Creating the Combined Arms Officer Branch

A Monograph
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ABSTRACT

CREATING THE COMBINED ARMS OFFICER BRANCH by MAJ John L. Gifford, USA, 50 pages.

The US Army is looking ahead at future weapons to capitalize on the Revolution in Military Affairs. As these weapons concepts develop, the officer corps that will employ them must also evolve. The Future Combat Vehicle (FCV) is an interesting concept under development in 1999 as a replacement for the tank (Abrams), the self-propelled howitzer (Paladin), the infantry fighting vehicle (Bradley), and the current air defense vehicle (Avenger/Linebacker). If the US Army develops an FCV that is capable of direct fire, indirect fire, short range air defense (SHORAD), and troop transport, an officer corps will be required in 2025 that is more skilled than at present in integrating the effects of combined arms on the future battlefield.

This monograph asks if it is advantageous, desirable, and feasible that the Army create a "Combined Arms Officer" branch to develop multi-functional officers who are skilled in the current branches of Infantry, Armor, Field Artillery, and Air Defense. The combined arms branch would specialize in the capability to integrate, coordinate, and synchronize the effects of all combat arms in mid- to high-intensity conflict. The main purpose of the branch is to provide highly skilled officers that are widely experienced in integrating combined arms effects by their tenth year of service. An additional topic throughout the monograph is the recognition of the difficulty in implementing major changes in a large, complex organization such as the US Army.

The monograph concludes that the combined arms officer branch concept has merit, and that the Chief of Staff of the Army should appoint a task force to study the concept of a combined arms officer branch further. If after extensive study the key ideas are found to have compelling logic, then a consensus might be built to implement a combined arms officer branch. This consensus is necessary to avoid the difficulties inherent in peacetime military reform.

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Chapter 1: Introduction

In the year 2025, the United States "Army After Next" will no longer be a forward-looking concept; it will be reality. Weapon systems will have changed, threats will have evolved, yet the Army Officer Corps will look much as it did at the turn of the century. The combat arms branches will still be divided into infantry, armor, field artillery, air defense, aviation, and combat engineers. Officers will specialize in mastering the skills and tactics of their own branch for the first twenty years of their career, while coordinating the effects of the other combat arms during training exercises. This is a recipe for disaster. The Army will have to change its officer corps to reflect the new environment of 2025 if it is to be ready for full-spectrum combat.

The US Army is looking ahead at future weapons to capitalize on the Revolution in Military Affairs. As these weapons concepts develop, the officer corps that will employ them must also evolve. The Future Combat Vehicle (FCV) is an interesting concept under development in 1999 as a replacement for the tank (Abrams), the self-propelled howitzer (Paladin), the infantry fighting vehicle (Bradley), and the current air defense vehicle (Avenger/Linebacker).[1] If the US Army develops an FCV that is capable of direct fire, indirect fire, short range air defense (SHORAD), and troop transport, an officer corps will be required in 2025 that is more skilled than at present in integrating the effects of combined arms on the future battlefield.

This monograph asks if it is advantageous, desirable, and feasible that the Army create a "Combined Arms Officer" branch to develop multi-functional officers who are skilled in the current branches of Infantry, Armor, Field Artillery, and Air Defense. (Aviation and combat engineers will not be included in this proposal).[2] If an officer were

highly skilled in all of the combat arms branches, then he might obtain greater flexibility in solving military problems, as he would be able to understand the combat situation from a combined arms perspective.[3] Potentially, he could bring greater combat power to bear at the decisive point, given this flexibility and understanding. If implemented, it is possible that many aspects of the officer distribution plan would be simplified, since a greater pool of officers would be available to fill a combined arms position at any given time. Another problem, branch parochialism, might be (slowly) eliminated.[4]

A criticism of the combined arms officer branch might be that it would produce "generalists". The complexity of the future battlefield may require officers that are highly skilled and specialized in a single branch, instead of a generalist that is master of none. This monograph examines whether the potential benefits outweigh the costs of developing the Combined Arms Officer branch concurrently with the Future Combat System.

This is not the first time that this concept has been explored. Historically, the introduction of mechanized and armored forces following World War I initiated the debate over how to organize and educate the new forces. The interwar period yields applicable lessons on the difficulty of peacetime reform of military forces, and foreshadows the potential difficulties in implementing the proposal. More recently, three studies have significantly influenced how officers are developed. The Review of Education and Training for Officers (RETO) Study in 1978 was a landmark survey of how to reshape the officer corps following the post-Vietnam drawdown. The Professional Development of Officers Study (PDOS) of 1985 reexamined all aspects of officer development since RETO to recommend a course of action through 2025. Finally,

the Officer Personnel Management System (OPMS) XXI Task Force has recently implemented major changes in officer career development that will have implications for the topic at hand. The interwar period, RETO, PDOS, and OPMS XXI will all be discussed to gain perspective and context on the complexity of changing officer professional development.

The monograph takes the development of the FCV and fielding of the project by 2025 as a baseline assumption. The focus is not on the merits of the FCV concept, but instead on the determination of whether a combined arms officer would be superior to the current separate combat arms branches. The criteria for evaluation will include:

I. The proposal must enhance the Army's warfighting capability;

II. The proposal must be based upon the Army's expected missions in peace and war (full-spectrum conflict);

III. The proposal must be consistent with OPMS XXI;

IV. The proposal must be able to be implemented in a resource-constrained environment.

The remainder of this introductory chapter briefly explains the organization of the monograph, and then defines the phrase "combined arms warfare". Chapter Two provides historical background concerning reform in the Army. This includes the development of armor and mechanized artillery in the interwar period (1918-1939), and the RETO, PDOS, and OPMS XXI studies. Chapter three examines the current methods of officer branch training and education in the United States to establish a baseline understanding of how combined arms warfare is now taught. Chapter four surveys the current and planned efforts of DARPA and the U.S. Army's Directorate of Force

Development to solve the question of officer skills required for the Future Combat Vehicle. This chapter also describes the combined arms officer branch concept. In Chapter Five the monograph defines the evaluation criteria mentioned above, and applies the criteria to evaluate the proposed combined arms branch versus the current separate branch system. Finally, Chapter Six concludes the monograph by examining the potential obstacles to implementing the proposal, analyzing in depth how the new branch would fit with OPMS XXI.

Definitions

To enhance common understanding, it is critical to define important terms at the beginning of this monograph. Combined arms is defined in Field Manual (FM) 101-5-1, *Operational Terms and Graphics*, as "[t]he synchronized or simultaneous application of several arms, such as infantry, armor, artillery, engineers, air defense, and aviation, to achieve an effect on the enemy that is greater than if each arm was used against the enemy in sequence."[5] The Army's capstone doctrinal manual, FM 100-5 *Operations*, describes combined arms warfare further:

> Modern combined arms warfare puts added stress on maintaining dispersed and noncontiguous formations. Army forces overwhelm the enemy's ability to react by synchronizing indirect and direct fires from ground and air-based platforms; assaulting with armor, mechanized, air assault, and dismounted units; jamming the enemy's communications; concealing friendly operations with obscurants; and attacking from several directions at once. The goal is to confuse, demoralize, and destroy the enemy with the coordinated impact of combat power. The enemy cannot comprehend what is happening; the enemy commander cannot communicate his intent nor can he coordinate his actions. The sudden and devastating impact of combined arms paralyzes the enemy's response, leaving him ripe for defeat.[6]

Jonathan House, a military historian and author of *Toward Combined Arms Warfare: A Survey of 20th-Century Tactics, Doctrine, and Organization*, incorporates

more detail in his description of the meaning of combined arms. He discusses three elements in the definition: the combined arms concept, combined arms organization, and combined arms tactics and operations. The combined arms concept is similar to the FM 101-5-1 definition. "The combined arms concept is the basic idea that different arms and weapons systems must be used in concert to maximize the survival and combat effectiveness of each other. The strengths of one system must be used to compensate for the weaknesses of others."[7] Combined arms organization brings the different arms and weapons systems together for combat at various levels (company, battalion, brigade/regiment, etc.)[8] "Combined arms tactics and operations are the actual roles performed and techniques applied by these different arms and weapons in supporting each other once they have been organized into integrated teams."[9] For the purposes of this monograph, the focus is specifically with creating a single officer branch that is proficient at implementing the combined arms concept through tactics and operations at the division level and below. This does not imply that one branch alone will be able to fight all engagements. The combined arms branch would specialize in the capability to integrate, coordinate, and synchronize the effects of all combat arms in mid- to high-intensity conflict.

The branch shapes the skills and experiences of its officers through education, training, and assignments. Thus there are several threads that this monograph weaves. First is the challenge of imparting the skills of combined arms warfare to the officers. Second is the change required in the officer professional development and education sequence. Third is the change required to the officer personnel management system, or OPMS. Common to each of these threads is the difficulty of change in a conservative

institution such as the Army. The next chapter provides a context for each of these threads by using examples of change in the past. This guides the monograph in creating a framework for future change in the officer branch structure.

Chapter 2: Historical Background

The Army is a complex bureaucratic organization. In some ways it is similar to an ecosystem, in that a change to one subsystem can have major and unintended effects across other subsystems.[10] *When considering change, a holistic approach is required in order to minimize these unintended consequences. The Army uses a model called DTLOMS to achieve this holistic approach. The model is introduced here in the historical background chapter to provide a tool to assist the reader in conceptualizing the complexities and interdependencies inherent in a large organization.*

Explanation of DTLOMS

DTLOMS is an acronym for a model that represents the interrelated and integrated nature of the Army subsystems of Doctrine, Training, Leader Development, Organization, Materiel, and Soldier Systems. The model is useful for conceptualizing the ripple effect caused by the introduction of a new weapon system such as the FCV, and the creation of the combined arms officer branch.

If one assumes the creation and fielding of the FCV as given, then one is assuming many other aspects of force development have also occurred in parallel. Under normal conditions, the Army does not simply create a major weapon system, buy it, and then field it to the force without first initiating other changes that prepare the force to receive and fight the system. When a warfighting capability requirement is determined, and a materiel solution to the requirement will be applied (creating the FCV for instance), all the remaining elements of DTLOMS are studied to determine what other requirements the new equipment will generate. If doctrine must be modified, there will be subsequent changes to training and leader development. New organizations may need to be designed to use the new materiel in accordance with the new doctrine. These new organizations

may require additional soldiers, or soldiers with specialized training to fight with and maintain the new system. Each part of DTLOMS may have a lengthy lead-time from the identification of a requirement to implementation. For example, a new weapon system may take 15 years to go from concept to implementation. Changing an organization may be phased in over four to eight years. Doctrinal change may require two to four years, depending on the level for which it is being written. Leader development and training are driven by the other changes, and may also take several years.[11] While these concepts are developed into reality, the strategic (and tactical) environment and technology continue to change, making the goal a moving target.

Ideally, doctrine should drive procurement by identifying the military capabilities necessary for the Army to execute the National Military Strategy. However, as technology races ahead, many times doctrine is unable to keep pace. Potential capabilities evolve that meet unforeseen needs, and procurement outpaces the doctrine necessary to fight with the new equipment. Until a prototype is fielded, it is difficult to simulate and experiment with enough fidelity to develop useful tactics for employment of the system. Thus, the model allows us to understand how the system *should* work, but reality may not be an exact match.

The purpose of examining DTLOMS here is that it will assist us in evaluating the feasibility of the combined arms officer branch. The FCV is currently only in the advanced concept stage, but if it is approved for further development, then it will be critical that all of the other factors of DTLOMS are evaluated for second and third order effects. In summary, DTLOMS allows us to analyze the effects of change on the

interdependent systems of the Army. The next section illustrates that, while organizational change is necessary, it is often quite difficult.

"To Change an Army" and the difficulty of reform

In October 1973, Michael Howard addressed the Royal United Services Institute on the occasion of his receipt of the Chesney Memorial Gold Medal. His lecture, entitled "Military Science in an Age of Peace" described the difficulty of military reform and innovation in times of peace. Part of the challenge is an indifferent populace that does not expect another major war, and therefore is less disposed to support the military with various resources. A second challenge is that in peace the military cannot get accurate feedback on weapons and ideas; a war is necessary for this.[12] Thus, given these challenges, Howard declared "whatever doctrine the Armed Forces are working on now, they have got it wrong." He also said that this did not matter, but what mattered was "their capacity to get it right quickly when the moment arrives." To achieve this capacity, Howard said "the task of military science in an age of peace [is] to prevent the doctrines from being too badly wrong."[13] He stressed that militaries must be versatile, adaptable, and flexible to absorb not only technological change, but social and political change as well.[14] Absent these qualities, history shows they will be defeated.

While Howard's argument is convincing, he does not provide the answer on how to overcome the difficulty inherent in reforming an Army in a time of peace. In 1983, following a turbulent decade in the US Army, General Donn Starry wrote "To Change an Army," and offered seven requirements for effecting change. First there must be a way to identify the need for change and someone to enunciate what needs to be done. Second, those responsible for change must have the educational background to "bring a common

cultural bias to the solution of problems." Third, there must be a spokesman for change who, fourth, can build a consensus of support. Fifth, the "architects of change" must have a continuity that will bring "consistency of effort" to the process. Sixth, the change must gain high-level support. Finally, experiments must be conducted to prove the relevance of the change.[15]

This is the framework, according to Starry, that the US Army used to rebuild itself after the trauma of Vietnam. Major revisions of doctrine and organization were initiated as the Army drew down in end strength from 1973 to 1980, converted to the "All-Volunteer Army", and began the development of the doctrine of Air-Land Battle. Starry based his framework of seven requirements on the German experience during the interwar period, 1918-1939.[16] Here is where several threads of this monograph cross. The Germans were the only great power in the interwar period to develop combined arms warfare in a period of great technological change. They overcame the difficulty of military reform in peacetime to produce a superior military force at the outbreak of World War II. It is worthwhile to briefly investigate what the Germans did differently than the British and Americans, as this will provide insight on the benefits and pitfalls of creating the combined arms officer branch.

Lessons of the Interwar Period

The German Blitzkrieg warfare was the product of the framework described above by GEN Starry. First, the German General Staff was the element tasked to identify the need for change, and to recommend how to implement the change. The General Staff recognized the significant technological changes brought about by advances in mechanization, communication, and aviation.[17] They also saw the potential of armored

forces after watching the British experiments on the Salisbury Plain in 1927.[18] General Hans von Seeckt, chief of the General Staff, was primarily responsible for initiating the changes that resulted in Blitzkrieg, as the creator of Germany's interwar doctrine and organization.[19]

Again using the framework described by GEN Starry, those individuals selected to serve on the General Staff had the privilege of rigorous training and advanced civilian education, and during the interwar period the mentorship of von Seeckt. This gave them the "common cultural bias" necessary to solve the problem of rebuilding the German Army. This also brought consensus. The longevity of the "instigators of reform" allowed for consistency of effort, and high-level leaders such as Guderian and eventually Hitler himself supported the creation of the combined arms formations and training that produced Blitzkrieg.[20] The final step of successful military reform is experimentation, and the Germans conducted these in Russia and in the Spanish Civil War to prove the relevance of the changes and refine the concepts.[21]

The British had little of the framework for successful reform in place in the interwar period. While many of the doctrinal ideas on mobile warfare that the Germans developed and perfected had originated with British thinkers such as J.F.C. Fuller and B.H. Liddell Hart, the conservative British system rejected efficient reform. Fuller and Liddell Hart were fanatically dedicated to maneuver warfare, but their argumentative nature created enmity from their superiors and eventually ostracized them from any position to effect reform.[22] In general, polarization over mobile warfare instead of consensus characterized the British Army of the interwar period. At one end of the spectrum, Fuller called for drastic reform of doctrine that would place the tank at the

center of mobile warfare and relegate the infantry to a support role. Opposite Fuller were those that regarded the tank as an unreliable adjunct to the infantry, tethered to the speed of foot soldiers. External factors also slowed reform, such as the generally pacifistic attitude of the populace, the requirements of maintaining troops across the British Empire, and an environment of constrained resources.[23] Without consensus on what change to make, even the support of Churchill did not allow the British to develop and refine maneuver warfare doctrine, organizations and training prior to the start of the Second World War.

The United States abolished the World War I Tank Corps in 1920, and assigned all tanks to the infantry, stipulating that "hereafter all tank units shall form a part of the Infantry."[24] The parochialism of the Infantry, Artillery, and Cavalry branches managed throughout the early twenties to prevent the proponents of combined arms warfare from succeeding over the powerful branch chiefs. There was no "common cultural bias" among the branches analogous to that of the German General Staff. Without a proponent branch that supported the development of a mobile armored force, the concept was repeatedly discredited through the 1930's, and the United States remained wedded to a "linear tactical doctrine of fire and maneuver whose management was controlled by the infantry."[25] It was not until 1940, when GEN George C. Marshall overruled the branch chiefs, that a separate armored force was created.[26]

In summary, the German General Staff was the key factor that allowed radical reform in a time of high technological flux. Consensus was formed around a reform idea that was based on studied thought. The common cultural bias of the General Staff helped form this consensus, and aided the communication of the idea. Consistent support at high

levels allowed the reform to advance through experimentation to implementation. These factors were not evident in either the British or the American Armies with respect to combined arms warfare in the interwar period. Complacency instead or reform was the hallmark of these conservative complex organizations, thus retarding the creation of a mobile armored force.

This section has examined reform through the example of the introduction of armor and the doctrine of mobile warfare in the interwar period. The next section looks at the efforts in the United States Army following the Vietnam conflict to reform the development of the officer corps.

Recent Change

RETO '78

The Office of the Army Chief of Staff conducted a "Review of Education and Training for Officers", or RETO, in 1977-78. The study was motivated by the geopolitical environment of the time. The 1973 Mid-East War demonstrated the effectiveness of sophisticated new weapon systems, and these weapons were readily available to many potential US enemies. Soviet conventional forces outnumbered those of the US, and it was believed the technology gap was small. The conclusion was that the US would have to gain the winning edge through the quality of its military people. [27]

TRADOC made incremental changes to officer education to increase military competency, but by the spring of 1977 the Chief of Staff was disappointed in the standard achieved. At the same time, there was pressure from the Office of Management and Budget to reduce the cost of training and educating officers. Thus, the Chief of Staff directed the RETO Study Group to "determine officer training and education requirements based on Army missions and individual career development needs."[28]

The RETO Study examined officer education and training from pre-commissioning through separation. RETO proposed 370 recommendations to the Chief of Staff, extensive changes that took from FY79 to FY89 to implement. The Chief of Staff approved two-thirds of the recommendations, and a massive overhaul of the officer education and training system began.[29] What emerged by 1990 was an improved system that increased the competence of military officers through the expansion of officer basic courses, the introduction of the Military Qualification System, and the creation of the Combined Arms and Services Staff School at Fort Leavenworth. These changes placed extended responsibility on officers for their own development, in conjunction with the mentorship of their leaders. The Military Qualification System, for example, informed officers what tasks they were expected to master by what stage of their careers. While at first appearance this is a simple concept, a clearly enunciated system of professional development expectations had not been implemented prior to RETO. The study was comprehensive, logical, and forward-looking. In this author's opinion, part of the success of the US Army in Operation Desert Storm is attributable to the changes initiated by RETO.

RETO is an example of successful peacetime reform in the military. The RETO study group was successful in forming a logical concept through studied effort, and communicating a vision to the Chief of Staff of the Army. The majority of the recommendations were accepted, and the RETO concepts had a proponent at the highest level of the Army. The ten-year implementation plan provided consistency over a period beyond the time horizon of the Army Chief of Staff. Thus, many of the elements

described by GEN Starry that are necessary for successful military reform were present for RETO.

PDOS '85

The Professional Development of Officers Study (PDOS) team was tasked "to reexamine all aspects of the officer professional development system as it has evolved since the 1978 Review of Education and Training for Officers (RETO) study, and to project the applicability of that system and...recommendations out to 2025."[30] This sweeping mandate, however, did not result in radical changes. Evolutionary recommendations were made, resulting in incremental changes to the system created by RETO. (The one significant change to note was the recommendation to maintain recently established School of Advanced Military Studies).

Perhaps this study was overshadowed by the Officer Personnel Management System (OPMS) II study of 1984, which made significant revisions in OPMS policies to compensate for the passage of the Defense Officer Personnel Management Act (DOPMA) by Congress in 1981. Some of these revisions were the "creation of functional areas, dual tracking, and Regular Army integration."[31]

It is difficult to draw conclusions from the example of PDOS. It may be that the system designed in RETO was solid enough that major new reform was not required, given the generally positive domestic environment for the military in the first term of President Ronald Reagan's Administration (1981-1984). However, the relative stability of the Cold War was about to change.

OPMS XXI '97

Between 1985 and 1997, the only constant was change. In 1986, Congress enacted the Goldwater-Nichols DOD Reorganization Act, which among other changes,

required officers to serve in joint duty assignments. The Cold War ended starting in 1989 with the fall of the Berlin Wall, followed by the dissolution of the Soviet Union in 1992. Congress mandated the formation of the Army Acquisition Corps in 1990, and also enacted Title IX (1992) and Title XI (1993) legislation that required increased active duty support to reserve component units. The Army reduced its active duty forces from 750,000 down to 480,000, while it increased its OPTEMPO with actions in Iraq, Somalia, Haiti, and Bosnia. All of these changes strained the Officer Personnel Management System, necessitating the formation of the OPMS XXI Task Force in 1996. The Task Force delivered their final report in 1997, and implementation of their major recommendations began soon afterwards.

Designed to provide multiple paths to success, OPMS XXI has the potential to be an example of successful military reform in peacetime. Recognizing the requirement for highly trained specialists in some skill areas in the 21st Century, OPMS XXI divided the Army into four Career Fields: Operations, Operational Support, Institutional Support, and Information Operations. The concept allows multiple paths to success (defined as reasonable opportunity to pursue a career through the rank of Lieutenant Colonel). Only those in the Operations Career Field are offered the opportunity to command at the battalion-level and above. Since command has always been limited to a few of the best qualified, OPMS XXI allows those in technical or specialized fields to compete for promotion only against other officers in the same career field. The system also allows them to obtain advanced technical expertise and specialization that the Army requires for success in the increasingly technologically complex "Information Age". Career field designation occurs following selection for promotion to major at approximately the tenth

year of service. Thus, OPMS XXI maintains preeminently a warfighting focus for the officer corps during the first ten years of service, but then develops a contingent of officer specialists that can assist in running the Army as a complex institution for the remainder of their field grade years.[32]

It is beyond the scope of this monograph to offer an in-depth analysis of the many changes that OPMS XXI will make to the Officer Development System. However, OPMS XXI does offer an example of potentially successful military reform in peacetime that follows the framework described in GEN Starry's article. The OPMS XXI Task Force, like the RETO Study Group, had highly visible support from the Chief of Staff of the Army. The members of the Task Force formed a "common cultural bias" through extensive research, and built consensus concerning the proposed reforms through an aggressive information campaign. Following the study, the director of the OPMS XXI Task Force, MG David Ohle, was promoted to Lieutenant General and assigned as the Deputy Chief of Staff of the Army for Personnel (DCSPER), thus allowing for the continuity and longevity of the reform process. These factors militate in favor of the OPMS XXI reform proving successful.

To conclude this chapter, the monograph has examined the factors of successful military reform using examples related to combined arms warfare and reform of the officer corps. The intent was to sensitize the reader to the extreme complexity involved in modifying a large bureaucratic organization like the United States Army. DTLOMS can act as reminder of the interdependent pieces that must all be adjusted in concert with each other. GEN Starry's article, "To Change an Army" provides a general path to follow for peacetime reform, and the German interwar experience, RETO, and OPMS

XXI provide examples to support GEN Starry's conclusions. The remainder of the monograph builds on this foundation to explore the creation of a combined arms officer branch.

Chapter 3: Current Branch Training and Education

The US Army holds that there are three pillars to officer development: institutional training, operational assignments, and self-development.[33] The institutional pillar is made up of the courses taught in an academic environment, including the officer basic course, the Captain's Career Course (formerly the officer advanced course and CAS[3]), the Command and General Staff Officer Course (CGSOC), and Senior Service College (SSC). The operational pillar of officer development is the experience gained through various branch-qualifying assignments in operational units. These assignments occur throughout the first 20 years of commissioned service, and vary according to branch and functional area. Finally, the self-development pillar is formed by the personal study that one devotes to his or her profession outside of duty hours.

Combat Arms Common Skills

The system in place in 1999 uses the company-grade years (Second Lieutenant through Captain) to develop branch expertise in officers. The officer selects his branch prior to commissioning, attends a branch basic course, and is then assigned to his first unit. At the basic course, all combat arms officers receive a mix of training and education in leadership, ethics, land navigation, tactics, training of soldiers, equipment maintenance, and unit logistics. In the first operational assignment, the officer gains the experience necessary to lead and manage a platoon-sized unit. Armor and infantry lieutenants serve in a series of assignments to line platoons, specialty platoons (mortar platoon, support platoon), and perhaps as a company executive officer over the course of four years.[34] Artillery officers normally serve as a firing platoon leader within a battery to gain experience, and then may serve as a company fire support officer.[35] Air defense

lieutenants may serve in Bradley or Avenger platoons in maneuver units, or they may be assigned to Patriot platoons at corps or theater level.[36]

Prior to company/battery/troop command, officers attend the Captain's Career Course. This institutional training serves to reorient the officers to a new frame of reference. Upon completion of the Captain's Career Course, there are higher expectations of performance and a larger scope of responsibility entrusted to the officer. The branch advanced course refines the tactical knowledge gained in the lieutenant years and expands the scope beyond the platoon and company level up to the battalion and brigade. The Captain's Career Course also incorporates problem-solving techniques and staff procedures into the curriculum so that the officer can serve on battalion and brigade staffs when he is not in command.

Branch-Specific Skills

As one reads (in DA PAM 600-3 *Commissioned Officer Development and Career Management*) the description of the "unique features" of the infantry, armor, field artillery, and air defense branches and the officer characteristics required, the similarity is striking. The majority of skills that can be called "branch-specific" are centered on the tactics, techniques, and procedures peculiar to the weapon systems that the officer will employ. If the FCV were the common weapon system, then a single officer should learn the tactics, techniques, and procedures to effectively employ the system in each of its multiple roles—a combined arms officer.

Combined Arms Training

Combined arms training in the US Army is limited in scope and frequency. Lieutenants in infantry and armor are expected to be able to plan, call for and adjust indirect fire. Infantry lieutenants gain expertise with mortars, as do some armor

lieutenants, especially those that serve in cavalry units. Mechanized infantry lieutenants become familiar with working with armor platoons through frequent task organization during field exercises. However, it is rare for an armor, artillery, or air defense lieutenant to be competent in mechanized infantry tactics, or for an infantry lieutenant to be competent in leading a tank platoon or artillery firing platoon. The system is not meant to produce such a lieutenant.

Combined arms principles are taught to lieutenants and captains. Their opportunity to practice these principles in field exercises, however, is predominately restricted to the Combat Training Centers (CTC). In the live fire portion of rotations at the National Training Center, battalions are able to integrate direct fire, indirect fire, and Close Air Support. For lieutenants and captains, this is an excellent opportunity to experience the combined arms concept, as multiple effects are coordinated and synchronized. Unfortunately, because of safety restrictions, the firing vehicles cannot reposition during the live fire, and the effects of fire combined with movement are not experienced. It is the field grade officers that gain the most combined arms experience as they practice planning, synchronizing, and coordinating the effects of all the combat multipliers available to the battalion. The majors (S3 and XO) and the lieutenant colonel commander of an infantry or armor battalion are the prime combined arms training audience of the NTC, because of the current system of officer development.

Problem Statement: Too little, too late

One may conclude that the current US Army system of officer development creates an experienced "combined arms officer" by the time they reach the rank of lieutenant colonel. At this rank, combat arms officers should be qualified to coordinate

and synchronize all the combat forces and combat multipliers available to a battalion. At 20 years of service, the US Army has grown a combined arms officer that on average will have the opportunity to employ his skills at a Combat Training Center (CTC) once during his battalion-level command. If fortunate, his infantry or armor unit will have coordinated one Joint Air Attack Team (JAAT), and will have employed field artillery assets during each battalion-level field exercise during his 24-month command. Following a successful battalion command, a combat arms officer can expect to serve in positions of increasing responsibility until the 30 year retirement mark, unless he is one of the few chosen to serve at flag officer rank. However, between the completion of battalion command and retirement, the majority of the officer's assignments will be away from troops and the "muddy boot" army. While the combined arms experience of senior field grade officers will help them contribute to Army and joint staff positions, it is not the ideal model where once the desired combined arms "product" is developed, it is less likely to be used. It may not be necessary to take twenty years to develop a "combined arms officer", an expert at integrating the effects of multiple systems to create a "whole greater than the sum of the parts". This monograph proposes that the process of combined arms development could begin at the officer basic course. The next chapter will start by examining what the Future Combat Vehicle (FCV) concept entails, and then explain how a combined arms officer branch would contribute to the FCV's successful employment.

Chapter 4: The FCV & the Combined Arms Officer Branch Concept

The Future Combat Vehicle Concept

The Army Force Development Directorate is developing the FCV concept in conjunction with the Defense Advanced Research Projects Agency (DARPA). DARPA's role in the joint project with the Army is to investigate high-risk, high payoff technologies that will provide the "activation energy" to create a new design paradigm that will help the Army reach its goals for the FCV. Using the current design evolution process without DARPA, it is unlikely that the Army could field the FCV by 2025. According to Dr. Marilyn Freeman, DARPA TTO, the current process tends to

> use the "building blocks" method where every critical subsystem (like weapons, protection system, or drive system) comes as a discrete package that must be integrated into the platform. The number of blocks that can be fit into the platform, and thereby the capability, is severely limited if we make weight and volume the platform constraints—as we must if we want transportability. And if we set capability as our goal, the total package gets too big to be of interest.[37]

There are many parameters driving the development of the system. Mobility, survivability, lethality, and transportability are parameters that constrain a single solution in conflicting ways. If a system is to be easily and quickly deployed, it must be light enough and small enough to fit in a C-130J cargo aircraft. This limits the height to 102", the width to 100" if tracked and 102" if wheeled, and the combat weight to 36,000 to 40,000 pounds. To provide survivability to a four-man crew, the armor on an M1A1 tank, for example, makes up 40% - 50% of the vehicle weight of 70 tons.[38] This high weight constrains mobility, requiring a track-laying vehicle to carry the high weight through varied terrain. Mobility is limited in many parts of the world, as most bridges outside of Western Europe are not designed to support 70 tons. Also, tracked vehicles generate a requirement for high horsepower, which constrains endurance and

transportability because it requires a huge logistical support network for fuel and spare parts. Finally, increasing lethality (using current direct and indirect fire paradigms) increases weight, and adds to the logistical tail required to transport ammunition. Thus, lethality and survivability work against mobility and transportability. The FCV is intended to solve this conundrum by changing how the Army thinks about a "vehicle".

One idea is to design a light, single-man vehicle (20 tons or less) as a "mother ship" that controls unmanned, robotic satellite components which perform the desired combat function (direct fire, indirect fire, SHORAD). These separate components could thus be lighter and more deployable. The mother ship would protect the crewman through active and passive defense technologies, in addition to traditional armor, while the unmanned components could be much less protected. With decreased weight, wheels could be used instead of tracks, thereby reducing the logistical needs of the system. As an early-entry combat system, the FCV could be tailored for the combat environment, only deploying the robotic components necessary for that mission.[39]

Another facet of the FCV is the incorporation of enhanced situational awareness. By 2025, information dominance is to be achieved through advanced sensor and communication nets. These systems will allow friendly forces to know their location, the location of other friendly forces in the area, and the location of enemy forces. Through dominant maneuver and precision firepower, the enemy's will to fight will be broken through simultaneous engagement of multiple echelons. The FCV would play a large role in this type of high-intensity combat, using its high mobility to exploit gaps in the enemy defense and penetrate quickly to the enemy's flank and rear, destroying the

coherence of the enemy force. Synchronized joint combat effects would bring to reality the synergy and destructive power of combined arms from air, ground, sea, and space.

DARPA and the Army recognize that the revolutionary capabilities of the FCV (if it becomes a reality) will require rethinking the tactical and operational aspects of its employment. At Fort Knox, the Mounted Maneuver Battle Lab is studying Battle Command Reengineering. The linkage to the FCV is the desire to create a standard way to interface with and operate the multi-functional systems, so that soldiers of different branches (infantrymen, tankers, artillerymen, and air defensemen) can easily employ the system. The intent is to automate those tasks that computers do well, such as data manipulation, to free up humans to perform those tasks that only they can perform, such as tasks requiring intuition, innovation, and tactics.[40] Such an improved interface would allow soldiers to concentrate on a larger view of "how to fight", as opposed to focusing on "how to make the weapon system work." This is where the concept for the Combined Arms Officer Branch fits in. Unfortunately, the FCV is too early in the concept development phase for the Army or DARPA to directly address this topic. Hence, this monograph acts as a starting point for debate.

Combined Arms Officer Branch Concept

This monograph deals specifically with creating a single officer branch that is proficient at implementing the combined arms concept through tactics and operations at the division level and below. Officers commissioned into the combined arms branch would be trained from the start in coordinating the effects of the various combat arms. This section discusses how the Combined Arms Officer would employ the Future Combat Vehicle.

As one visualizes the battlespace of 2025, we can hypothesize that situational awareness will be markedly improved from that of 2000. If the US is engaging in a major theater war against a regional competitor, we should assume that the enemy's situational awareness is also enhanced. It would be a safe additional assumption that both forces have developed the technological counter-measures to deceive or cloud the other's situational awareness. Therefore, even in 2025, the US will not know exactly where every element of the enemy force is located, and will sometimes suffer through degraded awareness of where friendly forces are.

The doctrine of 2025 will differ from that of 2000; the question is one of degree. If one considers the span of twenty years between 1920 and 1940, the change could be remarkable. This new doctrine will be the conceptual foundation on which organizations and leaders will be built. As seen in the case study of the German army in the interwar period, it is critical to create a common doctrinal culture where the officer corps shares a common understanding of doctrinal terms and concepts. Doctrine must also reflect the international environment. Most assessments, such as the Army After Next program, project a time of shifting alliances, regional competitors, and asymmetric warfare. Non-state actors such as crime syndicates, drug cartels, and terrorist networks may also require a military response in 2025.

While military forecasters (such as the Army After Next study group) currently speculate that the non-linear battlespace will dominate the linear battlefield, it is likely that gray areas will remain, and that some battles will be sequential and some will be simultaneous. Likewise, some battles will be contiguous, while others are non-contiguous. In this respect, the Combined Arms Officer in the FCV could be useful. To

explain, imagine a system capable of both indirect and direct fire. Current distinct roles and locations on the deep, close, rear division battlefield framework could blur, and all-arms FCV formations could conduct artillery missions at one point in the battle, then use their protected mobile firepower to conduct an armored penetration. Approaching an objective, the FCV's would mass indirect fires on the target while still outside of direct fire range. As the high-explosive rounds impacted around the enemy, the FCV's would use their high dash speed to close with the enemy, thus exploiting the effects of the indirect fire through the use of their direct fire guns. The mounted infantry in the vehicle could then dismount to clear and secure the objective while the FCVs continued to pursue the enemy, exploiting the penetration. All the while, SHORAD coverage is contained within the moving unit.

The vehicle/system is just a concept in 1999. With the FCV, there are the advantages described in the scenario above to having a single officer branch capable of expertly employing direct, indirect, and counter-air fires in mounted, mobile warfare. The disadvantage is that as a generalist, a Combined Arms Officer may have a great breadth of knowledge, but limited depth—the "jack of all trades, master of none" criticism. Infantry tactics, armor tactics, and field artillery tactics are different. Clearing a trench as a dismounted infantryman requires different skills than clearing a trench as a tanker.

Yet, these are simply different tools to achieve the same goal. Combined arms have always been about combining all the different tools available to place the enemy into a dilemma. If the enemy tries to avoid the effects of one lethal system, he places himself into the effects of another lethal system. For example, in an infantry fire team,

this point is illustrated by the use of the machine gun and the grenade launcher. When the enemy takes cover to avoid the direct fire of the machine gun, the fire team leader directs the M203 gunner to lob grenades into the hiding place. The enemy moves to avoid the grenades, and exposes himself to the machine gun. The enemy has an unsolvable dilemma. At higher levels, the combined arms of direct and indirect fires, in combination with attack aviation, CAS, Information Operations, and smoke deny the enemy a viable choice. An officer skilled at coordinating these effects is not a new idea—he is currently a major or lieutenant colonel. The new idea is to create this skill level starting at commissioning.

Combined arms lieutenants would be expected to assimilate substantially more information in a short period of time than their peers. Thus, pre-commissioning screening would be conducted to only select those with the highest aptitude, similar to the physical and mental screening implemented for aviation branch aspirants. The basic course for the combined arms branch would require a minimum of twenty-four weeks, eight weeks longer than the current Infantry Officer Basic Course (IOBC). New officers would start by learning the core leadership instruction and the tasks common to all combat arms basic officer training. The new lieutenants would next receive training in the tactics of light infantry, mechanized infantry, armor, air defense, and field artillery. The Future Combat Vehicle would be the primary weapon system. While the basic course would not allow the new officers to master each of the former branches, it would provide enough grounding in the required skills that graduates could lead any of the above types of platoons.

Operational assignments following the basic course would allow lieutenants to serve in each of the various FCV organizations/roles over a four year period. They would gain "basic practical leadership experience in a tactical environment", honing their leadership skills and enhancing their technical and tactical competence.[41] By the time they were considered for promotion to captain, they would have mastered the techniques of coordinating and employing each of the combat arms to achieve combined arms effects at the platoon and company level.

As new captains, officers would attend the Captain's Career Course, with the first portion (the former branch advanced course) again integrated as a combined arms course. The training would focus on preparation "for company level command and duties at the battalion or higher levels", just as does today.[42] The difference is that the program of instruction would not specialize in applying the combat power of one of the branches, but would instead focus on all-arms formations and expertise in coordinating combined arms effects. Practical exercises would place each student officer in a variety of roles over the course of instruction, until he is competent in all of them. Following the first phase, the officer would attend the staff phase, (formerly known as the Combined Arms and Services Staff School, or CAS3).

Combined arms command at the company level is the next developmental step. A pertinent question here is what type of company would this officer command? Based on his performance on qualifying tests at the Captains Career Course, past performance, the officer's preference, and the needs of the Army, Combined Arms Branch at PERSCOM would assign qualified officers to FCV battalions. The envisioned capabilities of the FCV would make these battalions an "all-arms" formation, so that every field exercise

would involve combined arms training. Additionally, those officers that did not demonstrate combined arms proficiency during past performance or on the qualifying tests would be branch transferred to legacy system units (Abrams, Bradley, Paladin, Avenger), which would most likely still be in use in 2025.[43] This type of system would provide the officer the best chance to succeed, an outcome that is good for the Army, the officer, and the soldiers he commands.

Following successful command at the company level, a prerequisite of branch qualification, officer development would parallel that of 1999. Assignments on battalion and brigade staffs would help captains continue to develop an in-depth understanding of combined arms operations. After branch qualification, captains would serve in branch/functional area generalist positions (Active Component/Reserve Component (AC/RC) duty, Recruiting Command, ROTC/Service School instructor, USMA instructor), nominative assignments, or Advanced Civil Schooling.[44]

Upon selection for major, the combined arms officer would undergo a Career Field Designation board. If selected to remain in the Operations Career Field, his career would mirror that of combat arms field grade officers of today. The difference would be the experience and expertise that the combined arms officer would bring to the battalion and higher-level tactical unit. As a new field grade officer, he would have on average ten years of service, with at least seven years of combined arms training. This is a positive improvement over the current system, where a new major is likely to have much less combined arms experience.[45]

This introduction to the combined arms officer branch concept is necessarily brief, and unfortunately incomplete. The idea requires further study as more becomes known

about the future operational environment of the 21st century. If major theater wars remain a possibility for the United States, then officers highly skilled in combined arms warfare will be required. The concept should be examined in depth soon, for changes to the officer education, training, and the assignments process will have effects that ripple outward to affect doctrine and the way the Army organizes to fight. DARPA and the Army Force Development Directorate are currently focusing on the materiel solution, the FCV, to combined arms warfare. However, to use an old saying, the Army "must equip the man, not man the equipment." Procurement should follow doctrine, not the reverse. The combined arms officer branch must be well thought out in parallel with the development of the FCV concept.

Chapter 5: Criteria and Evaluation

Criteria Definition

In order to evaluate a proposal, it is necessary to stipulate the criteria against which the proposal is to be measured. The ideal criteria would allow quantitative analysis, so that at the end of the evaluation, there is a clear solution. This is difficult when the proposal concerns capabilities that are hypothetical. In this case, an objective evaluation may not be possible, and only subjective evidence can be provided to support or detract from the proposal. These criteria do allow judgment on whether the idea is worth further study.

This monograph proposes a Combined Arms Officer Branch. The following criteria will be used to measure the worth of the proposal:

I. The proposal must enhance the Army's warfighting capability;

II. The proposal must be based upon the Army's expected missions in peace and war (full-spectrum conflict);

III. The proposal must be consistent with OPMS XXI;

IV. The proposal must be able to be implemented in a resource-constrained environment.

1. The first criterion is a measure of the benefits to the Army's warfighting capability as they compare to the costs and tradeoffs of implementing the proposal.

2. The second criterion assumes that in the projected geostrategic setting of 2025, the Army will be expected to perform missions across the full spectrum of conflict. Suitability for full-spectrum conflict is defined as a system that will produce officers versatile enough to lead their units in the full range of military operations, from

humanitarian operations to small-scale contingencies to global war. Higher suitability for full-spectrum conflict is a positive measure.

3. The third criterion measures whether the proposal is compatible with the OPMS XXI system. Significant changes to this system of systems are difficult and take extended periods of time to implement. Therefore, the less change required to OPMS XXI, the more positive a measure of the proposal.

4. The fourth criterion is based on the assumption that available resources will always be less than desired or required. Therefore, the less cost involved in implementing the proposal, the more positive the measure of its value.

Criteria Applied

For the first criterion, the combined arms officer branch on balance contributes to the Army's warfighting capability. The main purpose of the branch is to provide highly skilled officers that are widely experienced in integrating combined arms effects by their tenth year of service. This is an improvement of ten years over the current system, allowing the Army to benefit much earlier in the officer's career from his combined arms expertise. This factor over the long term outweighs the initial investment of eight extra weeks of training in the officer basic course.

The second criterion requires that the combined arms officer be versatile and flexible enough to lead his unit in both high intensity conflict and in stability and support operations (SASO). This criterion is positive, with qualification. The training in the combined arms branch would be focused at the high intensity end of the conflict spectrum, similar to the combat arms branches today. One could logically conclude that the proposed branch would be neither more nor less capable of conducting SASO

missions following a short training ramp-up. Therefore, the proposal satisfies the criterion, but does not substantially improve over current capabilities.

The third criterion measures how compatible the proposal is with OPMS XXI. The combined arms branch incorporates changes at the basic and advanced courses, requiring more time to complete the training at both. This would require minor changes in company grade timelines to allow for the additional institutional training. However, no changes to career field designation or the field grade OPMS would be necessary. In sum, this criterion could be classified as slightly negative, but easily accommodated.

The final criterion requires that the proposal be implemented in a resource-constrained environment. In the final analysis, a combined arms officer will be more expensive to train. Additional classroom time, simulations, and live-fire exercises will be resource-intensive. In a zero-sum budget, there would need to be a decrement in another program in order to free the resources required to implement the proposal. This results in a negative rating for this criterion.

Evaluation

To summarize, the proposal for a combined arms officer branch measured positively for the first criterion, met the second criterion with qualification, was slightly negative for the third criterion, and negative for the fourth criterion. In order to evaluate these results, one would have to determine whether each of the criteria was weighted equally. If the enhancement of the Army's warfighting capability were substantially weighted over the resource constraints, then on balance the proposal would measure positively. However, the lessons of the interwar period show that resource constraints

during economic downturns will overrule good ideas, and the fourth criterion could be weighted.

The conclusion one should draw from this simple analysis is that further study is justified, but until the concept is developed further, resources should not be devoted to implementation. Ideally, if the FCV were fielded in 2025, it would be desirable to have experienced combined arms branch captains ready to take command of the companies. Therefore, five years prior to fielding the weapon system, the new combined arms branch would have to be implemented and functioning. This would probably require several years to phase in, prior to which testing and experimentation would be completed with the developed concepts of an in-depth study. All together this means that the study should take place no later than 2015 in order to place combined arms captains in company command in 2025. If the FCV program timeline were to shift, as often happens with major weapons systems, the combined arms officer branch timeline would also shift. If the FCV were canceled altogether, the combined arms officer branch concept still retains validity worthy of continued study. An alternative thought process would promote further study now before significant resources are devoted to the FCV, as the changes launched by creating highly skilled combined arms officers sooner might allow the legacy systems to serve the force longer.

Chapter 6: Conclusions

This monograph has explored the proposal to create a combined arms officer branch. An additional topic throughout the monograph has been to recognize the difficulty in implementing major changes in a large, complex organization such as the US Army. From the above discussion, one may conclude that this proposal would be difficult to implement unless the steps discussed in GEN Starry's article were followed.

First, the Chief of Staff of the Army should appoint a task force to study the concept of a combined arms officer branch in much more depth than was possible in this monograph. If after extensive study the key ideas are found to have compelling logic, then a consensus might be built to pursue a combined arms officer branch. The primary obstacle would be the difficulty in finding a proponent to sponsor the idea from development to implementation. The Combined Arms Command (CAC) at Fort Leavenworth has proven relatively weak against the ingrained common cultural bias of the separate combat arms branches.[46] Without a powerful proponent and support from the highest levels of the Army, the combined arms officer branch would be stillborn.

More specifically, a prominent problem is the status of the legacy weapon systems in 2025. The FCV will be a large capital investment, and thus will require gradual fielding (given constrained resources) to replace legacy units. Until the FCV proves itself, the legacy units will be proven combat power that the Army will be required to maintain as an insurance policy. If these legacy units remain, then the former branches of armor, infantry, field artillery, and air defense will have to remain. Thus, during the transition period, the branches will coexist.

Additionally, the missions of specialized troops are likely to remain, such as airborne, air assault, Ranger, rocket artillery, and Patriot or other corps and theater level air defense. The combined arms officer as conceived in this monograph would not be the best-trained officer for these specialties.

The result may be the obstacle of branch parochialism, the traditional cultural bias of officers toward their own branch. The fight would likely be intense between the current branches, first against the concept as a whole, and then over which branch would take the initial proponency for developing the combined arms officer branch. While Armor branch could make a strong case for holding primacy over training mobile warfare, it is unlikely that the Infantry and the Field Artillery would acquiesce quietly to the necessary changes in resource allocation that would follow.

If the Chief of Staff of the Army were to champion the idea of the Combined Arms Officer branch, and build support through an extensive information campaign to inform and educate the officer corps on the merits of the concept, implementation would be possible. Successful reform of complex organizations is difficult, but for survival and progress, reform is essential. [47]

Endnotes

[1] Sean Naylor, "Combining Arms: Can one combat vehicle do it all? The Army's betting on it," *Army Times*, 30August 1999, 14-15.

[2] The Aviation and Engineer branches require highly specialized training and use equipment that will not be incorporated in the FCV. Thus, the proposal of the monograph does not include consolidating these branches into the combined arms officer branch, despite the fact that to achieve combined arms effects these branches' effects must be synchronized into the tactical engagement.

[3] This monograph assumes that the combined arms branch would be restricted to the male gender based on current US policies. The use of male pronouns is intended. However, the author does not make a judgment or recommendation in this monograph concerning the worth of this policy.

[4] Branch parochialism is the bias toward one's branch that causes one to fight for programs, resources, or missions that may help one's own branch, but at the expense of other branches or the Army as a whole.

[5] Department of the Army, *FM 101-5-1 Operational Terms and Graphics* (Washington, D.C.: U.S. Government Printing Office, 1997) 1-32, 1-33.

[6] Department of the Army, *FM 100-5 Operations* (Washington, D.C.: United States Government Printing Office, 1993) 2-3.

[7] Jonathan M. House, *Toward Combined Arms Warfare: A Survey of 20th-Century Tactics, Doctrine, and Organization*, ed. Combat Studies Institute, Research Surveys, vol. 2 (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1984) 2.

[8] Ibid., 2-3.

[9] Ibid., 3.

[10] Department of the Army OPMS XXI Task Force, *OPMS XXI Final Report* (Washington, D.C.: United States Government Printing Office, 9 July 1997) 1-7.

[11] Department of the Army, *How the Army Runs: A Senior Leader Reference Handbook 1997-1998*, (Carlisle, PA: US Army War College) 5-1 – 5-4.

[12] Michael Howard, "Military Science in an Age of Peace," *Journal of the Royal United Services Institute*, March 1974, 4-5.

[13] Ibid., 7.

[14] Ibid., 8.

[15] Donn Starry, GEN, "To Change an Army," *Military Review* LXIII, no. 3 (1983): 25.

[16] Ibid., 22-23.

[17] Douglas A. Macgregor, *Breaking the Phalanx: A New Design for Landpower in the 21st Century* (Westport, CT: Praeger, 1997) 43.

[18] Starry, 22.

[19] James S. Corum, *The Roots of Blitzkrieg: Hans von Seeckt and German Military Reform* (Lawrence, KS: University Press of Kansas, 1992) 29.

[20] Starry, 23.

[21] Ibid.

[22] Ibid., 21.

[23] Harold R. Winton, *To Change an Army: General Sir John Burnett-Stuart and British Armored Doctrine, 1927-1938* (Lawrence, KS: University Press of Kansas, 1988) 26.

[24] Mary Lee Stubbs and Stanley Russell Connor, "Armor-Cavalry Part I: Regular Army and Army Reserve," *Army Lineage Series*, (Washington, D.C.: US Army Center of Military History, 1969) 49-50.

[25] George F. Hofmann, "Combatant Arms vs. Combined Arms: The U.S. Army's Quest for Deep Offensive Operations and an Operational Level of Warfare," *Armor* 106, no. 1 (1997): 12. This excellent article describes in detail the interbranch conflict of the interwar years and draws useful parallels for today, including the idea for the creation of a "combined arms officer designation."

[26] Ibid., 13.

[27] Department of the Army, *A Review of Education and Training for Officers*, vol. 1, *An Overview* (Washington, D.C.: Office of the Chief of Staff of the Army, 1978), v.

[28] Ibid., v-vii.

[29] Department of the Army, *Professional Development of Officers Study*, vol. 1, (Washington, D.C.: Office of the Chief of Staff of the Army, 1985) v.

[30] Ibid., iii.

[31] Department of the Army, *DA PAM 600-3 Commissioned Officer Development and Career Management*, (Washington, D.C.: United States Government Printing Office, 1998) 2.

[32] Department of the Army OPMS XXI Task Force, *OPMS XXI Final Report*, vii.

[33] Department of the Army, *DA PAM 600-3*, 1.

[34] Ibid., 34, 41.

[35] Ibid., 49.

[36] Ibid., 56.

[37] Marilyn Freeman, Presentation Script, p. 2; available from http://www.darpa.mil/darpatech99/Presentations/Scripts/TTO/freeman.txt ; Internet; accessed 10/29/99.

[38] Marilyn Freeman, "Multi-Mission Combat Systems", slides 4 and 5, PowerPoint Briefing; available from http://www.darpa.mil/darpatech99/Presentations/tto pdf/tto mmcs.pdf; Internet; accessed 10/29/99.

[39] Naylor, 14-15.

[40] Personal email correspondence with LTC Marion Van Fosson, manager of FCV program at DARPA, dated 11/2/99.

[41] Department of the Army, *DA PAM 600-3*, 34.

[42] Ibid.

[43] Naylor, p. 15.

[44] Ibid., p. 35.

[45] For an excellent analysis of the problems of developing combined arms skills in the officer corps in the late 1990's, see "CTC Quarterly Bulletin," 4th Qtr, FY95, No. 95-11, September 1995. LTC Rosenberger's comments specifically address the critical need for revising the officer training and education system to produce officers capable of executing combined arms operations in the near future.

[46] Huba Wass de Czege, BG (R), "How to Change an Army," *Military Review* LXIV, no. 11 (1984): 37-38. This is an excellent article that builds on GEN Starry's methods for peacetime military reform.