of operational optically guided AAA decreases steadily as you move towards the north.

The primary missions of the North Korean Navy (NKN) in the early stages of the war were to insert Special Operating Forces (SOF), interdict sea lines of communications (SLOC), and protect the North Korean coastline. In the days that followed, combat surface ships only attempted to gain local sea control for limited periods of time in support of specific missions. As the war progressed, mining of NKN ports, ROK/US air superiority, and the influx of US Naval assets into theater quickly degraded the effectiveness of the NKN. Combat losses of both NKN surface and sub-surface vessels mounted rapidly as a result of ROK/US's effort to expand their control of the seas around the peninsula.

North Korea continues to maintain its defensive posture across the entire front. The ROK and US national command authorities have accepted the risk that North Korea might employ their reserve operational echelon and sacrifice their homeland in order to unite the two Korea's. It is therefore essential to destroy the 212th Armor Brigade before conducting a counteroffensive in order to reduce the threat of North Korea committing their operational reserve.

The 6th Combat Aviation Brigade has been given the mission to conduct deep operations to destroy the 212th Armor Brigade in EA SPLASH during the night of D+5. Destruction is defined as rendering the force incapable of continuing any significant

military mission. The aviation brigade commander will use one Longbow attack helicopter battalion for the mission. The battalion is based on the USS ESSEX (WASP CLASS: Amphibious Assault Ship) which will deploy into North Korean waters vicinity Wonsan. The ship will remain approximately 50 nautical miles (NM) off the coast and loiter until mission completion. In an effort to maximize the survivability of the battalion's assets, confirm target resolution, and verify target specificity prior to committing the entire force, the Longbow battalion will conduct phased deep operations. Based on an anticipated operational readiness rate of 80%, the battalion will conduct this operation with 19 of the 24 AH-64Ds on-hand. Each AH-64D will carry 12 Hellfire missiles and 1200 rounds of 30mm ammunition. Thus the battalion will deploy with 228 Hellfires (86 SAL and 142 RF missiles) and 22,800 rounds of 30mm ammunition. The correlation of forces measurement is 185 threat vehicles in the 212th Armored Brigade versus 228 Hellfire missiles in the Longbow battalion.

THREAT

The objective of the threat air defense is to "reduce effectiveness of enemy air attacks."[72] To accomplish this, the North Koreans deploy fully integrated air defense systems which include missiles, ADA guns, and fire from other ground systems. Command and control of the North Korean Air Defense Command is exercised by the North Korean Air Force. The Air Defense Command's combined air regiments and ground-based air defense regiments are under one command within assigned zones.

Redundant radar systems include both early warning and tracking capabilities. Missile air defense systems includes the SA-2, SA-3, SA-7, SA-14, and SA-16.[73] North Korea

has produced a variety of anti-aircraft weapons. The 14.5mm anti-air machine-gun was derived from the Soviet ZPU 2/4. NK also produces the 37mm self-propelled anti-aircraft gun (SPAAG) as well as the 57mm S-60 and the KS19 (100mm) guns which are used to protect ground forces as well as strategic sites. Air defense priority of coverage is to major ports and cities as well as airfields, SAM sites, coastal areas, and logistics sites.

Considering the devastating effect amphibious operations had against North Korean offensive operations during the Korean War, it can be assumed that North Korea has made extensive preparations to oppose an amphibious assault. SA-2 and SA-3 battalions concentrated along the coastal corridors are augmented by ZPU 2/4 and S-60 batteries and shoulder fired SA-7/14/16 missile launchers.

The SA-2 is a somewhat mobile high level guided SAM system. SA-2 sites are deployed as batteries of six missiles each and are used to protect cities and key industrial sites.[74] Associated radar's include the FAN SONG and SPOON REST which provide fire control and early warning respectively. The SPOON REST radar is a target acquisition radar which provides early warning and has a range of 275 kilometers and is data linked to the FAN SONG radar.[75] The FAN SONG is a fire control radar system with a range of 60 to 120 kilometers and can track 6 targets and guide three SA-2 missiles at once.[76] Both systems are trailer mounted and are located normally within close proximity of the SA-2's. The SA-2 has a minimum range of 7 kilometers and a maximum range of 50 kilometers.[77]

The SA-3 is a medium level guided SAM system. The SA-3 is deployed in batteries consisting of four missiles each.[78] The FLAT FACE radar, an acquisition radar, works in conjunction with the LOW BLOW radar which provides fire control for the system. The

FLAT FACE radar is truck mounted; can also be emplaced in hardened bunkers and has a range of 250 kilometers.[79] The LOW BLOW is a trailer mounted system which can track up to six inbound aircraft and can guide one or two missiles to each target. The LOW BLOW system also has a TV on board to counter electronic jamming.[80] The SA-3 has a minimum and maximum range of 1.5 and 29 kilometers respectively.[81]

The towed ZPU-2/4s are 14.5 mm anti-aircraft machine guns which are normally collocated as batteries with the SA-2 and SA-3 batteries to provide tactical anti-air defense. The ZPU-2/4 systems are organized with six guns per battery and three batteries per battalion. They are optically guided systems and share minimum and maximum ranges of 1.4 and 7 kilometers respectively.[82]

The S-60 (57mm automatic AA gun) is organic to AAA battalions of infantry divisions and also can be used to augment coastal defense systems. The S-60 has three guns per battery and three batteries per battalion and are used to augment tactical air defense. They can be fired optically using mechanical computing firing sights or fired using the FIRE CAN and FLAP WHEEL radars. The FIRE CAN radar is mounted on a box body van which functions as a fire control system. The FLAP WHEEL radar is truck mounted and serves as a tracking system. Both radars are capable of controlling up to six weapons at a time. The S-60 has an effective range of 6 kilometers and a maximum range of 12 kilometers.[83]

The shoulder fired SA-7, SA-14, and SA-16 are short range man-portable, fire and forget SAMs. They are integrated throughout the North Korean air defense system and are used for close in protection against low flying aircraft. These systems require visual

acquisition. The SA-7 has a maximum range of 5.6 kilometers and is further limited by its inability to engage approaching aircraft because of the IR seeker head.[84] The SA-14, maximum range of 6 kilometers, has an improved head on capability, but still requires the gunner to acquire the target visually prior to missile launch.[85] The SA-16 is an improvement over the SA-14. It has a bigger warhead, more speed, greater maneuverability, and is laser guided. The SA-16 has a maximum range of 8(+) kilometers.[86]

The 212th Armor Brigade has an organic air defense battalion which consists of three batteries of ZSU-57-2s, BTR-152As, 37mm Self Propelled Automatic Anti-Aircraft Guns (SPAAG), and SA-7s. Additionally, the Corps has attached a battery of KS-19s to the 212th Brigade. The 212th may also attempt to defeat air attacks by using direct fire weapons on their armored vehicles. These systems also require the gunner to acquire the target visually and then direct the weapons fire towards the target.

The ZSU-57-2 is a self-propelled AA system which uses the FIRE CAN radar for fire control. It has an effective range of 6 kilometers and a maximum range of 12 kilometers.[87] The BTR-152 (ZPU-2 SPAAAG) system is a replacement for the towed ZPU-2/4. It uses the DRUM TILT radar for tracking targets and has effective and maximum ranges of 1.4 and 7 kilometers respectively.[88] The 37mm SPAAAG can fire high velocity armor piercing rounds capable of penetrating 38 to 44mm of rolled homogenous armor with a maximum effective range of 8 KMs.[89] This system possibly receives acquisition and tracking data from the FIRE CAN, FLAP WHEEL, and DRUM TILT radars. The KS-19 has a maximum effective range of 11.9 KMs with a maximum range of 21 KMs.[90] There

are normally 6 guns per battery and the batteries are used primarily to protect Army artillery groups and second echelon exploitation forces.

The ground components of the 212th Armor brigade include three armor battalions, a light armor battalion, and a mechanized battalion. Specifically, the unit consists of one armor battalion equipped with thirty-one T-72s, two armor battalions equipped with thirty-one T-62s each, one light armor battalion equipped with forty-one PT-76s, and BTR-60 equipped mechanized battalion composed of forty-one vehicles. The brigade has an organic artillery battalion and associated combat support and combat service support assets.[91]

The brigade's focus for march planning is security of the main force which creates conditions for its successful commitment into the battle. The elements in the march formation moving to contact include recon elements, flank security elements, main force and rear security. The brigade recognizes a threat of air attacks against their march columns and protects them by planning and employing air defense weapons throughout the area of operations. In addition, they recognize the advantages of darkness, limited visibility and adverse weather, in protecting the force, and plan on conducting movements during these times.

PENETRATION & MANEUVER

This chapter describes how a Longbow attack helicopter battalion penetrates a threat air defense and maneuvers to an objective according to Army doctrine. The ingress analysis examines the ability of a Longbow battalion to penetrate North Korean first

echelon divisions (Direct Approach) and maneuver 125 kilometers from the FLOT to arrive with sufficient combat power to destroy the 212th Armor Brigade in EA SPLASH compared to employing a coastal penetration (Indirect Approach) to arrive with sufficient combat power to destroy the same threat in the same EA. This chapter also examines what effects threat air defense systems have on the Longbow attack helicopter battalion, and reports the results of the simulation.

Penetration of a coastline or FLOT requires detailed coordination and support from all joint and combined arms. For both deep attack simulations, the Longbow attack helicopter battalion conducted a penetration using massed artillery fires, other attack helicopters, or USAF and Navy aircraft to create a gap in the enemy's defenses.

The first step in planning a penetration is a laydown of the enemy doctrinal template to plan air routes for ingress. Route planning, both forward and behind the FLOT, is based upon employing terrain that minimizes enemy direct fire capabilities and provides cover and concealment from electronic, radar, and visual acquisition. Also, the basic line-of-sight limitations associated with radars provide effective means of denying acquisition while aircraft are enroute.[92] The electronic countermeasure portion of the plan begins prior to the lead aircraft arriving at the FLOT/coast with the communications jamming and ends as the aviation units get out of friendly artillery range.[93] Electronic intelligence jamming continues until the unit returns.

Considering the capabilities of the North Korean air defense system, the fact that the attack is conducted at night, "anti-aircraft artillery (AAA) and shoulder fired surface to air missiles along the coast are limited in their ability to acquire the aircraft visually."[94] Any

missiles that acquire the AH-64Ds are defeated by the ALQ-144 missile jammer mounted on the aircraft.[95]

Active radar along the coast not only direct missile systems to the target, but provide early warning to other AAA sites supporting the AAA umbrella. The AH-64D has the APR-39 radar detector that indicates active radar and their location relative to the position to the aircraft.[96] This gives the battalion an additional capability to maneuver around firing systems without coming into range of the missiles. The aircraft are also equipped with the ALQ-136 radar missile jammer. This system provides protection to the aircraft by confusing the guidance systems of radar missiles.[97] The aircraft also have chaff dispensers to assist in confusing radar missiles.[98] Using these systems effectively negates the missile systems.

Based on the capabilities of the aircraft and the enemy, a single ingress route was chosen for both the direct approach and the coastal penetration. Additionally, the Longbow battalion used a single flight to penetrate the FLOT/coast in both attacks. The flight mode used was low and fast in an effort to avoid enemy radars, enhance the battalion's survivability, and improve its prospects of maintaining stealth and surprise.

Due to the difficulty of a robust air defense threat that the Longbow battalion encounters near the FLOT/coastal crossings for both deep attacks, aircraft in the companies are given specific types of targets to suppress. AH-64D With Radar aircraft will engage emitting air defense units only, passing all other targets to the AH-64D Without Radar. Once past the FLOT/coast, avoidance or rapid suppression of enemy fires

and continued movement to the objective area are key to mission timing and synchronized arrival into the battle positions as the enemy enters the engagement area.

Two scenarios were evaluated for the conduct of this exercise. Scenario one involved a Longbow attack helicopter battalion penetrating North Korean first echelon divisions (Direct Approach) by fire and maneuvering 125 kilometers to destroy the 212th Armor Brigade in EA SPLASH. The second scenario evaluated a coastal penetration (indirect approach) to destroy the same threat in the same EA. During both scenarios the Longbow battalion's task organization included nine AH-64Ds With Radar and ten AH-64Ds Without Radar, and the battalion led the attack with its AH-64Ds With Radar. The battalion incorporated a similar non-lethal SEAD package in both scenarios, however, in scenario one the Longbow battalion was supported by one Corps artillery brigade to suppress known and suspected locations of enemy air defense radars, air defense systems, and concentrations of troop units. Additionally, the weapons configuration for the Longbow battalion was 12 Hellfire missiles and 1200 rounds of 30mm ammunition per aircraft for both scenarios.

In scenario one, upon departing the assembly area and successfully penetrating the FLOT, the lead companies immediately suppressed enemy air defense systems threatening the battalion while enroute to the objective. During all of the replications, most of the AH-64D losses were taken during the penetration or the initial occupation of the battle position. While SEAD was effective in reducing the number of ADA systems, it did not eliminate the problem. Due to adjacent threat units, there was no terrain to separate the aircraft from the 37mm SPAAG systems, so in many cases it became a question of

ordnance range and acquisition timing of who won the "duel". Although all SAMs had been destroyed, the anti-aircraft artillery threat remained significant, with the 37mm SPAAGs occupying key terrain throughout the sector. Use of the direct approach resulted in the lost of two AH-64Ds.

In scenario two, the Longbow battalion departed the ship and ingressed landfall by stealth. During the ingress, the Longbow battalion faced stiff opposition from the ZPU-2/4 and the S-60 AAA systems providing coastal air defense. While the non-lethal SEAD was effective in reducing the air defense radar for the SA-2s and SA-3s, it did not eliminate the problem. The battalion's lead company effectively penetrated the air defense belt by fire and maneuvered to the objective without losing any aircraft.

The difference in the number of AH-64Ds lost during the penetration was largely the result of the variation between the number of air defense systems. Thus, the Longbow battalion reached the battle position with 19 AH-64Ds in scenario two as opposed to 17 AH-64Ds in scenario one.

ACTIONS AT THE OBJECTIVE

Actions on the objective begin at the release point of the Longbow battalion's air route and continues until the engagement is complete. An engagement area is defined as an area along an enemy avenue of approach where the commander intends to contain and destroy an enemy force with the massed fires of all available weapons.[99] In order to contain or destroy an enemy force effectively in an engagement area, a Longbow attack helicopter battalion must be able to collect intelligence information at the objective

(*detect*), distribute and control fires in the target area (*designate*), and *destroy* the target with all available means.

This chapter describes how a Longbow attack helicopter battalion conducts actions at the objective to include detection, designation, and destruction of a moving second echelon armor brigade. This chapter also examines high resolution results from engagements of the two different penetration models and provides feedback as far as actions on the objective.

The engagement area used in both scenarios is approximately thirty kilometers long and ten kilometers wide. A dominant characteristic of the terrain surrounding the engagement area was compartmentation due to rivers and mountain ranges. These features radiate from the Northern edge of the engagement area, and form two corridors running Northeast to Southwest. The corridors facilitate North/South movement but also form cross-compartments which seriously impede East/West travel. Observation and fields of fire are limited within the engagement area. The broken, forested terrain limits observation to one to two kilometers except in the Northern portion of the engagement area where it could be up to five kilometers. Indirect fire systems are somewhat limited by the number of ridge lines, which hinder reverse slope fire, as well as locations for battle positions. The mountains provide favorable cover and concealment due to the rugged terrain and foliage. Also, the city of Kosan provides some cover and concealment from air observation. Considering the natural characteristics of the terrain, EA SPLASH is the best available engagement area to destroy the 212th Armor Brigade.

As the aviation unit arrives at the release point the detection phase begins. The AH-64D With Radar moves to and conducts reconnaissance of the BP to ensure security for the AH-64Ds Without Radar. Once this is complete, the AH-64D With Radar moves forward to position himself where he can observe the engagement area without compromising his own position to the enemy and reports current activity in the engagement area. Upon arriving at these positions, "they must ensure the maximum possible area of the EA is covered by overlapping FCR scans."[100] The aircraft must remain close enough together to maintain communication with one another. By employing the FCR in the wide scan ground targeting mode, the AH-64D has the means to "see" the battlefield.[101] This capability is essential in adverse weather but equally important in good weather. From this "picture" of the battlefield, the AH-64D air mission commander can determine the best manner to plan and conduct the attack.[102]

After contact is established, target identification establishes the necessary fire control means to preclude fratricide (engagement of friendly forces).[103] Designation, through fire distribution and control, and further division of the target area into kill zones, takes on added significance when employing RF Missiles from the AH-64D. Without it, pure autonomous engagements of targets in a designated engagement area by more than one member of the attacking Longbow battalion will result in multiple kills of the same target.[104] Attack coordination and target handovers for the AH-64D Apache employing RF Missiles is viewed in terms of a target area in addition to the traditional view of handing over specific targets or engaging the array by SOP (i.e.. left aircraft shoots left targets, etc.).[105]

The use of the Longbow system and digital communications within the Longbow attack battalion allows the unit to distribute and execute fires rapidly. Once the target handover is complete, the fire-and-forget capability of the RF Hellfire Missiles allow rapid engagements by the battalion. All available assets focus on the destruction of the brigade.

In examining actions at the objective, two scenarios were observed. In both scenarios, the nature of the terrain caused a large separation within the Longbow battalion, with two companies attacking two armor battalions in the north while the third company attacked the forward light tank battalion in the south. The AH-64Ds With Radar vacated their initial battle positions and moved to within 2-3 KMs of the armor brigade in order to acquire, lock-on, and engage targets. This close range in both scenarios made the aircraft more vulnerable to direct fire attacks. To maintain standoff and survivability, the AH-64Ds With Radar performed all acquisitions for the company, and the attack was conducted using remote RF Hellfire shots which were executed one at a time. While survivability was increased, rate of fire was degraded.

The battalion was undetected by the enemy armor brigade until the first Hellfire impacted the column. The enemy's reaction to coming under attack was to deploy off the road, seek cover and concealment, turn their vehicles toward the direction of the attack in an effort to utilize their counter-measures, and then employ multispectral smoke to gain concealment. Air defense teams and dismounted infantry squads dismounted from their vehicles.

The 212th Armor Brigade, fighting at 90% strength, had 158 operational combat vehicles. In both scenarios, the Longbow battalion was unable to destroy the moving

armor brigade in EA SPLASH. The number of losses sustained by the armor brigade at the hands of the Longbow attack helicopter battalion in scenario one (direct approach) was 46-T62s, 10-T-72s, 14-PT 76s, 5-BTR 60s, 4-BMPs, 4-122mm HOWs, and 33 ADA systems. These numbers are equivalent to two battalions of armor, one company of mechanized forces, and a battalion of ADA. Scenario two (indirect approach) produced slightly lower armor and mechanized numbers, 37-T62s, 11-T72s, 12-PT 76s, 4-BTR 60s, 4-BMPs, 18-152mm HOWs, and 23 ADA systems. Scenario one destroyed more ADA systems because of the concentration of ADA near the FLOT, which resulted in the lose of two aircraft. In both scenarios, the armor brigade could not continue with its COA and had to pass another 2nd echelon brigade through to reinforce 1st echelon elements.

Due to the heavy concentrations of air defense systems along the ingress route in scenario one, the battalion lost two aircraft enroute to the objective. Although the battalion penetrated the FLOT by massed artillery fires, the Longbow battalion used five missiles for self-SEAD during the ingress. The battalion arrived at the objective with 199 Hellfire missiles, again, the Battalion Commander's intent directed that each AH-64D With Radar egress with two Hellfires to provide self-SEAD.

In scenario two, the battalion reached the objective with all 19 of its aircraft, however, 25 Hellfire missiles were shot during the penetration phase as self-SEAD against anti-aircraft artillery. The battalion arrived at the objective with 203 Hellfire missiles, once again the Battalion Commander's intent directed that each AH-64D With Radar egress with two Hellfires to provide self-SEAD.

Although the Longbow attack battalion departed the assembly area in scenario one and the ship in scenario two with 228 Hellfire missiles, the battalion, in both scenarios, reached the objective with 185 missiles available for use. This was due to an additional hellfire rack of four missiles added to each aircraft in scenario one as compared to an external fuel tank needed to accomplish the mission in scenario two. Additionally, the Longbow battalion in each scenario, lost two AH-64Ds to S-60 AAA fire prior to egress. This was caused by the aircraft having to reduce standoff range in order to acquire the targets. Thus, the combat power of the Longbow attack helicopter battalion was equivalent for both scenarios. However, survivability was increased in scenario two as expected by using Naval vessels as a force projection platform. Although the simulation does not predict the outcome of combat, it raises issues that drive discussion in the assessment chapter of this monograph.

ANALYSIS

This chapter assesses the ability of a Longbow attack helicopter battalion to operate from naval vessels, penetrate the coastal and inland air defense systems, and detect, designate, and destroy a moving North Korean armor brigade versus taking the direct approach to the enemy's rear by flying across the FLOT. The deep attack simulation models are tools used to validate and test the primary research question. However, results from the simulation, along with standard criteria for each subordinate research question, provide a basis of original analysis. The goal is to determine if a Longbow attack helicopter battalion should conduct independent deep operations in the Korean context, using naval vessels as launch and/or pickup platforms.

The Navy's white paper, "From the Sea," issued in September of 1992, describes the change from a global threat to one of a regional nature. It states that, "the shift in the strategic landscape means that naval forces will concentrate on littoral warfare and maneuver from the sea"[106] with forces tailored for a particular operation; because "the battlefield of the future will demand that everyone on the field be teammates."[107]

Amphibious assault ships are absolutely critical to our concept of optimizing attack helicopter maneuver, but what does a CINC gain or lose by using these vessels as launch and/or pickup platforms? Assault ships come in many different shapes and sizes, and there are competing requirements a CINC must consider before directing the Navy to support this type of operation. Amphibious operations are an integral component of the Navy's concept for forcible entry from the sea. Assault ships are specifically designed to conduct amphibious force landings by providing helicopter support to transport troops and assist in establishing air superiority in a designated landing area. Not only do assault ships form a sea base from which a Marine Air Ground Task Force (MAGTF) springs, but they also serve as a tactical sea-based maneuver force during the ship-to-shore phase of the power projection.[108] Amphibious assault ships can also aid an advancing or retreating army by using the sea as a way of putting small disruptive forces behind the enemy's front line. The ability to maneuver ships into position to strike vulnerable targets, or to threaten amphibious assault at multiple locations along an extended coastline, is a significant tactical and operational advantage a CINC must consider before committing such an enabling force. However, in the Korean scenario being studied, maritime and air superiority have already been achieved, and the value of naval forces operating and

fighting in concert with the Army provides the CINC a capability to respond to any crisis throughout the entire area of operation.

PENETRATION AND MANEUVER

To analyze whether or not survivability is increased using a direct approach over land to penetrate a FLOT, versus an indirect approach over water, based on the results from a computer simulation, would be ludicrous. However, to disregard some of the indicators the simulation provides would be just as dangerous. Therefore, to analyze critically the penetration and maneuver, the author will compare the two types of maneuver using information, terrain, and enemy capabilities as method of evaluation. These are the same evaluation criteria a planner would use to plan this type of mission.

The commander maneuvers forces in order to keep the enemy off balance, protect the force, and enhance the effectiveness of firepower.[109] The degree of information a Longbow battalion has to plan an operation and keep the enemy off balance is based on the capabilities of the information systems they have available. To gain an advantage over the enemy, the current systems aboard ship, enhanced by information superiority, provides a clearer picture of enemy locations than a battalion, brigade or even a corps fire support element. A ship with its state of the art command and control systems can combine information from the corps deep operations cell along with national intelligence to provide better targeting intelligence to either suppress or bypass known ADA radars. Indirectness as used in scenario two entails movement both along the line of least resistance and/or the line of least expectation while avoiding the enemy's strength. The greatest concern when

executing the indirect approach is knowing where the enemy has concentrated his combat power so it can be bypassed. A ship, as compared to a corps deep planning cell, provides the fusion of all-source intelligence with the fluid integration of sensors that allows a greater number of tasks to be accomplished faster. Combining the effects of information along with the known doctrinal ability of the North Koreans to mass their ADA systems along the border, allows the Longbow battalion to maneuver indirectly (where the enemy is not) by using the mistakes into which the enemy can be lured.

In order to protect the force, the relationship between maneuver and terrain is a permanent factor so much so that one cannot conceive of a North Korean force operating except in a definite space. This definite space is where North Korean ADA units would emplace their systems to protect their forces, and it is also where aviation planners would attempt to plan air routes to maneuver deep and destroy 2d echelon forces. Clausewitz stated in the book On War that terrain is decisive in the highest degree, for it effects the operations of all forces, and at times entirely alters them. This statement holds true in the case of scenario one. Using the direct approach implies some preponderant level of combat power in which the combat unit (in the case of scenario one, the Longbow battalion and a corps artillery brigade) must be strong enough to shatter the enemy.[110] However, the terrain entirely altered the use of the direct approach at the point of penetration in two ways: it provided outstanding cover to protect enemy ADA units from suppression by the corps artillery brigade, and concealment from the Longbow battalion along designated routes. The result was a loss of two AH-64Ds from the 37mm SPAAGs occupying key terrain throughout the sector.

In order for a Longbow battalion to penetrate an enemy force successfully and maneuver to an objective requires the knowledge of the enemy's air defense capabilities and locations. Using the direct approach (scenario one) requires the Longbow battalion to penetrate and maneuver through the defending corps. The typical corps consists of four or five divisions and the normal supporting elements to include a surface to air missile brigade. Facing the penetration are two or three defending regiments of the first echelon division. Each of these two regiments have their own organic ADA battery. Once through the penetration, which normally extends 10 to 30 kilometers (rear of first echelon regiments), the Longbow battalion would face second echelon divisions with the same air defense organization. Considering the mobility of the North Korean ADA systems, the fact that the vehicles are lightly armored, and the capability of EW units to pinpoint the radars, the artillery is capable of suppressing 50% of the ADA systems out to the maximum range of supporting artillery.[111] Given the fact that the AH-64D has a fire control radar which is able to detect, classify, and prioritize targets; a radar frequency interferometer which detects and identify's radar systems; an APR 39 which indicates active radar and their location relative to aircraft; a ALQ 136 radar missile jammer as well as chaff and flare's to confuse the missile, the computer simulation provides reasonable data (loss of two AH64Ds) compared to the number of ADA systems a Longbow battalion faces when using the indirect approach.

An attack launched from a ship by a Longbow battalion some fifty miles off the East coast of North Korea into an engagement area thirty miles inland presented very few problems with launch and recovery ranges, nor did it effect dwell time in the target area.

Total mission time from start to finish was 3 hours, including 45 minutes on station in and around the battle position as compared to 2 1/2 hours using the direct approach. The AH-64D Longbow has the capability to carry four auxiliary fuel tanks. The installation of one fuel tank, which increases total flight time to 3 1\2 hours, is sufficient to accomplish the mission. The drawback to installing an external fuel tank on the wing is a decrement of four hellfire missiles per aircraft. Although the Longbow battalion did not destroy the moving armor brigade in either scenario, in theory the initial battlefield calculus of 158 enemy vehicles to 228 hellfire missiles was enough to accomplish the mission.

Although simulation results conclude that the indirect approach (zero AH-64D losses) is more survivable than the direct approach (two AH-64D losses) the fact remains that there are a number of inherent risks associated with this type of maneuver. Just because the number of enemy ADA systems are significantly reduced by sneaking in the backdoor, doesn't necessarily mean that this type of maneuver is less complex. In fact flying overwater is more complex than flying over land and requires a significant amount of training. Secondly, there is a greater need to rely on surprise and deception. There is also more friction associated with the indirect approach since friction generally varies directly as the maneuver distance increase.[112] No matter what advantages one form of maneuver has over the other, the purpose of this analysis is to question the conventional mind set of always using the direct approach.

DETECTION

Helicopters fight from selected battle positions which facilitate the detection of targets and provide protection from the opposing force. While in the battle position, the

helicopter attempts to find targets by "unmasking" (i.e. rising from a concealed position to an appropriate height to observe the enemy), which in turn can compromise its location. Doctrinally, the detection of the opposing forces implies the need to accomplish the following: acquire, classify, recognize, and identify targets in all battlefield conditions.

In the Korean simulation model, natural obstacles, in the case of visibility, such as mountainous, vegetated terrain, specifically ridgelines and reverse slopes remain a limiting factor in relation to standoff distance for observation. The Longbow system with its Millimeter Wave Fire Control Radar was able to detect, classify, prioritize, and engage targets with radar frequency missiles without visually acquiring targets.[113] However, the simulation amplified the mountainous terrain causing the Longbow battalion on numerous occasions to move closer in order to observe the enemy, which in turn compromised their location and caused the loss of two aircraft in both scenarios. By employing the FCR in the wide scan, ground targeting mode, and the ability of teams to function independently over greatly dispersed areas, the commander was able to overcome this limiting factor which facilitated in the detection of 80% of the battalions targets. This tactical advantage greatly reduced target acquisition time and exploited the full potential of an accurate, true, fire and forget missile, capable of operating during periods of degraded visibility/battlefield intervisibility.[114] Thus, the Longbow Apache accomplished the doctrinal subtasks supporting the detection of an opposing force.

DESIGNATE

Fire distribution and control has at its foundation, well-established and well-trained target engagement techniques and procedures. The manifestation of these techniques and

procedures, coupled with superior technological characteristics of the Longbow attack helicopter battalion resulted in optimum kills in the engagement area with less exposure to enemy fires.[115] Essential elements of engagement area designation, such as specific task dispersion, assignment of kill zones and the designation of priority fire zones were aided by the use of the Longbow system and digital communications within the Longbow attack helicopter battalion.[116]

During the multiple runs using the simulation, the RF missile hit the assigned target 90% of the time regardless of whether the target was moving or stationary. However, there are some valuable lessons concerning target designation that should be considered. On three different occassions, stationary targets were engaged with RF missiles that were in fact smoke generators and not within the briefed target array. As demonstarted, use of the FCR and RF missiles on a smoke obscured battlefield now allows an Apache crew to engage targets without positive, visual identification. As a result, the potential for fratricide or unwanted collateral damage is greatly increased. Crews must now, more than ever before, maintain a clearer mental picture of the battlefield. Fortunately, the system also provides several outstanding capabilities that assist crews in maintaing this situational awareness (priority-fire zones, no-fire zones, GPS, etc.). As we found in subsequent events, when the above stated capabilities are fully employed the potential for engaging targets outside established priority zones can be virtually eliminated.

DESTROY

There is no doubt that the AH-64D can destroy enemy armor. However, what is the capability for one Longbow attack helicopter battalion to destroy a second echelon armor brigade in the Korean context?

If the battalion conducts the operation with nine AH-64Ds With Radar and ten AH-64Ds Without Radar, and does not suffer any losses enroute, it does not have the capability to destroy the armor brigade. The main fighting power of the armor brigade is its four tank battalions and one mechanized battalion. To effectively destroy the formation, 70% of its combat power has to be killed.[117] That equates to 110 combat vehicles.

To assess the results of the simulation, multiple runs were executed and the most losses the armor brigade ever received using both the direct approach and indirect approach was 79 combat vehicles or 50% of its combat power. The 212th Armor Brigade, fighting at 90% strength, has 158 operational combat vehicles. Using scenario one as a case study, if each of the nineteen Longbow Apache's carries twelve Hellfire missiles and 1200 rounds of 30 mm ammunition, does not suffer any losses enroute, scores 100% hits with its missiles and does not hit a single target twice, and each AH-64D With Radar saves two Hellfire missiles for egress, the battalion could destroy 210 combat vehicles or 100% of the force. Since it is impossible to acquire all of the vehicles in that type of terrain, and score 100% hits considering the probability of kill for an RF missile is .9 and .6 for a SAL missile, it is reasonable to deduce that the battalion would kill 120 combat vehicles or 75% of the force. A more realistic figure is 80 combat vehicles

destroyed or 50% of the force. This is based on a reasonable planning figure for AH-64Ds With Radar using five missiles for self-SEAD during the ingress. Three AH-64Ds With Radar in each company acting as scouts and suppressing enemy ADA and not killing combat vehicles in the engagement area. Each of the ten Apache's that are engaging combat vehicles will kill eight each for a total of 80. This figure gives the battalion a 80% probability of kill considering all of the aircraft are not armed with RF missiles and the difficulties of detecting the enemy in the rough mountainous terrain.

This does not equate to the destruction of the armor brigade. It may, however, delay the arrival of the armor brigade into the close fight and if this Longbow attack helicopter battalion or others are employed against the same target again, the armor brigade may be destroyed prior to reaching the close battle. So does our linear language and defensive ways of presenting our thinking lead to perceiving false dichotomies and irreconcilable differences or does computer simulation capture the main feature of the real world?

CONCLUSION

Sun Tzu said in his book on The Art of War that "rapidity is the essence of war. Take advantage of the enemy's unreadiness, make your way by unexpected routes and attack unguarded spots." The ability to deploy from naval vessels, ingress landfall with the purpose of destroying a priority target or group of targets and return to that vessel, adds a new dimension to Apache warfighting. This monograph took a look at old facts through new glasses, then made use of those facts in order to become more innovative and effective in the employment of a Longbow attack helicopter battalion against a second echelon armor brigade in the Korean context.

The monograph examined three separate but related areas necessary for a Longbow attack helicopter battalion to execute successfully one type of deep attack, the ambush. In each of the three areas evaluated, an attack launched from a ship by a Longbow attack helicopter battalion has strengths and weaknesses. The monograph concludes that a Longbow attack helicopter battalion can conduct successful independent deep operations using naval vessels as launch and/or pickup platforms. Although the Longbow battalion is unable to destroy the armor brigade, using naval vessels provides flexibility, survivability along ingress and egress routes, and force protection which is inherent in conserving the fighting potential of a force.

The role of Army attack helicopters flying from naval vessels offers unlimited mobility and a means by which integrated joint operations can help decide the outcome of a war. There are three classes of the big-deck amphibious assault ships that can support a Longbow attack helicopter battalion. Of the twelve ships available for use by a Longbow battalion, five are allocated for planning in a major regional contingency such as Korea. The projection of intense, precision offensive power is made possible by the fact that Pacific Fleet has seven battle groups as well as amphibious ready groups postured to react to any scenario.[118]

An attack launched from a ship by a Longbow battalion some fifty miles off the East coast of North Korea into an engagement area thirty miles inland presents very few sustainment problems. An amphibious assault ship provides large areas to store equipment, workshops with proper tools to conduct intermediate level maintenance, and enough fuel to support three attack helicopter battalions. The only drawback to

sustainment aboard ship is a Longbow's limited access to additional parts which is not a show stopper, and can be overcome with deliberate planning.

Command aboard ship adds a unique challenge with two commanders charged with the execution of an operation. However, a ship allows a commander and staff the ability to synchronize operations across the entire spectrum because of a ships communications capabilities and its ability to link directly into national intelligence. The degree of information superiority the ship offers allows all commanders from battalion to corps the ability to exploit this capability and not only achieve a tactical advantage, but an operational advantage.

The last area evaluated and an important capability a ship offers is force protection. Longbow battalion's are not protected from rear area threats in the Korean context. The rear area aboard ship is continually moving which helps commanders protect their forces from observation, detection, and destruction. Using ships as a force protection platform not only decreases a Longbow battalion's vulnerability, it is a prerequisite to ensure the battalion can maintain their freedom of action.

In examining the ability of a Longbow battalion to penetrate the coast line and maneuver through the North Korean ADA to reach a battle position, the monograph concludes that using the indirect approach (the ability to use unexpected or advantageous air routes) provides increased survivability to the Longbow battalion which aides in the battalion's ability to arrive with sufficient combat power at the battle position to defeat a second echelon armor brigade.

The difference in the number of Longbow Apaches lost during a penetration is largely a result of the variation between the number of air defense systems. Although the

monograph did not examine losses during egress, return to and reentry through the FLOT/coastline differ chiefly in the selection and use of different air routes and the use of onboard ASE. In both scenario's the Longbow battalion used different egress routes, and results as far as aircraft losses were similar to ingress. In scenario one (direct approach) the battalion lost one aircraft compared to zero losses in scenario two (indirect approach). During mulitple replications, the Longbow battalion once again faced stiff opposition from AAA specifically the S60s and 37mm SPAAGs occupying key terrain. Given the fact the Longbow battalion in scenario one had to egress through 1st and 2d echelon divisions, the result once again was the variation between the number of air defense systems.

A commander maneuvers forces in order to keep the enemy off balance, protect the force, and enhance the effectiveness of firepower.[119] A ship with its state of the art command and control systems can combine information from the corps deep operations cell along with national intelligence to provide better targeting intelligence to either suppress or bypass known ADA radars. Combining the effects of information along with the known doctrinal ability of the North Koreans to mass their ADA systems along the border, allows the Longbow battalion to maneuver indirectly (where the enemy is not) by using the mistakes into which the enemy can be lured.

In examining the ability of a Longbow battalion to detect, designate, and destroy a North Korean second echelon armor brigade, the monograph concludes that the Longbow battalion has the capability to defeat an armor brigade, but not destroy it. Results from the simulation indicate a slight difference in the number of combat vehicles destroyed (direct approach 79 combat vehicles vs indirect approach 68 combat vehicles). However, the

friendly force delta is two additional Apaches destroyed in the direct approach, at 22 million dollars per aircraft, not including the four pilots.

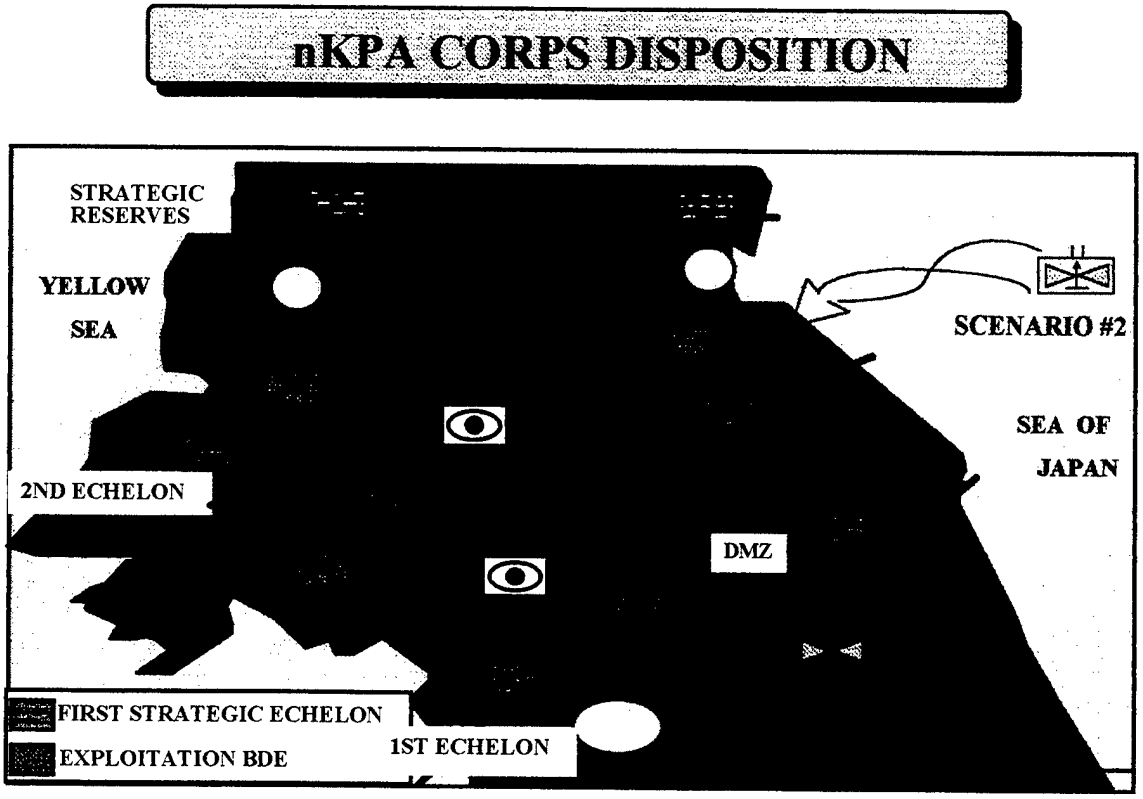
The technical capability the Longbow system offers, greatly increases the ability to detect and designate a target. The FCR, RFI, and data modem greatly reduces target acquisition time, increases fire distribution and control, and provides a commander a means to see the battlefield. However, "anyone glancing at the range of glossy publications dealing with the Longbow Apache and its organization should be forgiven for thinking that technology is the overwhelming dominant factor in war, and the sophistication of that technology must, of itself, confer a decisive advantage."[120]

The conclusion of this monograph is that a Longbow battalion can defeat a second echelon armor brigade in the Korean context using both the direct and indirect approach. However, using the indirect approach is more survivable during ingress and egress and significantly increases force protection from rear area threats. Doctrine indicates that deep attack helicopter operations are high risk or high payoff operations. However, to gain an advantage over the enemy, the current systems aboard ship, enhanced by information superiority, provides a clearer picture of enemy locations than a battalion, brigade or even a corps fire support element. Indirectness as used in scenario two entails movement both along the least resistance and/or the line of least expectation while avoiding the enemy's strength. Using the direct approach (scenario one) requires the Longbow battalion to penetrate and maneuver through the defending corps. The result is a loss of two AH-64Ds going in.

In the course of a war we have learned that man is - supreme, that it is the soldier who fights who wins battles, and that fighting means using a weapon, and that it is the

heart of man which controls this use.[121] In an effort to rethink how a Longbow attack helicopter battalion fights, doctrine reflects a shift to stronger joint operations and incorporates the new tenet versatility. Tailoring forces to operate from a variety of locations and platforms enables commanders to be more innovative and effective in considering the employment of a Longbow battalion. Each individual has his own opinion about using naval vessels as a force projection platform in order to conduct deep operations by a Longbow battalion. This monograph has attempted to quantify some of the arguments by analyzing the indirect approach with the direct approach and comparing the weapon systems employed on both sides and their capabilities.

Appendix 1: nKPA CORPS DISPOSITION.



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