THE ARMY IN THE INFORMATION AGE

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March 31, 1995

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PREFACE

Two earlier monographs in this series by General Gordon R. Sullivan and Colonel James M. Dubik, *Land Warfare in the 21st Century* and *War in the Information Age*, provided a general concept of what land warfare might portend in the post-Cold War and post-Information Age environment. This monograph, by General Sullivan and Lieutenant Colonel Anthony M. Coroalles, brings into focus several areas where the future will differ most from the past. They provide insights into three critical areas: the operational environment; the emergence of *simultaneity* as a unifying concept in Information Age warfare; and, changes that must take place in the planning environment.

When history is at a watershed, people, institutions, and nations have three choices. One choice is to live in the past; relishing triumphs, elaborating on myths, and eventually becoming a part of the past. The second choice is to fight change. Indeed, all change is not for the better. In times of uncertainty, like those the Army faces today, individuals, institutions, and nations are susceptible to what can be facile, transitory, and faddish. The Army would do well to recall the "pentomic divisions" plan of 1956. The third alternative is for individuals, institutions and nations to embrace the future with all of its uncertainties. It is better to transform rather than to be transformed by the future.

Uncertainty will be the norm as the Army moves into the 21st century. During the Cold War, the Army was ready to fight a particular kind of conflict. Today, when conditions are less certain and the threats more ambiguous, unpredictable, and in a sense more likely to be translated into acts of force to achieve political, economic, or terroristic objectives, the Army must be structured, trained, equipped, and prepared for maximum flexibility. The authors suggest that the challenge today is to determine what array of capabilities may be needed to perform a broader range of requirements and to decide how much of each capability Force XXI will need.

The Army has one tremendous resource as it faces the 21st century: soldiers that can think. They constitute more than a half million smart weapons in the Army inventory. Each one can make decisions under adverse conditions, track on multiple

targets, fire and forget, and each one possesses a virtually unlimited reloading capability. Because each one also can make moral choices, they are individually more precious than any number of Comanche helicopters, multiple launch rocket systems, or counter-battery radars. That is why, as we address the challenges of the present while articulating a vision for the 21st century, we must be very careful to consult history, the

only reliable guide we have for addressing the future for the wisdom it offers.

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BIOGRAPHICAL SKETCH OF THE AUTHOR

GENERAL GORDON R. SULLIVAN, Chief of Staff, United States Army, was commissioned a second lieutenant of Armor and awarded a Bachelor of Arts degree in history from Norwich University in 1959. He holds a Master of Arts degree in political science from the University of New Hampshire. His military schooling includes the Armor School, the Command and General Staff College, and the Army War College. He has served in a variety of command and staff positions including four years in joint and allied assignments. His overseas assignments include four tours in Europe, two in Vietnam and one in Korea. General Sullivan also served in assignments on the Army Staff in Washington, DC, including a tour as the Deputy Chief of Staff for Operations and Plans and as the Vice Chief of Staff of the Army. General Sullivan has commanded at platoon through division level. In United States Army, Europe he commanded the 4th Battalion, 73d Armor and the 1st Brigade, 3d Armored Division, followed by an assignment as 3d Armored Division's Chief of Staff and the VII Corps Operations Officer (G-3). Subsequently, he served as the Assistant Commandant of the Armor School at Fort Knox, Kentucky, on the NATO staff as the Deputy Chief of Staff for Support of Central Army Group in Germany, and as the Deputy Commandant of the Command and General Staff College at Fort Leavenworth, Kansas. He also served as Commanding General of the 1st Infantry Division at Fort Riley, Kansas. In June 1991, General Sullivan became Chief of Staff of the United States Army. He also serves as a member of the Joint Chiefs of Staff.

LIEUTENANT COLONEL ANTHONY M. COROALLES currently serves on the personal staff of the Army Chief of Staff. A former tactics instructor at the Infantry School, he earned a Bachelor of Science degree in systems management from the University of Southern California. He also holds a Master of Military Arts and Science degree in theater operations from the School of Advanced Military Studies and has written extensively in military journals. Lieutenant Colonel Coroalles' operational assignments have included service with the 82d Airborne Division, the 2d Ranger Battalion, the 4th Mechanized Division, the 75th Ranger Regiment, and the 25th Infantry Division. Before assuming his current position, he commanded the 6th Ranger Training Battalion.

THE ARMY IN THE INFORMATION AGE

May you live in interesting times.

Old Chinese Curse

Introduction.

Times of change, times of turbulence, and times of uncertainty are inherently "interesting" periods. The element that makes them so is unpredictability. Unpredictability also compels many people, including military professionals, to fear and to want to avoid such times. Certainty, stability, and calm are conditions that we find much easier to deal with in our daily lives. Given a choice, these are also the conditions that most nations and institutions would prefer as characteristic of their strategic environment. Yet neither the Army nor the nation seem to have a choice in the rapid pace of change that is swirling around us as the 20th century draws to a close. Indeed we live in interesting times.

Two powerful conditions define the environment in which the United States Army operates today: the collapse of the Cold War strategic environment and the dawning of what futurists Alvin and Heidi Toffler have described as the "Information Age."[1] In November 1989 the Berlin Wall came down, and with it tumbled the central strategic focus of the United States. From the end of the Second World War until the collapse of communism in Central and Eastern Europe and in the Soviet Union, our world view had been filtered through the lens of the Cold War confrontation between the United States and the Soviet Union; a stable and certain strategic focus. From 1948, when American and Allied forces stood firm during the Soviet blockade of Berlin, and simultaneously showed their determination over Greece, the United States and the Soviet Union were locked in a worldwide, political, economic, military, and ideological struggle; a struggle we correctly perceived as a life-or-death contest between diametrically opposed socio-political, economic, and ideological systems. The U.S. Army went to war in Korea in 1950 and American troops faced off with Soviet and East German soldiers at Checkpoint Charlie during the Berlin crisis in the summer of 1961. The armed forces of this nation stood ready for what might have been the final conflagration as the John F. Kennedy administration stared down

Nikita Khrushchev and Fidel Castro during the Cuban Missile Crisis of October 1962. The Army, Air Force, Navy and Marines fought a long and bitter war against communist insurgents and North Vietnamese aggression in Indochina in the 1960s and into the 1970s.[2] In the 1980s, Washington supported resistance forces in Nicaragua and Afghanistan while standing by our traditional allies in NATO and our friends in the Middle East. All of this was done under the rubric of containment with one goal in mind: to stop the spread of Soviet communism. The Cold War was America's third most costly war; 100,000 Americans gave their lives in this effort.

Ultimately, we prevailed. Not only was Soviet communism contained, but Germany and the countries of Eastern and Central Europe were freed from the yoke of communism. Today freedom is growing in these countries and, however delicately and precariously, growing in a democratic Russia.

Throughout this 40-year conflict, our Army trained and prepared for global war against the Soviet Union. Army doctrine, organizations, and equipment reflected this reality. Physically and psychologically the Army was oriented to our biggest threat–a Soviet and Warsaw Pact attack into Western Europe. By November of 1989, the Army had 28 Divisions, 18 in the Active Component and 10 in the Reserves. Of these, 24 were committed, in one way or another, to fighting a war in Europe. The others were apportioned to the fight in other theaters against the Soviets or their surrogates and allies. Thus in November of 1989, after years of preparation for a war that never happened–precisely because we were prepared for it–we found ourselves the victors in Europe and the heirs to a new strategic environment which we are just now beginning to understand.

Today, as we articulate a vision for the Army of the 21st century, Force XXI, rapid technological developments in information management and processing are ushering in what many believe to be the beginning of a post-industrial age; the Information Age. The microprocessor is revolutionizing the way that we live our lives as individuals, the way that society functions, and the way that we are likely to fight our future wars. Just as coal and steam, and petroleum and electricity made possible the mass production of goods and the emergence of industrial society by supplementing muscle power with machine power, the microprocessor is revolutionizing industrial society

today by supplementing brain power with the near instantaneous power of electronic computation. The results are already apparent. Electronic banking, barcode scanning, personal organizers, cellular car phones, telephones and modems on airline seats, electronic town hall meetings, and teleconferencing are among the developments that mark new ways in which people work, govern, transact business, and teach. These powerful developments are leading society toward an uncertain but interesting future; a future which it is just beginning to explore. These same forces acting on society are acting on our Army as well.

As exciting as all this may be, interesting times are difficult times precisely because, unlike more stable periods, the very uncertainty and turbulence that makes these periods interesting also makes planning for the future very difficult. Assumptions are less secure, objectives less well defined, and the future utility of current means decidedly less certain. By themselves, either the collapse of the Cold War strategic paradigm, or the coming of the Information Age would have presented the Army with a formidable task. As we contemplate not only new missions but also new means, these events present us with both an unprecedented challenge and an unparalleled opportunity.

The two previous monographs in this series, *War in the Information Age* and *Land Warfare in the 21st Century*, aimed at identifying in general terms what future war and land combat in this new environment is likely to portend. We are continuing to gain insights into the conduct of operations in this new environment. As we have conducted additional military operations, continued to think about the challenges facing us, and engaged in experimentation to test our ideas, several areas where we believe the future will differ most from the past have come into focus. This monograph will provide insights into three critical areas: the operational environment; the emergence of *simultaneity* as the unifying concept in Information Age warfare; and, changes in the planning environment. The intent of this discussion is to further the dialogue necessary for moving our profession into the 21st century.

The Operational Environment.

Five trends will define the operational environment in

Information Age warfare. These are:

- Greater lethality and dispersion.

- Increased volume and precision of fire.

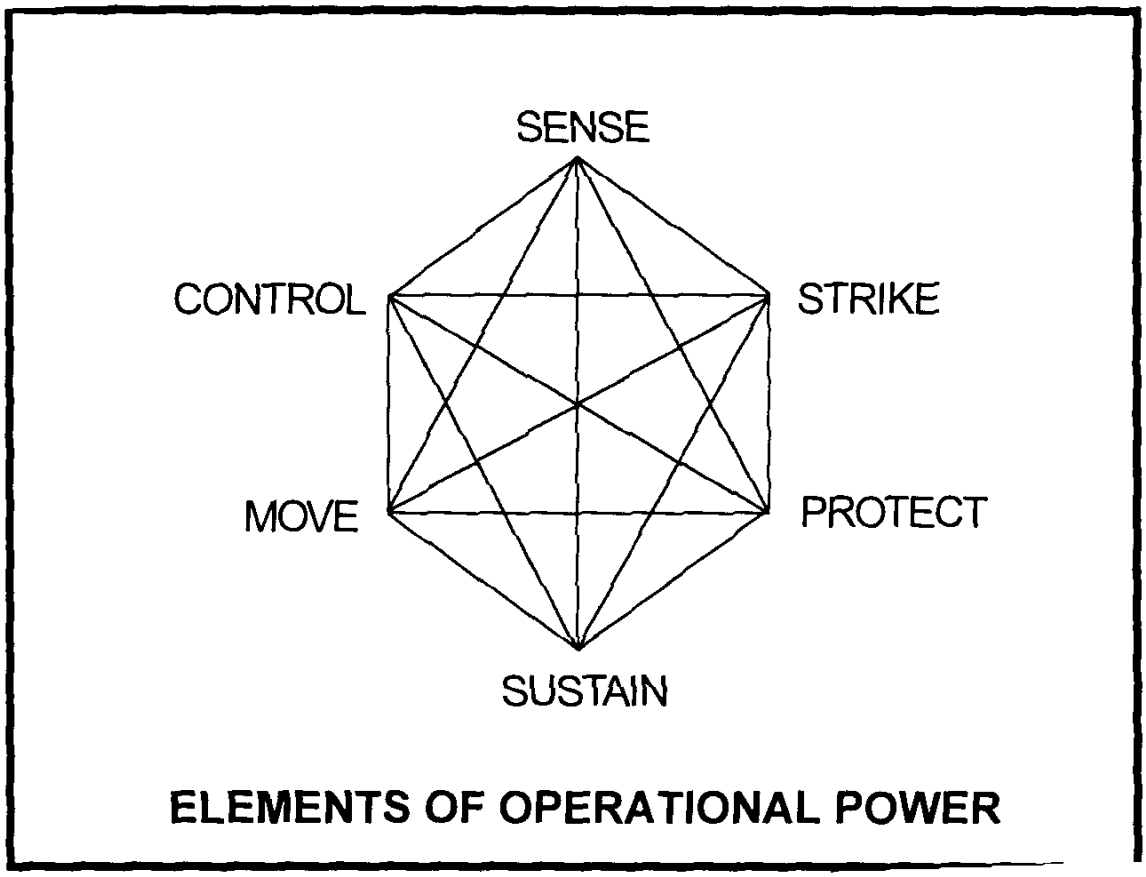
- Better integrative technology leading to increased efficiency and effectiveness.

- Increasing ability of smaller units to create decisive results.

- Greater invisibility and increased detectability.[3]

As these trends take hold, future operations will assume a much different character than those of the past. To fully appreciate the significance of this change, one must understand the relationships underlying these trends as well as the fundamental building blocks of operational power in this new environment.

Operational forces generate their power from the interaction of six elements. In the environment in which Force XXI will operate, power will derive from the ability of a force to: sense the enemy, itself and its environment; strike an opponent decisively; protect itself from the attacks of the opponent; move freely in the area of operations; exercise control over sub-elements; and sustain itself.[4] Each of these elements interacts in dynamic fashion with the other elements to create the total potential power of the force. For example, consider what is principally a strike function: operational deep fires. To be effective, deep fires must be accurate. Accuracy depends on the ability to sense the target and exercise control over the timing of the fires. Also, the effectiveness of these fires will depend on the ability to move the strike means into position, protect them both while en route and when in place, and to sustain the strike means with ammunition and other supplies. Thus the effectiveness of operational fires is a function not only of the missile or the bomb itself, but also of the operational commander's ability to sense, control, move, protect, and sustain.



ELEMENTS OF OPERATIONAL POWER

Maneuver is also a function of the same elements. Success depends on the commander's ability to achieve effective situational awareness; an accurate sensing of both enemy and friendly forces in the area of operations. This sensing will lead to an identification of enemy weakness in relation to friendly strength, and the identification of areas from which positional advantage can be attained. Controlled, protected, and sustainable movement to these areas will then allow the commander to move the enemy out of position or provide the maneuver forces with a more favorable position from which to further strike the enemy. As with operational fires, the success of operational maneuver is a function of the combined effect of the same fundamental elements.

These fundamental elements are the first order forces at

work behind the five trends that are defining the operational environment. These trends describe what is happening as a result of the increasing strength of the individual elements of operational power. For example, the trend towards greater lethality and dispersion results from the increased power of the sensing, striking, and controlling functions. Similarly, the trend toward greater integrative capacity issues from vast improvements in our ability to sense enemy forces and exercise control over our operations. These elements are the dimensions of the Information Age battlefield, blending traditional battlefield functions and systems in a way that enables commanders to better understand the complex dynamics required to achieve total integration in space, time, and effects.

Understanding this interaction helps us to extend our discussion to the theater level. Called on to compel, deter, reassure, or support, at the theater level specific mission, environmental, and situational factors, as well as specific enemy forces, enter our calculations. At the theater level, we can balance requirements with the capabilities required to achieve success–decisive victory. The elements of operational power are a useful framework within which to balance our ends with our means under these specific conditions.

The nature of the operation which we are undertaking will exert the greatest influence on the capabilities that we bring to bear in the theater. Our aim–whether it is to compel a foe to do our will, deter that foe from taking certain actions, reassure an ally, or conduct support operations–will determine the character of the operation. Once there is a clear understanding of the mission and the environment, the elements of operational power can guide our thinking through the development of a balanced theater structure.

As an example consider planning an operation similar to the one the Army undertook in Rwanda in the summer of 1994. The first task would be to determine the nature of the operation. As in Rwanda, the operation in this instance would be a humanitarian support effort. The specifics of the environment might vary, but in our planning the following would be considered: the magnitude of the effort, size of the geographic area, available infrastructure, climate and weather, and many other factors. Based on the operational functions, this assessment would lead to

a determination of the joint capabilities required to execute the operation.

Control: The control capability could take the form of a Joint Task Force (JTF) formed around a division, corps, or unified command headquarters with the appropriate means required to exert control over the forces deployed throughout the area of operations. Our analysis of control would also extend to determining the capabilities required to exert an appropriate degree of control over the population and resources in the area.

Sense: Next, the planner could consider the sensing capabilities that might be required. This could take the form of Special Forces survey teams, aerial reconnaissance, or any of a number of means designed to give the commander the capability to sense both the environment and the progress of the relief effort.

Sustain: A relief operation such as the one we are outlining would hinge on sustainment. As an element of operational power, the sustainment function must be considered as it relates to our forces. We would have to analyze the requirements and deploy the capabilities necessary to meet our needs. Moreover, in this operation sustainment considerations must also be considered relative to what additional capabilities might be required to execute the relief effort. This study would lead to a determination of the capabilities required to store, transport, and distribute the total required supplies as well as any requirements for improvements to the existing infrastructure.

Move: The move function is closely linked to the sustainment function in this operation. The planner would consider the capabilities required to move relief supplies and equipment into the area as well as within the area. Additionally, requirements to move the forces executing the relief effort, as well as requests from Non-Governmental Organizations (NGO), like the International Red Cross, would have to be integrated and balanced.

Protect: In relief operations like the one under consideration, protection of the force seldom involves the traditional measures needed to ward off the destructive effects of an opposing enemy force. Rather, the planner has to consider a broader and less easily defined combination of possible threats

including disease, armed bands, and terrorists. If the relief efforts are undertaken in an area torn by civil or clan warfare, planners will need to consider the danger of attack by one or more factions engaged in conflict with each other.

Strike: Under the conditions laid out above, the strike function would be viewed in two distinct ways. First, it would be considered in terms of the degree of coercive capability necessary to support the execution of the mission. In this light, it would entail an analysis of the capabilities required to guard against theft, to establish order, to police the area, and perhaps to neutralize armed bands. Viewed in another, and perhaps more important way, the strike function would be defined by our ability to mass effects (relief) at the critical times and places we sense. Decisive victory would be defined by our ability to coordinate "strikes" to stop the dying and stabilize the situation for local government and NGOs.

The above discussion, although incomplete in many details, illustrates a way of thinking about future operations. Tailoring of capabilities to specific theater and mission requirements will be the norm in war and Military Operations Other Than War. Structuring our thinking in terms of the elements of operational power will facilitate this process. We have to think not in terms of how many brigades or divisions are needed, but in terms of what we need in the theater to sense, strike, protect, and so on. Additionally, thinking in this way allows us to consider more precisely the functional relationships and their effect on power.

Thinking in these terms is particularly useful against a foe with multidimensional capabilities. Combat power is a function of the interaction of the six elements across the Joint Force. To succeed in multidimensional warfare, we must exert relative dominance over our opponent across functions and mediums in the theater of war. This dominance is the result of the total power generated by the entire set of friendly capabilities in relation to that which an enemy can bring to bear against us.

Spatial-Temporal Dimension in Future Warfare.

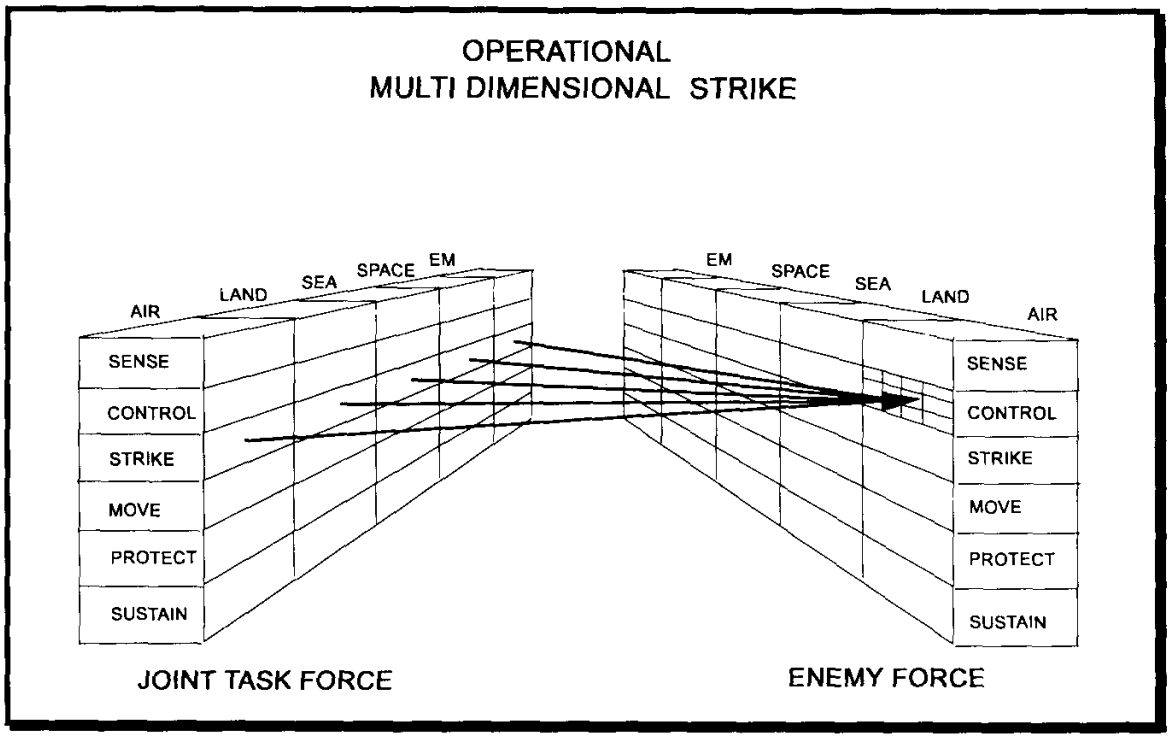
The goal is to be able to wield military power across space and through time with heretofore unimaginable precision and accuracy. We aim at the integration of the entire force's

capabilities in a way resembling the effects of a single weapon. That is, we are striving for an unprecedented ability to synchronize multiple capabilities, from multiple services in time, space, and direction. If we can attain this ideal, the Army will have achieved the capability to conduct operations in a qualitatively different way. Commanders will be able to link joint sensors, with joint strike and protection means, into a protected and sustainable seamless entity whose elements are able to interact with each other effortlessly to deliver devastatingly accurate effects. This is our vision of the joint context in which Force XXI will operate.

The model shown below depicts this ideal. It illustrates the combined strike means of the Joint Force being employed in a synchronized and precise way against a specific enemy capability; in this case, a critical control node in the enemy's air arm. The same idea could be applied to the employment of sensing means, either in the broad band across the entire enemy force, or in a narrow band aimed precisely at a particular capability. The value of this kind of approach should be obvious; precision of this nature will enable us to destroy the coherence of the enemy force by taking away the lynch pins that hold it together.

In the macro sense, the elements of operational power also provide the means to conduct a capabilities-based tradeoff analysis. One can ask questions such as, "What is the optimum relationship in a theater force structure between strike and

sensing means?" Or, "What is the best mix of theater mobility assets and protection means?" As part of the first question, it is important to remember that the greater our capability to sense, the more effectively the enemy can be struck. But, at some point deploying greater sensing capabilities adds little capability at the margin. As a part of the latter question, we need to understand that every theater will be different in terms of mobility requirements and that every threat will present unique challenges in terms of our ability to provide protection for the force. Additionally, one must recognize the temporal variable. The relative importance of each function will vary over time as capabilities are sequenced into the theater.



Simultaneity.

Since the Civil War, military strategists have understood

that strategic decision in a theater of war comes as the result of success in a series of linked operations. These operations, each sequential in nature, are combined in effect to destroy the enemy's capacity or will to resist. The Civil War, both World Wars, and the Korean War offer examples of this method. But this approach to securing strategic decision has not always been the norm. Throughout much of history strategic decision could be achieved by attaining success in one great climactic battle.

As war became the endeavor of the industrialized nation-state, the size of armies grew and so did the frontages over which their operations were conducted. These frontages were wide, but very narrow in the depth that could be influenced by the weapons of each opponent. The occasional cavalry raid or partisan action notwithstanding, throughout the entire 19th century the "reach" of opposing forces was limited to the range of their largest weapon–the cannon. Armies could sense and strike each other only as far as they could see and bring artillery fire to bear. Because reserves could operate just beyond the range of reliable detection and out of the range of artillery fire, reserve forces could not be attacked and fixed in position. The result was that armies had near-total freedom of movement in their rear areas. This circumstance, exploited by the rapid lateral movement made possible by railroads, meant that a breakthrough could be countered more rapidly than it could be exploited.[5] Thus, throughout World War I operation after operation came to a halt after gaining only a few kilometers.[6]

Beginning in World War II, the airplane extended the range of artillery to operational and strategic depths. For the first time in warfare, freedom of movement behind the front was seriously hampered. Bridges could be bombed, railroad yards destroyed, and operational reserves delayed or disrupted. Aerial interdiction brought legitimacy to war in the third dimension. Although the means employed were undeveloped and unbalanced, the concept of attacking the enemy throughout the breadth and depth of the operational area was in place by 1945.[7]

During the Cold War the concept of simultaneous attack throughout the entire breadth and depth of the theater was developed and extended. This effort matured in 1982 with the development of AirLand Battle doctrine by the U.S. Army. The initial AirLand Battle doctrine and its subsequent refinement in

1986, along with the complementary NATO concept of Follow-On Forces Attack (FOFA), drove operational requirements to extend the battlefield in terms of depth and time–spatially and temporally. But having the ability to strike deep was not enough. What has been needed, and what can now be achieved, is a qualitatively different way of fighting–the ability not only to strike the enemy deep, but to see the enemy deep in real time. With this capability, commanders can now blend previously separate and discrete operations into a single and seamless whole.

This was the genesis of the idea which is now developing into its full promise: Theater-Strategic Operations. This involves the design and execution of a theater-wide effort to bring strategic decision in a single operation by inflicting simultaneous tactical, operational, and strategic paralysis on an enemy in order to bring about rapid and total collapse of resistance.

As became evident during Operation Urgent Fury in Panama in 1989, overwhelming the enemy simultaneously at the operational and tactical levels neutralizes his ability to react. Strategic collapse quickly follows. Simultaneity, applied across the Joint force is the ultimate force multiplier. Sequential operations simply cannot achieve the synergistic impact that simultaneity offers. The simultaneous use of force enables Joint forces to achieve their objectives quickly, establishing control and imposing their will on any given situation by controlling the operational tempo to bring about order in a chaotic environment. All of this can be achieved with minimum loss of life on either side and minimum destruction of resources and infrastructure.

Simultaneity, the simultaneous employment of overwhelming combat power throughout the breadth and depth of the operational area to paralyze the enemy, is the defining characteristic of war and Military Operations Other Than War in the Information Age. Operation Just Cause and the maneuver phase of Operation Desert Storm were both examples of a Theater-Strategic Operation. Had the negotiations failed to bring about a peaceful transition of power in Haiti, that kind of operation would have taken place there as well.

In these operations, we received a glimpse of the leveraging

effect of simultaneous action. Such leverage is the result of the application of simultaneity in three different dimensions: in time, over time, and throughout the levels of war. Simultaneity in time refers to the conduct of multiple actions at the same time. Such action has the effect of overwhelming an opponent's capacity for effective action by simultaneously presenting him with multiple threats. It directly strikes at his freedom of action by attacking and immobilizing multiple parts at the same time. This is analogous to a police technique for subduing a suspect. Three officers simultaneously rush the offending party, one grabbing the legs while the other two each grab an arm. This quickly overwhelms the target, causing minimum damage to all concerned. Compare this with a sequential use of force where one police officer at a time goes after the same suspect. In this case the suspect would eventually be subdued, but in the process both he and each policeman would be the worse for the exchange.

Simultaneity over time is linked to both the nature of surprise and the decision cycle of the opponent. Surprise can be looked at as being either cognitive or physical. Cognitive surprise occurs when the target of the surprise is totally unaware of the action that befalls him. That is, the enemy has no idea that something will happen until it does. Physical surprise is different. The target may know that something is about to happen, but he is physically unable to do anything about it. The effect of both types of surprise is the same. The target becomes incapable of effective response. If the target cannot recover the ability to take effective action, the effect of the initial surprise will be decisive.

Considering the decision cycle of the target–its ability to cycle among observation, orientation, decision, and action–it is obvious that when the attacking force achieves surprise, the opponent is faced with a situation that he has either not seen coming, or is not oriented to block. However, at the moment of attack the target begins a new cycle. If opposing forces can be confronted with another action before they can act to cope with the first, then the power of simultaneity over time becomes evident.

To the target, the new action is for all practical purposes simultaneous to the initial action. This type of action conducted on a continuous basis magnifies the effect of the initial

surprise. It precludes the enemy from regaining its balance by presenting ememy forces with a continuous array of actions, each of which precludes them from taking effective action against a previous threat. If we strike an opponent a blow to the head to stun and in rapid succession strike the chest, stomach, and groin, the attack takes on an indiscernible unity in the eyes of our opponent.

Simultaneity throughout the levels of war aims at the simultaneous paralysis of action at the strategic, operational, and tactical levels. Historically, we have thought in terms of tactical success leading to operational success and operational success leading to strategic success. Paradoxically perhaps, we have also understood that the strategic level of war sets the conditions for the operational level, which in turn sets the conditions for the tactical. For example, if through a successful operational concentration of force we can achieve a tactical advantage of 20:1 over a foe at the point of attack, then no degree of tactical excellence on the enemy's part is likely to overcome this disadvantage. In such a case, operational level actions will almost predetermine tactical success. Similarly, for good or ill, strategic action can have the same effect on the operational level.

Conceptually, by striking the enemy simultaneously at all levels, its ability to salvage a situation is severely hampered. The enemy is denied the flexibility to take operational action to recover from tactical failure and the ability to take strategic action to recover from operational defeat. In this manner the linkages between the three levels of war are broken, making each irrelevant to the other. The Gulf War provided a vision of the advantage to be accrued from such a decoupling. First, on the strategic level, even as American and Allied forces were building up in the Persian Gulf region, Washington isolated Baghdad diplomatically from its traditional allies and economically from its sources of external income. Then, before Iraq could recover from this strategic diplomatic and economic action, Allied forces launched the first phase of Operation Desert Storm.[8] The air operation accomplished two tasks. First, it fixed the Iraqis in Kuwait by taking away their ability to conduct operational-level movements. Second, through continued strategic attacks directed against Iraqi infrastructure, command centers, and industry, the Iraqis were kept off balance strategically–even when they began

their series of SCUD attacks in an attempt to regain the initiative. These attacks made it impossible for the Iraqi leadership to exercise positive operational direction over their forces deployed in Kuwait as well as over many elements throughout Iraq. Consequently, Iraqi forces were incapable of any coordinated response to the attacking ground forces when the final, decisive phase of the war began on February 24, 1991. Localized, uncoordinated tactical responses were the extent of Iraqi military actions after the actual shooting began. In this fashion, through a series of sequential and simultaneous multi-level actions, the Allied forces achieved the effect of simultaneity over the Iraqis at *all levels of war*.

In the future, improvements in the ability to sense, control, and strike at ever increasing ranges with ever increasing accuracy and lethality will add further impact to simultaneous action. Moreover, the power of simultaneity can be seen across a wide spectrum of conflict. In support operations, simultaneous action can bring needed assistance throughout the affected area rapidly, thereby saving lives. If the objective is compellance, the ability to disconnect the enemy's strategic, operational, and tactical efforts from each other holds the promise of quick and decisive results at lower costs. Just as the climactic battle yielded to the need to conduct sequential operations in the Industrial Age, the Information Age is providing us the technologies and weapons needed to replace sequential operations with the overwhelming simultaneous theater operation.

The Planning Environment.

For the foreseeable future the planning environment is likely to be dominated by general assumptions and unquantifiable threats; an unsettling environment for any organization. For the U.S. Army, which must prepare to advance national interests in new, different, and perhaps unforeseen ways, the prospect is truly formidable. A sports analogy, though not entirely adequate, can illustrate the problem.[9]

During the Cold War the U.S. Army was like a football team, preparing for a game which coaches, players, and fans hoped would never take place. The opponent was bigger and had a deeper bench, but the U.S Army was quicker, sufficiently powerful, and perhaps

smarter. The Army also knew many other things. It understood the rules of the game. It knew the locations of the major stadiums and the field conditions at each of these locations. It had a good idea of its opponent's plays and probable game plans. And it had analyzed the strengths and weaknesses of the opponent and had developed specific game plans to counter each strength and exploit each weakness. This knowledge allowed the U.S Army to organize itself confidently, plan for the contest, and practice specifically for the big game under whatever circumstances it might be played.

The Army was ready for the whistle to blow. It may not have known precisely when or where it would play, but coaches, players, and fans knew that the game would be football. Today the team and the coaches are unsure of whether they will be playing football, baseball, or soccer–or some combination of these or any number of other games. Furthermore, many of the potential opponents have no commitment to playing by any rules other than their own. Desert Storm, Somalia, Hurricane Andrew, Rwanda, and Haiti are each as different from the other as baseball is different from football and as legitimate sport is different from a free-for-all.

As the Army moves into the next century, uncertainty will be the norm and not the exception. Under conditions of relative certainty, such as the Cold War environment, the Army could optimize for a particular type of conflict. Under the more uncertain conditions of today, we must structure for maximum flexibility. When we knew where we were going to fight, against whom, and for approximately how long, the Army organized its forces precisely to meet those conditions. Units trained according to very precise Mission Essential Task Lists (METLs) under very precise conditions and command relationships. Today we cannot make those precise assumptions, and we must structure to meet a wider range of requirements. Structuring for this wider range is a much greater challenge than structuring for a narrower set of conditions.

The challenge today is to minimize the inherent problems that come with the requirement for greater flexibility. The days of structuring and planning solely against a known threat are not likely to return soon. Now the challenge is to determine what array of capabilities may be needed to perform a broader range of

requirements. It is equally important to determine how much of each capability Force XXI may need and how it should best organize these capabilities. For example, will the Army structure a division or brigade to be multifunctional across a broad range of mission areas on a permanent basis? Or, would it be better to structure these headquarters so that a wide array of units with specific capabilities can be integrated on a temporary and mission-specific basis?

Other equally important questions must be addressed as the Army transitions to a capabilities-based force. How many echelons of command will be needed? Today, from squad to corps we have seven echelons. At what level can the Army most effectively organize and train for functional competency? At what level should capabilities be mixed? Which capabilities should be included in the Active and Reserve Components? These are difficult questions to which there are no easy answers. But these are precisely the type of questions that have to be addressed.

Moreover, every question will have to be considered within the framework of the Joint environment. Just like the days of structuring and planning against a known threat are over, so too are the days when individual services could structure without considering the capabilities that other services bring to the fight. This is another reason why the operational power model is so useful–it helps us to think in terms of functions that need to be performed across mediums, rather than in terms of individual service capabilities.

The answers will not come overnight. The Army EXFOR (Experimental Force) at Ft. Hood, Texas and other service and Joint tests will assist us in finding the answers to many of these questions. Through a commitment to finding the best solution and an iterative process of hypothesis and experimentation, the Armed Forces will go far in minimizing the tradeoff between flexibility and efficiency that comes with designing a force capable of meeting the challenges of the 21st century.

Conclusion.

Anticipating the future is an imprecise endeavor. Nevertheless, it is imperative that we look forward, not

backward. Only by anticipating the requirements can the Army expect to position itself as a relevant force in the future. History is the only reliable source we have for analyzing how previous armies anticipated change, and the pages of history books are replete with armies that failed to do so. For the nations unfortunate enough to have relied on these armies, the cost of not being prepared was high–sometimes catastrophically so.

The reason that many armies have failed to change with the conditions is that armies are by nature conservative institutions, generally resistant to change. This institutional resistance is particularly dangerous in times of historical transformation when a paradigm shift is evident. It is precisely then that the most rapid organizational response is needed. One of the most difficult, but also most essential tasks confronting a military establishment is the acceptance and development of bold new ideas. This is particularly true in military institutions which have recently experienced significant military successes, as the U.S. Army has in the Persian Gulf and in Haiti. Ideas that have the potential to overturn long-established, bureaucratically entrenched methods of operation are not welcomed by the average man. When the paradigm shifts, most cannot grasp the full potential of new ideas. New technologies and processes can frighten those who are comfortable with the routines established to accommodate the old technologies. Furthermore, vested interests within the organization and within its bureaucracy–usually for what to them are good and logical reasons–will resist ideas that threaten the status quo. Bureaucracies flourish on procedures instituted to insure efficiency. Innovation is the enemy of efficiency because it threatens established procedures. This is a mindset that we cannot afford in Force XXI. While military professionals must hold the security of the nation as something with which they dare not gamble, they cannot afford to discourage the kind of imagination and innovation that is needed to meet the varied challenges that will arise in the 21st century.

History can be a help. Consider the struggle within the Navy for carrier aviation. Prior to its development, the existing naval paradigm held that decisive victory at sea depended upon capital ships engaging with cannon at visual range. Shortly before World War I, tests and demonstrations were conducted which

established that aircraft could be launched from vessels at sea and that these planes could drop bombs with a degree of accuracy. The use of aircraft at sea presaged an alternative approach to the conduct of naval warfare. Throughout the inter-war period, a generation of naval officers worked to perfect the ideas and concepts for carrier warfare. Theory led practice because, until the 1930s, airplanes simply did not have the power to take off from the deck of a carrier while carrying enough ordnance to seriously damage a modern battleship. Army Air Services Colonel Billy Mitchell had shown that land-based aviation could do it, but his twin-engine bombers carried 1,100 pound demolition bombs and took off from large, grass and earth fields.[10] However, technology caught up with the concept. Better communications, more powerful airplanes, and larger aircraft carriers provided the means to realize the theory.

Concurrently, through gaming conducted at the Naval War College in Newport, Rhode Island, and in exercises conducted at sea, a doctrine of naval air power gradually evolved. This was so not only in the United States but also in Japan, England, and Italy. In the United States and England this was accomplished in a period of extreme budgetary constraints and against the opposition of a significant faction in each country's naval establishment who believed that scarce resources could better be spent elsewhere. Had these defenders of the status quo won the day over the proponents of innovation and change, the subsequent war in the Pacific may have turned out very differently for the United States. That the establishment reacted in this way is even more remarkable when one considers that when the admirals and captains of 1925 were ensigns and junior lieutenants, their senior officers had been in the Navy when there was a similar paradigm shift from wooden hulls and sail to steel hulls and steam power.

The Second World War, Pearl Harbor and Midway in particular, convincingly proved the validity of carrier power and changed entrenched notions about naval warfare. By the end of the war the aircraft carrier had replaced the battleship as the Navy's prime capital ship and another paradigm shift had taken place. The historical method of waging naval warfare, gunnery duels at visual range, gave way to engagements well over the horizon. In essence, naval commanders came to understand that the aircraft was more than just a long-range cannon, and that against an

integrated fleet no battleship stood a chance. Once this understanding took hold, the carrier became the dominant naval platform around which organizations and tactics were designed. A new paradigm was born.

Clearly there are forces at work today which will have consequences that military professionals need to anticipate. The purpose of this monograph has been to identify these forces and to suggest some of their consequences and how these might affect the operational environment, the structure of the Army, and the way we plan and conduct operations. While we live in a rapidly changing world, institutional change moves slowly. Just as the fully developed carrier concept matured over 40 years, so too will our force of the future grow, evolve and change. For two decades the Army has pioneered information-based systems. Now it is evident that information and knowledge based systems, organizations, and operations will change fundamentally the way the Army fights. While the precise manner in which this will happen may not be entirely clear, the one thing that is sure is that Information Age technologies will have a profound effect on land warfare in the 21st century.

In 1925, only the most convinced "true believers" in ship-borne air power could have imagined what impact their ideas would eventually have. They did not know precisely what equipment they would need or how their ideas would alter institutional organizations or the tactics of naval warfare. Yet they persevered despite tight budgets and internal opposition. Had they not done so it would have been clear, by the summer of 1942, with a fleet of Japanese aircraft carriers bearing down on Midway, just how much risk an institution and a nation can incur by discouraging and fighting change.

Today, America's Army is in a similar position. The world has changed and there is great risk in standing still. Information Age technology has advanced to the point that some can begin to see the potential that new tools will have in the way military operations are conducted. Through the lenses of experiments, such as the Synthetic Theater of War (STOW) and Advanced Warfare Experiments (AWEs), glimpses of what could be are apparent even if no one is yet able to specify exactly where all this will lead. Like those brave pioneers who developed naval aviation, we will test the validity of our concept and

continuously refine the application despite the opposition of the keepers of the intellectual status quo. We have a vision and a plan to grow into that vision. Keeping in mind that it took the Navy a generation until the idea of carrier-borne air power became fact, we should not expect full, fast, and precise solutions to all the challenges facing us today. But be very sure that America's Army will meet these challenges.

ENDNOTES.

1. See Alvin and Heidi Toffler, *War and Anti-War: Survival at the Dawn of the 21st Century*, Boston: Little Brown and Company, 1993.

2. A great degree of controversy still exists as to the strategy and conduct of the Vietnam War. Harry G. Summers, Jr., in *On Strategy: A Critical Analysis of the Vietnam War*, Novato: Presidio Press, 1982, presents one point of view. Andrew F. Krepinevich, Jr., presents an opposing argument in *The Army in Vietnam*, Baltimore: The Johns Hopkins University Press, 1986, as does Larry E. Cable in *Unholy Grail: The U.S. and the Wars in Vietnam, 1965-1968*, London: Routledge, 1991. The air war, too, is subject to opposing points of view. Admiral U.S. Grant Sharp's *Strategy for Defeat*, San Rafael: Presidio Press, 1978, holds that political constraints prevented air power from being used to its full potential. Articulate arguments to the contrary are presented by Mark Clodfelter in *The Limits of Air Power: The American Bombing of North Vietnam*, New York: The Free Press, 1989, and by Earl H. Tilford, Jr., in *Crosswinds: The Air Force's Setup in Vietnam*, College Station: Texas A&M University Press, 1993.

3. For a fuller discussion see: General Gordon R. Sullivan and Lieutenant Colonel James M. Dubik, *Land Warfare in the 21st Century*, Carlisle Barracks, PA: Strategic Studies Institute, February 1993.

4. For the purpose of this discussion, control refers to the structure, procedures, and technology in place that facilitate the "art" of command. The entire model reflects the elements that the commander wields, in a creative and personal way, to execute a military operation.

5. John Westwood, *Railways at War*, San Diego: Howell North Books, 1980, pp. 141-144.

6. Many other factors were at work in the inability of both sides to translate tactical success into operational success. But fundamentally, the problem was one of mobility–the failure of the offense to sustain forward movement against an enemy whose movement was virtually unhampered in his rear area.

7. For a discussion on deep operations theory see Richard E. Simpkin, *Race to the Swift: Thoughts on Twenty-First Century Warfare*, London: Brassey's Defense Publishers, 1985, pp. 37-53.

8. However, our inability to destroy their SCUD missile capability allowed the Iraqis to continue to operate, in limited fashion, at the strategic and operational levels. The attacks on Israel are evidence of this capability.

9. The problem with comparing sports to war is that in war, while certain internationally agreed upon codes and standards must be adhered to, one is also not necessarily constrained by obeying an established set of rules. It is okay to seek an unfair advantage–and "stealing the enemy's playbook" is entirely legitimate.

10. See William Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power, Economic and Military*, New York: G.P. Putnam's Sons, 1925, pp. 56-76.