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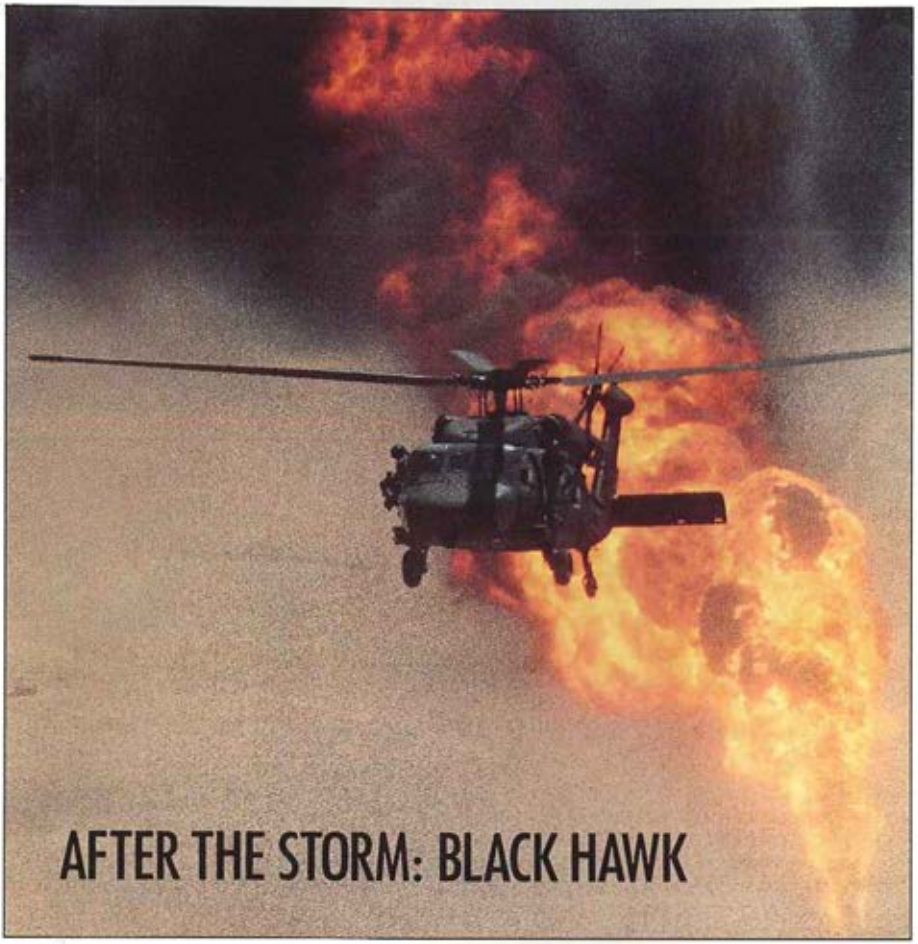

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Perspective and Requirements from the Korean Theater

By General Robert W. RisCassi

One of the most reassuring but less highlighted achievements of the Gulf War was the stunning success of Army Aviation. As the readers of this magazine know, Army helicopters were a vital part of the Gulf conflict—during the containment of Iraqi aggression to Kuwait, as a joint participant in the air and naval campaigns, and in every operation of the ground campaign. The missions assigned to Army Aviation units expanded beyond those tested in any previous conflict—and included operational deep strikes, suppression operations in support of the air campaign, even joint naval warfare. Traditional aviation roles, such as command and control, support to theater logistical operations, and a divisional air assault also were performed brilliantly. All who viewed or participated in DESERT STORM were impressed with the capabilities of Army Aviation. Perhaps most importantly, the effectiveness of Army Aviation's rapidly mobile, lethal weapons platforms created a legacy for the Army's newest branch.

GEN RisCassi is Commander in Chief, United Nations Command, CinC, ROK/US Combined Forces Command, Cdr, U.S. Forces, Korea, and Commanding General, Eighth United States Army.

The New Challenges

The historical debates that have surrounded Army Aviation to varying degrees over the years have now been laid to rest. In their place, new arguments have opened concerning the further expansion of aviation roles, or the relationship of helicopters to other Army weapon systems in performing various roles on the battlefield. The focus of the new challenge is the need for greater flexibility for strategic deployment, battlefield roles and task organization.

This flexibility requirement is driven by the expanded role of Army Aviation. There are operations, conditions, and environments where Army Aviation will be the centerpiece of operations, just as there are circumstances in which aviation will be

used to support other combat arms. Some now believe that attack helicopters have convincingly replaced the tank as the Army's premier offensive weapon and tank killing system. Others argue that Army Aviation should have expanded roles in reconnaissance, as well as an enlarged focus in deep operations. In some cases, Army Aviation's expansion would complement or supplement the role of other weapons platforms, be they tanks, reconnaissance vehicles, or artillery.

For two reasons, these debates emerge at an appropriate time in the history of our service. First, they coincide with the largest force reduction since the Vietnam demobilization. Our stated objective is to emerge from these reductions with a more combat capable, globally deployable force. As a measure of manpower, the future Army will be the smallest this nation has fielded since 1938. Once force reductions have been completed, the size of the United States Army will rank well below the top twenty armies in the world.

This draw down will leave us no choice—our Army must be a battlefield sledgehammer with unequalled technological and qualitative characteristics. Improving our combat capability at the same time we are reducing our personnel will rely on our ability to expand exponentially the battlefield potential of the individual soldier and unit. To achieve this goal, we already have initiated an Army-wide dialogue on the evolution of our doctrinal methodology. Simultaneously, we need to consider whether existing force structures and the balance of our systems will meet future requirements.

Second, the RAH-66 Comanche (previously LH) program will shape the core of our future aviation philosophy. The importance of the program to the aviation community and the Army cannot be overstated. When completed, the Comanche program will have produced the most technologically sophisticated piece of equipment in the Army. The shape and characteristics of the Comanche, already modified and expanded several times, will become the centerpiece of Army Aviation. What needs to be done now is to finalize the design, establish the program, and start production at the earliest feasible time.

The Perspective From Korea

From the perspective of the Korean theater, Army Aviation is a vital force. The rugged mountainous terrain, splitting the theater like longitudinal corridors, confronts defenders and attackers alike with enormous impediments to force mobility and lateral integration. Weighting ground forces and positioning reinforcements are time-consuming and difficult propositions. Army Aviation offers the ability to rapidly concentrate and counter-concentrate with powerful forces far more rapidly than ground mobile elements. The results are a vast increase in the operating tempo of our defending forces and the ability to quickly seize the initiative from a ground-based, attacking North Korean force.

The nature and composition of the North Korean threat creates the operational necessity for attack aviation in large numbers. The North Korean Army has emerged from a decade of force modernization as a highly mobile, combined arms force. It has forces grouped in large, mechanized, and armor-heavy corps that will be inserted into battle at propitious locations to exploit breakthroughs. These forces literally will be "fed" into battle in brigade-sized elements to maintain unrelenting pressure against the defenders. Successful allied defense will depend on the ability to rapidly concentrate anti-armor systems to destroy moving North Korean formations before they can create a breakthrough. Army Aviation will have a key role in meeting this challenge.

There are other roles for Army Aviation that are equally important. Helicopters offer unique advantages as platforms for electromagnetic warfare, particularly in mountainous environments like Korea, where the range and characteristics of ground-based systems may be degraded or offset by the terrain. Helicopters can be immensely effective at electromagnetic suppression, counter-radar, or Suppression of Enemy Air Defenses (SEADS) in support of close air support operations, to name but a few

missions. There are also roles in SOF insertion and rear battle reaction that will be critical in both the deep and rear battles.

These are the operational requirements from this theater. However, Army Aviation will have to be strategically deployable. Indeed, from this theater's perspective (and probably many others), Army Aviation will have to be among the first increments of the U.S. reinforcements to arrive in theater.

An Assessment

How are these views relevant to ongoing debates over the future of Army Aviation? First, they provide the Korean perspective of strategic and operational requirements for the aviation force—views that are, in all likelihood, common to many other ground-based theaters. They argue the need for rapid strategic deployability and operational concentration of aviation as a discrete element of our forces.

Although we tend to assign aviation units as organic parts of divisions and corps, we need to improve our ability to detach these elements for separate deployment and assignment to combined theaters. Increased flexibility in the ability to concentrate large numbers of helicopters and to sustain their operations would add significantly to employment planning for theater commanders. Fully recognizing the logistical and sustainment challenges associated with this line of thinking, it would be an asset to theater planners to know that self-sustaining Army Aviation units can arrive in large numbers early in a crisis.

Second, these views define a wide spectrum of operational and tactical requirements for Army Aviation. Existing plans for the RAH-66 and the broadening of mission capabilities in the design criteria must provide multi-capable weapons systems that will carry well into the 21st Century.

Similarly, we must continue to improve electromagnetic and counter-radar capabilities throughout our aviation fleet. Also, we must improve our ability to task organize and "weight" the mix of airframes and weapons systems dependent on the threat environment and missions to be executed. Just as important, we need to improve command and control capabilities to accommodate greater depth and width in aviation operations. Although aviation units were able to operate with relative impunity in DESERT STORM, other potential deployment areas present a more restrictive flying environment in terms of weather, terrain, and integrated air defenses. As Army Aviation units assume more battlefield roles, tailored force packages will be instrumental to success.

". . .[Army Aviation should not] become an independent organ within Army force structure—it is and should remain an integral member of the combined arms team."

A Final Note

None of this argues that aviation should become an independent organ within Army force structure—it is and should remain an integral member of the combined arms team. From its inception the challenge for Army Aviation has been to employ its unique ability to overcome the dictates of terrain through air movement while remaining an integral part of the ground campaign. Army Aviation has met this challenge in the past, and there is every reason to believe it will add to its illustrious legacy in support of ground forces in the future.

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International Focus on Interoperability

By Major General John D. Robinson

Principles contained in the Constitution of the United States have been the rationale behind many national policies which represent a powerful guiding force for U.S. relations with the nations of the world. Our present national policies have been seasoned by over two centuries of freedom from significant direct military threat to our mainland and by our attainment of superpower status. We have also adjusted policies to reflect the realization that our power must be tempered by our sense of democracy—for international decisions to have lasting meaning in the world, they must be made in concert with the other nations of this earth. The U.S. has learned that there are limits to what it can do alone.

In the past two years, we have experienced dramatic and irrevocable changes around the world. These changes have already affected national military strategy and the forces needed for its execution. Unfortunately, peace has a way of eroding the capability of an Army to fight alongside an ally. The United States has been rudely reminded of this fact in past conflicts. World Wars I and II and the Korean and Vietnam conflicts required adjustments to varying degrees in order to operate in a theater alongside our allies. More recently, we witnessed similar occurrences in Operation DESERT STORM.

In each instance, our capacity to interoperate improved over time, but at a high cost in scarce resources. Realizing that such problems exist has caused our nation to become more involved in international programs. These programs reduce the tendency for nations to pursue narrow unilateral approaches in meeting national defense requirements. Collaboration with our allies is ever more important as we enter into coalition warfare, and participate in multi-national formations.

U.S. Army policy supports several basic priorities to enhance our ability to fight beside allied armies. This policy reflects the adoption of common doctrine that allows allied forces to conduct combined and joint operations, enables forces to communicate and coordinate plans, and permits sharing consumables such as fuel, food, and ammunition. These contribute to achieving a more effective fighting force while conserving scarce resources.

The U.S. participates in numerous fora to achieve international cooperation in attaining the high degree of interoperability and standardization necessary to conduct successful coalition warfare. The most prominent forum is the North Atlantic Treaty Organization (NATO). Within the organization are research groups, armament groups, panels and working parties that address military and civil concerns of the organization.

MG Robinson is Chief, Aviation Branch, Commanding General, U.S. Army Aviation Center and Ft. Rucker, AL and Commandant, U.S. Army Aviation Logistics School.

Agreements produced by the NATO working parties are called Standardization Agreements (STANAGs). A key STANAG developed by the Helicopter Interservice Working Party is STANAG 2999, "Use of Helicopters in Land Operations." The agreement establishes techniques and procedures for employing aviation forces. The document incorporates 16 aviation operational STANAGs into a single document.

Another important NATO document is the Outline NATO Staff Target (ONST). ONSTs are similar to the U.S. Operational Requirement Documents (ORD) that describe the operational and technical requirements for military equipment. NATO members who ratify these documents are obligated to accept the terms of the agreement and incorporate them within technical and doctrinal publications.

ABCA Program

Another international forum is the ABCA program. The participating nations of this program are the armies of the United States, the United Kingdom, Canada, and Australia. The word "Quadripartite", referring to the four nations of ABCA, is used to identify the 18 Quadripartite Working Groups that make up the organization. Each working party is responsible for developing agreements that relate to their area of interest. Liaison between working groups is extensive to ensure that materiel or doctrinal gaps do not exist. An example of the work being accomplished within the Quadripartite Working Party on Aviation is the development of the Quadripartite Standardization Agreement (QSTAG) 915, "Army Aircraft Battlefield Damage Repair Procedures." This agreement establishes procedures and techniques which aviation units will follow in performing battle damage and repair on helicopters.

Each forum has established goals and has a common thread that links them together. The most significant goal is that the nations recognize the importance of working together and agree to share information and technology. No less important is the need to maintain an active program which pursues development of new doctrinal agreements. The accomplishment of these goals opens the door to achieving complete interoperability of aviation forces. Upon fielding a fully interoperable force, commanders can employ combined combat, combat support, or combat service support units without any degradation of capability.

The Army Materiel Command is assigned overall responsibility for the International Cooperative Program. It is their responsibility to ensure that all relevant international agreements are incorporated into the technical requirements for materiel items. Some of the cooperative research and development agreements with our allies include sharing technology on advanced tactical helicopters, helicopter weapons systems for air-to-air combat, wartime aircraft maintenance and integrated controls and displays. Another program makes equipment available through Foreign Military Sales (FMS). Many of our allies have purchased complete aircraft systems which include the OH-58, UH-1, AH-1, UH-60, CH-47, and most recently, the AH-64. Training provided to other countries, through U.S. Department of Defense resources, is a vital element of FMS. The transfer of U.S. defense equipment simultaneously considers the training requirements on the part of U.S. and international personnel involved.

The Training and Doctrine Command (TRADOC) plays an important role in international programs by ensuring that the agreements describing procedures and techniques for aviation operations are incorporated within national publications. By incorporating the terms of agreements into doctrinal manuals, aviation units are training to a standard that ensures interoperability when conducting combined and joint operations. Because the salient points of STANAGS and QSTAGS are incorporated within related publications, they are not available to units in the field. The title of each agreement implemented within a publication is identified in the preface and at the beginning of each chapter.

(Interoperability — continued on p. 42)

Why I Joined AAAA and Why I Stayed

By Captain Jeryl C. Ludowese

Editor's Note: CPT Ludowese presented the findings of the Company Grade Officers Committee on the recent random CGO Survey to the AAAA National Executive Board at the 18 October 1991 meeting in Washington, D.C. The following article highlights the findings of the CGO Committee consisting of CPT Ludowese, CPT Phil Martin and CPT Paul M. Steele, Chairman.

I didn't join AAAA for the reasons most young officers do. When I was pressured in Flight School to become a member, I rebelled. I was the only commissioned officer in my flight class who was not a member of AAAA on graduation day. I didn't feel it was right to be pressured to join an organization I knew nothing about. I felt that I was a professional, and being a member of AAAA didn't make me more or less of one.

I joined AAAA to attend the 1984 National Convention in Washington, D.C. A couple of my friends who were going said the conventions were a lot of fun, so I decided to tag along. I went to the first professional session and looked around the audience. I was the only 2LT in attendance. I felt very much out of place, and didn't really enjoy myself for the four days I stayed. I didn't think I'd spend the money to attend another one.

CPT Ludowese is a member of the AAAA National Executive Board.

A couple months later, I finished my training at Fort Rucker and went to Korea. The only event the local AAAA chapter hosted that I can remember was a Christmas Formal that we were "encouraged" to attend. I went to Seoul and ate an overpriced dinner, listened to a long speech, and wondered again why I was a member of AAAA.

The magazine was OK, but I didn't understand a lot of the articles. They seemed to be focused on high technology equipment, and I never saw an article written by a Captain, Lieutenant or even a Major. It just didn't seem like the organization cared about me as a young officer. I didn't renew my membership the following year.

I was not surprised when I read the 264 CGO surveys that poured in earlier this year to find that many CGO's shared these feelings and experiences about our professional organization. I feel however, that we as CGOs are not doing enough by just complaining about the way things are.

If we want to make this organization responsive to our segment of the total membership, we have to do things at the grassroots level to make things change.

When I returned from Korea to Fort Monmouth, NJ in 1985, I was asked by the Chapter President to fill a vacant position on the Chapter Executive Board. I became the interim Vice President for membership, with my first act to renew my own membership in AAAA. I took it as a personal challenge to contact each individual who didn't renew their membership to find out why. Then I went to the Board quarterly to suggest improvements/activities to help retain and regain our members. I published a quarterly newsletter to keep the membership informed of our chapter activities. I attended the National Conventions in Atlanta in 1986, and Dallas/Fort Worth in 1987 and although I didn't see a lot of other Lieutenants, I had a good time interacting with senior officers and learned the benefits of networking in the organization.

The bottom line was, I got involved. And by getting involved, I started to understand what AAAA was all about. It was about comraderie, fellowship, and looking for ways to increase the worth of the Aviation Branch in the total Army. I came to understand that AAAA is more than just a brotherhood of Aviators. It's about the enlisted soldiers who work side by side with us, the DACs who watch the green suiters come and go, the contractors who do their best to supply us with the equipment we require and the retirees who take our issues and lobby for us in Washington. Those that feel that one part of our organization is any more important than another are fooling themselves.

My husband would tell me right about now, that I'm up on my AAAA soapbox. For all the good that I feel about AAAA, I still think there are areas to improve. The Company Grade Officer Committee recently briefed the AAAA National Executive Board and reported that, to make the organization more responsive to CGO's, AAAA needs to work on five areas: recruiting tactics, increasing CGO representation on chapter boards, varying the types of local chapter activities, advertising membership benefits and getting Army Aviation Magazine back into the field.

Recruiting Tactics

Twenty-five percent of the CGOs that responded to the AAAA survey said they joined the organization as a result of "Command Emphasis". One officer recommended that the AAAA local Chapter at Ft. Rucker host functions for flight students periodically to explain what the organization is and how it would benefit them if they joined. Several suggested that instead of command emphasis, that peer solicitation be encouraged.

We all must understand the bottom line. As distasteful as command emphasis can be, it is one of the only ways the Aviation Center Chapter can effectively canvas the entire student population. There is a big push at Fort Rucker, as the branch home to have the largest Chapter. The flight student population is a substantial part of their total numbers. Command emphasis extends past the flight school experience. When a Battalion Commander looks at the percentage of AAAA members in his/her unit and says "We have to do better", and the call goes up to renew expired memberships, we face the same situation. We have to stop the Command Emphasis to join and concentrate on areas where potential members are gained...through chapter activities.

Chapter Activities

CGO surveys emphasized that local chapters need to get away from the high priced dinners held at the local Officer's Club and concentrate on quarterly professional seminars/speaker programs that address current issues facing the aviation community. Understanding that each Chapter is different, and that not all have a large population of CGOs—those that do should look at the following areas: the upcoming force reduction; how Aviation will be utilized/shaped in force restructuring; Aviation in the total Force (Active -vs- Reserve

Component); mentoring subordinates; and what senior leaders expect of junior leaders. The surveys also indicated that CGO's would like to see more family oriented activities — picnics, sports tournaments, runs — things that would involve all of the membership to include enlisted soldiers and NCO's, warrant and commissioned officers. Hosting these types of activities requires a lot from the Executive Boards to organize and run.

Chapter Boards

We don't know how every Chapter board is organized. We did see a number of surveys where CGOs were discouraged because their local board was presided over by an Aviation brigade or battalion commander, and filled by senior officers appointed by the President. This is a problem for two reasons. First, appointing chapter officers creates the impression that you must be a senior officer to have a voice in the organization. Second, the senior officers don't have the time to organize and execute their activities, and as we have heard, will often task their subordinates to plan, organize and execute events, leaving these Junior Officers/Warrant Officers bitter about AAAA. If a Chapter is predominantly military, and is not holding biannual elections, chapter presidents need to ensure representation of enlisted, warrant and company grade officers that want to serve the Chapter. On the other hand, members of these segments need to come forward and offer their time and efforts to support the organization. You can get involved in Chapter activities without being a member of the board. If you're not happy with your Chapter activities, volunteer to do something about it. Make the time.

Membership Benefits

CGOs overwhelmingly agreed that AAAA doesn't advertise its benefits of membership well enough. We have asked the National Board to mail a copy of AAAA membership benefits to each member with their renewal notice. We've also suggested periodic printing of these benefits in Army Aviation Magazine. If you have a reason to be a member of AAAA that you don't see printed, send it to the National Headquarters for inclusion on the list.

ARMY AVIATION Magazine

We received a number of comments on how to improve the AAAA magazine, ARMY AVIATION. Among the findings were to get away from R&D oriented articles and move toward articles representing the tactical/logistical events occurring in the field today, publish controversial subjects, publish more local Chapter events, increase the size of the magazine to 8 1/2 x 11 inches, limit advertising, and ensure that the people who really write the articles get credit on the by-line.

The publishers of ARMY AVIATION are trying hard to make the changes that will help make the magazine more readable. Over the last six months they have sought to ensure that CGOs who ghost-write articles for their senior leaders are identified as co-authors. They are seeking to have articles written by Aviation Advanced Course students sent to their offices for inclusion in ARMY AVIATION Magazine. They are looking to sponsor an annual essay contest. There are some things they can't do. Advertising is essential to the financial health of the magazine. They don't have a staff to write controversial, tactically oriented articles, and must rely on you to submit them. The time is now to put pen to paper and do something to spice up your organization's magazine. If you have an issue you'd like addressed, write to the editor. He'd be more than happy to find someone out there to address the issue or answer the question.

Your CGO affairs committee and National Executive Board learned a lot from your responses. We appreciate those of you who took the time to answer the questions, and will do our best to ensure your issues are addressed in print through this publication. We ask for your continued support at the local level, we ask the support of the local Chapter Presidents and we ask for the support of the National Headquarters to keep these issues alive and help implement the solutions. IIIII

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Commander's Intent and the Art of Maneuver

By Captain Richard D. Hooker, Jr., Ph.D.

Editor's Note: the following is an edited version of a Land Warfare paper, "21st Century Doctrine and the Future of Maneuver", presented by CPT Hooker and the Institute of Land Warfare at the October 1991 AUSA Convention in Washington, D.C. It is offered as a foundation for articles by CPT Hooker, to appear in subsequent issues of ARMY AVIATION Magazine, and as a springboard for discussion for the entire Army Aviation Community.

Writing in *The National Interest* in 1986, the eminent political scientist Samuel Huntington argued that American performance in war reflected industrial and technological strengths, not commitment to military excellence.[1] America, so the argument goes, is unsuited culturally and historically for the kind of self-absorbed, introspective professionalism that is needed to achieve a cohesive, highly skilled, professional military force. Far better, Huntington concluded, to rely on American mass and technological supremacy with all its attendant waste and redundancy to crush our opponents.

By and large, the virtues of American civilization have not been the military virtues and this has been reflected in military American performance. . . [o]ne should not be swept off one's feet by the romantic illusion that Americans can be taught to fight wars the way Germans, Israelis, or even British do. American strategy, in short, must be appropriate to our history and institutions, both political and military. . . bigness, not brains, is our advantage, and we should exploit it.[2]

CPT Hooker is assigned to the Department of Social Sciences at West Point. He joined the Army in 1975 as a rifleman in the 82d Airborne Division. Graduating from the U.S. Military Academy in 1981, he participated in URGENT FURY and later commanded Co C (Pathfinder/Airborne), 509th Parachute Infantry.

As a profession we must reject this line of reasoning. The commitment to excellence in the common defense is an open-ended contract, requiring constant reexamination and improvement. As resources become constrained, the military services will have no choice but to find ways to fight more effectively with smaller, leaner forces. Past criticism of American reliance on mass, firepower and abundant resources may have been accurate.[3] But innovation, initiative and competitiveness are American virtues too. In today's strategic environment, doctrinal approaches must use these strengths to find a way to win without overpowering mass.

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A maneuver-based doctrine—a shared vision and philosophy based on maneuver concepts—can exploit unique American strengths to build a more powerful, effective force even as numbers of systems and troops are reduced.[4]

Maneuver-based doctrine differs significantly from other approaches to warfighting. It de-emphasizes set-piece, linear, methodical views of warfare, stressing the fluid, nonlinear nature of modern warfare and a chaotic, fast-paced, "messy" battlefield characterized by friction in all its forms. As a general rule, attritional exchanges are rejected in favor of methods offering faster, more decisive results with far fewer casualties.

Maneuver-based doctrine is best understood as a *thought process which seeks to pit strength against weakness to break the enemy's will.* It should not be confused with systems of tactics, principles or formulas. In its broadest sense maneuver doctrine can be relevant at the theater strategic, operational and tactical levels of war. Looked at in this light, warfighting becomes something very different from applying "principles" to mass "systems" to "service targets". Instead, it appears as a clash of wills, with victory going to the side which destroys the opponent's will to resist.

Maneuver thinking is not new, although the work of modern students and practitioners has helped to crystallize and codify it as a coherent body of thought. Though the German and Israeli armies are often cited as expert practitioners, the maneuver thought process is not an exclusively "foreign" concept. Anthony Wayne, Stonewall Jackson, Ranald MacKenzie, Emery Upton, George Patton, and many other American commanders used similar methods and concepts with outstanding success. Maneuver doctrine teaches leaders how to think, not what to do.

A maneuver-based warfighting approach is much more than doctrine defined as "how to fight", though written doctrine is a necessary first step. Maneuver doctrine represents a comprehensive, articulated approach to warfare—more accurately described, perhaps, as "how to think about fighting"—supported by institutional structures which teach leaders how to "think" and "do" maneuver doctrine.

Many of these concepts are well-known and time-tested. What are most important are not the concepts themselves, but rather the mental processes by which they are employed and the means by which these processes are encouraged and developed throughout the force. It is not enough to memorize sets of principles and rules. *From top to bottom, the organization must accept and implement a shared approach to warfighting based on maneuver concepts.*[5]

Fundamentals

Conceptually, maneuver doctrine emphasizes result, not process.[6] Too often we confuse the two. Of course we must use a standard professional language. But what matters most is the outcome, not the process used to achieve it. This argues for wide latitude and discretion in method but strict accountability for result.

The first commandment in maneuver-based warfare is "attack weakness, avoid strength". Appreciation of strength and weakness is as much an art as a science, one reason (among many) why maneuver doctrine cannot be "taught" as a set of techniques or tactics. Weakness is often, but not always, the flanks or rear. It could be the enemy's command and control system, his fire control system, his logistical system, or a unit boundary. It might even be psychological, such as reluctance to conduct night operations.

To accurately identify enemy weakness, continuous reconnaissance and intelligence preparation of the battlefield are fundamental. So is terrain appreciation and an understanding of the enemy and his commanders. U.S. technology gives us signal advantages in this essential area, but traditional methods of intelligence gathering—reconnaissance, patrolling, interrogation, and upfront battlefield leadership—retain their crucial importance. All this might seem obvious, were it not for the number of battles fought in violation of the famous dictum: "hit the enemy as hard as you can, as often as you can, where it hurts him

most, when he ain't looking." A salient observation helps to make this point: we knew opposing commanders intimately in the Second World War. Did we in Korea?

In a war of maneuver the ultimate objective is destruction of the enemy's will to resist, not his physical destruction. This is obviously a psychological and moral as well as a physical effect. It also appears to contradict a fundamental premise of modern war, namely that the destruction of the enemy's forces should be the primary object of combat.

This contradiction is, however, more apparent than real. Clausewitz defined "destruction" as putting the enemy "in such a condition that they can no longer carry on the fight".[7] A.A. Vandegrift observed that "positions are seldom lost because they have been destroyed, but almost invariably because the leader has decided in his own mind that the position cannot be held". Only rarely will an enemy resist to the point where each of his positions must be physically destroyed. More often, hard blows combined with uncertainty, multiple perceived threats, pressure against weak points and similar stresses will break his will. In the just-concluded Gulf War, the bulk of the Iraqi forces confronting the allies disintegrated when faced with rapid blows delivered almost simultaneously on their front, flanks and rear. One hears little criticism of the almost bloodless victory which quickly followed.

The art of warfare was once said to consist of forcing the enemy's surrender without the necessity of battle. Maneuver does not offer victory by avoiding battle, although brilliance in planning and execution will sometimes bring about the early collapse of the enemy.[8] We should not expect an opposing force to capitulate without being struck hard and decisively.[9] Where and when the blow lands—and how this decision is reached—is the essence of maneuver operations.

Fear

How does a force destroy the enemy's will to resist without seeking to crush him with fire? A good start is to generate uncertainty and fear by hitting identified weak points with unexpected and indeterminate threats. Vertical envelopment, sudden attacks from the flank and rear, battlefield deception, jamming, psychological warfare, infiltration, and other forms of the unexpected are time-tested techniques which seek to unhinge the enemy's sense of control over the situation. Fear and uncertainty magnify any threat. The technique selected will differ with the situation, but the principle is the same: to target the enemy's balance and cohesion by hitting his weaknesses—physical, moral or psychological—with multiple, unexpected blows.

Some critics conclude that this focus on "stunning" the enemy encourages a lack of aggression or willingness to engage the enemy. Maneuver doctrine in no way implies a lack of violence or hard fighting. On the contrary, in its rapidity and offensive frame of reference it demands leaders who understand organized violence intimately. Maneuver is not glorified at the expense of firepower, but maneuver does not serve firepower. Firepower creates conditions which support the maneuver concept. To assume otherwise is to be drawn into a technical frame of mind where warfare becomes an exercise in targeting and neutralizing target sets and arrays by massing systems—the very essence of attrition warfare.

Such methods may prevail over weaker opponents, although at great cost in resources. They will almost certainly fail against a comparable or superior opponent who can play the attrition game better than we can. The enemy's fighting forces remain the principal objective. A maneuver mindset means attempting to create conditions where the enemy can be "knocked out" without becoming locked in an attritional exchange.

"Maneuver" deserves precise definition. Maneuver is not simply movement about the battlefield. Maneuver is relational movement, movement in relation to the enemy.[10] Maneuver doctrine preaches the ability to move faster than the enemy expects and faster than he can react. Maneuver fits conceptually into our theory when it advances the goal of attacking weakness with

strength to break the enemy's will. For example, a tactical or operational envelopment against a forewarned enemy who has shielded his flank (as the Soviets did at Kursk) meets the standard definition of maneuver but falls short of the essence of maneuver doctrine. A sudden frontal attack, delivered at night against an enemy whose reserves have been drawn off to a threatened flank, preceded by infiltration groups and coinciding with an air strike against the enemy command post, shows a maneuver thought process even though the technique used is the frontal attack.

Maneuver doctrine seeks to operate consistently faster than the opponent can react, so that a given response must inevitably lag behind one's own decision cycle. Outcycling the enemy ensures speed and surprise relative to the enemy, keeping the initiative out of the enemy's hands, but it does more. As the enemy attempts to respond to what has already happened—not what is happening and is about to happen—confusion, uncertainty and doubt set in to magnify every problem and threat. The inability to respond to a very fast decision/action cycle quickly leads to frustration, system overload, and panic.[11]

Command and Control

Maneuver doctrine accepts, even embraces, a non-linear battlefield where positive control measures and detailed coordination are reduced or absent, while initiative and innovation are encouraged at the lowest possible levels.

The perception that maneuver doctrine demands surrender of control to subordinates is a major concern for many critics. Maneuver doctrine does not call for abdication of command authority and responsibility, but it does prescribe a different approach to command and control leading to greater speed, initiative and flexibility. Command and control in maneuver operations is based on the following 'filters'.

- ***Mission-type Orders:*** *called auftragstaktik* in the German army, this concept requires commanders to articulate a precise mission statement, but leaves the "how" in the hands of subordinates.[12] The mission takes on meaning when explained as a function of the commander's intent.[13] Only then can the subordinate leader really grasp what the commander is trying to achieve. Leaders at each level should know what the commander's intent is at least two levels up. If they do, the role of the smaller unit in the overall plan now makes sense and leaders have a conceptual framework to use when the situation changes or when unforeseen opportunities present themselves.

When clearly understood, intent replaces detailed and restrictive instructions and permits subordinates to understand what the higher level commander is trying to accomplish. Subordinates are allowed, even encouraged, to depart from the original scheme if changed circumstances require a different response to satisfy the commander's intent. Sometimes called "trust tactics", mission-type orders are demanding—of commanders, of subordinates, of the whole system of command. In armies and units which trust the leadership, intelligence and initiative of their junior leaders, much more is possible than before.

- ***Focus of Effort:*** every operation must have a focus of effort, chosen for a specific purpose and clearly understood by all. Usually expressed in action terms ("focus of effort is 1st battalion's attack up the Rosario valley"), the focus of effort is not synonymous with the objective or the mission. While it will often coincide with the main attack, the focus of effort describes where the commander believes he can force a decision. The unit designated as the focus of effort is given the bulk of available fire, close air, engineer and other kinds of support and is supported by sister units. It reinforces the thrust of the commander's intent. When necessary to support the intent of a higher level, the commander may switch the focus of effort at any time to adjust to a changing situation or exploit opportunity.
- ***Surfaces and Gaps:*** These are concepts, not physical constructs. Surfaces represent enemy strengths or hard spots. Gaps are weak or vulnerable points. Reconnaissance and intelligence "pull" us towards gaps and away from

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surfaces. Recon pull may reveal an opportunity not realized during the planning phase. A strong, thrusting reconnaissance effort will probe the enemy for gaps while screening the main effort. If this reconnaissance justifies a departure from the original plan, for example by identifying an undetected gap which can be exploited, previous coordination and planning must not shackle subordinate commanders. They must be free to report and exploit if the friendly force is expected to move, think and strike consistently faster than the enemy. If they cannot, we are led back to a reliance on mass and fires to fix and crush the opponent.

This alternate approach to command and control provides a supporting environment for operations. While different from more traditional views, it does not imply an absence of command and control. But instead of "micro-managing", the commander manages by exception, by monitoring (instead of monopolizing) radio traffic and selectively intervening with decisions that only the commander can make, such as committing the reserve or shifting the focus of effort.

Otherwise, silence means consent. While the reins of command do not come together in the hands of the commander as fully, since subordinate leaders have the right (in fact, the duty) to act on their initiative, the command is actually more focused on the objective and more aware of what must be done. The commander's prerogatives are diminished, by the commander himself, in order to make the force more agile and more lethal.

What happens when situational changes require commanders to immediately reassert control and change the mission? An Army imbued with maneuver doctrine is actually *better* prepared to respond to rapid change. Mission orders, commander's intent and focus of effort are a way to speed up the decision/action cycle. The commander's orders still carry the stamp of urgency and authority. Subordinates are still responsible for results. The difference is in the speed and flexibility with which the force operates, and this can only come through decentralization and initiative.

Viewed from this perspective it becomes clear that maneuver doctrine actually demands more from the commander. It requires top-flight teachers and trainers who can develop their subordinate's ability to act independently. It demands the self-confidence to trust juniors to think and act on their own initiative, within the framework of the mission and the commander's intent. It demands the ability to see what must be done and to articulate it clearly. It demands intuition, flexibility, and decisiveness to dominate a much more fluid and unstructured battlefield. It demands originality to avoid patterned behavior. It demands physical courage to move well forward, to see the battle, to look in a subordinate's eyes, to take charge at the decisive moment and lead. It demands moral courage to create a command climate where juniors are free to be decision makers, and where they feel free to approach the commander with ideas, observations, and recommendations. There will be mistakes, especially in the early stages of combat where everyone is learning. But the commander remains responsible.

The Reserve

Because maneuver operations are so dynamic, the concept of a strong mobile reserve is a basic tenet. A standard rule of thumb is to hold one maneuver unit in three in reserve, but maneuver doctrine encourages larger reserves. The reserve is often thought of as the commander's insurance against disaster, his primary means of retrieving a deteriorating battlefield situation. It is better to think of the reserve as the "Sunday punch". Offensively or defensively, commanders must be alert for openings to score a knockout, not just hold or take a piece of terrain. Particularly in uncertain, fluid situations, strong reserves enable a force to strike with decisive force at points of our choosing.

Picture a division attacking with two brigades, holding a third in reserve. As the lead brigades make contact their presence, strength and direction of attack become known to the enemy. The ability of either to

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maneuver effectively is inhibited. The single remaining brigade is available, but it may not be strong enough to force a decision. It will probably be necessary to look to corps for forces strong enough to deliver a decisive blow. This means a slower operating tempo as fires, boundaries, airspace and logistics are coordinated and follow-on units move up and deploy.

If we reverse the situation and lead with a single brigade, the situation is very different. The lead brigade is strong enough to feel out the enemy, to probe strongly and engage the enemy in the main defensive zone. Supported by the division artillery, cavalry squadron, and the combat aviation brigade, it can take care of itself and develop the situation for the division commander. But now, two full maneuver brigades are available to hit the enemy.

This strong reconnaissance effort will confirm the intelligence estimate or find new weak points. Now, however, the division has more options than before. It can envelop both flanks with a full brigade, or use both to collapse a single flank and drive in to the enemy's rear. The lead brigade can fall back and accept a penetration which can be enveloped, chopped off and destroyed. The division can move straight ahead if resistance is weak. It can disengage and reposition in the face of very strong opposition, since most of the division is not in contact. For any option, its attack helicopter, field artillery and close air support assets can be switched on short notice to weight the main effort.

In the defense, strong reserves offer comparable advantages. Some maneuver units may occupy important terrain features to canalize or influence the enemy to move in a desired direction. Powerful mobile reserves should be retained, not to restore the integrity of a linear defense, but to lend depth to the defense and capitalize on opportunities to destroy large enemy forces. Even in defense, commanders should look for opportunities, not just to hold ground or buy time, but to take out whole enemy formations. Linear defenses which try to succeed by inflicting casualties on the attacker are rejected in favor of more elastic concepts which seek to combine depth, fires and maneuver to defeat the attacker, not rigidly hold terrain.[14]

Every situation is different. A maneuver focus does not mean that terrain retention is never important, that buying time is irrelevant or that mobile offensive action is always feasible even in the face of much stronger forces. A growing threat or increasing uncertainty, however, should lead the commander to provide a larger, not smaller, reserve. This limits the enemy's knowledge of friendly capabilities and intentions, increases the options available to the commander, and preserves a mobile combat force strong enough to make a difference.

How should the reserve be used? Usually the reserve commander will be told to prepare for multiple missions. Often, he is tasked to be ready to assume the missions of other elements. It is probably better to assign possible missions which offer the opportunity to strike a decisive blow.

For example, let us say that a brigade is attacking with two battalions abreast. The left-hand battalion makes no immediate progress. The right-hand battalion reports that one company is stalled, one is being slowly pushed back and one is making slight progress.

One tactical option is to commit the brigade reserve in support of the withdrawing company to restore the continuity of the attack and get the battalion moving forward. This solution is safe, methodical, and linear. It guards against disaster. But it also shows patterned thinking. It shifts responsibility for making a decisive blow up the chain of command. It avoids risk and contributes to a slow operating tempo. It is predictable and reinforces failure.

An alternative solution is to throw the entire reserve in the zone of the company which is moving forward, backed up by as much of the brigade and division's fire support resources as possible. An audacious commander might even move the stalled company over to participate in this effort, sliding adjacent units towards the breach at the same time.

The enemy might throw everything into

the weakened area and disrupt the entire operation. But he probably will not. Before he realizes that one part of his front has thinned out, he will be struck by a heavy and sudden blow in a weak area. He will try to assess what is happening and respond, but he cannot know the mind of his adversary or its intentions. He must respond to this very dangerous threat, and quickly.

If at the same time his communications are suddenly jammed and his Command Post (CP) is attacked with indirect fires, the enemy commander is in serious difficulty. He must relocate the CP and reestablish communications. He must try to make sense of the increasingly frantic messages from his front-line commanders. He must move forces to the threatened sector and coordinate fires to support them. He must report to higher headquarters and answer their urgent demands for information. In effect, the enemy is a captive, not master, of his situation. Unless he possesses considerable experience, nerve and talent he may fail completely.

In *Inside the Soviet Army*, Viktor Suvorov describes just such a situation. At Kursk in 1943, the 16th Guards Rifle Corps attacked with nine battalions. Eight made no gains at all, but one managed to make some slight forward progress. Its parent regiment and division rushed all available reserves to the area without consulting the corps commander, in accordance with standing orders. Within half an hour a kilometer-wide breach was made. Within three hours, 27 of the corps' 36 maneuver battalions were fighting in the breakthrough zone, widening the breach to seven kilometers. Every tank and 1,087 of the corps' 1,176 artillery pieces were dedicated to this attack. The Front's exploitation force, an entire army, was rushed to the spot, followed within days by the reserve army of the Supreme Command. Ultimately, the German front collapsed completely, ending forever the possibility of a German strategic offensive in the east.[15]

The important point is not the proportion of engaged to reserve units. Nor should we conclude that the reserve must always be used where a local success appears to be developing. What is important is having control of a force powerful enough and mobile enough to make a difference, and to use that force against an identified weakness where a decisive result can be gained to deliver a knockout blow. Forces in contact hit, fix, push, collect intelligence and shape the battlefield, but the reserve will decide the issue in many cases. It should not normally be given missions already assigned to other units, which assumes that those units will fail. Once the reserve is committed, other reserves should be immediately reconstituted from units not decisively engaged, or provided from higher. Because of the demanding nature of the reserve mission and its importance as a decisive part of every plan, the reserve commander should be a proven leader, not a weaker commander placed there to be kept out of trouble.

Logistics

More work is needed to develop fully the logistical implications of maneuver operations. Some points, however, stand out as logical corollaries. First, to the extent that maneuver offers a way to shorten the battle through the rapid collapse of the enemy, the possibility exists that the extreme demands placed on the logistical system by prolonged operations can be avoided. Less emphasis on the application of massed fires as the key to victory should mean much lower ammunition use rates. If battles can be kept short and sharp, fuel consumption within the theater may be high initially but much lower than one could expect from a more methodical, set-piece, sustained campaign of longer duration.

The maneuver distinction between "how to do" and "how to think" also applies to logistics. The 1986 version of Field Manual (FM) 100-5 *Operations* departs from the 1982 version with its conceptual discussion of sustainment principles in lieu of a purely descriptive approach. These include anticipating maneuver requirements, close integration of sustainment with the maneuver plan, the need to surge logistically as maneuver units grasp fleeting opportunities

and the importance of improvisation when things go wrong.[16]

At the tactical and operational levels, innovation and initiative are just as important to the logistician as to the operator. Fluid, mobile ground/air battles will often find units out of contact or with no clear line of supply to the rear, and the rear areas may have their own problems from ground and air attack. Nevertheless, these are features of modern warfare in general and not of maneuver operations in particular. Forward positioning of supplies, through-put logistical support, the ability to fix, fuel and arm well forward and at night, and protected supply vehicles which can keep pace with fast-moving mobile formations will all be needed to support large-scale maneuver operations.

Maneuver doctrine calls for many changes to our traditional way of doing business, but one thing that does not change is the central importance of logistical planning and support. The problem of supply in war will remain the driver behind all combat operations. We cannot afford to neglect it in the doctrinal development process.

Fire Support

Maneuver thinking is often criticized unfairly for its perceived denigration of firepower. While it is true that maneuver theorists are critical of approaches to battle which emphasize the methodical application of overwhelming fires, firepower plays an essential role in maneuver doctrine.[17] Firepower, and the technologies used to exploit it, are crucial components of modern warfare. Fundamentally, armies fight with fires. The difference between maneuver and attrition thinking is that in maneuver operations, fires serve to support the maneuver concept—not the other way around (as was the case in the Vietnam conflict).

Firepower and technology, as important as they are, must not mask the essential truth that human factors are decisive in war. Given reasonable numbers and adequate equipment, training, leadership and drive will tell every time. Concentration and timing of fires are more important than sheer mass, with victory going to the side which combines fires and maneuver most effectively to destroy the opponent's cohesion and will to fight. Rarely will an enemy consent to be physically torn to pieces. But you can create the impression he is about to be.

On 26 October 1917, a weak detachment led by Lieutenant Erwin Rommel, ignoring orders to withdraw, attacked and captured the Matajur massif in the Italian Alps. The action earned Rommel the *Pour le Merite*, Germany's highest battlefield decoration. Advancing boldly to create the impression of superior numbers, Rommel maneuvered across very steep terrain to attack consistently from unexpected directions.

Throughout the action, Rommel repeatedly concentrated the fires of his heavy machine guns against single targets, shattering them one by one and causing the collapse of entire formations as Rommel's small company of riflemen struck these demoralized units repeatedly from the flank and rear. Although infinitely inferior in firepower, Rommel used the fire assets he did have in a concentrated, closely controlled way to strike heavy blows at enemy weak points. Caught in the bag were 150 officers and over 9,000 Italian troops. It was the beginning of the Rommel legend.[18]

As the Second World War progressed, British artillery commanders began to realize that their standard fire support doctrine was not achieving desired results. Successive British defeats in North Africa provided a powerful stimulus to try something new. One such innovation was the Parham method of fire control, sometimes called the "72 gun battery".[19] Used primarily in British divisions, (though also by some U.S. units later in the war), this system placed seasoned battery commanders forward as observers in place of junior artillery lieutenants. These officers were delegated authority to literally command the fires of the division artillery through the use of a single code word—"uncle target". For single targets the battery commander/forward observer directed the fires of his own battery; since he commanded it these fires were extremely responsive.

If necessary, this officer could request a division artillery fire for effect over a net reserved only for "uncle" fires. Standard fuze-shell combinations were used and the calls for fire could not be countermanded by intermediary fire support personnel. Typical response time on the target for 72 guns was four to six minutes. Time and again, German formations attempting to move in the open were drenched with the massed fires of the entire division artillery, which could be switched to other targets quickly and easily.

At first glance one might assume that the division's indirect fire assets would be in a constant state of chaos as inexperienced officers called for simultaneous fires. In practice, this almost never happened. In the same way that outfielders sort out who will take the fly ball, combat-experienced artillery commanders quickly learned to identify the enemy's main effort and to reserve massed fires only for worthwhile targets. The system greatly speeded up the division's decision/action cycle and made the division artillery a decisive instrument of combat. The Parham method did away with the practice of giving some artillery to everyone but no decisive quantity to anyone—in effect making it an instrument of strength to break the enemy's will. Maneuver commanders now had fire support that moved and thought as quickly as they could.

These examples illustrate how firepower, used with speed and concentration against weak points, offers a way to use firepower to assist maneuver by providing decisive concentrations of fire extremely quickly. This underscores the fact that maneuver doctrine does not mean excessive reliance on movement and de-emphasis on fires. The two remain inseparable.

A maneuver-oriented force, however, will use its fire assets more effectively and decisively. If necessary, it can fight outnumbered with confidence that superior doctrine gives it important advantages over larger but slower and more methodical adversaries. Maneuver-based warfare views battle not as an attritional exchange of massed fire systems, but as the dynamic application of maneuver and fires to shatter the enemy's will—something very different.

The Operational Art

In maneuver literature perhaps no single concept is more prominent than that of the operational art. The operational level of war has received so much emphasis in the last decade that one forgets that, for most of our history, the U.S. Army made do without the use of the term.

Operational art is important because it provides structure, coherence and doctrinal focus to the process by which battles and engagements are linked together or sequenced to achieve strategic objectives. Previously, the relationship between tactical engagements on the one hand and strategy on the other was both indistinct and somewhat tenuous. Although broadly-based strategic planning within a theater did exist, there was a tendency to prosecute campaigns through the "accumulation of tactical victories" in order to wear down the enemy.[20]

A vivid example of the contrast between this approach and true use of the operational art can be seen in Operation DESERT STORM. The initial plan prescribed separate but related components: the air phase, the amphibious feint, the frontal holding attack along the Kuwaiti-Iraq border, and the operational envelopment from the west. The objective, however, was not to force the Iraqis to give battle and be physically destroyed by superior allied technology and firepower. Instead, these phases were sequenced in order to bring about the panic and collapse of the identified Iraqi center of gravity in the Kuwaiti Theater of Operations—the enemy's ability to command and control his forces.

At no time did the enemy see what he expected. Fooled from the outset by an epic deception plan, his attempts to recover were frustrated by the speed and depth of the allied envelopment, the surprising success of the frontal attack across the border, and pin-point attacks directed against virtually every identified command and control facility in the theater. With surprising speed,

the Iraqi will to resist evaporated as the enemy's "brain" died.

Many of the staff officers associated with the planning of DESERT STORM were products of the School of Advanced Military Studies, the "School of the Operational Art" at Ft. Leavenworth. Placed in key operational assignments in the divisions and corps of the field Army, they help to impart a shared doctrinal vision of the battlefield they have been trained to know exceedingly well. That vision is not concerned with "wearing down" the enemy. Instead, it seeks his early collapse by winning the clash of wills at the operational level of war.

The Maneuver Spectrum

In bridging the gap from theory to reality, it is important to note that combat operations may exhibit a higher or lower maneuver content depending on circumstances which may be partly or wholly beyond the commander's control.[21] Critics who point out that combat is rarely a question of pure maneuver vs. pure attrition are speaking accurately (and often from experience). While maneuver theory provides a basic framework for analysis of battlefield problems and a set of basic operating assumptions, reality dictates that operations will have a higher or lower relational maneuver content depending on circumstances. The maneuver thought process should always be applied. But practical considerations may dictate a low measure of relational maneuver in a given operation.

A classic example can be found in John Masters' *Road Past Mandalay*.[22] In the China-Burma-India theater in WWII, Masters' Long Range Penetration Brigade ("Chindits") achieved remarkable results in the Japanese rear in the first few weeks after their insertion by air. Their operations are outstanding examples of maneuver operations. Eventually, however, casualties, fatigue, terrain, weather, availability of food and ammunition and declining morale from all of the above strictly limited their ability to move, think and act faster than the Japanese. Their operations took on a half-speed, methodical character with a very low level of relational maneuver content.

In this vein, commanders and leaders must always consider the capabilities of their units relative to the enemy. Some courses of action which may otherwise seem appropriate will actually be infeasible because of the physical or psychological condition of friendly forces, or because of logistical, weather, space or time considerations. The range of options may reduce to one: a direct force-on-force engagement where leadership, aggressiveness and firepower must determine success or failure. At all times, however, commanders should weigh these considerations against the opportunities offered by speed, concentration, deception and originality—the hallmarks of a maneuver-focused battle force.

The Future of Maneuver

A close look at AirLand Battle Doctrine reveals a clear link to maneuver thinking. Where the 1976 FM 100-5 *Operations* focused on firepower, emphasizing force ratios, the destruction of enemy forces and the defense, the 1982 version which introduced AirLand Battle doctrine emphasized the operational art and the importance of human factors, stressed the role of maneuver and the importance of the offensive, defined the non-linear nature of the battlefield, and called for speed, surprise and audacity as key fundamentals of the new doctrinal approach to warfighting. The 1986 100-5 was more restrained in its advocacy of maneuver over fires but retained the essential thrust of the revolutionary 1982 document.[23]

The developing Training and Doctrine Command (TRADOC) vision of "AirLand Operations" may go even further. The next version of 100-5 will reaffirm these principles and place further emphasis on seizing the initiative in offensive and defensive battles, mission orders as a technique of command, the focus of effort to define responsibility and the commander's intent as the basis of command and control. Smaller forces will make the battlefield more fluid and non-linear than ever. Maneuver will be firmly imbedded in doctrine and the will of the opponent will remain the primary target.[24]

U.S. Army doctrine in the past fifteen years, beginning with the 1976 FM100-5 and continuing through the 1982 and 1986 versions, has steadily evolved towards a maneuver approach to battle and operations. Clearly, AirLand Battle doctrine and maneuver theory are largely complementary. By whatever name, these concepts deserve continued application and refinement.

But talking the language of maneuver is not enough. Beneath the lexicon of AirLand Battle, behind the maneuver "buzzwords", lie decades of tradition based on lavish resources and abundant firepower. Those days may soon be well behind us. An Army capable of maneuver-based AirLand Operations needs more than new terminology and new manuals. It also needs professional development programs, leader selection and evaluation architecture and unit training regimes designed to support a distinctly different approach to fighting wars. A smaller, less robust Army must learn to win without overpowering force. Other armies have learned to do so. Can ours? IIIII

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[1]Samuel Huntington, "Playing to Win", The National Interest (Spring 1986).

[2]Ibid, 10-15.

[3]A partial list of those who have commented on American reliance on "industrial" or "attrition" techniques and doctrines include Weigley, Hadley, Doughty, English, T.N. Dupuy, Michaelis, Luttwak, Fehrenbach, Hastings, and Lind, as well as Huntington and others.

[4]The term "maneuver warfare" is sometimes applied to the concepts and analytical framework discussed in this paper. Because of its emotional connotations, a legacy of the bitter exchanges between reformers and military professionals a decade ago, the label itself often detracts from serious examination of these concepts on their own merits, and is not used in this discussion.

[5]Implementing written doctrine may be the most difficult step in changing the way military forces fight. Without genuine changes in leader development, collective training and leader selection and evaluation processes, the leap to a different conceptual approach to warfare may be impossible—regardless of what is written in operations manuals.

[6]This discussion of maneuver fundamentals is based upon William S. Lind and M.J. Wyly, Maneuver Warfare Handbook (Boulder: Westview Press, 1985), still the most influential and widely read source on the subject.

[7]Karl von Clausewitz, Vom Kriege ("On War"), ed. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), 90.

[8]German victories in Poland and France, Israeli victories in the 1956, 1967 and 1973 Arab-Israeli wars and the Gulf War demonstrate that quick, decisive knockouts can be achieved by avoiding force-on-force engagements and paralyzing the will of the enemy. The important point, however, is not battle avoidance but rather the application of force against vulnerabilities which, when struck, will cause the collapse of resistance.

[9]Huba Wass de Czega, "Army Doctrinal Reform", in The Defense Reform Debate, ed. Asa Clark et al (Baltimore: The Johns Hopkins University Press, 1984), 103.

[10]See Edward Luttwak, Strategy: The Logic of War and Peace (Cambridge: Belknap Press, 1987), 93.

[11]This concept is based on Air Force Colonel John Boyd's "Patterns of Conflict" briefing, references to which exist throughout the body of maneuver literature. See Lind and Wyly, 5.

[12]See John L. Silva, "*Auftragstaktik*: Its Origin and Development", Infantry (September-October, 1989).

[13]In the author's opinion, commander's intent is often misunderstood. FM 7-72 *Light Infantry Battalion* (1987) discusses the term in the chapter addressing the defense, but no precise definition appears and no amplifying examples are used. FM 7-71 *Light Infantry*

(Intent — continued on page 65)

LNO: the Least Known Combat Multiplier

By Captain Garrett P. Jensen

As an aviation liaison officer (LNO) for the 11th Combat Aviation Brigade in Operations DESERT SHIELD/STORM, I had the unique opportunity to employ my aviation experience on the battlefield. This was a task that I was very well prepared for, but earlier in my career as a 2LT cast into the great unknown, I was not so confident. Looking back, I would attribute my success in the desert to being able to rely on previous field experience, insisting on a sound support package, and being given the latitude to work with some autonomy within the framework of the commander's intent.

In September 1985, four months out of flight school, I found myself a scout section leader in the 82nd Combat Aviation Battalion. It was a Friday afternoon and I was instructed that on the following Monday, I was to jump in with an infantry brigade for their annual ARTEP and perform as their LNO. My response was, "What's an LNO?" I was given a briefing by my S-3 which amounted to "Go forth and do great things." I had no support package with the exception of what was in my ALCE pack. Fortunately, one of my brothers in arms from my sister cavalry squadron was LNOing as well, and I was able to share his vehicle and radio. I succeeded in spite of my lack of preparation, but perhaps at the cost of some quality representation of the newly formed Aviation Branch.

CPT Jensen is Commander, A Co., 4-229th ATKHB, 11th CAB, Illesheim, Germany.

One year later, I found myself a 1LT Cobra platoon leader performing as an LNO for an armor brigade at the National Training Center. As a 1LT, I was much more confident and actually able to advise the Brigade Commander on the employment of attack helicopters. ("Sir, I don't believe the operator-controllers are going to appreciate diving fire in a high threat ADA environment.") But again, I found myself without the necessary equipment. My half-ton Jeep just couldn't keep up with the tracks. For-

tunately, the Air Force came to the rescue this time. Between battles, and during admin movements, I jumped into their HUMMWV. When a battle would commence, I got on board the ALO's APC and we shared some living space and radios. Do you see a pattern developing here?

Five years, the advanced course, the Apache transition, CAS³, and a company command later, I find myself an LNO for VII Corps' aviation brigade, the 11th, in DESERT SHIELD/STORM. Prior to the air war commencing, I was working with the 1st Armored Division on the defense of Wadi Al Batin. The OPLAN was an attempt to tie together 1st AD's 4th Brigade, the 11th CAB, and aviation assets from the 101st Air Assault Division to defend Hafir Al Batin and King Khalid Military City while VII Corps consolidated south of the Tapline Road. Fortunately, it never had to be executed. After the air war had commenced and the 101st did their successful Apache night raid into Kuwait, my former Squadron Commander from 2-6 Cavalry decided it was time for VII Corps' Apaches to see some action. Hence CONPLAN BUGLE was born. The mission combined 2-6 Cav's Apaches and artillery from the 1st Cavalry Division and VII Corps for a night cross-FLOT feint and combined artillery raid into southern Iraq. For this mission, since the real estate and airspace belonged to 1st Cav, I was co-located with them. My colleagues from 11 CAB jokingly said that I should be wearing a 1st Cav combat patch. It was the smoothest H-hour sequence I had ever seen.

During the time that I worked on the above mentioned missions, approximately five weeks passed. I logged 5,000 miles in day, night, rain showers, and sand storms. Although I used an OH-58 on occasion, the amount of coordination that was necessary to keep a helicopter on call just wasn't practical. The irony of it was that I was driving an old Blazer 4x4 while my parent unit had a dozen new HUMMWVs. I was doing more driving than anyone in the brigade and I couldn't get them to give up a HUMMWV. My travels included going between 1 AD, VII Corps Main, and 1st Cav, and my brigade collecting daily SPINS, INTSUMS, OPORDS, and other desirable information, but I couldn't get priority to the equipment that I needed. When I asked for a HUMMWV, a GPS, or night vision goggles, there were none to be found.

" . . . rank is not always commensurate with tactical proficiency. It is a dividend of experience and training."

One of my excellent adventures included getting stuck in the mud in the middle of the night off the Tapline Road and being pulled out by some Nigerian mercenaries from the Egyptian Army. Another included running over concertina wire which was left unguarded over a main dirt road by one of our beloved Patriot units. I am convinced that if I had a HUMMWV, a set of NVGs, and a LORAN or GPS those two events wouldn't have happened. Follow-on missions for me included coordinating my brigade's passage through the breach and LNOing for the 3rd AD on the day when my brigade had its highest BDA of the war. With the advent of the ground war, the equipment I needed mysteriously appeared. Obviously one of the points that I'm trying to make is that an adequate support package is essential for the LNO to be effective.

The focal point of the package should be

a HUMMWV with two mounted secure FM radios. Depending on the mission, it may be necessary for a tent, cot, and heater as well. Building a wooden box that locked on the back of the vehicle was the answer for storage and security. Other essentials included maps, SOIs, a KYK-13, an LNO handbook (which I will address in detail later), and an adequate supply of weapons, ammunition, and rations. Also, if there is not enough terrain relief to navigate by, then a GPS or LORAN is needed. Perhaps the most critical element is a competent driver. My driver was a school-trained aerial observer whose expertise was invaluable when I became fatigued. This equipment and driver has got to be identified and prepared in advance. When J-STARS picks up 100 moving target indicators headed toward your sector, that is not the time for the LNO to have to go shopping for support.

Experience

Just as there is no substitute for the right equipment, there is also no substitute for rank and experience. Imagine yourself as a brigade or division commander or his operations officer, who is skeptical of those who draw flight pay to begin with, listening to advice on how to employ his aviation assets from a warrant officer or lieutenant. You probably wouldn't be the most attentive audience. You would want at least a captain who can translate aviation into armor or infantry and vice versa, someone who has knowledge in combined arms training. Back at the ARTEP at Fort Bragg when I was LNOing as a second lieutenant, my credibility was minimal. Even when I knew what I was talking about, I was constantly being second-guessed.

Unfortunately, rank is not always commensurate with tactical proficiency. It is a dividend of experience and training. Had I not risen through the ranks in the attack helicopter business, I wouldn't have felt comfortable deconflicting airspace with the artillery and air defense, drawing graphics for deep attack routes, choosing battle positions, and advising brigade and division commanders. The prospective LNO must be as comfortable with doctrine as he is with his unit's SOPs, organization, and aircraft capabilities. To have these committed to memory should be the standard, but as my first commander told me, "A short pencil is worth a long memory." This is where the LNO handbook can become a useful tool.

The handbook can have whatever information the LNO feels necessary. It should contain an equipment checklist and vehicle load plan. Other useful entries may be friendly and enemy order of battle, weapon system capabilities (especially those of the organization of the supported unit). Applicable parts of the unit's SOP are also a good idea.

Being able to work autonomously within the framework of the commander's intent as an LNO is very important. Due to the amount of ground that I was covering in the Kuwaiti Theater of Operations, communication was difficult at times. Compounding this difficulty was that my parent and supported units were often moving while planning missions. Radio and telephone communication were not always reliable. So I had to make some tactical decisions on my own and brief the S-3 as soon as it became possible. Until this level of confidence is reached, face to face communication between the S-3 and the LNO should be emphasized.

OPLANS, OPORDS, and their associated graphics should be gone over in detail. Questions such as how often should the LNO check in, and by what means, must be addressed.

A well prepared LNO must have a high priority for the equipment he needs to perform his duty, be of the appropriate rank and level of experience for the position necessary in the supported unit, and have the level of confidence of his S-3 which enables him to make critical decisions with limited guidance. Too often the knee jerk reaction for the commander or his S-3 when tasked for an LNO is to give up an old pony and leave his thoroughbreds in the barn. But we must not forget that this horse's performance is a *direct* reflection on the professionalism of your unit, and will leave a lasting impression. IIIII

Where Have All the Man-hours Gone?

By Captain Thomas L. McClellan

Would you be shocked to find out that it cost $317 per day to have a soldier rake leaves? As it turns out, that is only a conservative estimate of the amount of lost productivity when a maintenance MOS soldier is taken away from working on his primary mission. I have done an analysis of manpower utilization using a non-divisional Aviation Intermediate Maintenance (AVIM) company as a basis for study. A close look at the results yields some interesting areas for improvement in the way we do business.

Why a Manpower Study?

In the aviation maintenance business, we expend a tremendously high amount of maintenance manhours to keep our systems operating when compared to the hours of usage of those systems. This is understandable since the complexity of the systems, coupled with the need for them to be lightweight, can detract from their durability. Considering the potentially high cost in terms of life and limb when aircraft systems fail, it becomes even more important to put in those maintenance manhours.

CPT McClellan is Production Control Officer, B Co, 8-158th AVN, Hanau, Germany.

Separate studies have shown that Army aircraft require upwards of 10 man-hours of direct productive maintenance time for every flight hour (ref: Sample Data Collection program administered by Cobro Corp., aircraft in USAREUR, 1990). Finding the time to allow soldiers to do this maintenance in conjunction with their other soldierly duties is a great challenge to leaders at every level.

As the Production Control Officer of a Non-Divisional AVIM Company in Germany, I am responsible for its maintenance support mission. I have felt frustrated in my efforts to support our customers because I did not think we were getting enough productivity out of the 272 soldiers in the company. I had a strong suspicion that it was because the soldiers were just not in

the hangar enough. I therefore sought to determine where all of the man-hours went and I came to see some interesting conclusions from this study. None of the conclusions were Aviation specific, so there are good lessons in here for support units from other branches of the Army.

I calculated the equivalent number of days on which soldiers would be working ("N") and multiplied it by the equivalent number of soldiers ("S") who would be working on each of those days to come up with the total number of man-days worked in a year. In this text, the words man, men, man-hours, etc., shall refer to soldiers of both genders. All calculations are based on a generic non-divisional AVIM company, assumed to have personnel filled to exact MTOE authorization, at ALO 3 in this case.

Man-days Available in a Year

In a non-leap year, there are 365 days, of which 104 fall on weekends and 11 fall on federal holidays (including the Friday after Thanksgiving which is generally given to soldiers as a day off). This leaves 250 work days per year, so right now N equals 250.

I estimate that we will have to participate in two change of command ceremonies per year, each taking up to two days (one for rehearsal, one for the actual ceremony). There may actually be more or less, but with possible ceremonies for Company, Battalion, Group, and COSCOM changes of command, it is likely we will see two per year, a loss of four days. N is now 246.

The unit will likely have at least one Organization Day or similar type event each year. This will actually subtract two days from N due to preparation and cleanup time. N is now 244.

We will probably see two in-ranks and TA-50 layout inspections per year, each taking an entire man-day. N is now 242.

All units are required by USAREUR Reg 350-1 to conduct Common Task Testing (CTT) once per year, likely taking two days to complete. N is now 240.

Higher headquarters schedule Training Holidays for everyone in the command. We have recently seen separate training holidays approved by USAREUR, V Corps, and COSCOM headquarters. Estimate five per year. N is now at 235.

USAREUR's commander instituted a theater-wide program in 1988 called Sergeant's Time. Every Thursday morning from 0700-1200, all enlisted soldiers engage in MOS, common-task, and war-fighting skills training. No soldier is allowed to miss this training for appointments or other distractors unless approved by the first Colonel in the chain of command. No mission support work may be performed during this time; the morning is committed totally to training. This takes away half of one day every week for an equivalent of 26 total work days lost per year. N is now 209, which is only 57% of the total number of days in the year (365).

Soldiers Available Each Day (S)

The company's total authorized strength at ALO 3 is 272 soldiers, of which 19 are authorized for the company headquarters (CO, 1SG, supply, clerks, cooks, etc.), 23 are authorized for the Motor Pool, and 34 are in the Supply Support Activity (SSA). The remainder are authorized in platoons/sections which directly impact the unit's maintenance mission (what I will call wrench-turners), including the Production Control and Quality Control sections. S starts out as 196.

Unfortunately, the number of personnel authorized to staff the company headquarters is insufficient to perform the amount of administrative work necessitated by regulations, policies, directives, and the sheer size of the unit. Training management, reenlistment, mail room, and publications management are the full-time jobs of seven soldiers, but have no authorization on the MTOE. The supply room is not adequately staffed with only its MTOE authorization, so three more soldiers must be taken out of other sections to help there. Due to geographic separation from our Battalion headquarters, the company headquarters has had to assume several functions normally performed by the battalion PAC, so four more soldiers are needed to do this. A total of *14 extra soldiers* are required in order to help manage the "overhead" functions of this

organization, acting as what they are commonly referred to as shadow clerks. Every unit that I know of has them, so to pretend they are not there when conducting a manpower study would be inappropriate. Of these 14 soldiers, the wrench-turners' share would be 10 (on a strict percentage basis). *S is now 186.*

This unit also gets tasked to provide personnel for post details (Unit Police, roads & grounds, community duty driver, fitness center workers, etc.) taking another 10 wrench-turners away. *S is now 176.*

Of those 176 wrench-turners, some will be in and out processing. It takes at least a full month to inprocess into a unit in USAREUR (consider housing, personnel, driver testing, German language training, CIF, etc.) and almost that long to out-process. Figuring that each soldier will spend two months of his tour in and out processing, and an average length of three years, we have 1/18th of our wrench-turning force unavailable at any given time for this purpose, or 10 soldiers. *S is now down to 166.*

Every soldier gets 30 days leave per year, so at any time 1/12 of the force will be on leave. This will fluctuate seasonally, but for calculating the total man-hours available in a year it will come out about right. 1/12 of 166 is 14, so *S is now 152.*

Calculating Total Man-hours (T)

If we multiply our figure for S of 152 men by our figure for N of 209 days, *T equals 31,768 Man-days* (MD) or *285,912 Man-hours* (considering a 10 hour duty day with 9 work hours and an hour off for lunch) available for the purpose of performing aircraft and component maintenance in a given year.

There are further distractors which take people away and at this point, I will start counting Man-hours (MH) lost instead of Man-days.

Organized physical training (PT) takes place three times per week as mandated by USAREUR Reg 350-1. We do it in the afternoon to minimize MH lost to recovery time but it still takes soldiers away for about 1.25 MH each time. 1.25 MH x 152 men x

3/5 x 235 days = 26,790 MH. The figure of 235 days accounts for all of the whole day distractors except Sergeants' Time, since that does not interfere with afternoon PT, and we do PT three days out of every five. *T now equals 259,122.*

Billets clean-up takes an estimated 15 personnel one MH each work day to complete. Subtracting only from the days on which work would be accomplished, a total of 235, this means that billets clean-up takes away 3,525 MH per year. *T is now 255,597.*

Soldier of the month/quarter boards and promotion boards further erode our work time. Figuring two boards per month taking NCOs from throughout the company as board members (four from the wrench-turners), as well as four soldiers with their squad leaders, all for one half of a day each time: 12 men x four MH x 24 boards per year is 1,152 MH lost per year. *T is now 254,445 MH.*

I studied our company sick call log and found that on the average, seven soldiers go to sick call each day. These soldiers may be gone for only an hour, may take all morning, or may get quarters for their illnesses. I further estimate that an additional six soldiers are gone each day to health care appointments for themselves or their dependents. Of this total of 13 soldiers, the wrench-turners' share would be eight soldiers. Figuring five MH lost for each of these soldiers, eight men x five MH x 235 days equals 9,400 MH. *T is now 245,045 MH.*

Maintenance of motor vehicles and ground support equipment is extremely important but it does take time away from working on aircraft. Most units schedule Motor Stables once per week for all vehicle operators and supervisors. This takes away about 75% of the people who would otherwise be working on aircraft for three MH each week. 75% x 152 men x three MH x 52 weeks equals 17,784 MH. *T is now down to 227,261 MH.*

Our Military Community (MILCOM) requires parents of school-age children to periodically serve as bus monitors. We generally lose about three people per day during the school year, and it takes up almost the whole day so I figure seven MH lost. Three men x seven MH x 173 school days equals 3,633 MH. *T is now down to 223,628 MH.*

Police call of our unit's specified areas on post usually takes a 10 man detail one day per month. Figuring that six of these are wrench-turners, six men x nine MH x 12 times a year equals 638 MH. *T is now 222,990.*

What is left to take out? I have not included any time for performance counseling, writing NCOERS, conducting Article 15 hearings, reports of survey, toolbox inventories, command inspections, meetings, and many other distractors too hard to quantify. I have not included soldiers attending BSEP, PLDC, BNCOC, or ANCOC. I am sure you can think of others. These will also take soldiers away from working on aircraft, but are difficult to quantify. Though I do not account for the effect of these factors in the Man-day calculations, these distractors still take away from our productivity.

How Are We To Fix Aircraft?

Converting T back into Man-days, we have 24,777 MD available to use for fixing aircraft and components each year. If you consider that 250 days in each calendar year are "normal" work days, then we are only getting the equivalent of 99 men to put in a full day's work on each of those days. This is not much bang for our buck especially when you consider that we are paying for the salaries and benefits of what should be 196 wrench-turners, plus the salaries and benefits of the personnel authorized in the Company headquarters and Motor Pool.

Speaking of salaries, my analysis of the payroll for the entire company shows that the government pays approximately $654,000 per month in pay and allowances for these 272 soldiers. This does not count non-monetary benefits such as medical care, PX and commissary, retirement pension accural, etc. If our equivalent force of 99 soldiers mentioned above works 250 man-days each year, then the marginal unit

(Man-hours — continued on page 50)

International Focus

The Wings of the Italian Army

By Lieutenant Colonel Giovanni Tonicchi

The Italian Army first used aircraft for military purposes during the Libyan War (1911) and, immediately after, during World War I. For almost 30 years after the birth of the Air Force in 1923, Army Aviation was completely subordinate to the latter flying corps.

In 1951, the Defense General Staff, following the example of other western countries, decided to create the ALE—Aviazione Leggera Esercito (Army Light Aviation) in order to allow the land forces to rely on their own aviation assets. The birth was not an easy one because of the imposition of such restrictions as: maximum take off weight of 1.5 tons; all planes painted yellow in civilian markings; and the requirement that all Army aviators hold a civilian license. In 1950 a small group of artillery officers was sent to Ft. Sill, OK to become fixed wing pilots and serve as the new breed, the army's new generation of (literally) "Flyingmen".

LTC Tonicchi is an A-129 Instructor pilot at the ALE Center in Viterbo, Italy.

The first "Light Aircraft Unit" was established, in May 1951, on the grassy strip of the field artillery school in Bracciano, a small town not far from Rome. The aircraft was the Piper Cub (L18C) and the initial tasks for the unit were essentially training pilots and technicians. Soon the introduction of the Piper Super Cub (L21B) and the more modern 01E Bird Dog (L19) gave the ALE the tools to begin operational activity and new units began to be spread all over the peninsula. At this time, the roles of the airplanes were related to their limited performances and included: liaison, observation of artillery firing, photography, reconnaissance, etc.

In the early 1960s the ALE began to introduce the helicopter, greatly increasing its capabilities. After the initial experience with Bell 47 Series (G and J), the purchase of the UH-1B allowed the branch to explore the promise of "Airmobility", which was greatly needed by the army. The process

of acquisition of new turbine powered aircraft was facilitated by the "boom" of the Augusta Company, the Italian firm which had been producing rotary wing machines of its own design or under license since the late 1950s. In the recognition of the expanding presence of the branch, the initial restrictions were removed and the aircraft received their "Military" camouflage and the three color roundel.

During the 1960-1970 period, following increasing interest, technological development, and the international evolution, equipment was adapted to the evolving requirements of the land forces and ALE introduced the SM-1019 (a turbine engined light aeroplane built by the Italian SIAI Marchetti). This general purpose craft still represents the "backbone" of Army aviation's flight line.

From the 1970's to the 1980's, ALE acquired state of the art aircraft introducing the A-109 Hirundo (employed for staff transportation, liaison, and served as the "Test Bed" for the development of an indigenous antitank attack helicopter) and the CH-47 Chinook for the medium lift mission. During the same period, the helicopters began to be armed with machine guns and rocket launchers offering the army their first opportunity for independent fire support from the air.

The acquisition of the AB-212s (UH-IN), AB-412s, more A-109s and the introduction of the UH-1 CAE Flight Simulator, further modernized the fleet in terms of safety for employment in IMC flight conditions. The delivery of the first batch of the A-129 Mangustas in October 1990 represented a historic milestone for the ALE and has given the army the anticipated autonomous CAS capabilities in antitank and area suppressive fire.

With the Mangusta, the Italian army is the first in Western Europe to rely on an original project for a "Military Helicopter" rather than a "Militarized Helicopter". The A-129 flies in all conditions thanks to a combination of weapon systems and IR sensors designed for both navigation and combat. The pilot and co-pilot/gunner's integrated helmet and display sight system provides perfect visibility in any operational condition, day, bad weather or night. Its unique integrated control system assures complete automatic management of all aircraft functions allowing the pilot to concentrate exclusively on the mission. The Mangusta architecture provides high protection and survivability. With its advanced features and system integration, the Mangusta has a low life-cycle cost and assures mission success while achieving the best cost-effectiveness among combat/attack helicopters.

Command/Logistic Organization

The chain of command is represented by the "'Ispettorato ALE" (directorate) headed by an "'Ispettore", Major General Giampaolo Giannetti. This directorate is directly subordinate to the Army Chief of Staff and has:

- direct disciplinary and operational control of the Army Aviation Center and school, and the 1st "'Raggruppamento Antares".
- authority for the employment of personnel, direction, standardization and safety for all the aviation units, both operational and logistic.

The logistical chain of command is included in the Logistic Directorate of the general staff and is represented by the "'Comando Materiali ALE" (Material Command), which supervises:

- Management of Purchasing and Maintenance
- Disciplinary control on the "'Reparti Riparazioni ALE" (regiments) for the technical support for 2nd and 3rd level.

Twenty operational and logistic units are spread throughout the Italian peninsula and the two main islands. The participation of the ALE in missions abroad include one company of utility helicopters "ITALAIR" in Lebanon since 1978 and another, "HELITALY", in Namibia from 1989 to 1990, both operating under the flag of the United Nations.

Recent international emergency situations in Turkey (Kurdish relief) and Albania have seen the ALE involved with teams of forces.

Present Organization

Presently, the ALE inventory is more than 400 aircraft (8% of them are helicopters). The fleet is subdivided as follows:

- 70% Operational
- 20% Training
- 10% Reserve

The gross total of flight hours per year is more than 50,000 consisting of 65% Operational, 25% Training, and 10% relief operation in emergency situations, particularly fire-fighting.

The ALE is organized in Regiments "Raggruppamenti" at General Staff and Corps level; Squadrons "'Gruppi Squadroni" at military regions level; and Troops "'Squadroni" for special roles. The strength in men is about 5,200, of whom 60% are on permanent duty. They include: 800 pilots (60% CO's and 40% NCOs); 1,500 technicians (15% CO's and 85% NCOs); 500 Non-aviation qualified (20% CO's and 80% NCOs) and 2,400 draftee soldiers.

The Future

The cuts in the defense budgets of many western countries will unavoidably affect the Italian army. The ALE, however, is not expected to be very adversely impacted by these financial and numerical reductions because of its increasingly important role in both the military and civilian fields. The immediate future for the branch foresees the creation of one rapidly deployable airmobile brigade and an undetermined number of Attack Helicopter Squadrons made up of 18 A-129s armed with TOW-2 missiles and 81mm rockets; nine A-129s "Scout/Escort"; three A-109s in C^3 version; together with a utility component.

Additional capability will be brought to the inventory with the acquisition of new aircraft and improvement of existing ones, i.e. the A-129 "Scout" fitted with Air-to-Air armament (missiles and guns); the NH-90, a four nation project for the replacement of the present generation of utility helicopters; the EH-101, a British-Italian venture for reinforcement of medium transport fleet; the Dornier 228, a modern twin engine airplane for liaison and special team rapid deployment; and the CH-47C transformation to the "D" version.

Celebrating its Fortieth Anniversary, the ALE is looking ahead with confidence that its best years are still to come. Despite the existence of the adjective "'Leggera" (Light) the men of the organization do not consider the word as a reference to reduction of their capabilities, but as the recognition of the "nimbleness and swiftness" of their specialty. IIIII

French Army Aviation

International Focus

By Major General de Lacroix de Vaubois

In light of the unusual events that took place within a little more than a year on the international scene, the need for a modern army to have a powerful airmobile component available appears even more obvious today. For France, which needs to play a role in Europe, within the Atlantic Alliance, as well as in Africa or the Middle East as part of multinational alliances, the helicopter constitutes a favored combat or force projection piece of equipment suitable to the new types of crises that are unfolding throughout the world. While maintaining airmobile units within its mechanized armor corps, the French Army has developed within its Rapid Action Force the 4th Airmobile Division, which is a powerful, flexible, and multifaceted unit.

Founded in 1977 on the basis of the need to have a significant number of special duty helicopters available within the combat helicopter regiments, the present doctrine materialized through the creation of the 4th Airmobile Division. The objective is to operate a large, rapid, and flexible airmobile unit with major anti-tank firepower capabilities. Currently used for day combat, the unit will, in the near future, perfect warfighting skills for night and adverse weather operations. Power, swiftness, and autonomy are the key attributes of this airmobile force.

MG Vaubois is Commandant, l'A.L.A.T. (CG, French Army Aviation Command).

The airmobile assets of the French Army are being used at two different levels: for operations (1st Army or Rapid Action Force) and at the tactical level (Army Corps). With its 250 combat helicopters (90 anti-tank, 20 reconnaissance, 30 support, and 84 maneuver), the 4th Airmobile Division is the first airmobile unit capable of being engaged, together with the 1st Army or the RAF, in an almost autonomous way, against a powerful armored adversary while extremely mobile and well-armed ground units relay continuous intelligence.

Whether it be at the national, European, or NATO level, or even in cooperation with foreign intervention forces to assist a country at risk, this large airmobile unit can be used in two main scenarios:

- the show of force which means that the power of the force is acknowledged, that its deployment as well as its possible withdrawal can be rapid and fairly autonomous, while retaining a capability to maneuver or to intervene at a distance of several hundred kilometers without requiring major new support;
- the armed engagement which may or may not follow a period of unrest and can involve the destruction of armored or mechanized units, raids on enemy bases, and even the recapturing of political or strategic objectives.

The Airmobile Division is therefore capable of tactically destroying a force of 200 to 300 armored pieces within 48 hours, 350 kilometers away from its initial deployment base, and 48 hours after the alert has been launched. In the wake of a first engagement, it can stop fighting and intervene, on as short a notice as two to three hours, in another direction within a distance of roughly 200 kilometers. It should be pointed out that most of the Western countries are presently considering acquiring similar units.

At the Army Corps level, the airmobile units conduct airmobile support actions by using essentially their firepower, but also by supplying anti-helicopter protection as well as tactical and logistical transport resources. French military officials recognized very early how important the airmobile capability was to the outcome of combat, with an enemy using armored units on a massive scale. Consequently, the French Army today can deploy a coherent airmobile unit as a result of its numerous experiences in various operations theaters. The helicopter has become an essential combat element.

As for the concept and doctrine, the coming years are not expected to bring any major change since the present organization is the result of extremely advanced ideas. On the other hand, as far as the materiel is concerned, French Army Aviation will have to undergo a real technological revolution by going from the 1st and 2nd generation militarized civilian helicopters to true weapon systems helicopters.

The present inventory of 720 aircraft maintained, supported, and manned by some 7,200 personnel, will be modernized with more and more specialized helicopters with greater combat capabilities. Consequently, a slight decrease in the number of operating aircraft is expected to be offset by a great increase in firepower. Similarly, a greater need for simulation techniques could result in a decreased volume of flight hours, which currently number 170,000 per year.

Priorities

In order to meet this technological revolution, the French Army has set four priorities:

- To increase the intervention capability of its assets
- To reduce the vulnerability of its aircraft
- To increase the anti-tank capability
- To diminish the training costs.

The increase in our assets' intervention capability will allow flying and firing under the widest range of conditions, requiring night and all-weather capabilities. Night vision goggles, which are being progressively fielded, will enhance our night operational capability. As for firing, we are waiting for the roof-mounted sight VIVIANE, which is currently under development.

The decreased vulnerability can be obtained through protective and offensive assets. The protection consists of improving the aircraft by using a thrust vector control, heat flares, or later on, a mast-mounted sight. The offensive assets designed to destroy the enemy's helicopter are today the gun of the Gazelle, the air-to-air Mistral, and in the future, the protection/support helicopter.

As for the increase in anti-tank capability, it will result from the development of ammunition of the third generation AC 36, which will be the first "Fire and Forget" type used by French Army Aviation. This ammuni-

(French Aviation — cont. on page 42)

The 1990s: A Decade of Change

International Focus

By Major General Robin D. Grist, OBE

I very much welcomed the invitation to contribute an article for this issue of ARMY AVIATION Magazine; first and foremost because it gives me an opportunity to express my congratulations, to all in United States Army Aviation, who took part in DESERT STORM. It was truly a magnificent feat of arms and a first class vindication of the importance of the helicopter on the battlefield today, particularly when employed with such skill and boldness. We in the United Kingdom greatly admired the sheer professionalism displayed by all involved in the operation; those of our forces, which deployed alongside our allies, took great pride in being associated with its success.

Clearly, there were many lessons to be learned from such a major undertaking, however I believe the single most important feature was its underscoring of the importance of international cooperation, in this decade of change. This is a theme which we should all endeavor to develop, throughout the 1990s, and I look forward to the exchange of views, between Nations, in the pages of ARMY AVIATION.

MG Grist is Director, Army Air Corps, Middle Wallop, United Kingdom.

A key element of this increasing cooperation must be the development of common concepts of Future AirLand Battle (or Air/Land Operations in UK terminology). The ability for allied aviation forces to work together is particularly important, given the central role aviation must inevitably play in any future operations—especially those requiring rapid reaction. Crucial to this, in an era of technological dominance, should be improvements in our C³I interoperability. Forums, such as NATO and ABCA, have a clear responsibility to work in this direction.

Articles, devoted to discussion of these issues in greater detail, will be of considerable interest to us all. However, with final decisions on the specific roles of NATO, and individual Nations, still awaited, these are perhaps best left to future issues. In-

stead, I will concentrate here, on outlining some of our future organization and equipment plans for the Army Air Corps (AAC).

Organization and Roles

In parallel with the restructuring planned in the US forces, the UK has made radical decisions, resulting in significant overall reductions in force levels and major deployments of units. In an Army, which places great emphasis on tradition and the importance of "The Regiment", this has, as might be expected, caused considerable anguish amongst those most affected. However, in recognition of the increasing importance of its role, the AAC has retained its overall number of six regiments (battalions in US Army terms, as each will have some 36 helicopters). It is intended that four of these are allocated to the currently proposed Ace Rapid Reaction Corps (ARRC), as follows:

- One anti-tank regiment AAC, based in Germany, with the UK RRC Armored Division.
- One anti-tank regiment AAC, based in the UK, with the UK Strategic Reserve Division.
- Two airmobile regiments AAC, based in the UK, as part of the UK's 24 Airmobile Brigade (which itself will, it is hoped, form part of the Multi National Airmobile Division, with brigades from Germany, Belgium and the Netherlands).

A further regiment will be stationed in the UK to support units throughout the country and to fulfill a variety of specialist tasks, including the provision of support to the, soon to be formed, Combined Arms Training Center.

The sixth, but certainly not least, of our regiments will continue to provide support to the security forces in Northern Ireland. This is a demanding, but rewarding, role, involving 24 hour-operations each and every day of the year—often in atrocious weather conditions—against a terrorist enemy that is extremely difficult to identify. Nevertheless, it is an excellent field for developing individual skills and providing valuable experience for the Corps in specialist techniques; in particular our development of NVG operations owes much to our use of them in the Province.

In addition, the AAC will continue to maintain detachments around the world, including Belize, Hong Kong (until 1997), Brunei, BATUS (the UK training facility in Canada) and Cyprus (where we also provide helicopter support to the UN peacekeeping forces). The AAC also provides the infrastructure support and training for the Royal Marines Air Squadron, who were recently deployed in Northern Iraq to assist the allied operation to protect the Kurds.

I don't think we can complain about a lack of variety, or interest, in our roles!

Equipment

The backbone or our current helicopter fleet is the Westland Lynx Mk 7 equipped with TOW missiles, progressively upgraded to increase their overall effectiveness and fitted with Thermal Imaging to provide a capability. The Lynx has now evolved into an excellent anti-tank helicopter. Deployed on DESERT STORM, it proved to be extremely capable, although the speed and overwhelming triumph of the operation denied the Lynx the opportunity to demonstrate its full talents. Those engagements which did take place, were most effective (the US Army exchange aviator, serving with us, playing a full part in these). Our other mainstay is the Gazelle observation and reconnaissance helicopter. The fixed wing Islander is used in Northern Ireland and the venerable Westland Scout is deployed in the UK and Far East.

A recent newcomer is the Light Battlefield Helicopter, the Lynx Mk 9, which will provide an LBH Squadron for each of the two airmobile regiments. This recently took part in Exercise CERTAIN SHIELD, the Multi National Airmobile Division trial, where it quickly demonstrated its suitability for its role of providing intimate helicopter support for the Brigade.

Of course, we are now looking ahead to our plans to introduce a new fleet of helicopters towards the end of this decade. There is no doubt in my mind of the need for an attack helicopter (AH); the Gulf War provided convincing proof of this—for those

skeptics who still needed persuading. Despite the undoubted qualities of our anti-tank helicopters, I believe there is a quantum difference between these and an AH and that, without an AH, an army has a yawning capability gap. We intend to fill that gap, but it will be some time before we decide which helicopter is selected.

We also see the need for a helicopter optimized for the role of Armed Reconnaissance, an ARH, and are now studying how best this might be achieved.

Conclusion

In conclusion, it is quite clear to me that Army Aviation will play an increasingly focal role in the future defense plans of all our Nations. This has been recognized by The British Government in the outcome of The Options for Change exercise. It is also clear that we must work closely together, partly to draw on the valuable experiences of each other, but also because future operations (and the Gulf War demonstrated that the world can still provide dangerous surprises) will inevitably involve close cooperation between allies.

Finally, I make no apologies for taking this opportunity to advertise the Middle Wallop International Air Show, which we will be holding here during 7-10 May 1992. We hope that many aviators, around the world, will visit us then, either to take part in the helicopter competition—HELIMEET 1992, or to visit the Air Show (9-10 May) and Exhibition (7-10 May). We look forward to seeing you then! IIIII

French Army Aviation

(continued from page 39)

tion combines firing efficiency with protection of the firing platform.

Finally, personnel training costs need to be reduced. A greater specialization should replace multifunction positions, while the instruction and training will be done more and more with substitution resources such as simulation (a Puma/Super Puma simulator will be operational in 1993) and the use of less expensive aircraft for instruction. Thus, the IFR flight training, which will take place aboard the AS 350 "Squirrel" helicopters ordered by French Army Aviation will be less costly than the training taking place now on board the Puma.

All these trends, along with the highest performing helicopters either already in operation or soon to become operational, will contribute to giving the French Army—thanks to its light Aviation—a first-rate airmobile force. As soon as highly advanced equipment bridges the gap between the newly developed airmobile concept and the means to implement it, French Army Aviation, which is already an essential component, will represent a major asset in the wide range of French Defense resources. IIIII

Interoperability

(continued from page 9)

Not all of the international programs are conducted in a forum where a group of nations assemble around a table and hammer out an agreement. Two relatively new programs are the Bilateral Staff Talks and the Subject Matter Expert Exchange. Both programs allow the U.S. to meet with a single nation to discuss topics which are of primary concern to each nation. There are nine nations participating in the Bilateral Staff Talks and five nations in the Subject Matter Expert Exchange.

These international programs will undoubtedly remain an important vehicle to achieve increased combined combat power in an era of declining defense budgets, changing threats, revised R&D objectives, slowing modernization efforts, and increased personnel turbulence.

Maintaining a close and mutually beneficial alliance is extremely difficult under the best of conditions. The elusive goal of interoperability is a constantly moving target. Each forum focuses national will and provides the framework so vital to establishing and sustaining key programs that help us pool our defense resources and build defense muscle—muscle that, if history repeats itself, will be relied upon. IIIII

International Focus

Perspectives of German Army Aviation

By Brigadier General Istvan Csoboth

In 1986, during an information visit to the U.S. Army as Commander of a mechanized infantry brigade, I was made aware of the consequences of the Air-Land Battle Doctrine for the then still new branch of US Army Aviation. I found them to be largely in line with German Planning objectives.

Inclusion of the airspace above the ground into combined arms combat, emphasis on airborne anti-tank defense, organizational structures designed to form major airmobile units which combine a variety of different helicopters under a single command to accomplish their missions autonomously to the maximum extent possible. Low-level flying, possibly at night and with the use of night vision aids, was the method to fight on the battlefield common to both concepts. These concepts were instrumental in pointing the way for helicopter modernization and procurement.

However, something else attracted my attention at that time. It was the clear distinction made between "high" and "low intensity war" with all the implications on different equipment allowances and operational doctrine which in the meantime have become a standard feature in U.S. Army Aviation.

New to me then, this doctrine has also come to affect German Army Aviation. With the highly gratifying, breakneck pace of changes in the Soviet Union, Eastern Europe and Germany, perspectives of a new NATO doctrine are emerging which will require German Army Aviation to perform missions outside national boundaries transcending the previous tasks of immediate territorial defense within NATO.

New Missions

In the past, we had to dispatch a helicopter component in support of the Allied Commander Europe Mobile Force to provide flank protection to the NATO area

BG Csoboth is Director of German Army Aviation, Cologne, Germany.

of interest. The spectrum of missions to be carried out abroad will increase in the future. As a prerequisite, the German parliament will first have to create the constitutional foundation for such action.

Already today, we can look back at some experience gained from missions abroad. To mention a few, there are humanitarian aid efforts such as the Kurd relief in the spring of 1991, or disaster control operations such as fighting the fire which raged on the Holy Mountain of Athos in Greece last fall.

We will be breaking new ground with support missions under the auspices of the United Nations such as those planned for this fall in Iraq.

Even if such additional tasks will lead to a regional extension of its scope of missions, the primary role of German Army Aviation will remain unchanged, i.e., to contribute to combined arms combat within the Army system—primarily through airborne anti-tank defense—and to provide air transportation—Medevac in particular—in a great variety.

Organization

German Army Aviation is presently organized into three Army Aviation Commands available to each of the three corps. Each command has three regiments. One Army Aviation Liaison squadron is assigned to each division. Under the new Army Structure 5, German Army Aviation expects a reduction of its forces of some 10% and a reorganization into three mixed Army Aviation brigades beginning in 1994.

Equipment

With this organization we hope to better satisfy the requirement for mission-oriented modular task force composition. Our equipment will also have to be adapted step-by-step to meet future needs.

Although the majority of our inventory of approximately 800 helicopters will remain in service, they will be subject to modifications and/or product improvement programs similar to US Army Aviation in order to give them a capability for night low level operations.

The aging Alouette II has to be replaced by 1994 after 30 years in service. The BO-105 fleet will undergo product improvement, and some of these aircraft will be converted to operate in an escort role. The Sikorsky CH-53G cargo helicopter will be kept in service well past the year 2000. The PAH-2 Tiger (anti-tank helicopter) developed in Franco-German cooperation is expected in 1998 as a completely new night fighting system.

As for the Bell UH-1D which has proven itself so well over many years, we hope to replace it with the NH-90 NATO helicopter.

Interoperability

It is a true matter of concern that peripheral equipment be supplemented to comply with the requirements for missions abroad. This will be a costly effort, achievement of which will only be possible in the long run. This issue particularly highlights the importance of interoperability and standardization. Equally essential are compatible command and control means and procedures, primarily for airspace control.

We feel that this offers a wide field of cooperation with our allies. Common training efforts similar to the EURO-NATO Training Program will increasingly gain importance in the light of future tasks.

With the Central European region being our "home" in the past, we could very well learn from the worldwide experience of US Army Aviation for our future tasks. This is a desirable process with the beneficial side-effect of bringing people close together.

This is a goal to which the "Gemeinschaft der Heeresflieger" (Community of Army Aviation) in Germany has dedicated itself by addressing active and former members of the branch. I am pleased that this association has established contact with the U.S. Army Aviation Association of America and is consolidating these contacts.

Together we will succeed in shaping the future of "Army Aviators" to our mutual benefit.

Let me wish US Army Aviation and the Army Aviation Association of America success. IIIII

International Focus

Army Aviation in The Netherlands

by Major A. Rietkerk and Major H. Giesberg

Security policies in most Western countries have adapted to conform to the changing pattern in East-West relations over the past few years. This is also true for The Netherlands. However, the most recent events make it clear that the need for adequately armed forces to remain in Western Europe is a necessity. Security policy still requires precautionary measures to safeguard against unforeseen hazards.

The Netherlands, according to the Defense Appropriations Act of 1990, requires an army which is capable of protecting the interests of the country within NATO or other international levels, and shall contribute to maintaining peace and security elsewhere in the world as necessary. The contribution of The Netherlands to the allied defense is in accordance with the strategy and defense concepts of NATO.

MAJ Rietkerk is The Netherlands Liaison Officer stationed at Ft. Rucker, AL.

Reflecting the changes in NATO, the present organization of the military is restructured. Aspects such as flexibility, mobility, interoperability, versatility, and response capability make up the guidelines for the new structure. The present Army organization is aimed at a pre-1990 NATO static defense in a limited area. The modernized structure will require a radical change to facilitate a more dynamic role in a much larger area.

This concept continues to be studied by the Royal Netherlands Army. Anticipated is the transformation of one Armored Infantry Brigade into an Airmobile Brigade equipped with attack, observation, utility, and transport helicopters. The helicopter units working with the 1st Netherlands Army Corps are units in the Light Aircraft Group of the Royal Netherlands Airforce. This group consists of three squadrons of

MAJ Giesberg is Chief, Standardization & Evaluation Office, LAG, Deelen Airbase, The Netherlands.

light utility helicopters (1 x BO-105CB and 2 x AL III). The mission of the unarmed helicopters include surveillance, reconnaissance, liaison, artillery adjustment, forward air control, and medevac.

The replacement for the Allouette III is currently under consideration, while the mission of the 105CB will become observation, command and control, and light utility. Future plans accommodate transport and armed helicopters, necessary for an airmobile brigade, in this Group. For the present, a possible lease of armed helicopters will give the required fire support to the 1NL Corps and the proposed new Airmobile Brigade.

The goal of the 1st Netherlands Army Corps is to purchase sufficient aircraft to transport one light infantry battalion in one lift. The aircraft must be capable of transporting a variety of corps personnel and equipment, self-deployable for logistical support of the airmobile brigade, and capable of medevac missions. The utilization of the aircraft will be outside direct detection range by enemy units and under the protection of armed helicopters. Sufficient loading capacity and range of action are the most important criteria for these transport helicopters.

Currently, the Netherlands is considering the UH-60 Black Hawk, NH-90, AS 352 Cougar, EH-101, and CH-47 Chinook as the replacement for the Allouette III. Depending on the mission and the type of unit being transported, the aircraft requirement could be between 22 and 48 aircraft taking 10% of the aircraft into account as spares and compensation for peacetime attrition. The choice of aircraft will depend on its ability to lift our airmobile battalion with its organic equipment and support it over a distance of 300 km. A combination of larger and smaller transport helicopters (similar to the UK) is also a possibility.

The long-term budgetary plans include funds for the acquisition of 25 transport helicopters. The aircraft capabilities have been established and a request for quotation will be submitted to a number of manufacturers at the end of 1991. The final decision on the purchase should be made by the end of 1992. A contract with the manufacturer could be finalized around January 1993. The actual introduction will depend on the delivery schedule.

Armed Helicopters

The Netherlands plans to purchase forty armed helicopters for the airmobile brigade, utilizing a lease program followed by the full purchase of the desired aircraft. These helicopters must be capable of the following:

- Reconnaissance;
- Fire Support;
- Anti-tank;
- Air-to-air;
- Armed Escort.

These tasks may be carried out during all phases of brigade operations. Armed helicopters will escort the transport helicopters in the battle area, provide fire support, and defend against air attacks while the brigade's personnel and materiel are being positioned. During combat in the brigade's operation zone, the armed helicopter units are a combat element under the brigade commander's control which can be inserted into action at any time.

The armed helicopters will be divided into two squadrons, each consisting of three flights of six aircraft and two spares. The aircraft must be capable of being equipped with various, quickly-interchangeable armaments. The desired aircraft will be equipped with a 20 or 30mm cannon, air-to-air missiles, anti-tank missiles, and rockets.

No decision has been made; however, the Tiger, Apache, or Comanche are suitable for this role. A request for quotation is expected to be made at the end of 1991 and a possible lease/purchase decision at the end of 1992. It is hoped that a contract can be completed by the start of 1993 in order to be fully operational by 1995.

The introduction of the transport and armed helicopters operating within the airmobile brigade is a new concept in the Netherlands Armed Forces. There is still work to be done and assistance from our NATO partners is indispensable. As mobility and flexibility are the keywords, the future helicopter units will play a prominent role in the decades to come. IIIII

AIR TRAFFIC CONTROL:

TACTICAL ATC EQUIPMENT

BY LTC DARCEY T. TATUM & VERNON GREENWOOD

ST. LOUIS, MO — An after action look at the recent conflict in Southwest Asia highlighted the fact that support of deep, close, rear and contingency operations is dependent on modern technology in all areas. For Army ATC to effectively operate on today's AirLand Battlefield, an equipment modernization effort is essential. The newly formed AVSCOM Product Manager office for Air Traffic Control (PM-ATC) is in the lifecycle replacement process for four key items of ATC equipment. The first of four items to be replaced will be the AN/TSQ-97 Air Traffic Control Facility.

Since early 1980, the TSQ-97 ATC facility has been a vital communications link in the Air Traffic Service (ATS). However, advancing technologies, streamlined requirements, and lifecycle obsolescence dictates replacing older equipment to keep pace with today's aviation. The Tactical Terminal Control System (TTCS) will replace TSQ-97 and is scheduled for initial fielding in 3rd Qtr FY94.

LTC Tatum is Program Manager, Air Traffic Control, Aviation Systems Command, St. Louis, MO.

The TTCS will be used to provide ATC and ATS to aviation assets conducting reconnaissance, maneuver, medevac, logistics, and intelligence operations across the battlefield area. The TTCS will also provide ground-to-air communications between ATS units and Army, other DoD services, and allied aircraft as well as ground-to-ground communications internal to ATS units and between ATS units and other ground units. In addition to the wartime mission, the TTCS will also be used to augment the capability of planned transportable towers during emergency contingencies, natural disasters, and at airfields where ATS is required on a temporary basis.

Secure Voice

Unlike the older TSQ-97, the TTCS will provide jam-resistant, secure voice, radio communications from a highly mobile bank of radio equipment, rack mounted, and fitted into a standard Army organic vehicle, either a HUMMV or CUCV. The UHF-AM, VHF-FM, and HF radios will be capable of removal for use in a manpack configuration. The TTCS will be air droppable, mounted in the vehicle or in the manpack configuration. The TTCS will be capable of remote operations from up to 1,000 meters and will be compatible with NBC gear (MOPP IV) and NVG devices. The TTCS will not affect tactical team manpower requirements and will be easier to maintain than the TSQ-97.

Using NDI

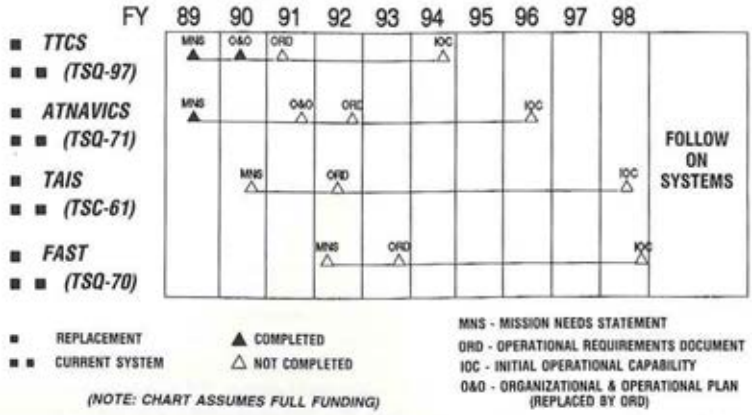
Although still in the early stages of the acquisition process, it is hopeful that a favorable decision to move into the full scale development phase will come about in January 1992. By using the Non-Developmental Item (NDI) acquisition process, utilizing the Air Force AN/GRC-206 PACER SPEAK system as a model, the overall acquisition time for the TTCS has been changed. The Army procured ten GRC-206 systems from the U.S. Air Force for use in Southwest Asia during Operation DESERT STORM. These systems received high acclaim from the users and it is anticipated that the TTCS will provide the communications answer for tactical ATC in the years to come.

ATNAVICS

The second of the four systems scheduled for replacement will be the AN/TSQ-71B ASR/PAR ground-controlled approach facility. This item was first fielded in 1965 with upgrades in 1967 (TSQ-71A), and again in 1979 (TSQ-71B). The 71B will be replaced by the Air Traffic Navigation, Integration, and Coordination System (ATNAVICS). ATNAVICS will provide ground controlled approach capability at Division, Corps, and Echelon above Corps Army airfields and landing areas.

Mr. Greenwood is the PM Action Officer, ATC PMO, Aviation Systems Command, St. Louis, MO.

AIR TRAFFIC SERVICE — MODERNIZATION MILESTONES



(NOTE: CHART ASSUMES FULL FUNDING)

The value of this system was highlighted when the present system (TSQ-71B) was instrumental in saving three multimillion dollar Army aircraft during Operation DESERT STORM in Southwest Asia. These "saves" were accomplished as a result of the professional skills of the controllers and maintainers from the 1st of the 58th Aviation Regiment combined with the capabilities of the TSQ-71B. Although still a valuable system, the 71B is plagued with Reliability, Availability, and Maintainability (RAM) deficiencies.

ATNAVICS will eliminate the deficiencies and provide a communications, display, and surveillance and precision radar approach control system that is capable of facilitating nearly all weather aircraft departure and recovery systems. ATNAVICS will be a self-contained, vehicle mounted, highly mobile radar facility, fitted with a jam resistant secure voice radio communications system. The only airborne avionics required to use this system will be a two way radio.

The Operational and Organizational Plan, a requirements document for the ATNAVICS, is scheduled for a milestone approval decision by the U.S. Army Training and Doctrine Command (TRADOC) in July 1991. Efforts are well underway to complete the Concept Formulation Package and prepare the Operational Requirements Documents. Like the TTCS, the ATNAVICS acquisition will follow the NDI concept strategy but will involve a more extensive research and development effort. Initial fielding for the ATNAVICS is anticipated for FY96.

The third tactical ATC asset in the lifecycle replacement process is the Tactical Airspace Integration System (TAIS) which is slated to replace the AN/TSC-61B. The TSC-61B is based on 1965 technology which was updated in 1979 and is employed at Division and Corps levels to perform airspace command and functions for aircraft operating in or through airspace control, flight following, flight advisory, and coordination controlled by or delegated to the Army. The 61B is equipped with UHF, VHF, FM, and HF communications radios and maintains situation maps manually. The 61B was also used in Southwest Asia but was found to be deficient in its ability to rapidly disseminate the voluminous Air Force-generated Air Tasking Order, to communicate over extended distances, and was manpower intensive to maintain.

The answer to the shortcomings of the TSC-61B will be TAIS. The acquisition strategy for TAIS has not been determined but the PM is emphasizing the use of state-of-the-art rather than evolving technology, to speed the development cycle. The TAIS will contain a communications upgrade that will include jam-resistant (SINCGARS and HAVEQUICK), secure voice radios and provide automated situational information which includes a near real-time air picture with rapid dissemination of air tasking orders.

The TAIS will serve as a critical element of the aviation force

(ATC — cont. on page 66)

HARDWARE:

AH-64 MATERIEL CHANGES

BY COL DAVID F. SALE & CPT JAMES P. LUDOWESE

FORT RUCKER, AL — During Operation DESERT STORM, the AH-64 Apache demonstrated that it is unquestionably the most lethal attack helicopter in the world today. However, even with its most recent successes, the Army is in the process of improving the Apache. The mechanism for making these improvements is the U.S. Army Materiel Change Management (MCM) process. Materiel changes in the past were referred to as retrofits, modifications, or product improvements. Regardless of the name, the bottom line behind these programs is to provide the user with the best piece of equipment available.

Current Changes

The following list describes the current priority Materiel Changes for the AH-64A:

- *Global Positioning System:* will provide the aircrew with a highly accurate, satellite-based navigation system capable of providing the Fire Control Computer and Doppler with aircraft position updates.
- *Improved Data Modem/ Avionics Integration (IDM/AI), High Frequency Radio (HF), Improved ADF Radio and Cockpit Lighting:* The IDM/AI will allow the crew to send secure data burst messages to all players in the Joint Air Attack Team (JAAT) arena, to include the USAF and Field Artillery assets, as well as the OH-58D, Longbow Apache, and the RAH-66 Comanche. The incorporation of the HF radio will improve NOE communications significantly. The improved ADF will increase reliability and accuracy over the current system, and cockpit lighting will reduce the light signature of the aircraft and provide NVG capability. We will also incorporate all AVRADA communication fixes to include filters, wiring, and antennas.
- *Improved Area Weapon System Reliability and Accuracy:* this manufacturer-sponsored program will improve the accuracy and maintainability of the 30mm chain gun.
- *Air-To-Air Stinger:* ATAS will provide the AH-64A with a near-term Air-To-Air Missile capability. We continue to work for follow-on improvements to Stinger to increase its effectiveness in ground clutter against countermeasures.
- *Digital Scan Converter:* this will provide a computer-enhanced image for the Target Acquisition and Designation System (TADS), which eliminates "dead" channels while greatly improving the TADS picture quality.
- *Image Intensifier (I^2):* this puts a third generation NVG Image Intensifier Tube into the Pilot Night Vision Sensor. The pilot will be able to instantaneously select either PNVS or I^2, depending on which system provides the best picture.
- *Laser Warning Receiver:* the AN/AVR-2 receiver will alert the crew when the aircraft is being lased and is also compatible with MILES/AGES equipment. This eliminates the need to install a MILES/AGES harness on the aircraft.
- *Altitude Hover/Hold:* allows the crew to select and maintain a specific altitude above the ground-based Radar Altimeter input.
- *TADS/PNVS Optical Improvement Program:* through laser hardening of the TADS optics this improvement will provide laser protection to the gunner and the optics of the AH-64.
- *Laser Protective Visors:* this will provide the aircrew with eye protection from laser energy directed at the aircraft.
- *Alternate Laser Coding:* an improvement to the aircraft designed to defeat False Target Generators.
- *TADS Multi-Tracker:* allows the gunner to track a variety of targets.

COL Sale is TRADOC System Manager for Airborne Target Acquisition & Weapons Systems, Ft. Rucker, AL.

CPT Ludowese is Assistant Weapons Systems Manager for Airborne Target Acquisition & Weapons Systems, Ft. Rucker, AL.

This list reflects only the top 12 materiel changes of over 50 improvements proposed for the AH-64A. The important thing to note is that a materiel change can come from a variety of sources to include the user, the combat developer, the materiel developer, or the contractor. If you, the user, feel that these changes are not in the correct order or that something is missing from the list, the mechanism exists for you to provide your input into the process. Simply direct your comments to:

Commander, USAAVNC
ATTN: ATZQ-TSM-W
Fort Rucker, AL 36362
DSN 558-2198/3408
C: (205) 255-2108/3408

To show you how much impact you have on this process, GPS was moved from number five (below the funded line) to the number one priority (fully funded) because you said you wanted it to be your top priority. We look forward to receiving your input in the future and serving you, the user. IIIII

Man-hours

(continued from page 34)

cost of having a soldier work one man-day is $317. This means that every soldier taken away from doing aircraft maintenance work for a day to cut grass, rake leaves, perform gate guard, or act as a duty driver signifies $317 in lost maintenance time. That's some expensive grass to cut! This marginal cost is higher than the $247.09 per man-day which the Army pays for our contract field team civilian employees. That is the average cost paid for contract field team employees in Germany. This cost varies from $216.34 to $299.92, based on the cost of living at each site.

This analysis gets worse if one includes higher level staffs' payroll costs into the equation. The figures cited are only for the AVIM company itself. The two AVIM companies in an AVIM battalion have a 46-man battalion headquarters detachment which commands and controls them. Of those 46 soldiers, only the 10-man Maintenance Operations section deals with subjects related to the aircraft maintenance and supply missions; the other sections perform the "housekeeping" functions of running the unit. So the cost gets higher if the headquarters is counted. The same principle applies right on up the chain.

This also does not account for amortization of the Army's investment in training each of these soldiers, plus the cost of transporting the soldiers, their families, and their household goods overseas. Contractor personnel do not have training nor transportation costs. By contract, they even provide their own tools!

Most people are shocked when they find out how much the Army pays for contract maintenance personnel. But after considering how much we pay for military mechanics, $247.09 for a highly-qualified civilian aircraft mechanic seems like a bargain. And that does not just pay for the mechanic's salary; the contracting company's administrative costs, medical benefits, and other costs are rolled up into that figure. The contractor further agrees to ensure that in the event an employee is sick or on vacation, a replacement will be provided to cover that time. Considering the amount of work we are able to get out of them because of their experience, their freedom from distractors, and the stability they provide, we get quite a bit more for our maintenance man-hour dollar from the contract civilians than we get out of our military mechanics.

In addition to diverting our available maintenance man-hours, having maintenance soldiers perform other duties adversely affects their MOS proficiency and their morale. Our soldiers like working in their specialities and get motivated about fixing helicopters. Distractors which take them away from this erode their morale and make them want to get out of the Army. When they get out, they take with them their Army-funded technical training and motivation to work on helicopters. Our good soldiers are getting out in sufficient numbers that the contractor has no difficulty finding highly qualified and suitable applicants for all vacancies, even here in Germany. IIIII

HARDWARE:

THE AVSCOM CASL FOLDER

BY MARION SIMMS

ST. LOUIS, MO — The United States Army Aviation Systems Command (AVSCOM) issues the Competition Advocate's Shopping List (CASL) as part of an ongoing effort to increase competition for aircraft spare parts and overhaul. The goal is to maintain materiel readiness and maximize return on tax dollars by broadening the industrial base and increasing competition.

The actual "shopping list" is a computer printout, arranged by National Stock Number (NSN), of the items AVSCOM plans to buy in the current fiscal year and the next two fiscal years. Prospective contractors can review the shopping list for aircraft parts and accessories which will repay the time and expense of submitting a source approval request (SAR).

Other lists in the CASL folder are useful references. There are two lists of Spares Technical Data Packages (STDPs): one for fully competitive parts and one for items requiring source approval.

The folder also contains an "overall shopping list," arranged by aircraft, listing probable requirements for repair and overhaul in the current and next two fiscal years and indicates whether a Depot Maintenance Work Requirement (DMWR) is available for a given requirement.

A list of Flight Safety Parts (FSP) is also supplied in the folder. This is a complete list of all parts which have been designated FSP on the date of the list. Items are continually being added, and sometimes deleted. Source approval for an FSP is requested under a different category from non-FSPs.

The newest addition to the folder is an instruction sheet for remote access to the CASL data base. Firms with this capability will have access to the most recent CASL information.

The CASL Instructions provide:

- Abbreviations and definitions.
- Policy regarding SARs, reverse engineering, and maintenance/overhaul.
- SAR preparation instructions.
- List of AVSCOM weapons systems and the PMs for each.
- A list of AVSCOM technical manuals and how to order.
- Partial list of Federal Supply Classes (FSCs) managed by AVSCOM. (The first four digits of NSN are the FSC).
- List of aircraft and turbine engines managed by AVSCOM.
- Addresses and telephone numbers for other Army Competition Management Offices (Army Materiel Command and all its major subcommands).
- How to obtain technical data from AVSCOM.
- Information for non-U.S. firms seeking U.S. defense contracts.
- The address and phone of the Small Business Office.
- How to get AVSCOM's procurement history on microfiche.
- How to subscribe to the Commerce Business Daily (CBD), where AVSCOM and other Government agencies advertise upcoming procurements.
- How to order Government-published specifications & forms.
- How to be assigned a Commercial and Government Entity (CAGE) code.
- How to obtain a microfiche listing of all the items for which AVSCOM is the National Inventory Control Point (NICP).
- How to obtain a microfiche listing which translates CAGE codes to company names and addresses, and vice versa.

Copies of the CASL folder are always available at no charge from AVSCOM, ATTN: AMSAV-3A, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798, or by calling 314-263-1712. IIIII

Ms. Simms is Source Development Officer for the AVSCOM Competition Advocacy and Spares Management Office, St. Louis, MO.

CASL Workshop & Parts Symposium
3-5 Feb 1992
St. Louis, MO

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View 200+ aircraft spare parts and learn how to become an Approved Source for AVSCOM.

Contact the above address for more information.

HARDWARE:

LONGBOW APACHE

BY MAJOR HOWARD T. BRAMBLETT

FORT RUCKER, AL — Not long after the end of the ground war in Iraq, I was watching an evening news segment where the anchorman was praising the capabilities and tremendous successes of the "smart" weapons in our arsenal. Following that brief pitch, he asked the rhetorical question, "Where does the Pentagon go from here in weapons acquisition?" He answered the question with two words: "brilliant weapons" and a short film segment. Following brief glimpses of the B-2 and the Advanced Tactical Fighter, I was pleased to see footage of the Longbow Apache maneuvering in flight. It was exciting to hear one of Army Aviation's premier acquisition programs declared to be one of the "brilliant" weapon systems of the future.

The Longbow Apache will be an upgraded AH-64A which will incorporate the new — 701C engine, Global Positioning System (GPS), Inertial Navigation System (INS), improved avionics, MANPRINT glass cockpit, and a host of other improvements which will greatly enhance the fightability, reliability, and maintainability of the aircraft. However, the heart of the weapon system will be the millimeter wave fire control radar, a radio frequency interferometer, and the Longbow Hellfire Modular Missile System.

Longbow will provide the Army with vastly improved capabilities over the current Apache. The radar antenna, located in a Mast Mounted Assembly (MMA), will allow the crew to "view" the battlefield by unmasking only the radar dome. The radar will be capable of detecting both moving and stationary targets during day, night, and in adverse environmental conditions.

Once the targets are detected, their radar signatures are compared to a target database. The system will then classify each target as an Air Defense Unit (ADU), track vehicle, wheel vehicle, rotary wing aircraft, or fixed wing aircraft.

After classification, each target is prioritized by the system based on capability and range. This is all done very rapidly and the pilot is provided with the array of targets on his multi-function display. The first target the system recommends for servicing is then indicated, and its location automatically handed over to a Longbow Hellfire missile.

MAJ Bramblett is Asst. TSM for Target Acquisition and Weapons Systems, Ft. Rucker, AL.

If the pilot elects to engage the recommended target, the engagement will be conducted in a lock-on-before-launch or a lock-on-after-launch mode. In either case, once the missile is launched, it is truly fire and forget. Each Longbow Hellfire missile is equipped with its own millimeter wave seeker which allows it to autonomously seek and destroy targets. The system will have capability to service several targets sequentially in an exceptionally short period of time. The short timelines coupled with the standoff range and fire and forget capabilities of the Longbow will significantly enhance both the survivability and awesome armor killing power of the Apache.

The program entered Full Scale Engineering Development (FSED) in January 1991. Four prototype systems will be developed and tested during this phase. The first fully-equipped Longbow Apache flight is scheduled to occur in August 1993. Initial Operational Test and Evaluation (IOT&E) is scheduled from January 1995 to April 1995.

We are currently planning to procure 227 Longbow Apache systems with low rate initial production starting in the fourth quarter of CY 1996.

Given the phenomenal successes enjoyed by our attack battalions during the war with Iraq, it is hard to imagine the incomparable success we would have experienced with the Longbow Apache. If it meets specifications and lives up to expectations, as we believe it will, it will give new meaning to the old saying, "You ain't seen nothing yet." IIIII

BRIEFINGS

The **UH-60L Black Hawk** helicopter will fulfill the U.S. Army's future mission requirements for air assault, command and control, and medevac, Sikorsky Aircraft representatives told a news conference at the AUSA Convention on 15 October 1991. The UH-60L is capable of carrying up to 3,000 lbs of additional payload, the result of modifications to the aircraft's flight controls which allow it to utilize the higher shaft horsepower of the twin T-700-GE-701C engines. The Army has announced plans to procure a minimum of 300 additional aircraft in fiscal years 1992 through 1995.

BG R. Dennis Kerr is the new commander/director of the Army Safety Center at Ft. Rucker, AL. He replaces retiring commander **BG Clyde A. Hennies**. Kerr's previous assignment was that of Assistant Division Commander for Support of the 82nd Airborne Division, located at Ft. Bragg, NC.

LTC Robert Wilson, Commander, 1st Squadron, 4th Cavalry, 1st Infantry Division (Mech), Ft. Riley, KS, was the guest speaker during the 15th Annual Bivouac of the **U.S. Horse Cavalry Association** in Ft. Riley on 5 October 1991. LTC Wilson's presentation was "The Role of the Cavalry During DESERT STORM", and he emphasized the magnificent role played by the cavalry as they were the first to cut off the Kuwait City/Basra Highway, blocking the retreat of the Iraqi Army. They also captured the first prisoners of war in the Division and seized the final objective by capturing the Safwan Airfield for the Peace Talks. The USHCA was founded in 1976 to preserve the heritage of the Horse Cavalry and to perpetuate its history in the development of the nation.

The **Society of U.S. Army Flight Surgeons** has a memorial to flight surgeons who died in the service of their country. Retrieving information from the Vietnam era has been difficult. If you have any information on Army Flight Surgeons who were seriously injured and died in the line of duty please contact: U.S. Army Aeromedical Center, ATTN: HSXY-AER (Flight Surgeon Memorial), Ft. Rucker, AL 36362-5333.

The Shephard Press **Fighter Helicopter Conference** will take place on 23-24 January 1992, at the Queen Elizabeth II Conference Center, in Westminster, London. This year's briefers include Richard Cody, Cdr 1-101st Avn Reg, GEN Pavlov, USSR Army Aviation Commander and Dr. Mikheyev, General Designer, Kamov Helicopter & Scientific Company, USSR. Contact: Conference Manager, Shephard Conferences, 111 High Street, Burnham, Bucks SL1 7JZ, UK, +44 (0) 628 604311.

On 13 November 1991, the Searcher, a long-range multicapable Unmanned Aerial Vehicle (UAV) was rolled out at the Malat UAV Plant of **IAI's Aircraft Division**. It features flyaway weight of 700 lbs, 24 hour endurance, and a maximum ceiling of 20,000 feet. For further information, contact: Mr. F.P. Hermann, Communication Directorate, Tel.: 972-3-9358514, 9712958, FAX: 972-3-9358516, 9358512.

The **Port Authority of New York Board of Commissioners** paid formal tribute to 18 of the bistate agency's employees who served with the U.S. Armed Forces during the Persian Gulf War, including three who received the Bronze Star for meritorious service in a combat zone. One of those recognized was **Thomas L. Bosco**, of Staten Island, NY, who received a Bronze Star and Army Commendation Medal for meritorious service in a combat zone while piloting aeromedical evacuation helicopters out of Riyadh South Airfield in Saudi Arabia.

AEL Industries, Inc. announced that its AEL Defense Corp. subsidiary has been awarded a $10.4 million contract by the U.S. Army Communications-Electronics Command (CECOM) at Ft. Monmouth, NJ. The contract calls for providing the U.S. Army with Aviator Night Vision Heads-Up Display (ANVIS/HUD) devices. The contract includes the manufacture of ANVIS/HUD devices and helicopter modification kits. The initial award is for 320 shipsets and could include up to 3,000 shipsets for use on eleven different types of helicopters over the next five years.

1991 DAC PACK

The professional-personal roster of Dept. of the Army Civilian members of AAAA that returned their questionnaires by October 25, 1991.

ROSTER CODE

Last Name, First Name, MI
(Date of Joining AAAA)
(Nickname)
Address
Duty Phone

Residence Phone
Name of Spouse
Job Description
Current GS (GM/WG) Grade
AAAA Offices held

STANDARD ABBREVIATIONS

AMC - U.S. Army Materiel Command
ARPRO - U.S. Army Plant Representative Office
ARTA - U.S. Army Aviation Reseach & Technology Activity
ASE - Aircraft Survivability Equipment
ASF - Aviation Support Facility
AVSCOM - U.S. Army Aviation Systems Command
AVRADA - U.S. Army Avionics Research & Development Activity
CCAD - Corpus Christi Army Depot
CECOM - U.S. Army Communication & Electronics Command
CONUS - Continental United States
FW - Fixed Wing
MICOM - U.S. Army Missile Command
LHX - Light Helicopter Experimental
OASA - Office, Assistant Secretary of the Army
ODCSLOG - Office, Deputy Chief of Staff for Logistics
PEO - Program Executive Office
PMO - Project (Program/Product) Manager's Office
TADS/PNVS - Target Acquistion Designation Sight/ Pilot Night Vision Sensor
TROSCOM - U.S. Army Troop Support Command
USAALS - U.S. Army Aviation Logistics School
USAAVNC - U.S. Army Aviation Center

A 1991 DAC Directory

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Carrion, Ignacio R., (M82) (Joe) 4918 Merrimac Street, Corpus Christi, TX 78415-2517. Dy: (512) 939-3898. Res: (512) 854-4129. S: Bella. Job: Acrft Eng Repairer/Mech, CCAD.

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Clawson, Kathy P., (M84) 1137 Hazel, Corpus Christi, TX 78412. Dy: (512) 939-2595. Res: (512) 992-1190. Job: Machinist Helper, CCAD. GS: 5.

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Coester, Hans W., (M89) 11th Aviation Brigade, Storck Barracks, APO AE 09140. S: Genia. Job: Bde Ground & Avn Safety Off.

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Coonan, Gerald R., (M91) (Jerry) AVSCOM Directorate Maint., 1224 Coal Bank Court, St. Louis, MO 63138. Dy: (314) 263-3300. S: Betty. Job: Maintenance Engr, AVSCOM. GS: 13.

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Cooper, Jeanette L., (M88) 11681 Union Grove Road, Union Grove, AL 35175-9552. Dy: (205) 842-6734. Job: Supply Systems Analyst, Army Missile Cmd. GS: 12.

Coppens, David P., (M82) 111 Roger Drive, Collinsville, IL 62234-5814. Dy: (314) 263-1415. Res: (618) 345-4625. S: Sue. Job: Log Mgr, CH-47 Mod, V22 PM Office. GS: 13.

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D'Arrigo, Vincent J., (M91) Hudson-Mohawk Chap. Treas, 25 John Street, Rensselaer, NY 12144. Dy: (518) 786-4376. Res: (518) 434-4968. S: Maria. Job: Fire Chief. GS: 6. Trea, Hudson-mohawk Chapter.

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544-3563. Job: Integrated Logistics Supp Mgr, AVRADA. GS: 13.

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Dean, J.W., (M83) (Jay) 1054 Woodland Trail, Fenton, MO 63026. Dy: (314) 263-1704. Res: (314) 343-1272. S: Ervel. Job: Chief, ILS Division, Black Hawk Project Mgr. GS: 14.

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Elber, Wolf, (M88) ATTN:SAVRT-SD-D, MS 266, NASA Langley Research Cen, Hampton, VA 23665-5225. Dy: (804) 865-2473. Job: Director, Aerostructures. SES: 4.

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Forehand, Martha W., (M84) (Marty) 649 Blossom Street, Corpus Christi, TX 78418. Dy: (512) 939-2068. Job: Supervisory Inventory Mgmt Spec, CCAD. GS: 11.

Foreman, Laverne R., (M82) (Vern) 164 N. 74th Street, Apt. 2024, Mesa, AZ 85207. Dy: (602) 891-3579. Res: (602) 981-2974. S: Doris. Job: Chief, Manufacturing Branch, DPRO-MDHC Def Contract Mgmt Cmd, DLA. GS: 13. Past Sec, Arizona Chapter.

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Frazier, Mary E., (M88) 810 Roseanne, Corpus Christi, TX 78418. Dy: (512) 939-2404. Res: (512) 937-5794. S: Robert R.. Job: Acft Records Clerk, CCAD, D/Quality Assesment, Maint Assess. Div.. GS: 5.

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Garcia, Raquenel S., (M87) (Rocky) 3622 Redwood, Corpus Christi, TX 78411. Dy: (512) 939-3500. Res: (512) 853-7227. S: Moises. Job: Machinist SHE30, CCAD.

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Geoffroy, Thomas A., (M86) (Tom) 1290 St Anthony Lane, Florissant, MO 63033. Dy: (314) 263-3053. Res: (314) 837-2563. S: Rosalie. Job: Chief Maint Engrng Pgm Mgmt Br, AVSCOM. GS: 14. Life Member.

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Holmes, Maria L., (M91) 2 Wickham Fen Road, St. Louis, MO 63033-7534. Dy: (314) 263-1082. Job: Aerospace Engr, AVSCOM. GS: 12.

Holubasch, George J., (M87) 27 Pat Drive, Collinsville, IL 62234. Dy: (314) 263-3197. Res: (618) 345-0119. S: Roberta. Job: Aerospace Engineer-SEMA PMO. GS: 13.

Horne, Deborah L., (M81) (Debi) P.O. Box 32, Edgewood, MD 21040. Dy: (301) 671-1740. Res: (301) 879-5168. Job: Prog Analyst, Chf Avn Div, HQDA NGB. GS: 11. NEB. Pres, Chesapeake Bay Chapter. Past SrVP, Chesapeake Bay Chapter.

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Hubler, Donald E., (M85) (Don) 2523 England Town Road, St. Louis, MO 63129. Dy: (314) 263-1480. S: Catherine. Job: Chief of Product Assurance and Test Division, PM for ASE. GS: 14.

Hudson, James M., (M90) (Mike) 106 Tyborne Court, Columbia, SC 29210. Dy: (803) 822-6866. Res: (803) 798-4780. S: Rose. Job: ASF Supvr, Avn Spt Fac. GS: 12.

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Hutson, Robert V., (M82) (Bob) 2 Zinzer Court, St. Louis, MO 63123. Dy: (314) 263-1952. Res: (314) 849-2355. S: Anna. Job: Dir, Sys Mgmt, PEO, Avn. GS: 15.

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Johnson, Douglas C., (M74) (Doug) 4 Seward Drive, Ocean, NJ 07712-3725. Dy: (908) 544-3284. Res: (908) 922-0568. S: Patricia. Job: Proj Engr, USA AVRADA, Fort Monmouth. GS: 14.

Johnson, Edward T., (M88) (Ted) 106 Rollingswood Road, Chesapeake, VA 23325. Dy: (804) 878-6203. Res: (804) 424-4700. S: Evelyn. Job: USAALS. GS: 11.

Johnson, Robert H., (M82) (Bob) 5727 Hidden Cove Lane, Florissant, MO 63034. Dy: (314) 263-3775. Res: (314) 741-8045. S: Bunny. Job: Chf, Avn Sys Div, AVSCOM. GS: 15.

Johnson, Sammy R., (M80) 5322 Bromley, Corpus Christi, TX 78413. Dy: (512) 939-3622. Res: (512) 992-2900. S: G. Faye. Job: Chief, Instrument Electrical Branch.

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Jorgensen, Erin K., (M90) (Ken) 4422 Mistletoe Drive, Corpus Christi, TX 78411. Dy: (512) 939-3525. Res: (512) 853-6013. S: Cindy. Job: Aircraft Elect/Electr. Systems Supvr, CCAD. GS: 10.

Juhola, Veikko I., (M91) (Vic) P.O. Drawer 189, Fort Rucker, AL 36362. Dy: (205) 598-2449. Res: (205) 774-9478. S: Betty. Job: Manager, Golf Course.

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Kallos, Nicholas C., (M79) (Nick) 209 Roger Webster, Williamsburg, VA 23185. Dy: (804) 878-3507. S: Gay. Job: Deputy Director, AATD. GS: 15.

Kaiser, Darrel P., (M90) 335 Quebrada Del Mar, Marina, CA 93933. Dy: (408) 242-4310. Res: (408) 883-4885. S: Betty. Job: MICOM/LAO. GS: 12.

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Karvinen, Clifford P., (M88) 5320 Sugarloaf Road, Collinsville, IL 62234-9803. Dy: (314) 263-1952. Res: (618) 346-0123. S: Joan. Job: General Engineer, PEO Avn-Systems Mgmt. GS: 14.

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Kelley, Karen L., (M82) 1709 Nashua Drive, Dellwood, MO 63136. Dy: (314) 263-3307. Res: (314) 867-4695. Job: Supv Contracting Off, TROSCOM. GS: 13.

Kemph, Faulton E., (M90) (Gene) HHC 2nd Infantry Division, Unit 15046, ARTBASS, APO AP 96224-0289. S: Brenda. Job: Engr, CAE-Link Simulation. GS: 11.

Kerby, Paul D., (M83) 5715 Hidden Stone Drive, St. Louis, MO 63129. Dy: (314) 693-1550. Res: (314) 487-9872. S: Darlene. Job: Cobra PMO Chf Log Mgmt Div. GS: 14.

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Lange, James P., (M86) (Jim) 356 Suburban Drive, Toms River, NJ 08753. Dy: (908) 544-4028. Res: (908) 349-0284. S: Carol. Job: Electronics Tech, AVRADA. GS: 12.

Langford, Isaiah C., (M75) (Charlie) 941 Rickey, Corpus Christi, TX 78412. Dy: (512) 939-3251. Res: (512) 991-7060. S: Carolyn. Job: Chief, Power Train Shops Div, CCAD. GS: 13.

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Larsen, Kathleen M., (M83) (Kathy) 700 Concordia Lane, St. Charles, MO 63301-4656. Dy: (314) 263-1435. S: Nick. Job: Congressional Affairs Officer, AVSCOM. GS: 12.

Laughlin, Edward P., (M67) 15014 Manor Lake Drive, Chesterfield, MO 63017. Dy: (314) 263-1171. S: Pat. Job: Dir of Sys & Cost Analysis, AVSCOM. GS: 15.

Laughlin, John J., (M87) 1351 Heydt Ave, Dellwood, MO 63135. Dy: (314) 263-3434. Job: AVSCOM, Equipment Specialist Acft. GS: 11.

Laughlin, Pamela C., (M91) 1351 Heydt Avenue, Dellwood, MO 63135. Dy: (314) 263-1550. Res: (314) 521-6146. S: John. Job: Cobra PM-Secretary. GS: 5.

Lavella, Anthony E., (M85) (Tony) 2304 Outlook Drive, St. Louis, MO 63136. Dy: (314) 263-1722. Res: (314) 653-1151. Job: Electronics Engr, USA AVSCOM. GS: 14.

Laverda, Frank R., (M84) 60 Fairfield Avenue, Cranford, NJ 07016. Dy: (908) 544-2490. S: Yvonne. GS: 13.

Leal, Roland E., (M90) P.O. Box 18187, Corpus Christi, TX 78480. Dy: (512) 939-2185. Res: (512) 939-8670. Job: A/C Pneudraulic System Mechanical, CCAD.

Leavis, Gerard J., (M89) (Jerry) 513 East Silver Oak Drive, Enterprise, AL 36330. Dy: (205) 255-3300. Res: (205) 347-6409. S: Mary T.. Job: Director of Logistics, USAAVNC. GS: 15.

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Letts, Clifford E., (M67) (Cliff) 459 Dunmore Drive, Newport News, VA 23602. Dy: (804) 878-2320. Res: (804) 874-0726. S: Midge. Job: Chief, NTC Instrumentation Team, CTC-S. GS: 13. Life Member. Past VP, Colonial Virginia Chapter.

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Lewis, Richard W., (M57) (Dick) 306 Hudson

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Lindberg, Arthur W, (M76) (Wayne) 840 Woodbriar Lane, St. Charles, MO 63303. Dy: (314) 263-1637. Res: (314) 441-8357. S: Bernice. Job: Chief, Mission Equip Div, Direct for Engrng, AVSCOM. GS: 15.

Lines, Charles W., (M88) (Chuck) 3659 Knollstone Drive, Ferguson, MO 63135. Dy: (314) 263-1301. Res: (314) 521-4394. Job: Opns Research Analyst, Kiowa Warrior PM. GS: 14.

Long, Judy E., (M89) 240 Queensbury Drive, Apt. 3, Huntsville, AL 35802. Dy: (205) 842-8957. Res: (205) 881-5720. Job: Supervisory Inventory Mgmt Spec, U.S. Army Missile Cmd. GS: 14.

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Loupe, Glen E., (M89) 2400 Tree Ridge Lane, Orlando, FL 32817. Dy: (407) 380-8511. Res: (407) 679-5055. S: Vickie. Job: Electronics Engr, Naval Training Systems Center. GS: 12.

Lovell, O. Carlos, (M89) P.O. Box 18063, Corpus Christi, TX 78480. Dy: (512) 939-3431. Res: (512) 949-8704. S: Tena. Job: Attorney Advisor, Army, CCAD. GS: 13.

Lowman, Joseph L., (M74) HQ USAREUR/7A, Box 2633, APO AE 09063. S: Dorte. Job: Asst Deputy Chief-of-Staff, Logistics, HQ US Army Europe. GS: 15.

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Marsh, Cynthia C., (M90) (Cindy) 1706 Harriett, Corpus Christi, TX 78416. Dy: (512) 939-2178. Res: (512) 857-6436. Job: Warehouse Worker, CCAD, Dir. Sup.. GS: 6.

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Matthews, William G., (M85) 1333 Cherry Glen Court, Chesterfield, MO 63017. Dy: (314) 263-2807. Res: (314) 537-0849. S: Karen. Job: Deputy Dir Resource Mgmt, AVSCOM. GS: 15.

McCall, Richard A., (M91) (Rich) Chief Supply & Services, USMCA Mannheim, APO AE 09066. S: Gisela. Job: USMCA Mannheim. GS: 11.

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McClellan, Max C., (M91) 3547 Aberdeen, Alton, IL 62002. Dy: (314) 263-1380. Res: (618) 462-6705. S: Donna. Job: Longbow Project Mgr Office. GS: 12.

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McDermott, James T., (M88) (Jim) 14963 Pocono Circle, Chesterfield, MO 63017. Dy: (314) 263-1952. Res: (314) 532-7892. S: Ruth. Job: Electronic Engineer, PEO Avn.. GS: 14.

McEneany, Daniel M., (M82) (Mike) 304 Wildbrier Drive, Bulwin, MO 63011. Dy: (314) 263-1100. Res: (314) 227-2891. S: Mary Ann. Job: Dir of Engrg, AVSCOM. SES: 4. 1987 Dac Of The Yr..

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Miller, Thomas R., (M76) (Tom) 13303 Point Pleasant Dr., Fairfax, VA 22033. Dy: (703) 695-0330. Res: (703) 968-8328. Job: Deputy Dir, Plans & Progs, OASA(RDA). GS: 15.

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Moody, Sylvia J., (M91) 631 Donald Street, Enterprise, AL 36330. Dy: (205) 255-3407. Res: (205) 347-6045. Job: Contract Specialist, Directorate of Contracting, Contracting Div.. GS: 11.

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Mudd, Clemence P., (M90) (Clem) 12 High Forest Drive, Belleville, IL 62223. Dy: (314) 263-1400. Res: (618) 233-1766. S: Audrey. Job: Supervising Engr, AVSCOM. GS: 15.

Murphy, Nancy A., (M83) CMR 420, PSC Box 911, APO AE 09063. S: John Bryan. Job: Secy to USAREUR DCSLOG, USAREUR & 7th Army. GS: 7.

Murphy, Thomas P., (M91) (Murph) 9174 Villaridge Court, St. Louis, MO 63123. Dy: (314) 263-2444. Res: (314) 631-4084. S: Shirley. Job: Supply Mgt. Rep.. GS: 9.

NNNNNNNNN

Nellson, Donna M., (M87) (Nee-Na) 6448 Industrial Pk Blvd, No. 5D, Fort Worth, TX 76180. Dy: (817) 280-7006. Job: Contract Off, DPRO-Bell. GS: 12.

Nelson, Ralph C., (M90) (Ralph) 105 Longhorn Road, Winter Park, FL 32792. Dy: (407) 380-8123. Res: (407) 671-2042. S: Cheri. Job: Chief Program Analyst, PM TRADE, Orlando, FL, ATTN: AMCPM-TND-R. GS: 13.

Nenninger, Gary S., (M82) 1353 Westbrooke Terrace, St. Louis, MO 63021. Dy: (314) 263-1944. Res: (314) 225-4053. S: Betty. Job: Chief, Log Div, Apache PGM Mgrs Ofc. GS: 15.

Nicholson, John J., (M90) 201 So. Chaparral, Apt. 11, Corpus Christi, TX 78401-2828. Dy: (512) 939-2486. Res: (512) 883-6494. Job: Supply Clerk, CCAD. GS: 5.

Nicholson, William R., (M87) (Bill) 300 Meadow Place Drive, St. Charles, MO 63303. Dy: (314) 263-1477. Res: (314) 441-5024. S: Jean. Job: Chief, Tech. Mgmt Division, AVSCOM. GS: 15.

Niehaus, Patricia, (M77) (Pat) 295 Avant, Apt. D, Hazelwood, MO 63042. Dy: (314) 263-1637. Res: (314) 839-3852. Job: Secretary, AVSCOM, Direct for Engrng. GS: 6.

Niemela, John, (M76) 217 Lakeside Avenue, Colts Neck, NJ 07722. Dy: (908) 544-4635. Job: Chf, Navigation Div, AVRADA.

North, Robert E., (M85) 16705 Stanford Place Dr., Florissant, MO 63034-3214. Dy: (314) 263-1573. S: Mary Kay. Job: Chief Business Mgmt Div, Special Opns Acft PM, AVSCOM. GS: 14.

Norton, Theresa C., (M88) (Terri) 1 Scenic Drive, Unit P-12, Highlands, NJ 07732-1318. Dy: (908) 544-4851. Job: Secretary, AVRADA. GS: 8.

OOOOO-PPPPP

Obermark, James R., (M90) (Jim) 627 West Third Street, Washington, MO 63090. Dy: (314) 263-1722. Res: (314) 239-7894. S: Mary. Job: General Engr, AVSCOM. GS: 14.

Ogburn, Larry D., (M89) CECOM-LAO-K, PSC 303, Box 33, APO AP 96204-0033. S: Sheila. Job: Camp Stanley, CECOM, Korea. GS: 12.

Okorgi, Robert M., (M85) (Bob) LAO FE (AVSCOM), APO AP 96301. S: Pong Sun. Job: Sr Cmd Repr, AVSCOM. GS: 13.

Olson, Paul M., (M84) 304 Timberline Place, Brick Township, NJ 08723. Dy: (908) 544-3912. Res: (908) 920-1948. S: Lillian. Job: Electronic Engr, AVRADA. GS: 14.

Ordway, Richard C., (M80) (Dick) 12812 Polo Park Drive, St. Louis, MO 63146. Dy: (314) 263-1813. Res: (314) 576-1394. S: Toni. Job: Training Branch Chief, Comanche RAH-66-PMO, AVSCOM. GS: 14.

Ormill, Herman M., (M63) (Dick) 2681 Centennial Court, Alexandria, VA 22311. Dy: (703) 756-1818. Res: (703) 578-9692. S: Peggy. Job: Logistics Mgmt Spec/OPTEC. GS: 14. Life Member. Past Sec, Arizona Chapter.

Parpa, Sheila, (M91) 10074 Bon Oak Drive, St. Louis, MO 63136. Dy: (314) 263-2813. Res: (314) 869-4705. S: John. Job: Budget Analyst. GS: 9.

Parker, James A., (M67) 135 Bridge Avenue, Bay Head, NJ 08742. Dy: (908) 544-2592. Res: (908) 892-0936. Job: Electronic Engr, AVRADA, Fort Monmouth. GS: 13.

Parrie, Charles W., (M74) (Bill) 4165 Montego Drive, Corpus Christi, TX 78411. Dy: (512) 939-3315. Res: (512) 852-3872. S: Norma. Job: Security Off, X-10000 X-3313, CCAD. GS: 12.

Patterson, Carolyn D., (M88) 1274 Exeter Lane, Fayetteville, NC 28314. Dy: (919) 432-2146. Res: (919) 868-9096. Job: Associate Director for SAD-BU, USA SOC. GS: 12.

Patterson, Douglas T., (M85) (Doug) 6637 Hardwick Drive, Corpus Christi, TX 78412. Dy: (512) 939-2102. Res: (512) 993-8066. S: Christine. Job: Ind Engr, Ped D-Maint, CCAD. GS: 12.

Paul, Keith E., (M90) 11069 Golf Crest Drive, St. Louis, MO 63126. Dy: (314) 263-1775. Res: (314) 842-1358. S: Dorothy. Job: Quality Assurance Specialist (Aircraft), AVSCOM. GS: 12.

Peterson, Mark A, (M85) (Pete) 353 Mason Ridge Drive, St. Charles, MO 63304. Dy: (314) 263-1807. Res: (314) 928-7084. S: Leslie. Job: Aerospace Engr, Comanche PMO. GS: 14.

Pfingsten, Sally J., (M91) 1229 Trails Drive, Fenton, MO 63026. Dy: (314) 263-1424. Res: (314) 225-5238. Job: Administrative Services Assistant, AVSCOM. GS: 7.

Pickett, Gaines T., (M81) 2305 Dwight, Granite City, IL 62040. Dy: (314) 263-3624. Res: (618) 797-8240. S: Linda. Job: Chf, CH-47/CH-54 Br, Dir, Mat Mgt, AVSCOM. GS: 14.

Pippins-Griffi, Constance L, (M86) 3915 Marietta Drive, Florissant, MO 63033. Dy: (314) 263-3576. Res: (314) 839-8155. S: Wade. Job: Contracting Officer-AVSCOM. GS: 12.

Platt, Donald L., (M82) (Don) 36 Heather Hill Lane, St. Louis, MO 63132. Dy: (314) 263-3216. Res: (314) 432-0835. Job: Dir of Int'l Logis, AVSCOM. GS: 15. Past

Pollard, Richard L., (M82) (Dick) 1220 Airline Road, Apt. 130-D, Corpus Christi, TX 78412. Dy: (512) 939-3434. Res: (512) 937-5064. Job: CCAD, DOA, AMC, DES Com. GS: 13.

Pondaco, Dominick P., (M88) (Dom) 4800 Belmar Boulevard, Neptune, NJ 07753. Dy: (908) 532-0101. Res: (908) 280-1243. S: Frances. Job: Chief, Data Communications Branch, AVRADA. GS: 14.

Port, Michael E., (M87) (Mike) 3119 Maryville Road, Granite City, IL 62040. Dy: (314) 263-2251. Res: (618) 451-4823. Job: Logistics Mgmt Spec, AVSCOM AMSAV-IAS. GS: 12.

Post, Martin, (M82) (Marty) 53 Tyson Lane, Freehold, NJ 07728. Dy: (908) 544-2706. S: Jill. Job: Chief Combat Avn Branch, U.S. Army AVRADA. GS: 14.

Pottheff, Thomas D., (M88) 4300 Goodfellow Boulevard, AMSAV-NC, St. Louis, MO 63120. Dy: (314) 263-1078. Res: (314) 532-9699. Job: General Engr, AVSCOM. GS: 14.

Potts, Homer W., (M64) 5245 Studer Lane, St. Louis, MO 63128. Dy: (314) 263-2404. Res: (314) 849-8495. S: Betty. Job: Operating Accountant, USA Troop Spt & Avn Mat, TSARCOM. GS: 11.

Powell, Richard L., (M88) (Dick) 99 Baxter Acres Drive, Manchester, MO 63011. Dy: (314) 263-1712. Res: (314) 256-8407. S: nancy. Job: GS-13, Logistics Mgmt Spec. AVSCOM. GS: 13.

Powell, Yuseff D., (M87) 191 Riddle Avenue, Long Branch, NJ 07740. Dy: (908) 544-2748. Res: (908) 229-7112. Job: Electronics Engr, AVRADA-SAWAA-F. GS: 12.

Powers, Donna M., (M82) 140 Condor Court, St. Charles, MO 63303. Dy: (618) 256-2869. Res: (314) 946-4042. Job: Chief of Protocol, USTRANSCOM. GS: 11.

Prorok, John F., (M88) 511 North Riverside Drive, Neptune, NJ 07753. Dy: (908) 544-3548. Res: (908) 776-8501. S: Phyllis. Job: Electronic Engr, Avionics R&D Activity.

Puryear, Judith P., (M90) (Judy) 1754 Star Cove, Corpus Christi, TX 78412. Dy: (512) 939-2304. Res: (512) 993-0397. S: Bill C.. Job: File Clerk, Typist, (Lead), CCAD. GS: 6.

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Quintanilla, Billy F., (M84) (Billy) Corpus Christi, 4618 Calvin, Corpus Christi, TX 78411. Dy: (512) 939-2069. Res: (512) 852-7051. S: Diana. Job: Acft Engine Mech, CCAD, T-700 Engine Shop. VP, Corpus Christi Chapter. Past VP, Corpus Christi Chapter.

Raabe, George F., (M88) 4729 Broughton Drive, Corpus Christi, TX 78415. Dy: (512) 861-2711. Res: (512) 855-9917. S: Jeanie. Job: Acft Examiner (Transmission), CCAD.

Raines, Edgar F., (M89) (Ed) 4752 West Braddock Road, Alexandria, VA 22311. Dy: (202) 272-0334. Res: (703) 845-1481. S: Rebecca. Job: Historian, US Army Center of Military History. GS: 12.

Ramon, Samuel A., (M88) (Sam) 306 Stages, Corpus Christi, TX 78412. Dy: (512) 939-2596. Res: (512) 993-0193. Job: CCAD Special Opns Section.

Randall, Clara R., (M89) 204 Red Oak Place, Madison, AL 35758. Dy: (205) 876-3458. Res: (205) 772-8628. Job: Inventory Mgmt Spec, Redstone Arsenal. GS: 11.

Rarick, Marilyn B., (M82) 402 Hickory Bend, Enterprise, AL 36330. Dy: (205) 255-3766. Res: (205) 347-4241. Job: Education Specialist, DOTD, Off & Unit Trng Br, USA Avn Cen. GS: 12.

Ray, James A., (M82) (Jim) 3705 Red Hawk Court, Bridgeton, MO 63044. Dy: (314) 263-1100. Res: (314) 739-6352. S: Charlotte. Job: Dep Dir, Directorate For Engrg, AVSCOM. GS: 15.

Ray, James R., (M67) (Jim) USAMC-E, Unit 29331, Box 396, APO AE 09266. S: Peggy. Job: Chief Logistic Asst, AVSCOM Europe. GS: 14.

Ray, Peggy L., (M89) USAMC-E, Unit 29331, Box 396, APO AE 09266. S: James. Job: Program Analyst, AVSCOM-Europe. GS: 9.

Redman, ConnieSue, (M91) (Connie) 255 E. Bolivar, No. 83, Salinas, CA 93906-1740. Dy: (408) 242-5545. Res: (408) 449-0117. Job: Secretary at Flight Surgeon's. GS: 4.

Redmond, William H., (M85) (Bill) 1548 Autumn Leaf Drive, Ballwin, MO 63021. Dy: (314) 263-1587. Res: (314) 225-2966. Job: AVSCOM, AMSAV-9 Directorate for Fielded Avn Sys. GS: 14.

Reed, Frederick T, (M88) 6235 Blue Spruce, Florissant, MO 63034. Dy: (314) 263-1637. S: Susan. Job: Electronics Engr, AVSCOM. GS: 11.

Reese, Alferd G., (M79) (Al) 1590 Fairmount Drive, Florissant, MO 63033. Dy: (314) 263-1400. Res: (314) 839-6508. S: Nelda. Job: AVSCOM, Chief Electronics System Support Div, AEMO. GS: 14.

Reeve, Edward A., (M90) (Ed) 9868-A Breeds Hill Drive, Affton, MO 63123. Dy: (314) 263-3889. Res: (314) 631-1043. Job: Equipment Specialist (Aircraft & Electronic) AVSCOM AMSAV-MC. GS: 11.

Respass, John T., (M86) 3000 Alicia Drive, Wall,

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NJ 07719. Dy: (908) 532-0102. Res: (908) 681-7270. S: Marie. Job: Supervisory Electronics Engr, AVRADA. GS: 15.

Reynolds, Louie F., (M91) 704 Dauphin Street, Enterprise, AL 36330. Dy: (205) 255-5374. Res: (205) 347-5748. S: Ann. Job: Director, Religious Education, Chaplain's Activities Office. GS: 11.

Reynolds, Virginia L., (M84) (Ginny) 822 Greenview Drive, Mountain View, CA 94040. Dy: (415) 404-5256. Res: (415) 968-7503. S: Daniel. Job: Secy (Typing), COMPATWINGSPAC, US Navy, Moffett Field, CA. GS: 6. Past Sec, Corpus Christi Chapter.

Rhen, Claudia Lee, (M85) 241 Falling Leaf Drive, St. Peters, MO 63376. Dy: (314) 263-1189. Res: (314) 441-5727. S: Darryl. Job: Opns Research Analyst, AVSCOM. GS: 13.

Ricketts, Debra L., (M90) 1053 Burr Drive, Corpus Christi, TX 78412. Dy: (512) 939-2905. Res: (512) 993-9811. Job: Secretary. GS: 5.

Rickmeyer, Jaros C., (M81) (Jay) 12036 Berkley Manor Dr., Des Peres, MO 63131. Dy: (314) 263-1778. Res: (314) 822-4654. S: Marilyn. Job: Dep Prod Mgr, Spec Opns Acft, PEO for Avn. GS: 15.

Riggins, Michael A., (M90) 3717 Brushwood Lane, Corpus Christi, TX 78415. Dy: (512) 939-3525. Res: (512) 855-1284. Job: Aircraft Electrician CCAD.

Roberts, Mary C., (M89) (Charlie) 103 Lightfoot Drive, Enterprise, AL 36330. Dy: (205) 255-2480. Res: (205) 393-2573. Job: Education Specialist. GS: 11.

Robinson, Curtiss L., (M90) 2502 Jeane Court, Alamogordo, NM 88310-4436. Dy: (505) 479-5367. Res: (505) 437-6663. S: Movaline. Job: Aircraft Maintenance Manager/Branch Chief Army Air Oper. Dir.. GS: 11.

Roby, David R., (M85) (Dave) 2474 Indian Tree Circle, Glencoe, MO 63038. Dy: (314) 263-1966. Res: (314) 458-2474. S: Darlene. Job: Supervisory General Engr.. GS: 14.

Rocha, Ernesto, (M90) (Ernie) 2222 Brighton Drive, Corpus Christi, TX 78418. Dy: (512) 939-2087. Res: (512) 937-1228. S: Rose Linda. Job: Supervisor, Inv. Mgt. Spec., Depot Prop. Div. CCAD. GS: 11.

Rodgers, Floyd, (M91) 809 Gonzales Drive, Dothan, AL 36301. Dy: (205) 255-2340. Res: (205) 792-4536. Job: Directorate of Resource Management, USAAVNC, Fort Rucker. GS: 13.

Rodgers, Gary A., (M85) 6838 Crosstimbers, Corpus Christi, TX 78413. Dy: (512) 939-3500. Res: (512) 993-4106. S: Shirley. Job: Machinist Supervisor, CCAD DOO. Past Vp, Corpus Christi Chapter.

Rodriguez, Carlos M., (M85) 2114 Meadowpass Drive, Corpus Christi, TX 78414-2605. Dy: (512) 939-3715. Res: (512) 993-7008. Job: Painter, Eng Div Paint Shop, CCAD. GS: 9.

Rodriguez, Mary M., (M89) 6301 Meadowvista, Apt. 1218, Corpus Christi, TX 78412. Dy: (512) 939-2304. Res: (512) 991-2259. Job: Chief, Classification & Staffing Team 1, CCAD. GS: 12.

Rodriguez, Robert, (M85) (Rod) 8202 Running Creek Court, Springfield, VA 22153. Dy: (703) 487-8291. Res: (703) 455-8330. S: Charlotte. Job: Comm Mgmt Spec, JTCSA, Defense Info Sys Agency. GS: 14.

Roland, Don L., (M73) 64 Rock Creek, Corpus Christi TX 78412. Dy: (512) 939-3585. Res: (512) 992-0962. Job: CCAD Civilian Exec Asst.. GS: 15.

Roth, Irwin, (M83) (Irv) C/O Insbrook Estates, 1 Insbrook Estates Dr.#12, Wright City, MO 63390. Dy: (314) 263-2241. Res: (314) 745-3000. S: Karen.

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Job: Info System Cmd. GS: 14.

Rouland, Donald P., (M87) 2628 Benton Street, Granite City, IL 62040. Dy: (314) 263-3224. Res: (618) 876-2674. Job: Contract Specialist, AVSCOM. GS: 9.

Rouse, Peter L., (M88) 1800 Bellevue Avenue, St. Louis, MO 63143-1307. Dy: (314) 263-1661. Res: (314)

Rutland, James S., (M88) 508 S. Ouida Street, Enterprise, AL 36330. Dy: (205) 255-4605. Res: (205) 347-9720. S: Marcia. Job: DAC Flight Instructor-Ft. Rucker, C Co, 1/212th. GS: 12.

Ryan, Trudy, (M89) 2635 Arcadia Street, Deltona, FL 32738. Dy: (407) 380-8322. Res: (407) 323-7103. Job: Trainer Facilities Engr, PM Trade. GS: 12.

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Saavedra, Manuel, Jr., (M85) 3629 Prosper, Corpus Christi, TX 78415. Dy: (512) 939-3447. Res: (512) 853-1510. Job: Industrial Engrg Tech, Dir of Maint, CCAD. GS: 9.

Saenz, Roberto S., (M83) (Bob) 4310 Carlton, Corpus Christi, TX 78415. Dy: (512) 939-3262. Res: (512) 852-6509. S: Emilia. Job: QC Inspector, CCAD.

Samuell, Brian J., (M85) (Sam) 6813 Holiday Lane, Corpus Christi, TX 78414. Dy: (512) 939-2214. Res: (512) 993-3720. Job: Mech Engrng Tech, CCAD SDSCC-ECA Stop 24. GS: 11.

San Miguel, Norma, (M75) P.O. Box 10170, Corpus Christi, TX 78460-0170. Dy: (512) 939-2776. Res: (512) 241-1607. S: Fred. Job: Dir of Personnel, CCAD. GS: 13.

Sandridge, Leslie G., (M86) 1261 Ballast Point, Arnold, MO 63010. Dy: (314) 263-1026. Res: (314) 464-0302. S: Judy. Job: Ind Spec (Acft), AMSAV-A-KC. GS: 11.

Satterfield, Kenneth T., (M89) 101 Oakview Circle, Enterprise, AL 36330. Dy: (205) 255-6418. Res: (205) 393-2773. Job: Hoptr Flt Instr. GS: 12.

Schlieper, Elizabeth I, (M89) (B.J.) Route 1, Box 765h, Ingleside, TX 78362-0000. Dy: (512) 939-3061. S: Richard. Job: Parts Mgt. Specialist, CCAD. GS: 9.

Schmitz, Cindy A., (M89) 3001 Wheatfield Lane, Trenton, IL 62293. Dy: (314) 263-2551. Res: (618) 224-7824. Job: Position Classification Spec, CPO-AVSCOM. GS: 12.

Schmitz, Don W., (M83) (Don) 1090 Marion, Carlyle, IL 62231. Dy: (314) 263-3125. Res: (618) 594-2883. S: Mary Ann. Job: Dir of Acquisition, AVSCOM AMSAV-A-GAD. SES.

Schodroski, Jeannette, (M83) 1417 Olive Street, Highland, IL 62249. Dy: (314) 263-3769. Res: (618) 654-8316. Job: Inventory Mgt Spec, AVSCOM, Directorate for Materiel Mgt. GS: 12.

Schofield, Randall L., (M89) (Randy) 103 Hickory, Apt. 1, Jerseyville, IL 62052. Dy: (314) 263-2636. Res: (618) 498-3961. Job: Equipment Spec, AVSCOM. GS: 9.

Schroeder, Jill E., (M85) 2183 Hillsgate Court, St. Louis, MO 63146. Dy: (314) 263-2236. Res: (314) 469-6810. S: Paul. Job: Contracting Ofcr, AVSCOM. GS: 12.

Schwartz, Joseph R., (M84) (Joe) P.O. Box 166, Manasquan, NJ 08736. Dy: (201) 544-3967. Job: Associate Technical Dir, USACECOM. GS: 15.

Schwind, Gemma, (M83) P.O. Box 18106, Corpus Christi, TX 78418. Dy: (512) 939-2662. Res: (512) 939-9486. Job: Computer Sys Analyst, CCAD, Dir of Info Mgmt. GS: 11. Past VP, Corpus Christi Chapter.

Selcach, Stephen M., (M87) 8334-D Road, Waterloo, IL 62298. Dy: (314) 263-1373. Res: (618) 939-6055. S: Barbara. Job: Logistics Mgmt Specialist, SFAE-AV-ASH-L. GS: 13.

Serrata, Emily, (M91) 5757 South Staples, Apt. 1606, Corpus Christi, TX 78413. Dy: (512) 939-2185. Res: (512) 992-7616. Job: Hydraulics Mechanic Helper.

Shackelford, Sandra H., (M87) (Sandy) Route 1, Box 1160, Hayes, VA 23072. Dy: (804) 878-2208. Res: (804) 642-3143. S: James. Job: Secy to Cdr, Avn Applied Tech Directorate, Fort Eustis. GS: 7.

Shannon, John K., (M81) (John) 6946 Pershing Avenue, University City, MO 63130. Dy: (314) 263-1360. Res: (314) 862-1302. S: Linda. Job: DPM Kiowa Warrior Program. GS: 15. 89 Dac Of The Year.

Sharp, Betty S., (M89) 4326 Yucca Street, Corpus Christi, TX 78411. Dy: (512) 939-2972. Res: (512) 852-2980. Job: Admin Prog Coord, CCAD, Dir Maint, SH000. GS: 5.

Sheth, Chandrakant, (M87) (Chandu) 6 Old Bridge Drive, Howell, NJ 07731. Dy: (908) 544-3568. Res: (908) 367-4022. S: Bina. Job: Super Gen Engr, AVRADA. GS: 14.

Shipley, John L., (M82) Aviation Applied Technology Directorate, Fort Eustis, VA 23604-5577. Dy: (804) 878-2000. Res: (804) 249-2131. S: Betty. SES.

Sienknecht, Bruce J., (M88) RR 1, Box 77A, Troy, MO 63379. Dy: (314) 263-1568. Res: (314) 528-6873. S: Annette. Job: Acft Equip Spec, AVSCOM. GS: 11.

Simpson, Constance M, (M83) (Connie) 10 Hanson Drive, Granite City, IL 62040. Dy: (314) 263-3764. Res: (618) 797-0639. S: Jack. Job: Inventory Mgmt Spec, AVSCOM. GS: 12. Life Member.

Smith, Alfred F., (M66) Monmouth Chapter, Treas., 635 Tinton Avenue, Tinton Falls, NJ 07724. Dy: (908) 530-7198. Job: C3I Systems Group, Inc.. Trea, Monmouth Chapter. Past Trea, San Jacinto Chapter.

Smith, Clifton D., (M82) 108 Oxford Avenue, Fairview Heights, IL 62208. Dy: (314) 263-2505. Job: Chief Provision & Tech Data, Dir of Maint, AVSCOM. GS: 15.

Smith, Evan E., (M89) (Evan) Route 3, Box 250-8, Opp, AL 36467. Dy: (205) 255-2912. Res: (205) 897-5353. S: Carol J.. Job: Dir. Community & Family Activities. GS: 14.

Smith, Gary L., (M81) (Gary) AAAA Natl Member-at-Large, 514 Fox Pointe Drive, St. Charles, MO 63304. Dy: (314) 263-1121. Res: (314) 928-9458. S: Ida. Job: Dep PEO, Aviation. SES. NEB.

Smith, Paul J., (M80) (PJ) P.O. Box 252, Challis, ID 83226-0252. Dy: (208) 879-4321. Job: Hoptr Mgr, Challis Nat'l Forest. GS: 7.

Somers, Karen L., (M88) 106 Lookout Point, Yorktown, VA 23692. Dy: (804) 878-2179. Res: (804) 890-2558. S: Max. Job: Opns Research Analyst, USA AATD. GS: 14.

Sorrells, Ronald R., (M80) (Ron) P.O. Box 87, 6 South Johnson Street, Samson, AL 36477. Dy: (205) 255-6195. Res: (205) 898-2011. S: Emma.

Job: Chf, Alcohol/Drug Abuse Div, Dir Pers & Comm Act. GS: 12.

Sosa, Greg, (M91) 6225 Pebble Beach, Corpus Christi, TX 78413. Dy: (512) 939-2069. Res: (512) 853-3140. S: Teri.

Spears, Abner B., (M89) 7434 Piper Drive, Corpus Christi, TX 78412. Dy: (512) 939-3803. Res: (512) 992-9710. Job: Mgmt Analyst, CCAD. GS: 11.

Sprague, Lee F., (M87) 1255 Coral Bells Court, St. Louis, MO 63146. Dy: (714) 540-5621. Res: (314) 434-1619. S: Eleanor. Job: St. Louis Univ.

Stanford, Don L., (M83) 9511 Howerton Drive, St. Louis, MO 63123. Dy: (314) 263-1384. Res: (314) 638-0195. S: Janet. Job: AVSCOM, Chief, Manpower Mgmt Branch. GS: 13.

Steele, John A., (M87) 309 N. Sappington, St. Louis, MO 63122. Dy: (314) 263-1722. Res: (314) 965-1065. S: Patricia. Job: Chief Systems Engrg Div, Longbow PMO, PEO Avn, USAAVSCOM. GS: 15.

Steiner, Greg, (M88) 10770 Midwest Ind Blvd., St. Louis, MO 63132. Dy: (314) 426-7227. Job: Avn Material/Technical Support.

Stephens, Allen L., (M90) P.O. Box 72062, Corpus Christi, TX 78472. Dy: (512) 939-3871. Job: Director, Product Assurance and Test, Corpus Christi Army Depot. GS: 14.

Steuber, Ellen A., (M88) (Ellen) 3468 Gunston Road, Alexandria, VA 22302. Dy: (703) 274-9144. Res: (703) 998-8617. Job: Program Integration Spec, USA Materiel Cmd. GS: 14.

Stewart, Edna Roma, (M85) (Roma) 7208 Jenwood Street, St. Louis, MO 63136. Dy: (314) 263-1758. Res: (314) 381-1497. Job: Div Secretary/AVSCOM. GS: 5.

Stewart, Edwin J., (M91) (Ed) D Co., 4/159 Avn. Regt., CMR 422, Box 711, APO AE 09274. S: Dot. Job: Aircraft Maintenance Technician, Agusta Aerospace. GS: 11.

Stoops, Lewis E., (M85) (Lew) 7437 Piper Drive, Corpus Christi, TX 78412. Dy: (512) 939-3447. Res: (512) 992-0998. S: Kathy. Job: WC 5FA00, X3305, CCAD. GS: 11. Life Member.

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I certify that the statements made by me in this statement and dated September 21, 1991 are correct and complete.

Lynn Coakley
Publisher

Commander's Intent
(continued from page 27)

Company (1987) defines intent as "the purpose of the mission . . . that condition or situation to be achieved by the mission". FM 100-5 does not define the term, only mentioning it three times. Frequently, a statement of intent is little more than the mission, worded differently.

[14]German defensive doctrine from 1916-1918 is an apposite example. See Timothy Lupfer, Leavenworth Paper No. 4, *The Dynamics of Doctrine: Changes in German Tactical Doctrine During the First World War*, (Ft. Leavenworth: US Army Command and General Staff College, 1982)

[15]Viktor Suvorov, *Inside the Soviet Army* (NY: Berkley Books, 1984), 202.

[16]Major Jeff Long, "The Evolution of Army Doctrine: From Active Defense to AirLand Battle and Beyond," unpublished M.M.A.S. thesis (Ft. Leavenworth: U.S. Army Command and General Staff College, 1991), 103.

[17]"The importance of firepower in maneuver warfare cannot be overemphasized". Lind and Wyly, 21.

[18]Erwin Rommel, *Infanterie Greift An* ("Infantry Attacks"), (Vienna, VA: Athena Press, 1979), 270-275.

[19]See R.J. Bidwell, "The Development of British Field Artillery Tactics," *Journal of the Royal Field Artillery* (October-November 1978)

[20]Lind and Wyly, 24. Montgomery's allusion to "writing down" German armor during Operation Goodwood is an apt example.

[21]See Luttwak, 95.

[22]John Masters, *Road Past Mandalay* (NY: Harpers, 1961)

[23]Long, 94.

[24]See General John Foss, "Command", *Military Review* (May 1990) and "AirLand Battle-Future", *Army* (February 1991) and Major General Steven Silvasy, Jr., "AirLand Battle Future: The Tactical Battlefield", *Military Review* (February 1991).

ATC
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structure by providing the integrating center for Army Aviation Command and Control (A^2C^2) information, plans, and orders. TAIS will be lightweight and highly mobile with rapid setup and takedown times. TAIS will be a modular system approach so that the modules can be connected to increase the overall capability while maintaining individual item unity. TAIS will also interface with existing and emerging voice, data, imaging, positioning, and command and control networks. PM-ATC is optimistic that initial fielding of the TAIS will begin in early 1998.

The fourth tactical system presently scheduled for lifecycle replacement is the AN/TSQ-70A. Based on 1965 technology, the TSQ-70 is a two position tactical mobile control tower that was originally scheduled to be replaced by the TSW-7A. Because of the size and transportability limitations of the TSW-7A and funding cutbacks in the TSW-7A program, the TSQ-70A continues to be used at Division and Corps airfields. The biggest deficiency in the TSQ-70A is its inadequate communications system and expense to maintain.

The ATC acquisition community is in the concept formulation phase for the Forward Area Shelterized Terminal (FAST) which will replace the TSQ-70A. The FAST, formerly called a Division Tactical Tower System (DTTS) and Tactical Tower System (TTS), will follow the NDI acquisition strategy. The FAST will be a mobile control tower facility housing the latest in jam-resistant, secure voice radio, wind speed and direction indicators, altimeter and other digital equipment to provide the controller a contemporary work-area equipped with state of the art technology. Fielding for the FAST may begin in late 1996.

These are only four of the tactical ATC systems that are presently in the ATC acquisition process to incude the Mobile Microwave Landing System. We are aware of the many problems and antiquated equipment that the tactical air traffic controller faces each day and all of us in this office are working hard to eliminate these deficiences. Our goal is to provide the ATC soldier with the modern tools necessary to keep pace with the AirLand Battle and to defeat any threat with confidence. IIIII

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Mr. Timothy J. Phelps
Mr. William W. Pigott
Mr. Steve Rait
Mr. Glynn Raymer
Mr. Donald D. Rohloff
Ms. Linda B. Rusk
Mr. Terry Shivers
Mr. Randy Speed
Mr. Mike Zelmann

OLD IRONSIDES CHAPTER ANSBACH, GERMANY

CPT James W. Arp

PHANTOM CORPS CHAPTER FORT HOOD, TX

MAJ Roy E. McLendon
CPT David A. Mitchell
SFC David J. Mueller
CPT Manuel L. Quiterio, III
SSG Aniceto L. Rivera
LTG Horace G. Taylor

PIKES PEAK CHAPTER FORT CARSON, CO

CW3 Preston A. Cannedy

CPT Jerald L. Phifer

REDCATCHER CHAPTER NURNBERG, GERMANY

1SG John T. Green
SPC Francisco R. Perez
CPT S. Mitchell Strickland

RHINE VALLEY CHAPTER MANNHEIM, GERMANY

MAJ Robert T. Atterbury
CW4 Ronald S. Marchman, Ret.

SAVANNAH CHAPTER FT STEWART/HUNTER AAF, GA

CW3 Jack G. Burgin
CW3 Ernest David
1SG Edward P. Iannoni
CW3 Michael W. McDaniel
CW2 Tim M. Payne
CW4 Paul L. Reed
CPT Andrew A. Sileo, Jr.
CW3 Harold G. Sowers
WO1 Douglas J. Wright

SOUTHERN CALIFORNIA CHAPTER LOS ANGELES, CA

Mr. Arthur Edelstein
LTC James C. Ghormley, III
LTC Ronald L. Lucas
Ms. Gale R. Mathiasen
CW3 Alan W. Wilson

STUTTGART CHAPTER STUTTGART, GERMANY

SGT Brian W. Babcock
CPT Joseph P. Creekmore, Jr.
SSG Douglas K. Gallinger
SGT Cynthia E. Jent
SSG Trevor S. Thomas

TALON CHAPTER ILLESHEIM, GERMANY

CPT Donald W. Huffman
CPT Chandler C. Sherrell

THUNDERHORSE CHAPTER FULDA, GERMANY

CPT Jonathan F. Angeles

CW2 Glenn T. Carthron, III

WASHINGTON DC CHAPTER WASHINGTON, DC

Mr. Jonathan Gambill
MAJ Charles E. McKeone
COL Robert M. Novogratz, Ret.

WINGS OF THE DEVIL CHAPTER FORT POLK, LA

PFC William R. Riggs

MEMBERS WITHOUT CHAPTER AFFILIATION

CW2 Paul A. Albertson

CPT David G. Bridges
1LT Richard P. Christensen
Mr. Thomas M. Foster
CW3 Theodore V. Horman
MAJ William D. Horton
CW2 Terry R. Knight
MAJ Douglas W. LeFebvre
LTC Ralph L. Woods, Jr.

CAREER TRACK

If you'd like to take advantage of the Career Track employment referral service, but you're not yet a member of AAAA, the solution is simple: Fill out a membership form and send it in along with your request for a Career Track application. Your ad will run in the next available issue.

Active AAAA members may have a 30-word classified employment ad published in two consecutive issues of ARMY AVIATION MAGAZINE free of charge. Write to the AAAA National Office, 49 Richmondville Avenue, Westport, CT 06880-2000, or call (203) 226-8184 for Career Track applications. Inquiring organizations contact the National Office.

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Please check one: ☐ Change of Address; ☐ New Membership Application

I wish to join the Army Aviation Association of America (AAAA). My past or current duties affiliate me with U.S. Army Aviation and I wish to further the aims and purposes of the AAAA. I understand that my membership includes a subscription to the AAAA-endorsed magazine "Army Aviation", and that my membership will start on the subsequent first of the month. Contributions or gifts to AAAA are not deductible as charitable contributions for federal income tax purposes. Dues payments are deductible by members as ordinary and necessary business expenses.

Rank/GS Grade _____ First Name _____ MI _____ Last Name _____ Sex _____

Mailing Address _____

Mailing Address _____

City _____ State _____ Zip + 4 Code _____

Active Duty or Civilian Job Title and Unit or Firm Name _____

( ) _____ Area Code Office Phone ( ) _____ Area Code Residence Phone

Consent: ☐ I do ☐ I do not consent to the publication or release of the above information to third parties.

Signature _____ Date _____

Nickname _____ Spouse's Name _____

Date of Birth (Mo/Yr) _____ Social Security No. _____

AAAA ANNUAL DUES

Applicants other than those listed below:
( ) 1 yr, $21; ( ) 2 yrs, $39; ( ) 3 yrs, $57
Full-Time Students; Enlisted; WOCs; GS-8 DACs & Below; Wage Board 12 DACs & Below:
( ) 1 yr, $14; ( ) 2 yrs, $25; ( ) 3 yrs, $36
Add $5 per year if you have a foreign, non-APO address.
Add $15 if your check is drawn on a foreign bank.
☐ Check enclosed payable to "AAAA" or charge to:
☐ AMEX ☐ Diners Club ☐ Mastercard ☐ Visa
Card No. _____
Amt $ _____ Exp. Date _____
Signature: _____
Date: _____

Check (✓) Your Professional Qualification:

( ) Army Active Duty	( ) US Defense Industry
( ) DA/DOD Civilian	( ) Consultant
( ) Army Nat'l Guard	( ) Publishing/Other Assn.
( ) Army Reserve	( ) Foreign Military Service
( ) Army Retired	( ) Foreign Defense Industry
( ) Other US Military Service	( ) Other _____

Are you a former AAAA member? ☐ Yes ☐ No
If yes, what year did you join? _____
Chapter Affiliation Preferred _____
Print Name of Recruiter _____

AAAA ASE Symposium

The Ninth Annual AAAA Aircraft Survivability Equipment (ASE) Symposium, hosted by Hughes Aircraft Company, was held 5-6 November at the company's El Segundo, CA facility.

AAAA President, MG Charles F. Drenz, Ret., greeted the attendees and introduced this year's host, Vice President, Electro-Optical & Data Systems Group, Hughes Aircraft Company, Mr. Nathan L. Simmons. COL Thomas E. Reinkober, ASE Project Manager, opened the professional sessions by presenting some very special people with special commendations. They are, as follows: LtCol Peter R. McGrew, awarded the Legion of Merit and Air Medal; CPT Donnie C. Turner, Bronze Star and Air Medal; MAJ Craig G. Searfoss, Meritorious Service Medal and Air Medal; MSG Larry P. Landon, Meritorious Service Medal; and Mr. William R. Nicholson, Decoration for Exceptional Civilian Service Award. All of these individuals contributed immensely to the continuing ASE effort during Operation DESERT STORM, and their selfless dedication saved the lives of countless pilots, crewmembers, and passengers, as well as ensuring that aircraft survived to fight another day. COL Reinkober then went on to deliver the Keynote Address.

Thirteen technical papers were presented during the classified symposium and included:

Gray Systems—Showcase of Advanced Technology by Donald R. Fetterly, Project Engineer, Air Defense Systems Division, General Dynamics.

Laser Threat Briefing by William Krohn, Senior Program Manager, Hughes Danbury Optical Systems, Inc.

If You Thought the 'Smart' Technology of Operation DESERT SHIELD/DESERT STORM was Outstanding—Just Wait by Richard G. Powell, Senior Threat Analyst, CAS, Inc.

AN/AVR-2A—Advances in Laser Warning by LTC Paul A. Dvorsky, APM for Electro-Optics/Lasers, U.S. Army ASE PMO and Ralph Troisio, Project Leader/Electronics Engineer, U.S. Army CECOM, Center for EW/RSTA.

First Infantry Division ASE Program for Operation DESERT SHIELD/DESERT STORM by CW3 Stephen L. Woods, ASE Officer, C Company, 1-1 Avn Regt., 4th Brigade.

The Changing Role of ASE in the Air Defense Suppression Mission by Douglas J. Laurendeau, Staff Systems Engineer, IBM Corporation, IBM Federal Sector Division.

Technology Initiatives for Aircraft Survivability Equipment by Raymond A. Irwin, Chief, Advanced Concepts Division, U.S. Army CECOM, Center for EW/RSTA.

Advanced Threat Infrared Countermeasures (ATIRCM) by Russell Stanton, Physicist, U.S. Army ASE PMO.

Integrated Laser and Missile Warning Using the AN/AAR-47 by Louis W. Perich, Supervisor, AN/AAR-47, Product Development, Loral Infrared and Imaging Systems.

Tactical Situation Assessment and Response Strategy Program Overview (TSARS) by William V. Kropac, Program Manager, TSARS Program, Hughes Radar Systems Group, Hughes Aircraft Company.

Providing Survivability Through Infrared Radiation Suppressors by Gabor Kossuth, Project Engineer, Heat Transfer Engineering, Allied Signal Aerospace Company, AiResearch Los Angeles Division.

A Strap-On Training System Concept for Enhanced Aviation Survivability by Brian G. Cooper, Director, C^{3}I Business Development, Fairchild Defense.

The Direction Finding and Location System (DFLS) by David C. Sjolund, Project Manager, Electronic Warfare (EW) Programs, Hughes Aircraft Company.

The high point of the Ninth ASE Symposium was the presentation of the AAAA

Left to right, Anthony R. Grieco, Director, Electronic Combat, Office, Deputy Director of Defense Research and Engineering (Tactical Warfare Programs), Office, Under Secretary of Defense (Acquisition) - the ASE Awards Banquet Guest Speaker poses with the 1990 ASE Award Winner, CW3 Stephen L. Woods, Mrs. Woods and COL Thomas Reinkober, ASE PM. **Below left to right**, COL Reinkober accepts a AAAA Certificate of Appreciation from MG Charles F. Drenz, Ret., AAAA President.

"Aircraft Survivability Award" to CW3 Stephen L. Woods, 1st Battalion, 1st Aviation, Ft. Riley, KS.

The AAAA ASE Award, bestowed to the AAAA by Loral Electronic Systems, is presented annually during the ASE Symposium to the individual who has made an outstanding contribution to Army Aviation in the area of Aircraft Survivability Equipment during the previous calendar year. The trophy is on permanent display at the U.S. Army Aviation Museum at Ft. Rucker, AL.

CW3 Woods represented the epitome of what an Electronic Warfare Officer should be in an aviation unit. He filled the vacuum between the S-2 and the aircrews, and consistently walked the flight line answering questions by aircrew members about threat systems, ASE capabilities, equipment settings, and tactics. CW3 Woods became known Army-wide as an ASE expert and frequently received accolades from the ASE PM for tenaciously "bird dogging" the PM, making Army Management aware of his unit's needs and offering innovative ideas to improve life at the user level.

Following the last of the presentations, COL Reinkober made his final remarks, and AAAA President Drenz presented certificates of appreciation to COL Reinkober PM-ASE, MAJ Craig Searfoss, APM-ASE; Tom Warner, David Barker, Barbara Taylor, and Christopher Barrett of Hughes El Segundo; and Dick Hale, Pat Borrello, and Jeri Walsh, of Hughes Danbury.

AAAA NEB MINUTES

AAAA's National Executive Board (NEB) conducted its Fall meeting at the Sheraton Washington Hotel in Washington DC on 14 October 1991. Major actions included:

WELCOME TO NEW MEMBERS. MG Drenz noted in welcoming Ms. Debi Horne, President of the Chesapeake Bay Chapter, that she was the first female Chapter President in the history of AAAA.

ANNOUNCEMENTS & ACTIONS TAKEN SINCE THE LAST NEB MEETING: MG Drenz highlighted the decision made by the Executive Group to register concern in writing to the U.S. Office of Government Ethics regarding the Notice of Proposed Rulemaking (NPRM) on "Standards of Ethical Conduct for Employees in the Executive Branch" published in the Federal Register on 23 July 1991. MG Drenz advised the NEB that the interpretation of the NPRM had grave implications for the AAAA and that more than 130 associations, including AUSA, registered their objections in writing to the NPRM.

BY-LAWS: PETITION TO AMEND THE AAAA BY-LAWS SECTION 3.643, CHAPTER EXECUTIVE BOARD. MG Drenz noted that the petition signed by 25 AAAA members to amend the By-Laws had been received. The section in question reads:

3.6435-THE VICE PRESIDENT FOR MEMBERSHIP ENROLLMENT: *Advises the Executive Board on the trends in new membership; proposes and implements policies, programs, and procedures concerned with the recruitment of new Association members within the Chapter area.*

3.6436-THE VICE PRESIDENT FOR MEMBERSHIP RENEWALS: *Advises the Executive Board on the trends in membership retention. Proposes and implements policies, programs, and procedures, concerned with the retention of Association members within the Chapter area.*

It was proposed that the sections 3.6435 and 3.6436 be combined to read as follows and that section 3.6437 be renumbered accordingly 3.6436:

3.6435-THE VICE PRESIDENT FOR MEMBERSHIP: *Advises the Executive Board on the trends in new membership and membership retention; proposes and implements policies, programs, and procedures concerned with the recruitment of new Association members and retention of Association members within the Chapter area.*

A motion was approved to amend the By-Laws to incorporate sections 3.6435 and 3.6436 into an amended 3.6435 as stated in the petition.

BY-LAWS & LEGAL: RATIFICATION OF CHAIRMEN OF AAAA NATIONAL COMMITTEES. A motion was approved to ratify the appointment by the President of the Chairmen of the AAAA National Committees for the two-year term concluding the term of the President as follows: *Archival/Statistical Committee*, Arthur H. Kesten; *Aviation Warrant Officer Affairs Committee*, CW4 Joseph L. Pisano; *Awards Committee*, MG Richard E. Stephenson, Ret.; *By-Laws & Legal Committee*, COL John W. Marr, Ret.; *Company Grade Officer Affairs Committee*, CPT Paul M. Steele; *Convention Committee*, Terrence M. Coakley; *Department of the Army Civilian Affairs Committee*, Mr. Joseph P. Cribbins; *Enlisted Affairs Committee*, CSM Fredy Finch, Jr.; *Fiscal Committee*, MG Carl H. McNair, Jr., Ret.; *Hall of Fame Board of Trustees*, LTG Robert R. Williams,

NEB MINUTES

Ret.; *Industry Affairs Committee*, COL Sylvester C. Berdux, Jr., Ret., COL Gerald R. Kunde, Ret., Mr. William Pollard and LTC Brennon R. Swindell, Ret., Co-Chairmen; *International Affairs Committee*, LTG Harry W. O. Kinnard, Ret.; *Membership Committee*, MG Benjamin L. Harrison, Ret.; *Museum Affairs Committee*, MG George S. Beatty, Jr., Ret.; *Nominations Committee*, BG James M. Hesson, Ret.; *Policy & Plans Committee*, LTG John M. Wright, Jr., Ret.; *Reserve Component Affairs Committee*, COL John J. Stanko, Jr., Ret. and LTC Ralph W. Shaw, Co-Chairmen.

CONVENTION: STATUS REPORT ON 1992 AAAA CONVENTION. Mr. Coakley referred the NEB to the preliminary program, highlighting that GEN Gordon R. Sullivan, Chief of Staff, U.S. Army, had accepted to speak as the Keynote Speaker for the Opening Professional Session on Thursday and that Secretary of the Army, The Honorable Michael P.W. Stone had accepted to speak as the Keynote Speaker for the Awards Banquet on Saturday. He added that MG John D. Robinson, Army Aviation Branch Chief, would be serving as Presentations Chairman and that he had selected the theme of "Army Aviation in Power Projection." Mr. Coakley briefed the NEB that MG Robert S. Frix, Deputy Commanding General, Third U.S. Army, had agreed to serve as Military Affairs Chairman.

CONVENTION FUTURE SITES. MG Drenz referred the NEB to the Agenda, specifically citing the report of the AAAA Convention Rotation Plan and the increasing costs associated with conducting the AAAA Convention in Atlanta. A motion was approved to establish a new three-year rotation plan of St. Louis, a replacement for Atlanta, and a "Swing" site. MG Drenz tasked the Executive Director to undertake a study of the cities found to have met the AAAA's Convention requirements and to report back to the NEB at the conclusion of the study with recommendations for a replacement site for Atlanta.

MEMBERSHIP: STATUS. MG Harrison referred the NEB to the charts comparing membership statistics for the period ending September 1, 1991 and September 1, 1990, showing a gain of 212 members compared to the loss one year ago of over 1,008 members, and highlighted the significant gains in Lieutenants and Warrant Officer Candidates.

POLICY & PLANS: COMMEMORATIVE STAMP FOR ARMY AVIATION. COL Berdux advised the NEB that at the last meeting of the NEB, the NEB approved development of a pictorial cancellation commemorating the 50th Anniversary of Army Aviation on June 6, 1992 to be used at the Fort Rucker (Daleville) Post Office. COL Berdux outlined a program whereby the AAAA would develop a "First Day Cover" including the pictorial cancellation and offer it for sale to the AAAA membership. A motion was approved to undertake the program as presented by COL Berdux and advance $5,000 to initiate the program.

SCHOLARSHIPS: STATUS. MG Putnam advised the NEB that the AAAA Scholarship Foundation would award $108,000 in scholarship grants and loans in 1992 and had amended the program to include two scholarships for upperclassmen, one scholarship for spouses, and waived U.S. Citizenship as an eligibility requirement. MG Putnam added that the AAAA Scholarship Foundation planned to award $112,000 in 1993 and $124,000 in 1994.

New AAAA Chapter Officers

Aloha:
COL Justin G. Ballou, III (Pres); CSM Johann Ciboth (VP, Enlisted Affairs).
Army Aviation Center:
BG Robert A. Goodbary (President).
Hanau:
CPT Mark S. Fritz (Treasurer).
Isthmian:
LTC John R. Wrinkle (Treasurer).
Mainz:
MAJ Matthew J. Duffy (VP, Membership Enrollment).
Morning Calm:
LTC Richard L. McGlothlin (VP, Programs).
Rhine Valley:
CPT Scott T. Waggoner (Treasurer).
Talon:
CPT Michael J. Captain (Senior Vice President); CSM James M. Jackson (VP, Enlist. Aff.); CPT Keith R. Edwards (VP, Pub.); CPT Garrett P. Jensen (VP, Prog.); CPT Robert S. Bryce, II (Secy); 1LT(P) Brian L. Jackson (Treasurer).
Taunus:
LTC Randall M. Tieszen (President).
Washington, D.C.:
CSM Larry E. Thompson (VP, Enlisted Affairs).

AAAA Honorary Chapter Memberships

Mrs. Randolph Kahl-Winter
Monmouth Chapter
Horace G. Taylor
Phantom Corps Chapter

Terrence M. Coakley, Executive Director of AAAA, recently visited Westinghouse Electric Corp. and met with F. Michael Langley (above right), MSSA Program Manager, and Rich Batdorf (above left), Engineering Test Pilot. The visit included a tour of the Multi-Sensor Surveillance Aircraft at Westinghouse's Baltimore facility.

Below, five Corpus Christi Army Depot AAAA members and their wives attended the Navy's 216th Birthday Ball on 19 October 1991 at the Corpus Christi Naval Air Station. The ladies sported BDU gowns and the men wore BDU bow ties and cummerbunds. They are, from left to right: COL and Mrs. Tom Johnson, SGM and Mrs. Don Rymer, LTC and Mrs. Pete Marchiony, COL and Mrs. Chris Guppy, and CPT and Mrs. Ron Beach. (No word on the Navy's reaction.)

BG(P) Walter H. Yates, CG Berlin Brigade, USAREUR and Seventh Army, cuts a cake displaying the Berlin crest at the Allied Aviation Picnic, held at Tempelhof Air Base on 28 September 1991. The Picnic was co-sponsored by the Berlin Aviation Detachment and the AAAA Checkpoint Charlie Chapter. Members of the U.S., British, and French aviation detachments attended, as did members of the *Bundesgrenzschutz* (German Customs Police) Aviation Group, along with their families.

Arizona Chapter President COL James T. Stewart, Ret. (below left) congratulates MG Dewitt T. Irby, the U.S. Army's Program Executive Officer, Aviation, following his August 1991 presentation to the Arizona Chapter. The topic of MG Irby's presentation was the role of the PEO.

Soldier of the Month

A Chapter Program to recognize Outstanding Aviation Soldiers on a Monthly Basis.

SFC William G. Rawlins, Jr.
October 1991
SGT Glenn K. Whitcomb
November 1991
America's 1st Coast Chapter
SPC Denise M. Griswold
December 1991
Aviation Center Chapter

New Sustaining Members

Jack's Dinner Bell, Inc.
Corpus Christi, TX
Kay and Associates, Inc.
Arlington Heights, IL
Mitchell Nissan, Inc.
Enterprise, AL

Aces

The following members have been declared Aces in recognition of their signing up five new members each.

CDT Alexander H. Burgess
CW4 Kenneth A. Donahue
2LT Paul A. Eno, III
CPT John F. Laganelli
CW3 L.C. LeBlanc
LTC Eddie E. Moore, Ret.
LT James Nugent, Jr.
CPT Gerald M. Pearman
Mr. LeRoy L. Worm

SEE YOU IN ATLANTA!
8-12 April 1992
AAAA Annual Convention

AAAA NEWS

Top Guns as of 2 December 1991

The member who sponsors the greatest number of new members during the contest year ending 31 December 1991 wins an all expense-paid trip to the AAAA Annual Convention as well as a $500 cash award, and receives a plaque at the AAAA Membership Luncheon.

CW3 Roger K. Garner..404
2LT Thomas Turman...232
CW4 Butch Daniel.....88
CPT Martin Carpenter...62
CPT William Davisson...56
CW2 Berend J. Voute....49
MSG John H. Bae.....48
CW2 Gregory A. Wood...45
Ms. Janet J. Garmon....39
CW3 Kenneth Haynie....32
Ms. Susan Werkmeister.28
Ms. Susan E. Barnes.....24
CW4 J.D. Badgley.....22
Mr. Billy Quintanilla.....22
CPT Thomas Brew, Jr...21
CPT Perry D. Collette.....20
CW4 John Dixon, III....20
CPT Glenn A. Rizzi.....20
2LT Paul A. Eno, III.....19
MAJ David D. Krieger...19
CPT Richard E. Arnold..18
LTC R. Gillingham, Ret.18
CPT Ralph Perez.....17
Ms. Lois Contreras.....16
CPT Dempsey Solomon..16
Mr. Joseph A. Caines....15
Ms. Nancy Alexander...13
CW3 R. Guerrero, Jr.....13
CPT Richard Bedwell, Jr.12
LTC M. McClellan, Ret...12
CPT Kevin M. Woods.....12
Mr. LeRoy L. Worm.....12
Ms. Linda S. Dixon.....11
CW4 Reid D. Feltmate...11
Mr. F. Khemchand.....11
WOC Glenn A. Moya.....11

OBITUARIES

LTC Joseph Vincent Lenoci, Ret.

LTC Joseph Vincent Lenoci, Ret. died at Fallston General Hospital, MD on Sunday, 27 October 1991.

LTC Lenoci entered the Army in 1957, and flew both helicopters and fixed wing aircraft during his 23 years of service. He served two combat tours in Vietnam, and also served in Germany and Korea. He was a member of AAAA since 1961.

LTC Lenoci's numerous awards include the Master Army Aviator badge, Army Commendation Medal, National Defense Service Medal, Air Medal with V Device, Vietnam Service Medal, Silver Star, Bronze Star, Distinguished Flying Cross, Soldier's Medal, Meritorious Service Medal, Vietnamese Cross of Gallantry with Silver Star, Republic of Vietnam Gallantry Cross Unit with Palm, Republic of Vietnam Campaign Medal, Legion of Merit, and the Purple Heart.

He is survived by his wife, Jeanette Prehodka-Lenoci, a son, two daughters, and a sister.

Contributions can be made to the AAAA Scholarship Foundation, Inc., 49 Richmondville Avenue, Westport, CT 06880-2000.

COL Wayne "Ace" Phillips

Colonel Wayne "Ace" Phillips was laid to rest on 11 September 1991 in Homelake, CO.

Born on 29 August 1916 in Palmyra, MO, COL Phillips was a founding member of AAAA, having joined the Association in 1957.

Services were held on 11 September 1991 at the Homelake Chapel in Monte Vista, CO, where the Fort Carson Honor Guard officiated at the Soldiers and Sailors Cemetery.

MAJ Francis J. Stevens

MAJ Francis J. Stevens passed away 21 October 1991 at Sheppard AFB Hospital, Wichita Falls, TX. He was 72.

His awards and decorations include the Senior Army Aviator badge, Silver Star, Bronze Star with V Device, Army Commendation Medal with three oak leaf clusters, American Defense Service Medal, European-African-Middle Eastern Campaign Medal, American Campaign Medal, World War II Victory Medal, Army Occupation Medal in Germany, Belgium Fourragere, United Nations Service Medal, National Defense Service Medal, Merit Unit Commendation, and Purple Heart.

MAJ Stevens is survived by his wife, Alice Compton; five daughters, a sister, and six grandchildren.

On 6 September 1991, more than 30 soldiers conducted a relay over a 100 mile distance from Ft. Rucker to Ft. Benning. The runners, who were sponsored much like a walk-a-thon, were required to maintain a two-mile pace of less than 15 minutes; total time was 10 hours 50 minutes, versus 1990's time of 11 hours 47 minutes. Above, MG John D. Robinson, who competed in the first and last runs of the relay, joins the troops as they cross the finish line. The event raised money for the Ft. Rucker Morale Welfare Fund.

AAAA CALENDAR

A listing of recent AAAA Chapter events and upcoming National dates.

December, 1991

- **Dec. 19.** Lindbergh Chapter Holiday Party at Joe Hanon's Restaurant and Bar.
- **Dec. 20.** Phantom Corps Chapter Membership Meeting at 2AD Hangar, HAAF.
- **Dec. 23.** Aloha Chapter General Membership Meeting at the Schofield Barracks O'Club Lava Garden Room. Speaker: Justin G. Ballou, Cdr, Avn Bde, 25th ID (L).

February, 1992

- **Feb. 5-6.** 18th Annual Joseph P. Cribbins Product Support Symposium, sponsored by the AAAA Lindbergh Chapter. Stouffer Concourse Hotel, St. Louis, MO.

April, 1992

- **Apr. 8-12.** AAAA Annual Convention, Georgia World Congress Center, Atlanta, GA.
- **Apr. 8.** AAAA National Executive Board Meeting, Georgia World Congress Center, Atlanta, GA.
- **Apr. 9.** AAAA Scholarship Board of Governors Annual Meeting, Georgia World Congress Center, Atlanta, GA.

Top Chapters

AAAA NEWS

The 30 November 1991 Membership Enrollment Competition standings have the following chapters ahead with one month left in the CY91 contest ending 31 December. The rankings are based on CY91 **net membership gain.**

Master Chapters
(231 or More Members)

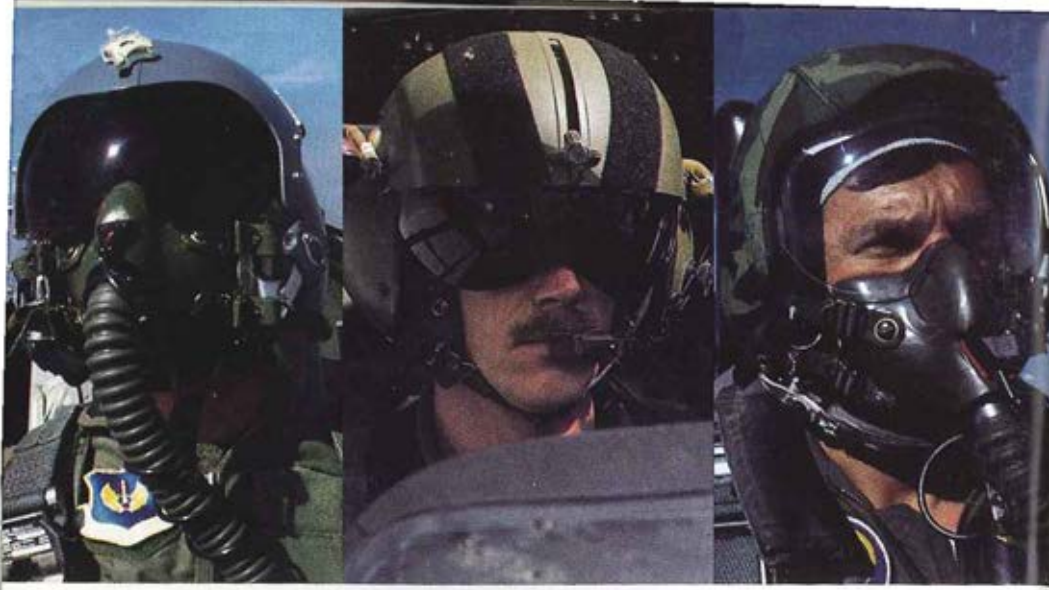
Army Avn Center	1102
Air Assault	36
Connecticut	16
Central Florida	12
Greater Atlanta	9
Washington D.C.	9

Senior Chapters
(116-230 Members)

Hanau	30
Fort Bragg	29
Greater Chicago Area	10

AAAA Chapters
(25-115 Members)

Redcatcher	32
Wings of the Devil	25
Pikes Peak	17
Mukilteo	13
Citadel	12
Indiantown Gap	12
Thunderhorse	11
San Jacinto	5
Checkpoint Charlie	3
Jack H. Dibrell (Alamo)	3
Old Tucson	2
Rhine Valley	1



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The Collins CP-1516/ASQ Automatic Target Handoff System (ATHS) helps ensure clear, quick, C³I communications. It facilitates air/air and air/ground interoperability and provides target steering cues on HUDs or CRT displays.

Instead of vulnerable voice communications, Collins ATHS uses digital data bursts to minimize jamming and to reduce enemy detection while speeding the transfer of accurate battle information.

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ATHS provides data for such HUD symbols as target I.D., range and steerpoint.

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