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COMBAT LETHALITY: A FORMULA

BY

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A RESEARCH REPORT SUBMITTED TO THE FACULTY

IN

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Advisor: Capt Larry Beatty

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COMBAT LETHALITY: A FORMULA

INTRODUCTION

Modernization versus readiness, under the current funding climate does it have to be one or the other? What are the choices and tradeoffs the Air Force has to make in the coming years to establish and sustain a force which can meet the tasking of the National Command Authority? To answer these questions we need to understand the essence of readiness and modernization and how they relate to the accomplishment of the Air Force mission. The Air Force is a technical service which relies heavily on equipment with state of the art capabilities which have a half life of a few short years. Furthermore the sophistication of the equipment requires a training regime that is dynamic and robust. The skills to effectively employ modern aircraft are perishable and must be constantly renewed. This costs money, lots of it. But readiness and modernization are not enough. In the dynamics of the post-Cold War era, employment philosophy of military force to achieve national objectives and promote security is equally important. A clear understanding of the capabilities of the military and the command environment necessary for success are essential.

During the Gulf War, air power was able to accomplish that which air power visionaries said it could. Why were we able to do this now and not before? Was the telling difference the environment of the war, military capabilities, the threat, the role of

intelligence? Perhaps we achieved that optimum balance between readiness, modernization, and employment philosophy which allowed us to make maximum use of our equipment and personnel. It would be similar to an athlete who has trained hard with the best equipment and used the best mix of frequency, duration, and intensity of training so that when he competed against other athletes he was so dominating that it was no contest. A key ingredient is how to employ this overwhelming capability. That is why employment philosophy is on equal ground with readiness and modernization. During World War II much of the strategic bombing campaign was directed toward the will of the enemy to resist. Targets were often selected for their psychological impact on the populace and less on their strategic significance. It is clear that the capability to wage war is key. Deny an enemy the capability to resist and your demands will be met. To employ airpower against a will is foolish, apply it against a capability and then you have something.

This paper will explore the nature of readiness and modernization and suggest some possible courses of action which will assure success in the current domestic and global environment. A basic tenet will be that readiness and modernization are not mutually exclusive but are synergistic with the proper mix always changing with time. The ability of the Air Force leadership to anticipate the effective service life of a weapon system with respect to a threat will be vital in the maintenance of the optimum mix of readiness, modernization, and employment philosophy. It is also important that the leadership realize what the current mix is so that the National Command Authority can be given the proper advice or estimate of the probability of success of a particular course of action.

READINESS

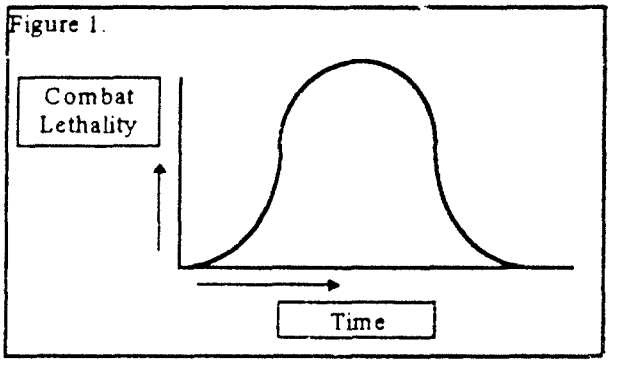
Readiness is an issue which has come to the fore in recent months with the rapid decline of the defense budget. The concern is that we may fall into the hollow force we saw during the 1970's. Lack of funds resulted in a force which was not equipped nor trained to meet the missions assigned to it by the National Command Authority. In some cases, such as that of the 1st Tactical Fighter Wing during an Operational Readiness Inspection in the early 1980s, it was not able to accomplish the missions which the service assigned itself. What does it take to be ready? It is clearly a combination of many factors which must include the obvious such as force structure, training, equipping and organization. The exact kind of things various major commands within the services perform, such as Air Combat Command for the Air Force and Forces Command for the Army. On the other hand readiness can be as much a function of employment philosophy as anything else. Readiness implies not only the ability to attempt to accomplish a mission but also to accomplish it well. A situation which comes immediately to mind is the dichotomy between Vietnam and the Persian Gulf wars where basically the same technology was available yet the results were drastically different. While training is frequently equated with readiness it is really only a portion thereof. A very real factor is the operations tempo of the unit. This is the rate at which they train, deploy, and respond to real world tasking. Personnel issues are another real part of the readiness puzzle. What mix of personnel we keep in the active force and how we train and manage their careers is paramount. How leaders are trained and what skills we value are all part of the personnel equation. Force structure is often an overlooked aspect of readiness. With the declining budget and the expanding and changing roles of the Air Force in pursuit of

the national interest, force structure, the most efficient way to organize affordable assets, becomes a major variable in the readiness equation. This concept encompasses not only what we can afford but such ideas as the composite wing and the role of the Guard and Reserve. A key issue is the robusting and the debusting of wings and the implications of doing so. Joint operations across the board in training and as an employment philosophy will take advantage of the unique capabilities each service brings to the table and leverage the country's investment in the defense arena. The employment philosophy of the National Command Authority is as much a function of readiness as is training and the other facets mentioned above. The military, in the current global environment of regional conflicts and a unipolar world order, must be allowed to employ with maximum force and defeat an enemy decisively. We must carefully choose the place and time ... and just do it.

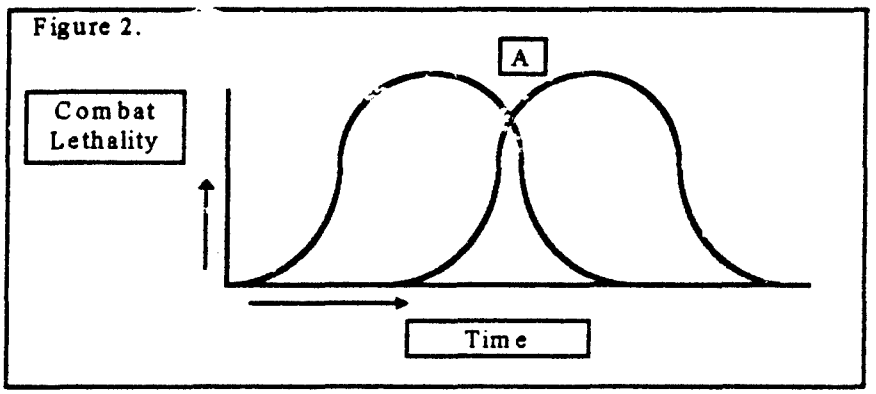
MODERNIZATION

Modernization is the second leg of the overall equation of combat lethality. It was quite clear that during Desert Storm a significant number of US weapon systems were at the apex of the modernization curve. This concept perhaps needs some explaining. Each new weapons system goes through a growth and maturation process until its utility in the field reaches a peak. In the beginning, combat lethality is limited by our understanding of the hardware, software, and tactical employment concept of the weapon. Toward the end of the life cycle combat lethality

Figure 1.



is limited by the enemies ability to counter the weapon. With respect to hardware, it can at times take as much as five or ten years to understand the limitations and advantages of a particular system and have its supply and spare parts support mechanism mature. Once the hardware has reached maturity the personnel tasked with maintaining the system can usually maintain an extraordinarily high readiness rate despite the heavy demands of a combat situation. Additionally, the leaders responsible with applying the system to solve operational combat problems understand the logistical constraints of the system and rarely overextend the capabilities of the weapon. Increasingly new weapons rely heavily on software to guide it to a target, sense a target, navigate, function, fuse, or display information. Whatever the function of the software, it is usually sophisticated enough to require a series of modifications to reach its most efficient operating mode. Furthermore, it may take several years until the correct settings are established to counter the threat. Once the software is fitted to the weapon system and the threat, outside of the research and development community, it will function as expected and with few surprises in the combat environment. The final phase of the maturation process of a weapon system is that of tactical utilization. This is where the operators learn to use the weapon system in relation to the existing threat as well as devising effective training methods. For example, it took a number of years and several different employment concepts (detached mutual support and fluid four to name a few) before an employment concept suitable to the F-15 was arrived at. This is not to be mistaken with a tactic to counter a particular enemy threat. A tactic will change as frequently as the threat changes if not more so. An employment concept changes with improvements to the weapon system and as a greater understanding of its capabilities develops.



The effort to maintain a modern force depends upon the ability to accurately forecast the decline from maximum combat lethality of a particular weapon system and estimate the rise to some acceptable level of combat lethality of a new weapon system. The intersection of these two curves, point A in figure 2, must be at some acceptable level of combat capability which will allow the military to meet the national objectives. The real trick is to monitor this capability through the spectrum of all key weapon systems in each service and make the requirement known. The funding then to bring the new weapon system to fruition and therefore to maintain the modernization of the force is in the hands of the senior civilian leadership.

Clearly there are many factors which influence the modernization effort of the armed forces. The time it takes to develop and field a weapon has become a hot issue in recent times. The lead time for an aircraft has become so long it is very difficult to estimate when to begin a new system to maintain a combat edge. Where to put the emphasis at any particular time is critical. Should we concentrate on a new fighter, transport, or precision guided weapon? The nature of the world order and where our threat comes from can both act as a guide to where we should put our emphasis and at the same time present so many options as to make a knowledgeable decision impossible. The

need to maintain a particular industrial base so as to provide the capability of reconstitution in the event of a major conflict can be a guide. The question to answer is which industrial base do we maintain since we cannot afford to sustain them all?

EMPLOYMENT PHILOSOPHY

Employment philosophy of US forces has matured in recent years. The quick strike practice of Grenada, Panama, and Libya has increased the confidence of the National Command Authority and the American public in the capability of the of US military force and particularly the senior leaders. This is in stark contrast to the Vietnam era where the civilian leaders had a deep mistrust of the military and its leaders. The sophistication of the employment of military force was graphically demonstrated during Desert Storm. The capabilities of the force deployed to Southwest Asia was clearly understood as were the vulnerabilities of the enemy. Unknowns abounded yet the leaders of the joint task force had the courage and confidence to employ the forces as they had been during major exercises in previous years. Particularly important was the joint training which has become a basis for most large force training in the United States. The various services have become used to fighting side by side and to plan with joint employment in mind. To a large extent, this has been the result of the Goldwater-Nichols Act.

The results of Desert Storm have very rapidly accustomed the American public to a quick and decisive victory by US led forces which has not only very few American casualties but few enemy or civilian casualties. This expectation is shared by the National

Command Authority and can have profound implications in the conduct of foreign policy. Take for example the situation in Somalia. The US had made a strong commitment to accomplish a particular objective there. Forces were deployed and a command structure was established. In an engagement, a number of US forces were killed and injured. Immediately thereafter the President established a date for the withdrawal of all US forces based to a great extent upon public opinion. If this becomes a habit it makes it easy for any adversary in a small regional conflict to force the US out through the death of a small number of US service men. Clearly, US forces must be deployed when national interests are threatened. Walking the tight rope between heightened tensions and open conflict puts troops in threatening situations which are not clearly defined. In this case losses may occur but US resolve must stand firm. Besides the encouragement given to possible adversaries, the continual pullout after a few casualties will seriously undermine the confidence and morale of the US military.

The US military leadership has learned to make the best use of the full gamut of military power to arrive at a decision point in a conflict with overwhelming combat capability and a decisive victory. The National Command Authority has learned to trust the military and have a clear view of what is the national interest and what price we are willing to pay to see that security is maintained. These two features combine to make a politico-military employment philosophy which when brought together with readiness and modernization results in superb combat lethality.

Vietnam versus the War in the Gulf

There is a story told by fighter pilots that the first four ship of F-100s were flying over Hanoi very early in the Vietnam war and were suddenly surprised to see a pair of

Migs converting on them. Their reaction was a flurry of radio calls so undisciplined as to make the radio unusable. This was followed by independent defensive and offensive turns resulting in such a total loss of mutual support that the next time any of the flight members saw each other again was back on the ground at their recovery base. It was miraculous that we did not suffer any losses in this reputed first encounter. Contrast this with the aerial engagement by a flight of F-15s from the 22 Squadron during the Gulf War. During the replay of the tape on CNN, the radio calls by the entire flight were so disciplined that a general officer was able to narrate what was going on to an audience between the radio calls of the flight lead as he was directing his flight and killing a bandit. Another example of the difference between Vietnam and the Gulf War is the success of laser guided bombs (LGBs). All the components were in place in Vietnam but success was limited. On the other hand, in the Gulf War the effects of laser guided bombs were spectacular. The argument could be made that targeting was easier in the desert than in the jungle, which is true, but that does not totally account for the difference in performance. Clearly, the LGB was a new technology in Vietnam which had not matured. The hardware and software of the system were not totally understood and this severely affected the combat effectiveness. Also, training systems had not been perfected and the aircrews were not proficient in LGB employment. Finally, employment philosophy was rudimentary at best. Target selection and the command relationship, which is beyond the scope of this paper, were both dismal. During the Gulf War combat lethality of our air-to-air fighters and laser guided bombs had matured. Each had peaked with respect to modernization, readiness, and employment. As a result, weapons effectiveness was extraordinary and airpower was able to accomplish what early airpower visionaries said it could.

Operations Tempo

Operations tempo is the level of activity of a unit with respect to training and in response to real world tasking. Training frequently refers to deployments to major training exercises such as Red Flag, Green Flag, or Maple Flag rather than day in and day out training at home base. However, the utilization rate of aircraft and sorties per pilot are considered but to a lesser degree. Response to real world tasking can include such things as support for Operation Southern Watch, Bosnia, and Somalia. The combination of major exercise participation, real world tasking, and daily training is critical to the readiness and therefore the combat lethality of a unit.

Major exercise participation has been perhaps the single most influential factor in the dramatic increase in combat lethality of US forces. The most visible of these exercises has been Red Flag. The ability to train as we expect to fight has paid enormous dividends. This exercise, as with many other major exercises, has matured into not only a joint service exercise but a multinational exercise with the corresponding advantage of coordination. Besides participating in the exercise itself, each unit has a work up period which can last up to a month. The work up period usually concentrates on special currencies, such as low altitude qualification, dedicated flight pairings and a higher ops temp at the home station. As a result there is a training advantage to be gained not only from participating in the exercise but in the work up to participate.

Participation in real world tasking, short of an active conflict, provides advantages and disadvantages to the participating unit. For example, the 9th Fighter Squadron deployed to Saudi Arabia in June of 1991 to replace an F-15 unit which had participated in Desert Storm. The 9th was tasked with maintaining a 24 hour combat air patrol (CAP)

over Kuwait and maintain two aircraft on 10 minute alert. The squadron deployed with 12 of its 24 aircraft and two thirds of its pilots. A higher than normal pilot to aircraft ratio was necessary because of the 24 hour a day operations. Six of the twelve aircraft were tied up with alert and combat air patrol with two additional aircraft as spares. One aircraft was usually tied up in hard maintenance. This left five aircraft for continuation training. A four ship with one spare was launched twice a day for continuation training. Depending on the adversaries available, the Navy, Saudi's, Bahraini's, etc. dissimilar air combat training was flown or 2 v 2 similar or other training was flown. About once every two months a large scale multinational exercise was flown to test coordination and large force employment. While some useful training sorties were flown they were no where near the intensity or frequency normally flown while at home station. On a typical three month deployment the operations officer had to be very concerned with pilot currency in such rudimentary skills as basic fighter maneuvers. So severe was the lack of adequate training while responding to a real world tasking that frequently upon returning to home station the unit was not combat ready and had to undergo intense training to regain combat readiness.

On the other hand, the unit was able to gain valuable experience in the coordination, communication, and planning for combat missions. During the long hours on alert and flying 4 to 7 hour missions fully loaded for combat, the pilots learned how to deal with boredom while all the time keeping a combat edge. Significant training and exposure of young pilots to the ins and outs of a combat employment was accomplished. An important lesson for senior officials was that in real world tasking, which require flying at a reduced intensity despite the potential threat of real combat, a units useful time on

station will be in the neighborhood of three months. After this time, especially for air superiority units, real combat capability will begin to decline rapidly.

As force structure is reduced the ability to maintain an optimum operations tempo is reduced. Because the force reduction is not even across the board some weapon systems are drawn down at a quicker rate than others. For example F-15Cs were drawndown at a much quicker rate than that of F-16s. Yet the tasking for major exercises and real world contingencies remained the same. The net result is pilot fatigue, increased wear on the airframes and reduced service life, and finally reduced combat capability. This situation is one extreme. The opposite situation is that after the force structure has stabilized not enough operations and maintenance (O&M) funds are available and sufficient sorties and training exercises cannot be flown. This is the beginning of the hollow force which cannot accomplish the national military objectives to support the national strategy.

Robusting and Debusting of Wings

During what many hope is the final phase of the drawdown of forces following the end of the Cold War, several force structure initiatives have been tried. One of the most visible has been the composite wing. Another less visible has been the debusting of wings. During the early 1980s a typical fighter wing consisted of three squadrons each with 24 primary assigned aircraft (PAA). For units with a mobility commitment, one squadron would be designated the Alpha squadron and be responsible for immediate deployment. The Bravo squadron would be next to deploy. The third squadron would support the other two with manpower for the mobility and deployment phases, spare parts, and in some cases aircraft and pilots. Therefore in reality while a wing had three squadrons it never planned to deploy more than two, nor did it have the resources in hardware or manpower

to deploy three squadrons. There were enough other wings to take up the slack should more forces be required. Now with the drawdown of forces, the Air Force has resorted to the debusting of wings and squadrons. This means that a normal three squadron wing would have two squadrons, such as the 33d Wing at Eglin AFB. A normal 24 PAA squadron would have 18 or even fewer aircraft assigned. Not all wings and not all squadrons have been debusted and there are varying combinations. Overall what this means is that what was previously considered a wings worth of combat capability now is something significantly less.

What needs to be done is just the opposite, robusting of wings. As force structure is reduced resources need to be consolidated and wings established with the usual three squadron line up. But now there is an increased crew to aircraft ratio, and a full complement of aircraft and spare parts so that the wing is deployable without augmentation. There is nothing magic about the figure of three squadrons per wing. It does provide a sufficient pad for personnel and hardware for an aggressive ops tempo so that fatigue does not set in and readiness is reduced. A robust wing is going to be more expensive. It will require an increased ops tempo just because there are more pilots and they need to fly more sorties to maintain proficiency. Also, increased training and real world commitments will require more personnel. The increased ops tempo means more spare parts and supplies and therefore more Operations and Maintenance (O & M) funds.

Debusting of wings and squadrons is one way to reduce the force structure commensurate with congressional guidance; however it does have some inefficiencies. Force structure is reduced but the infrastructure is not. Bases and support facilities remain open to support the smaller units. These facilities could just as easily support a normal size

wing or a robust wing for that matter. It would seem that the Air Force would be far better off by consolidating the units into robust wings and losing some of the infrastructure. The benefits gained through an increased ops tempo of the robust wing and the more efficient use of resources would to a certain degree offset the increased cost of base closing.

Force Structure

Force structure is perhaps the most controversial subject surrounding the military today. The question revolves not only on the size and composition of the US military force but also on the degree of forward basing. Confounding the whole situation is the difficulty in determining the actual threat we are confronting. Will it be a single major regional conflict (MRC) on the order of Desert Storm or will it be two MRCs happening at nearly the same time? Perhaps the specter of a single large enemy has not entirely disappeared and we will be faced with not a regional conflict but a global one. We can only make our best judgment on what we will confront and do the best with what the civilian leadership and congress provide us. In order to do that it is prudent to understand some of the forces at work during the post Cold War reduction in force.

Probably one of the most powerful forces at work today affecting military force structure is the tradition of the United States to have a very small standing national militia. This tradition dates back to the writing of the Constitution.

"The Framer's concept of civilian control was to control the uses to which civilians might put military force rather than to control the military themselves. They were more afraid of military power in the hands of political officials than of political power in the hands of military officers ... The national government if it monopolized military power would be a threat to the states: the President if he had sole control over the

armed forces would be a threat to the Congress. Consequently, the Framers identified civilian control with the fragmentation of authority over the military.[1]

As can be seen in the above quote the framers set the stage for the Guard/Reserve and expressed their fear of a nationally controlled militia. From the Civil War on the United States has entered every major conflict with insufficient forces at the ready and had to mobilize a sizable portion of the eventually committed forces from the civilian community. Immediately following World War I, World War II, the Korean War, and Vietnam there was a significant reduction in forces. For the period of the Cold War, which under lies the Korean War and Vietnam, there was a significantly large number of active duty service men and women in the active force. This 40 year period of a large active force was an aberration in the history of the United States. This is the force which we are drawing down at present.

Figure 3. *(From a briefing given by AF/XO at the Air War College)*

SINGLE MAJOR REGIONAL CONFLICT EXPERIENCE

KOREA	*VIETNAM*	*DESERT STORM*
July 1953	Dec 68	Feb 91
8 Army Divisions	8 Army Divisions	8 Army Divisions
6 Carriers	5 Carriers	6 Carriers
1 Marine Division	2 Marine Divisions	2 Marine Divisions
1 Marine Air Wing	1 Marine Air Wing	1 Marine Air Wing (+)
10.4 Fighter Wing Equiv	10.6 Fighter Wing Equiv	10.6 Fighter Wing Equiv

The force sizes noted for each of the conflicts in figure 3 demonstrates the relative consistency of the force size required for a regional conflict in recent history. The current

[1] Samuel P. Huntington, The Soldier and the State (Cambridge, Mass.: Harvard University Press, 1957), p. 168.

national military strategy calls for a force structure which can fight two nearly simultaneous major regional conflicts. Secretary of Defense William J. Perry in a 5 April 1994 address to the Air War College at Maxwell AFB, AL, stated that the United States did not necessarily expect to fight two MRCs, but by maintaining a force structure estimated to be capable to fight two MRCs we would be able to deter a possible trouble maker from becoming adventurous while we are occupied with a Desert Storm-like conflict.

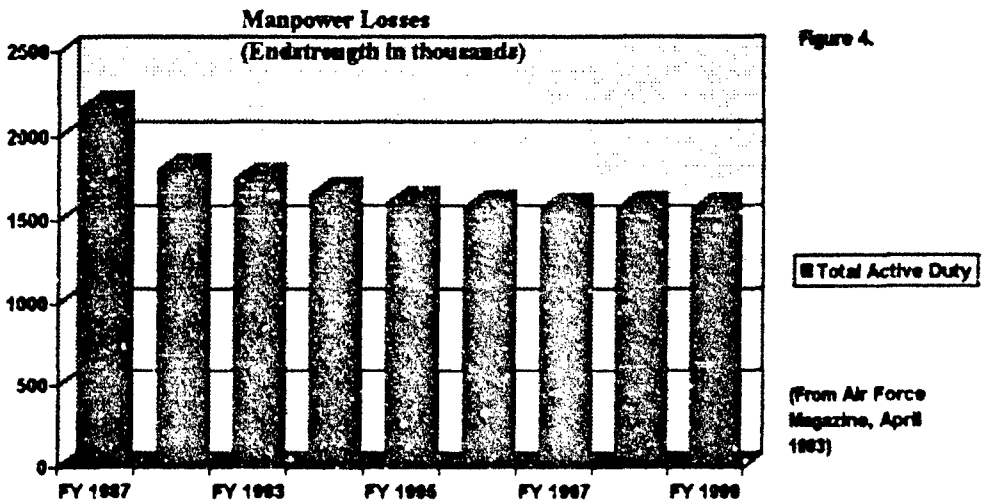


Figure 4.

(From Air Force Magazine, April 1993)

As can be seen in figure 4 the United States military has seen a significant drop in total manning. For the Air Force the following table is illustrative. The Air Force is hoping that the active duty level of fighter wings remains the same at approximately 13 and

	FALLING FORCE STRUCTURE			Air Force Magazine, Aug 1993
Force Element	1992	1993	1994	-/+
Fighter wings, active-duty	16.3	16.1	13.3	-3.0
Fighter wings, Guard & Res	13.4	12.3	11.0	-2.4
Long-range bombers	242.0	201.0	191.0	-51.0
Strategic missiles	912.0	787.0	667.0	-245.0

the Guard/Reserve level will drop to 7 wings, for a worst case total of 20. At this level the Air Force could not provide the forces necessary to fight two MRCs in just about any scenario you choose. Given that this is the case, the goal must be to reach a level which can be maintained in a state of readiness similar to just before the Gulf War. This means an operations tempo, parts and spares, and particularly realistic training to maintain a force which is combat lethal in the extreme. If the largest force level that can be maintained at the highest state of combat lethality in what has historically been used for a single MRC, see figure 3, then that level is far more desirable than a larger force structure which would exist at a significantly lower level of combat lethality, a hollow force. A smaller force which can maintain combat lethality is preferable to one which is larger but unable to accomplish the mission. The employment concept of a smaller force requires a great deal of finesse and commitment.

Guard and Reserve

The Guard and Reserve form a special subset of the force structure issue. The nature of the civilian militia has changed since its inception. It is no longer a force with the rifle over the mantle ready to run out and fight. The sophistication of the weaponry and the complexity of the battle field require almost full time training to be effective to the degree required by the nation. Realignment of the role of the Guard and Reserve has resulted in the situation, in the Army particularly, where the United States cannot go to war without calling them up. In the Army the Guard and Reserve have taken on the mission of support roles which are not provided in the active force. In the Air Force the Guard and Reserve have taken on a major role in strategic airlift. The military in general reaps significant

benefits from this arrangement. First of all the commitment of US forces to virtually any conflict overseas will require the presence of Guard and Reserve personnel. Their presence ensures national support for their involvement in any particular conflict and reduces the possibility of adventurism by the executive branch. An additional advantage to the military is the fact that Guard and Reserve forces are less expensive than active forces. Therefore a larger force can be maintained. But there are draw backs to such a heavy reliance on the Guard and Reserve.

The question of combat readiness immediately comes to mind. Our armed forces are equipped with highly sophisticated and technical hardware. How can a force which trains but two days a month and two weeks during the summer be as proficient as a force which trains virtually everyday? The answer is that they can't. The skill required to fly fighter aircraft are perishable and must be practiced constantly in order to achieve the type of results seen recently over the skies of Bosnia. The Guard and Reserve cannot maintain that level of skill.

The redundancies between the Guard and Reserve are perhaps a luxury we can no longer afford. The desire of the framers of the constitution to have a significant portion of the nations military in the hands of the states is perhaps still valid. But to have two separate organizations is perhaps too much. The Guard and Reserve need to be combined into a single component despite the claims of each that their heritage is important.

The problem of readiness can be reduced significantly by concentrating the shooters in the active force. For example, rather than have a mix of 13 active and 7 Guard/Reserve fighter wings, put all the fighter wings in the active force where they can train at a rate which allows them to be immediately useful to the national command

authority. Concentrate the airlift and other tasks which do not rely upon as an aggressive a training regime in the Guard and Reserve and then it will be a significant asset.

CONCLUSION

Combat lethality has to be our goal in the post-Cold War era. The ability to rapidly deploy an overwhelming force, target precisely, inflict maximum destruction with the minimum of assets, attack a wide range of targets nearly simultaneously to paralyze the enemy, and to suffer and inflict the minimum number of casualties is the essence of modern combat lethality. The component parts of combat lethality are modernization, readiness, and employment concept. A clear and calculating understanding of the role the military can effectively play in the arena of foreign politics is essential. Once committed the civilian leadership must allow the military to achieve the clearly defined goals it set prior to military intervention. Contrasts between the Gulf War and the Vietnam War provide valuable lessons to be learned in all areas of combat lethality. It would be foolish to believe that future antagonists have not learned similar lessons from the Gulf War. These include the American sensitivity to casualties, the use of weapons of mass destruction to scare off allies, and the use of ambiguous aggression rather than the senseless brutality of Saddam Hussein.[2] The choices we make with respect to operations tempo, force structure, technology acquisition etc., affect the components of combat lethality equally. The formula for combat lethality is constant, the interaction and emphasis on the components

[2] Eliot A. Cohen, "Beyond "Bottom Up"." National Review, November 15, 1993, p.40.

changes with time and the world situation. Readiness, modernization, and employment philosophy are the key elements to security.

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