"They Have Eyes, But They Do Not See" Platoon Forward Observers in the Mechanized Infantry Platoon

A Monograph
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The monograph first examines the evolution of the platoon FO, focusing on the recommendations made by the Close Support Studies Group, and subsequent formation of the FIST in 1977. Next, the doctrinal employment of the platoon FO is examined in light of changes in maneuver and artillery doctrine. The effectiveness of platoon FOs is evaluated using data from NTC, CMTC, and Operation Desert Storm. The impact of emerging technology is examined with respect to its effect or both the M2 equipped platoon leader and his forward observer.

Finally, a proposed restructuring of the fire support organization within DS artillery battalions which support heavy brigades is put forth as an alternative to the current organization. The proposal considers the impact of mobility and target location accuracy as the primary motivations for these changes.

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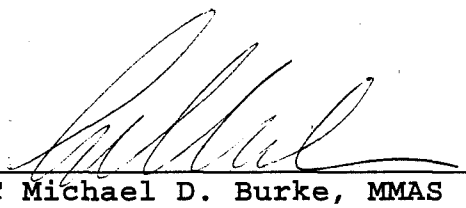

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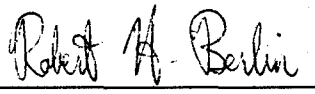

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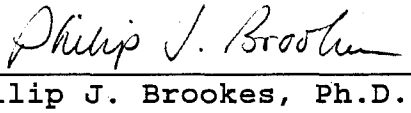

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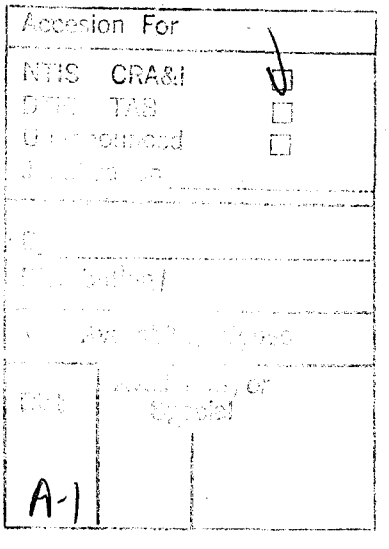


INTRODUCTION

Throughout its history, the US Army's field artillery has provided outstanding fire support during each of our nations conflicts. From the decisive fires delivered by massed Union batteries at Malvern Hill, to the destruction wrought on the North Vietnamese by the artillery of the First Cavalry Division during the battle for the Ia Drang Valley, US artilleryman have developed a tradition of providing superb close support fires. In 1924 General John J. Pershing stated, "The World War demonstrated the importance of the Field Artillery. The majority of casualties were inflicted by this arm."[1] General Douglas MacArthur praised the artillery with the words, "In many situations that seemed desperate, the artillery had been a most vital factor."[2] Perhaps the strongest words of praise for US field artillery were spoken by General George Patton shortly before his death in 1945. He stated, "I do not have to tell you who won the war. You know. The artillery did."[3]

As the US Army faces the challenges of warfare in the 21st Century, the artillery must change to continue that tradition of superb support to maneuver forces. The fast paced, highly mobile battlefield of today requires a more synergistic mix of firepower and maneuver than the attrition oriented battlefield of the World Wars, Korea, and Vietnam.

The nineteenth century French military theoretician Antoine Henri Jomini wrote that the truly successful commander is one who could master the "simultaneous employment of the largest number of troops of all arms combined. . . at the critical moment of battle."[4] Jomini was so convinced of the necessity of a combined arms approach to warfare that he wrote that the employment of combined arms to mutually assist and support each other was "the only fundamental rule that can be established."[5]

Field Manual 100-5, Operations, defines combat power as the product of combining the elements of maneuver, firepower, protection, and leadership.[6] Overwhelming combat power is the rapid, violent, and synergistic effect of all combat elements. Its effect is devastating, giving the enemy no opportunity for effective opposition.[7] Commanders seek to generate overwhelming combat power and focus it against the enemy "through violent, coordinated action at the decisive time and place."[8] Thus, US Army doctrine recognizes firepower as a vital component for victory. The field artillery has historically been a key factor in the firepower equation.

The US Army field artillery's ability to mass fires and generate superior firepower has been due, in part, to the quantity and quality of forward observers present on the battlefield.[9] This fact, coupled with an enormous amount of available artillery, mortar, and air support, allowed US

commanders to neutralize an enemy's advantage in superior manpower or tactical agility. As a result, US Army commanders have come to rely on a highly accurate, mobile and lethal fire support system to support their operations.

Recently, however, the field artillery has been criticized for its inability to support the other combat arms. Results from the National Training Center (NTC) continually show that at the brigade and task force level, field artillery is not integrated effectively into the maneuver plan.[10] Several senior commanders, such as General (Retired) Crosbie Saint, have called upon the field artillery community to make extensive changes in order to provide more effective close support to maneuver forces.[11]

Some of the criticisms directed at the artillery include the inability to integrate the fire plan with the maneuver plan, poor target location, and the inability of the field artillery to execute planned fires. This monograph seeks to provide insights into these problems and offer potential solutions by examining the role of the platoon forward observer in the mechanized infantry battalion. It is there that one finds the man at the point of the fire support spear.

The artillery has traditionally directed close support fires by using observers at the company and platoon level. The significant challenges of operating in a fast paced, lethal, non-linear battlefield have changed the field

artillery close support paradigm. Emerging technology, brilliant munitions, and doctrinal changes all point to a new and emerging role for the "eyes of the artillery"; the platoon forward observer.

Evolution of the Platoon Forward Observer

Prior to World War II, field artillery units did not provide forward observers (FOs) to maneuver units. Fires were controlled from central command posts with the battery commander acting as the observer. The battery reconnaissance officer often augmented the command post or established an alternate observation site.[12] These command observation posts observed and controlled the fires of their parent battery. Massed fires were usually delivered on unobserved targets located by sound, or as part of a planned program of fires in support of maneuver operations.[13]

During World War II, artillery doctrine called for providing one FO, a lieutenant, per maneuver company.[14] Each firing battery usually supported 3 maneuver companies but had only one FO assigned by the table of organization and equipment (TOE). Because of this, the reconnaissance officer and assistant executive officer for each battery were usually pressed into service as company FOs.[15] In order to maintain the ratio of 1 FO per company, FOs were moved from one company to another as units were committed to combat or placed in reserve. This placed an enormous strain

on the limited observer capabilities of the field artillery. Nonetheless, few companies in combat ever suffered from a lack of artillery support.

After World War II, the direct support (DS) artillery battalion TOE was changed and each firing battery was authorized three field artillery lieutenants as forward observers. This structure formed the basis for FO support to maneuver companies throughout the Korean and Vietnam conflicts.

After Vietnam the Army focused on the potential mid-to-high intensity conflict in Europe based on the threat of a Soviet-led invasion of West Germany. In such a scenario, the US Army would have been outnumbered and outgunned on the ground, and Soviet air defenses would have severely hindered support from the air. In short, US commanders would have been fighting without the significant advantage in fire support they had come to expect. In order to overcome the numerical disadvantage posed by the Soviet threat, the US Army sought a flexible means of quickly massing all types of indirect fires on the battlefield. This concept led to the development of the fire support team (FIST).

On 25 June 1975, Major General David E. Ott, the Commandant of the US Army Field Artillery School (USAFAS), wrote a letter to General William E. Depuy, Commander of the Army Training and Doctrine Command (TRADOC) informing General Depuy of the concerns the artillery community had in

providing fire support under the Army's emerging "air-land" battle doctrine.[16] Major General Ott commented that the expanded area of operations for maneuver companies under the new doctrine made it "virtually impossible for a field artillery forward observer to provide observed fire support throughout his company's sector."[17] Major General Ott also wrote that on a battlefield dominated by firepower, the value of indirect fires would be maximized only by "the rapid ability to shift and mass it [fires] quickly about the battlefield."[18] He pointed out that the variety of forward observers, (artillery, 81mm, and 107mm mortar) was counter productive toward the goal of maximum utilization of all fire support means available in a company sector. Major General Ott stated that he was convinced of the need "to reorganize the indirect fire support concept"[19] to create a system where any forward observer could call for any type of fire support.

Major General Ott urged General Depuy to appoint a study group "dedicated to the entire question of indirect fire support in the maneuver company section of battle."[20] He urged that the group be composed of members from all the combat arms centers, and that its charter include developing solutions in the areas of manning, equipping, and training a new force of forward observers capable of employing all types of indirect fires. General Depuy approved the concept on 17 July, 1975 and charged the Field Artillery School with

taking the lead in improving observed fire support to maneuver forces. The result was the formation of the Close Support Study Group (CSSG). The CSSG was composed of members from all the combat arms centers, the signal school, and representatives from the US Air Force. The CSSG had the mission of optimizing observed fire support to maneuver forces, primarily at the brigade level, and the group was given the latitude to recommend changes in force structure, training, doctrine, and equipment.

The CSSG results were adopted by the US Army in 1977. These results fundamentally changed the way the US Army controlled indirect fires and represented a marked departure from the past. In order to understand the current problems in organization and employment of the platoon FO, it is necessary to examine the results of the study.

The CSSG determined that there were significant shortcomings in the existing fire support system. Organizational problems included the lack of a fire support coordinator at company level and the fragmented and uncoordinated distribution of FO assets. These factors were the result of the specialization of FOs as either artillery or mortar observers. Without a common training or doctrinal base, it was impossible to synchronize the full range of fire support assets available to support maneuver companies; thus the employment of fire support was uncoordinated and therefore less effective. In addition, the study recognized

that it was also extremely difficult to mass mortar and artillery fires on a common target.[21]

Doctrinal changes were also seen by the CSSG as having a major impact on the need to restructure the fire support system. Emerging doctrine called for widely dispersed defending units to quickly mass against the enemy's main attack as part of the "active defense." The need to coordinate all fire support assets across a broad company front, on a highly mobile battlefield, demanded a new level of sophistication in the maneuver-fire support relationship. The CSSG determined that a full time fire support coordinator at the company level was essential because of increasingly complex battlefield requirements.[22]

Extended company frontages and increased reliance on maneuver were also cited by the CSSG as key reasons to expand the observation capabilities at the company level. The CSSG pointed out that multi-functional observers, capable of calling for and adjusting any indirect fire support, were needed in greater numbers to cover the expanding company zone of operations envisioned by the Army's emerging doctrine. This was particularly true in the European environment with limited visibility, a highly mobile enemy, and a scarcity of field artillery assets. The concept outlined by the study group required the consolidation of all FOs into a common Military Occupational Specialty (MOS) that emphasized an understanding of all fire

support weapons capabilities instead of the purely technical approach wherein an observer understood the employment of only a single system.[23]

The study group developed a requirements list based on the European threat, the projected battlefield environment, and projected new equipment fielding. This list was then used as the basis for the new FO structure they proposed. The CSSG proposal concentrated on organizational and training changes which formed the basis of their solution to optimize observer support to maneuver units.

The CSSG proposal called for consolidating all observer assets at the company level into a single team capable of employing all types of fire support assets. For a mechanized infantry company, this meant that the 3 FOs from the 81mm company mortar platoon, 1 FO party from the battalion 107mm mortar platoon, the 3-man field artillery FO party, and two radio telephone operators from the 81mm mortar platoon headquarters would be consolidated and form a 10-man FIST. The mechanized infantry company FIST would have a 4-man headquarters and three 2-man platoon FO parties.[24] The organization of the tank company FIST was identical except that there were no platoon FO parties allocated. The CSSG felt that platoon FO's were not practical or necessary for the tank company because of the absence of an appropriate place from which the FO could operate, the ability of tanks to effectively engage targets

out to 2500 meters, and the absence of any dismounted operational requirements.[25] The CSSG recommended that all heavy (mechanized or armored) battalion FIST's be equipped with M113A1 armored personnel carriers for transportation.

After consolidating the observer assets, the study group proposed several changes to training and employment as further means of optimizing observer support to maneuver units. The proposed changes were keyed to the consolidation of observer assets into the FIST and redefining of the traditional role for FOs.

Consolidating all observers would, in the view of the CSSG, help to overcome the training deficiencies that were a large contributor to the ineffectiveness of the fire support system. One key aspect of consolidation was that it would place all the observer units under one headquarters for training. Such an approach would allow for effective sustained follow-up training in the employment of all types of indirect fire systems. This constituted a marked improvement over the purely technical approach previously applied, where each observer was a technical expert in the employment of a particular weapon system.[26] The result of consolidating all observers assets would be to produce multi-functional observer capable of employing all types of fire support against given targets. Multi-functional observers would provide the flexibility and synchronization

of fires required under the emerging airland battle concept.[27]

The role of the field artillery observer was fundamentally changed as well. The field artillery lieutenant gave up his primary function as an observer, and become instead a fire support coordinator (FSCOORD) for the maneuver company commander.[28] This change relieved the maneuver company commander of the increasingly complex fire support tasks, while at the same time creating a single individual responsible for the effective employment of fire support assets to support the company's operations. By consolidating observer assets into a FIST, the CSSG felt that it would be easier to coordinate and synchronize the delivery of effective indirect fires. In effect, their proposal established unity of effort for fire support at the company level.

The concept was hailed by the artillery community as a quantum leap in improving the delivery of fires in support of maneuver units.[29] Following implementation, the FIST concept was well received by maneuver units as well. This was due to a marked improvement in the effectiveness of close support fires.[30] In general, the CSSG's recommended changes improved the delivery of fires in support of maneuver units.

Although the CSSG's findings led to improvements in fire support, the changes failed to achieve the objective of

optimizing fire support, given the constantly evolving battlefield environment. Since the FIST concept was adopted, FM 100-5 has been rewritten 3 times. As the battlefield environment, technology, and doctrine have changed, the organization of the FIST has remained fixed. Recently, the presumed effectiveness of observed close support fires has been dramatically challenged by the poor performance of platoon FOs at the Combat Training Centers, and during Operation Desert Storm.

Employment of the Platoon FO

Since the inception of the FIST concept, artillery doctrine and tactics have stressed the importance of the platoon FO as a key link in the employment of fire support for mechanized infantry operations. Current artillery tactics, techniques, and procedures (TTPs) continue this philosophy by emphasizing that the platoon FOs "are the primary shooters for the mechanized infantry company."[31] The role of the platoon FO as the primary shooter for indirect fires is a direct result of the emphasis placed on the company fires support officer (FSO) to act as the maneuver company fire support coordinator (FSCOORD). The field artillery lieutenant, once the field artillery FO, is now doctrinally the fire support planner for the maneuver company commander.[32] Since the officer is now primarily a

planner, the enlisted observer's importance has now increased dramatically.

Similarly, maneuver doctrine now places a great deal of emphasis on the platoon FO as the primary shooter, and on the company FSO as the primary planner of fire support.[33] Infantry doctrine is much more specific in its view of the employment of the observer, stating that an FO party is attached to each mechanized infantry platoon. The use of the term "attached" is significant because it gives the platoon leader the highest possible degree of control over the observer, short of permanently assigning the observer to the platoon as an infantryman. This relationship creates significant confusion during employment because artillery doctrine places the observer under the control of the company FSO.[34] A dichotomy of control is never good and usually leads to a less than optimal use of forces.

The command relationship between the FO party and the rest of the mechanized platoon creates significant problems in terms of command and control of the observer party. Because the two-man FO team is equipped with only one radio, it cannot maintain simultaneous communications with the platoon leader, the company FSO, and the fire support asset for which they are directing fire. Thus, the platoon leader is compelled to keep the FO party with him in order to maintain positive control of indirect fires. This arrangement keeps the platoon FO in close contact with the

platoon leader but does not automatically guarantee the FO party a vantage point from which they can observe and control indirect fires.

The lack of a dedicated, armored vehicle for the platoon FO party compounds the problem. If the platoon's situation or other circumstances dictate placing an observer in a location away from the platoon leader, the platoon leader must supply a vehicle to get the observer into position and to recover the team when necessary. This compounds the platoon leader's command and control requirement and complicates the platoon's scheme of maneuver.

The complete modernization of the mechanized infantry with the M2 series fighting vehicle poses another serious problem. The design of the M2 infantry fighting vehicle (IFV) prohibits adequate observation by anyone except the gunner and vehicle commander. When mounted, the forward observer is located inside a windowless armored box and is unable to observe targets and control engagement by indirect fires. Placing the observer in the gunner's or vehicle commander's station would allow adequate observation, but would displace a critical crew member and force the FO to assume two roles.

Ironically, the mechanized infantry platoon FO of today is in the same position that tank company FOs were in prior to the FIST concept. The CSSG stated that tank platoon FOs were unnecessary because:

a. the tank platoon provided its own heavy fires out to 2500 meters.

b. there was no place for a platoon FO to ride in a tank without displacing a crew member.

c. the tank platoon leader's communications suite made it easy for him to quickly access fire support nets if needed.

d. there was no operational requirement for dismounted operations.[35]

With the exception of the last point, the M2 platoon of today has the same characteristics of the tank platoon of 1977. An M2 equipped mechanized infantry platoon has immediately available fire power out to 2500 meters using the 25mm cannon and out to 3750 meters using the tube launched, optically tracked wire guided (TOW) antitank missile. As previously discussed, there is no position from which an observer can adequately surveil the battlefield from the M2 without displacing a crew member out of the turret. Finally, the communications suite in the platoon leader's M2 gives him the capability to rapidly switch to a fire net in order to call for and adjust indirect fires.[36] In fact, the current 3-net communications capability found in a mechanized infantry platoon command vehicle allows the platoon leader to simultaneously operate on 2 required command nets (platoon and company) and a fire control net.

Current artillery and maneuver doctrine clearly places the platoon FO in the role of a shooter, with primary responsibility for the delivery of accurate, observed indirect fires. Changes in organization, doctrine, and equipment used by the mechanized infantry platoon make it increasingly difficult for the platoon FO to be effectively employed. Coupled with these two factors, changes in artillery fire planning and execution within the armored or mechanized brigade further complicates the duties of the platoon FO.

Prior to 1988, fire support planning in the heavy brigade was a bottom-up process. Emphasis was placed on target production by the FISTs within the subordinate battalions of the brigade. This stemmed from the belief that the FIST was the closest observer element to the battle, and therefore could provide the best targeting information.[37] This process integrated indirect fires into maneuver plans at the lowest echelon. The platoon FO generated targets and forwarded the platoon fire plan through each echelon of command. Each FSO in the chain resolved duplications, added targets that were critical to the higher command, consolidated the list, and forwarded it to the next echelon. This time intensive process produced an inordinate number of targets in a brigade sector, dubiously referred to as "measle sheets." The number of

targets produced by this process was beyond the brigade's fire support assets capabilities.[38]

While bottom-up fire planning had the advantage of ensuring fires were integrated with maneuver plans at the lowest level, it also had significant disadvantages. First, the system was a time-intensive process. The artillery conducted fire planning manually, that is, on acetate covered maps, and target lists were handwritten on paper. These plans could only be distributed by courier or by voice over a radio, a laborious process. Second, while intended to work concurrently with maneuver planning, the process actually flowed in the opposite direction. The brigade planned maneuver from the top down, fires were planned from the bottom up. There were significant problems integrating fires above the company level. The number of targets generated by this method was unrealistically high, making the fire support plan unworkable. Most importantly, this system failed to focus fires on accomplishing the brigade commander's intent. Since the brigade was the last echelon to get the fire plan, there was often no time to synchronize the fires through rehearsals, or adjust the plan and redistribute it to subordinate elements. The echelon of command that controlled the supporting artillery had the least input on how the artillery would be used.

Recognizing the growing disparity between top down maneuver planning and bottom-up fire planning, illustrated

by poor performance at the NTC, the artillery began to change the fire planning process. By 1988 a technique known as "top-down" fire planning began to emerge as the preferred method of fire planning at the brigade level. This technique was formally adopted by the artillery with the publication of the 1990 version of FM 6-20-40, Fire Support for Brigade Operations (Heavy).[39]

Under the top-down concept, fire planning originated at the brigade level under the supervision of the most experienced fire support planner in the force, the DS artillery battalion commander. In its completed form, the plan had a limited number of targets (45 to 60 at most), and concentrated fire support assets on limited targets critical to the success of the brigade's plan. The brigade FSCOORD then assigned targets to each task force for observation and execution and allocated a limited number of targets for use in task force plans.

At the task force, brigade targets were assigned to company FSOs for observation and execution. The limited number of task force targets were also assigned to task force elements (scouts, observers, company commanders and FSOs) for observation and execution. Company FSOs were required to refine targets based on new information, exact locations of obstacles, visibility limitations, or as other circumstances required.[40] These tasks formed what was known as "bottom-up refinement" of the brigade fire plan.

Top-down fire planning is a technique for developing a plan for fires that supports the brigade commander's intent and develops the fire plan concurrently with the maneuver plan. Top-down fire planning has significant advantages over the bottom-up process.

Fire planning using the top-down method allows effective integration of fires with the intelligence preparation of the battlefield (IPB) process. At the brigade level, the products of the IPB process are readily available to the most experienced fire support planners. This allows fire planning based on both the brigade commander's intent and the most current and complete picture of the enemy. This results in a plan that concentrates fires against critical targets based on the best information available.

The top-down technique also provides a workable plan in a relatively short time. Instead of waiting for each echelon in the brigade to plan, refine, collate, and transmit a fire plan, the top-down process funnels the plan from the brigade down to the company with only minor adjustments required as circumstances dictate. As a result, fire planning is expedited.[41]

Top-down fire planning focuses the use of fires to support the brigade commander's intent. By limiting the number of targets in the fire plan and by beginning planning at the brigade level, the top-down process ensures that fire support is focused on only critical targets essential to the

success of the brigade. This process also prevents the fire support system from becoming overtaxed by preventing "measle sheets." The top-down process provides clear guidance on the intent for fires, the priority for use of fires, and definitive guidance on when, where, and how much artillery will be used.

The top-down process places the primary responsibility for execution of the fire plan on the maneuver company FISTs.[42] While this is consistent with the current artillery role of FOs as primarily shooters, top-down fire plan execution is different then the bottom up process. Using the top-down fire planning process, specific targets are assigned to units for observation and execution. The assets used to cover these targets come from the company FIST, the maneuver units, or assets controlled by the brigade (radars, helicopters, etc). Additionally, because the top-down process is focused on the brigade fight, targets are planned beyond task force areas of operation. The number of targets requiring observation, and the depth of the battlefield, forces company FSOs to rely on platoon FOs to cover some of the targets. This changes the platoon FOs role from supporting the mechanized infantry platoon with indirect fires, to supporting the brigade commander's intent for fires. This is a key difference, and the issue requires an in-depth examination.

As previously discussed, the platoon FO is normally located with the platoon leader. When required to seek a more advantageous observation point, the platoon FO would still operate within the platoon operations area. Now, a platoon FO may be forced to operate outside the platoon's area of operations in order to observe and execute an assigned target. Again, transportation for the platoon FO is an issue. How does the observer get in position to see the target he is expected to execute? The solution is currently found in two techniques. First, the platoon to which the observer is attached provides the transportation. The second technique specifies that the company FSO's vehicle provide the transportation to the observation post. In either case, assets are diverted from their primary mission in order to provide transportation to the observer. During offensive operations these techniques are nearly impossible to implement. Without organic transportation, FO parties have limited flexibility to reposition.

Another problem is communications. The platoon FO party is equipped with an AN/VRC-88 radio which has a maximum planning range of 8 kilometers.[43] While this range is adequate when the FO party is operating in proximity to the platoon and company, it is inadequate when platoon FOs are observing targets that are deep in the brigade sector. Although the use of radio relays (RETRANS) may mitigate this

problem, it also complicates the communications plan and diverts scarce assets to accomplish this task.

Under the top-down process the targets in the brigade fire plan are critical to the success of the brigade operations. In order to effectively execute the fire plan, observers must be thoroughly familiar with the brigade commander's intent for fires. An observer must know when and under what conditions these critical targets will be fired. In order to pass this information from the brigade tactical operations center (TOC) to the FO who will observe and fire on a target, this information must pass through three echelons of command. This creates opportunities for the omission, or misunderstanding of vital information critical to the correct execution of the fire plan.

As has been shown, the FIST organization, implemented in 1978, does not optimize the ability of observers to execute today's fire plans. The FIST organization was designed to consolidate observers and provide a means for integrating indirect fire with maneuver forces at the lowest echelon. Today, fire support planning concentrates primarily on integrating fire support with maneuver at the brigade level. The current organization of observers, while adequate to support the old bottom up process, does not provide the proper equipment or command and control structure to facilitate rapid execution of the top-down fire plan. The lack of transportation, inadequate communications, and

muddled command and control of observers contribute to this problem. DS artillery battalions are constantly forming ad-hoc teams or using non-standard procedures in order to find enough observers to cover the targets in a brigade fire plan. Results from the Combat Training Center and Operation Desert Storm suggest that the correct solution has not been found.

Effectiveness of the Platoon FO

As the Army's premier training center for heavy brigades, the National Training Center provides valuable experience for units as well as a wealth of information on what heavy units in the Army do well, and on what those units do poorly. One of the perennial observations made at the NTC is the inability of brigades to execute indirect fires in a timely and accurate manner.[44] Improvements in the employment of artillery have been realized. Marked increases in the number of missions and volume of fire have occurred since top-down fire planning began in 1988.[45] However, the number of effective missions, those where rounds impact within 500 meters of a target, has remained at about 45 per cent of the total missions fired.[46] This problem in accuracy has been traced directly to the effectiveness of observers at the NTC.

In the force-on-force operations conducted at the NTC indirect fire engagements are resolved using the Indirect

Fire Casualty Assessment System (IFCAS). The IFCAS generates a 260 x 600 meter box representing the impact area for a given target. An effective mission is one where enemy units are encompassed by the box. A suppressive mission is one in which the border of the IFCAS box is within 500 meters of the enemy. There are no firing battery mistakes, ordnance errors, or weather effects; the rounds land where the call for fire specifies. Thus, accuracy is solely the function of observers.

Observer accuracy has been the subject of numerous Army studies. Among these were three tests conducted in 1984; CSSG III, the FIST Force Development Test and Evaluation II (FIST FDTE II), and the Human Engineering Laboratories Battalion Artillery Test (HELBAT). The CSSG III concluded that observers equipped with only a compass, binoculars, and map could locate stationary targets to within 500 meters. The FIST FDTE II concluded that even with a hand-held laser range finder, such as the AN/GVS5, observer accuracy still incurred a target location error (TLE) of 400 to 600 meters against stationary targets. The HELBAT test showed that a conventional observer (map, compass, and binoculars) had a mean TLE of 390 meters for stationary targets and 700 meters for a moving target. An observer using a hand-held laser rangefinder had a mean TLE of 180 meters for stationary target and 400 meters for a moving target. In short, the three studies agreed that a conventional observer could

locate a target to within approximately 500 meters, and an observer with a hand-held laser rangefinder had a TLE of between 200 to 400 meters.

The HELBAT study noted a significant improvement however, when observers were equipped with a laser rangefinder using a tracking mount.[47] Observers equipped with ground/vehicle laser locator designators mounted on a tracking mechanism had mean TLE's of less than 25 meters against stationary targets and 80 meters against moving targets. The significant increase in observer accuracy was due to the tracking mechanism on the G/VLLD. Only devices with a stable platform and tracking mechanism like that found on the G/VLLD allowed an observer to produce targeting information accurate enough to obtain a first round fire-for-effect capability.

Another deficiency contributing to observer accuracy is self-location error. The aforementioned studies agreed that the observers studied had a mean self-locating error of more than 200 meters. This is significant since the method of target location with a laser rangefinder is by polar plot. Using this method, an observer uses his own location as a start point, derives the distance to a target using the laser rangefinder, determine the azimuth to the target, and then plots the target along that azimuth using the derived distance (See Appendix A). If the observer's location is inaccurate, the accuracy of his solution suffers.

The platoon FOs of today are equipped, for observation duties, with almost exactly the same "kit" as their predecessors in World War II. They have a 1:50,000 scale topographic map, a compass, binoculars, and one new piece of equipment, the AN/GVS5 hand-held laser rangefinder. Because the platoon FO party has no organic transportation, all of their equipment must be man-portable so they do not have a platform mounted laser rangefinder. There is no self-locating device such as a global positioning system (GPS) receiver authorized in the TOE for the FO.

Assuming the results reported in the previous studies reflect mean TLEs and self-locating errors, then without equipment to offset these errors, such as G/VLLDs or GPS, the probability of first round effective or suppressive fires is less than fifty per cent. The realities of combat, including fear, confusion, and battlefield clutter, will further reduce the effectiveness of observers from that shown by these tests. The accuracy of fires reported at NTC reflects the maximum achieveable capability of the current platoon FO party.[48]

Another measure of platoon FO effectiveness deduced from data produced at the NTC is the frequency of fires actually called for by these observers. The 1990 RAND Corporation study noted that only 35 per cent of the calls for fire they examined were initiated by either the company FSOs or platoon FOs.[49] The same study showed that 55 percent of

the calls-for-fire were initiated by brigade and task force FSOs and 10 percent were initiated by other sources such as scouts, maneuver commanders, and counter-fire radars. This data indicates that the platoon FOs are not fulfilling their role as the primary observers for the fire support system. Approximately 65 percent of the calls-for-fire studied originated with elements within the brigade whose primary function is something other than providing observer support to the brigade. The RAND Corporation's study identified several key reasons for the low percentage of missions called by the company FSOs and platoon FOs. One reason for the limited number of calls-for-fire by platoon FOs was their inability to see assigned targets. Company FSOs were able to position observers to see assigned targets in only 25 percent of the missions studied in 1990.[50] This fact, coupled with the lack of observation when platoon FOs are confined to the platoon leader's vehicle, points to the negative effects caused by the lack of organic transportation for the platoon FO.

Another factor in the under-utilization of platoon FOs at the NTC dealt with the assignment of targets to platoon FOs. According to the RAND Corporation's study, platoon FOs were given specific target responsibilities less than one quarter of the time in the offense, and in the defense were fully integrated in less than one-half of the battles studied.[51] Observers were issued specific guidance on the

execution of assigned targets in only 23 percent of the offensive operations studied and in less than 50 percent of defensive operations.[52]

The detailed analysis of the fire plan necessary to accurately position observers, and provide them with specific attack guidance for the execution of indirect fires, was insufficient for several reasons. Time was a major limiting factor. Fire missions at the NTC are conducted under time constraints which force units to practice intensive time management. Units must be proficient at planning, war gaming, and rehearsing operations in order to make the maximum use of allotted time prior to the start of an operation. The RAND study found that at the company FSO level, time was not available to conduct adequate preparation, in the detail required, to position observers who had adequate guidance on the targets for which they were responsible. Time constraints in some cases made it impossible for the company FSO to carry out his assigned mission. In short, the fire plan arrived too late for the company FSO to react and plan accordingly. As a result, execution of the brigade's fire plan suffered because critical targets were not adequately covered.

A study conducted by the author in 1993 reinforced the findings of the RAND report. The 1993 study involved the analysis of force-on-force operations at the NTC for 54 battles during rotations 93-06 through 93-11. The 1186 fire

missions analyzed, as well as discussions with the observer controllers (OC) who follow and critique the performance of each unit rotating through the NTC, revealed performance data that suggests that platoon FOs are still under utilized.

The sources for the calls-for-fire studied in 1993 are at Table 1. The absence of any calls-for-fire initiated by the FOs is clear evidence that they are in fact not performing as the "eyes of the artillery." Even if this is an anomaly caused by the absence of an Observer/Controller with each platoon FO, and one further assumes that all calls-for-fire initiated by the platoon FOs are relayed by the company FSO, the aggregate of total calls-for-fire by company FSOs and platoon FOs still accounts for only one fifth of the total missions fired. This 20 percent aggregate does not compare favorably to almost half of the fire missions initiated by the brigade and task force FSOs, officers who should not doctrinally be in any position to actually see the battle.[53]

TABLE 1
Sources for Calls-For-Fire
(Percent)

Brigade FSO	11
Task Force FSO	36
Company FSO	20
Platoon FO	0
COLT	8
Other (Scouts, Commanders, Counterfire Radars, etc)	25

During subsequent interviews, the OCs explained that a large number of the missions called by the brigade and task

force FSOs were based on spot reports rendered during the battle by other forces such as scouts, maneuver commanders, and aerial observers. The same OCs commented that often these spot reports were the only targeting intelligence available to the brigade because observers were not in positions to see the targets in the brigade's fire plan. Poor observer coverage throughout brigade sectors was caused by many reasons, including inadequate observation plans, lack of transportation for platoon FOs, observer casualties, and inadequate communications between platoon FOs and their supported unit.[54] The current FIST organization forces units to constantly develop non-doctrinal organizations in order to effectively execute fire support plans. Units are successful at the NTC not because of the current FIST organization but in spite of it.

The use of the Combat Observation and Lasing Team (COLT) at the NTC is another area that needs closer examination and comparison to the current effectiveness of platoon FOs. Two COLTs are authorized in the direct support artillery battalion TOE. The COLTs comprise a 3-man observation team and a modified M113A2 armored personnel carrier. The modified M113A2 contains an on-board self-locating system, a G/VLLD, and a Digital Message Device (DMD). In this configuration the vehicle is called an M981 Fire Support Team Vehicle (FISTV) and it is identical to the vehicle used by the company FSO. The COLTs work under the control of the

brigade FSO or they may be task organized for use by subordinate units.

The 1993 NTC study conducted by the author found that COLTs accounted for 8 percent of the fire missions initiated. This may not seem like an impressive performance, until one considers that COLTs make up less than one percent of the "eyes" dedicated exclusively to observed fire support in a mechanized infantry brigade. In this respect, the COLTs have an impressive record. Based on comments by the OCs, their success is largely a function of two factors. These mechanized observer teams have the mobility necessary to position themselves to see their assigned targets. Their organic transportation provides the COLTs with flexibility to move independently around the battlefield, quickly reposition to gain better observation posts, and to follow the flow of the battle while maintaining observation on key targets. The COLTs also work for the brigade FSO, and therefore have almost instantaneous access to the information necessary to correctly execute assigned targets. Their proximity to the brigade TOC during planning allows them to quickly access all of the information necessary to properly attack targets in a timely manner. They understand the commander's intent for fire support because they have direct access to the source of the fire plan; the brigade fire support staff. These factors are not shared by the platoon FOs who are confined to the

platoon leader's vehicle waiting for the fire plan to pass through three higher echelons before it reaches them.

Because of its sophisticated instrumentation system, the NTC has historically provided the benchmark for evaluating fire support effectiveness. However, the Combat Maneuver Training Center (CMTC) and Operation Desert Storm also provide useful insights into the recent employment and effectiveness of the platoon FO. A further examination of information from these two sources is necessary to complete an analysis of this subject.

The CMTC, located at Hohenfels, Germany, conducts force-on-force and live fire training for task force-sized armored and mechanized units. Although not as extensively instrumented as the NTC, the CMTC provides highly qualified OCs down to company level within units undergoing training. While there was no empirical evidence from the CMTC used in the preparation of this monograph, the comments of former OCs from CMTC proved enlightening.[55]

Generally, the CMTC observers concurred with the data from the NTC, and found platoon FOs to be under-used and usually ineffective for many of the same reasons previously cited. These officers pointed out that a lack of organic transportation and limited knowledge of the fire plan accounted for most of the problems associated with platoon FOs. They cited the inability of observers to properly position themselves to observe targets as a function of

inadequate transportation. When in position, observers often had no knowledge of when to execute a fire mission against a given target because they did not understand the commander's intent for fires.

Differing observations made by the CMTC OCs dealt with unit manning and experience. They noted that, in their opinion, platoon FO positions were generally the last in priority for manning within the direct support artillery battalion. In addition, many units observed at CMTC reassigned platoon FOs to fill battalion and brigade fire support sections (FSS) to strengths above their authorized level. Units did this because they felt that the current authorized strength was below what was actually needed to conduct operations effectively. The fact that the platoon FO slots were the last filled, and the first borrowed from, reflects their relative worth in the eyes of the fire supporters. As a general rule "essential" personnel are usually the last to be moved, while less "useful" individuals are often moved to accommodate the needs of an organization. One rule of organizing for combat is to fill your key positions first.

The relative value placed on platoon FOs is also reflected in the experience level of the platoon FOs found in units training at CMTC. Although authorized a sergeant, the OCs commented that often platoon FO positions were filled by soldiers of lesser rank while the sergeants

authorized for those positions performed other duties. The lack of platoon FOs as well as their inexperience were key factors contributing to their ineffectiveness at CMTC.

Operation Desert Storm was a great victory, and for many served as a validation of fire support doctrinal practices.[56] However, there is a complete absence of any published analysis on the effectiveness of platoon FOs in the largest mechanized battle fought by the US Army since World War II. In the absence of any empirical data on the performance of platoon FOs during Operation Desert Storm, the comments of four former direct support cannon artillery battalion commanders during that conflict are useful for assessing the employment and effectiveness of platoon FOs.[57]

The four former DS battalion commanders were remarkably consistent in their views of the effectiveness of platoon FOs during Operation Desert Storm. Lieutenant Colonel Lutz summed up their collective sentiments by stating "My platoon FOs were irrelevant."[58] The four former commanders confirmed many of the observations made by the CMTC OCs concerning manning of the platoon FO parties. Each of the interviewees stated that they had placed a low priority on filling the platoon FO positions. All four used platoon FOs to fill their brigade and battalion fire support sections to levels above those authorized by the TOE. Three of the four commanders used platoon FOs to provide fire support

personnel to the antitank companies (E company) within the brigades they supported. Currently the E company in each mechanized infantry battalion is not authorized a FIST by TOE.

During Operation Desert Shield, each of the battalions commanded by these officers was issued an extra FISTV for use by a COLT. The former commanders all chose to use soldiers from the platoon FO parties to man these additional systems. Using platoon FOs as the "bill payers" for filling these slots was a conscious decision made by commanders in combat who sought to optimize their observer assets. In each case these commanders chose to move platoon FOs into more useful positions in order to get the most from their available assets. The reasons cited for their actions were that platoon FOs could not function effectively while riding in the infantry platoon leader's M2 Bradley, that the high tempo of mechanized operations made it impossible to ensure dissemination of the fire plan down to the platoon FOs, and that without organic transportation platoon FOs lacked the operational flexibility to function effectively on a fast paced, highly mobile battlefield.

Emerging Technology

As the Army modernizes equipment for use in the 21st century, there is tremendous potential to create an infantry fighting vehicle that enhances the mechanized infantry platoon leader's ability to effectively employ indirect fires without the assistance of a platoon FO. The fielding of the improved M2A2(+) Bradley fighting vehicle (BFV) which will be completed by 1995, is a case in point.

The upgraded BFV is equipped with a laser ranger finder, the global positioning system (GPS), and a thermal imaging system.[59] With these improvements, the M2A2(+) BFV equipped platoon leader will have a better capability to observe, accurately locate, and engage targets than his platoon FO. The M2A2(+) has the target location and self location capabilities to allow platoon leaders to achieve first round fire-for-effect targeting data. This is not to imply that infantry platoon leaders should be primarily forward observers. However, the enhanced capabilities of the M2A2(+) will allow them to do what armor platoon leaders have been doing since 1977, act as their own FO.

The mechanized infantry platoon leader's ability to effectively integrate fire support will be further enhanced with the fielding of the Intervehicular Information System (IVIS) projected for fielding in BFV equipped units in 1998.[60] IVIS will provide near real-time acquisition, processing, and distribution of combat data and information.

The IVIS allows combat vehicles to share tactical information and data with other similarly equipped systems through the use of processing systems and output devices (display screens). The system uses digital transmissions sent over radio to exchange information through reports, messages, and graphic overlays that are stored in the receiving processing unit and displays as required on a commander's display screen.[61]

The IVIS gives the mechanized infantry platoon leader almost instantaneous input and access to the brigade fire plan. Through the use of a fire support menu, the platoon leader can move targets in the brigade fire plan based on obstacles, visibility, or other conditions. This results in near real time bottom-up refinement of a top-down fire plan. The platoon leader can also use the fire support menu to process a call for fire and transmit it digitally to the company FSO. When fielded, the Advanced Field Artillery Tactical Data System (AFATDS) will be able to interface directly with the IVIS equipped units.[62] The result will be almost instantaneous calls-for-fire from observer to firing unit.

In the near future technology will make the platoon FO an anachronism. A mechanized infantry platoon leader will be better equipped than his FO to locate both himself and the target. In addition, the platoon leader will have nearly instantaneous access to the fire support system,

through the use of IVIS, to plan and execute indirect fires. The platoon FO will become irrelevant because the role he plays is being replaced by the improved technology available to the mechanized infantry platoon leader.

Conclusion

The CSSG was given the task to concentrate on optimizing observed indirect fire support to maneuver forces. They created a new model for the employment of observers that did vastly improved the ability of the fire support community to provide close support fires to maneuver units. Optimization, however, requires constant scrutiny. The changing realities of the battlefield require constant vigilance if we are to avoid the calcification of organizations and doctrine to the point of disaster. Changing doctrine, technology, and tactics have marginalized the improvement created by the adoption of the FIST concept.

Current US Army doctrine relies on the employment of flexible, agile, and lethal forces capable of attacking enemies throughout the depth of their forces. Army doctrine focuses on achieving victory by massing the effects of combat power at the decisive point, overwhelming the enemy and giving him no opportunity to respond with coordinated or effective opposition. The key to achieving this end is the synchronization of combat power.

The existing fire support structure places a premium on the ability of the platoon FO to properly execute the fire plan and achieve the devastating effects of massed fires on the enemy. As shown, platoon FOs currently are neither equipped nor employed to execute their assigned mission. Top-down fire planning requires observers who are positioned to see targets assigned by the brigade, and equipped to accurately locate those targets with a first round fire-for-effect capability. Platoon FOs, buried in the bowels of platoon leaders' M2 Bradleys, and possessing no organic transportation, do not have the flexibility required for operations on a fast-paced, non-linear battlefield. These same FOs are also not equipped for achieving target location accuracy that allow them to fire-for-effect with the first volley.

The results of the artillery's failure to adapt to the changing realities of combat has been demonstrated at the Combat Training Center and in combat during Operation Desert Storm. The evidence proves overwhelmingly that the current structure is archaic and inefficient. By trying to compensate for these deficiencies, fire supporters create "home grown" remedies that complicate command and control, create interoperability problems between units, and desynchronize operations. This has led to a loss of confidence in the abilities of the fire support system to effectively support maneuver forces. Instead of optimizing

observed fire support, the FIST structure in a mechanized infantry battalion calls into question the value of fire support on today's battlefield.

Recommendation

Overcoming the current deficiencies in providing close support fires to maneuver forces requires a change in the organization of a direct support artillery battalion's fire support structure. To fully exploit the potential of current technology, and to effectively execute current fire support doctrine, the artillery must create highly mobile teams of observers and equip them with systems that allow first round fire-for-effect targeting solutions. The realities of a shrinking force structure require that this change incur no new personnel acquisitions. The Army has the capability to implement a change to observer assets that maximizes existing capabilities without an increase in force structure or personnel.

Currently, the Army has twenty-six mechanized infantry battalions in the active component. There are 624 platoon forward observer positions allocated to DS artillery battalions that support these units. By reorganizing these assets, the Army can create flexible, highly mobile, well-equipped forward observer teams that are capable of maximizing observed indirect fire support to heavy maneuver forces. The current force structure will allow the Army to

cross level platoon FOs and provide each heavy brigade with six 2-man FO teams, and each heavy battalion (armor and mechanized infantry) with three 2-man FO parties. Spread across the seventeen heavy brigades, and 59 heavy battalions in the active Army, these "combat observation teams" would use 558 of the 624 platoon FO positions in the current structure. The remaining 66 platoon FO positions should be used to increase the number of personnel in each heavy brigade fire support section.

The combat observation teams should be equipped with the armored version of High Mobility Multi-Purpose Wheeled Vehicle (HMMWV) for transportation. The HMMWV is easily obtainable as units are inactivated and represents a low-cost platform. The HMMWV provides adequate mobility and survivability for heavy battalion scout platoons, therefore it should be adequate for use by forward observers. HMMWV mounted FO teams will have the operational flexibility to effectively operate on a fast paced, non-linear battlefield.

The transportation capability that the HMMWV provides will also allow FOs to carry enhanced target locating systems such as the G/VLLD and a self-locating system such as GPS. Together, these systems will give the FO party a first round fire-for-effect capability against both moving and stationary targets. These systems will also increase targeting accuracy by ensuring that data for preplanned targets is as accurate as current technology allows.

Communications capabilities will also be enhanced by allowing FO party to use vehicle mounted radios which have greater range. This increase in communications capability will allow FOs to operate over extended ranges without the need for radio relays. This will speed fire mission processing and intelligence reporting.

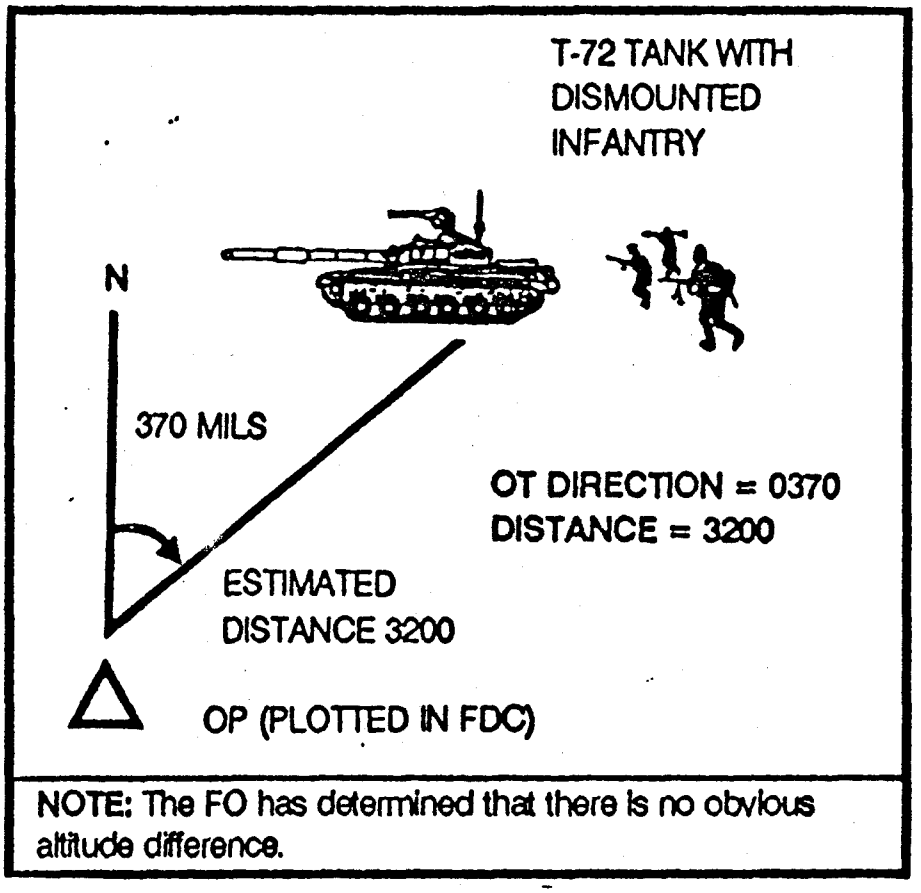
At the brigade, FOs should be organized into a "combat observation platoon" (COP) consisting of six HMMWV FO parties and two M981 COLTS (See Appendix B). This platoon would be controlled by the brigade FSO and task organized as necessary. The COP will be employed to cover critical targets in the brigade fire plan. Due to the proximity of the COP to the brigade fire support staff, the COP will have immediate access to the fire support plan, attack guidance, current intelligence, and the commander's intent for fires. During execution, the FO teams of the COP can be readily positioned by the brigade FSS to cover critical targets. They would also have the flexibility to quickly react to a changing tactical situation or, if necessary, they can operate without guidance because they understand the commander's intent for fires.

The three FO parties in each heavy task force should be similarly employed. These FO parties will cover critical task force targets, operate with task force scouts, or provide observers to support dismounted operations. Each company would retain its company FSO and FIST headquarters.

Although the mechanized infantry platoon loses its FO party with the new fire support organization, the brigade and task force gain a fully mobile, technologically enhanced observer capability. The new organization would allow top-down fire planning to fully exploit current fire support capabilities available through the use of technology and mobility, without an increase in personnel.

The field artillery should recognize that the FIST organization, as it currently exists in mechanized infantry battalions, is inefficient. The personnel, equipment, and technology exist to provide the best observed fire support possible to maneuver forces; they deserve no less. Failing to change will continue to produce criticism of the fire support system and erode the reputation of the field artillery.

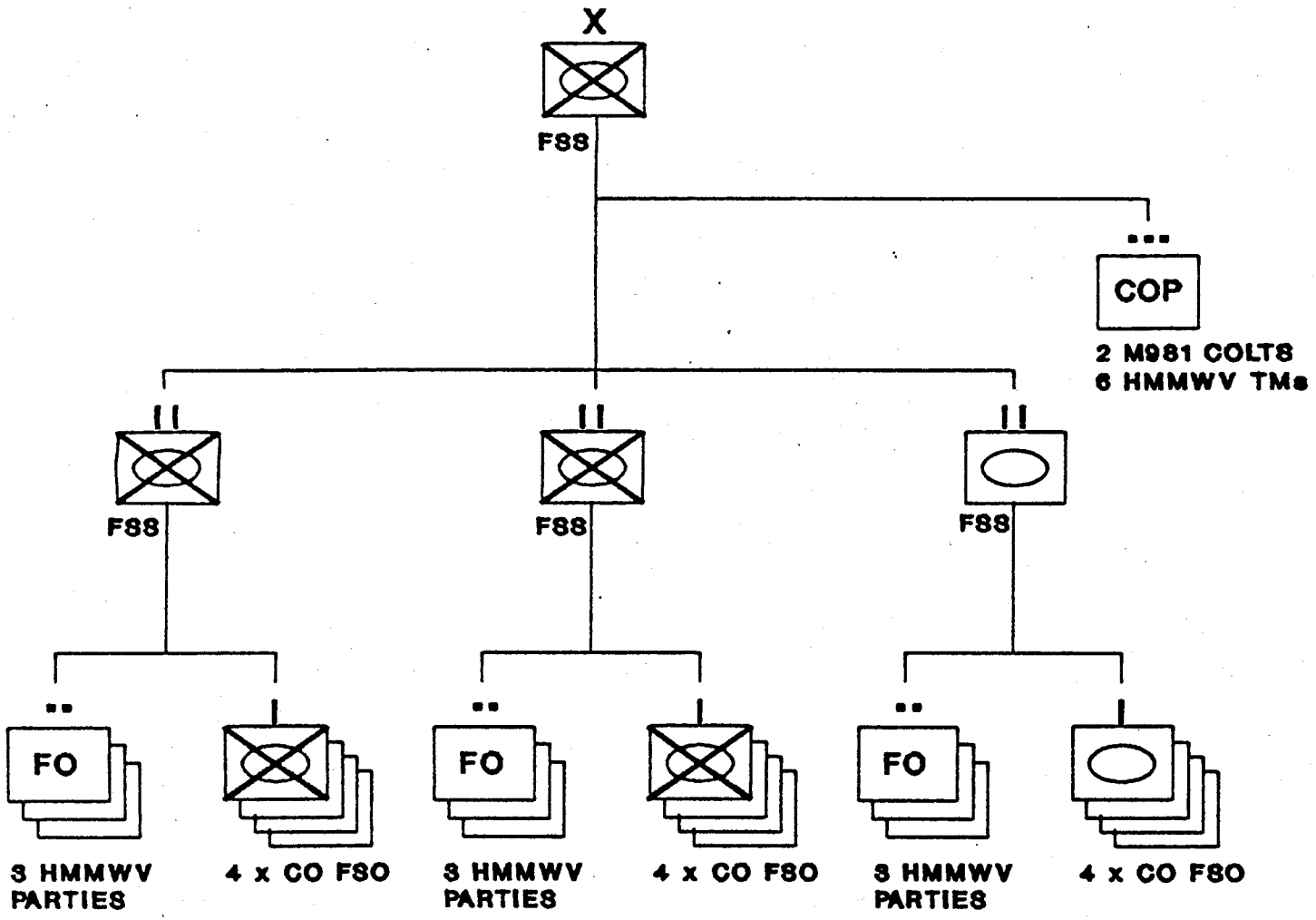
POLAR PLOT



NOTE: The FO has determined that there is no obvious altitude difference.

APPENDIX B

PROPOSED BRIGADE FIRE SUPPORT ORGANIZATION



APPENDIX C

Combat Observation Platoon Manning and Equipment

Mechanized Infantry FIST

	Current	Proposed
Lieutenant, FIST Chief	1	1
Staff Sergeant, NCOIC	1	1
Sergeant, FO	3	0
Specialist, Driver	1	1
Specialist, Radio Operator	4	1
TOTAL	10	4

HMMWV FO Party

Sergeant, FO	1
Specalist, Driver/Radio Operator	1

HMMWV FO Party Major Equipment

M1025 HMMWV	1
AN/VRC 91 Radio	1
AN/PAQ 3 G/VLLD Laser Range Finder Thermal Site	1
GPS	1
AN/GVS5 Hand-held Laser Range Finder	1
OE/254 Antenna	1
Forward Entry Device CP-1995/V	1
Digital Message Device AN/PSG 2A	1

ENDNOTES

1. United States Army Field Artillery School, Right of the Line - A History of the American Field Artillery (Fort Sill, OK, 1977), p. 32.

2. Ibid.

3. Ibid, p. 31.

4. Antoine Jomini, The Art of War, in Roots of Strategy, ed. J.D. Hittle (Harrisburg, PA: Stackpole Books, 1987), p. 511.

5. Ibid., p. 551-552.

6. U.S. Army, Operations, Field Manual 100-5 (Washington DC: U.S. Government Printing Office, 1993), p. 2-9.

7. Ibid.

8. Ibid.

9. US Army Field Artillery School, Close Support Study Group (CSSG) Final Report (Fort Sill, OK: United States Army Field Artillery School, 1975), p. A-1-4.

10. This trend appears in numerous publications, most notably "NTC Lessons Learned" and "Fire Support Lessons Learned" both published by the Combined Arms Training Activity (CATA) Fort Leavenworth, KS.

11. Crosbie E. Saint, "The Key to Field Artillery--Focusing Combat Power," Field Artillery (October 1988), pp. 11-12. "Fire Support Problems at the National Training Center (NTC)," letter from Commander, US Army Combined Arms Center to Commandant, US Army Field Artillery School dated 12 January 1987, pp. 1-2.

12. US Army Field Artillery School, Close Support Study Group I: Final Report (Fort Sill, OK: US Army Field Artillery School, 1975), p. A-1-4.

13. Ibid.

14. Ibid.

15. Ibid.

16. Although air-land battle did not become a doctrinal term until 1982, the Army was in the process of developing this doctrine as early as 1975. A good example of this was the establishment of the Air-Land Forces Application Directorate at Fort Monroe, VA. GEN DePuy refers to the airland battle concept in his letter to Major General Ott dated 17 July 1975 which authorized the creation of the CSSG.

17. Letter from Major General David E. Ott to GEN William E. Depuy dated 25 June 1975, p. 1.

18. Ibid, p. 2.

19. Ibid, p. 3.

20. Ibid.

21. CSSG, Final Report, p. D-1.

22. Ibid, p. 5.

23. Ibid, p. 7.

24. Ibid, p. F-3-1.

25. Ibid, p. F-1-1.

26. Ibid, p. 7.

27. Brigadier General Paul F. Pearson, "FIST!", Field Artillery Journal (May-June 1976): 9-11.

28. Ibid, p. 8.

29. US Army Field Artillery School, Close Support Study Group II, Final Report (Fort Sill, OK: 1980), p. 1-2.

30. Ibid, p. G-C-2.

31. US Army, Fire Support for Brigade Operations (Heavy), Field Manual (FM) 6-20-40 (Washington, DC: US Government Printing Officer, 1990), p. 1-5.

32. US Army, Observed Fire, FM 6-30 (Washington, DC: US Government Printing Office, 1991), p. 2-2.

33. US Army, Tank and Mechanized Infantry Company Team, FM 71-7 (Washington, DC: 1988), pp. 1-9, 1-10, and 6-2.

34. Observed Fires, p. 2-2.

35. CSSG, Final Report, pp. F-1-1 - F-1-2.

36. US Army, Mechanized Infantry Platoon and Squad (Bradley), FM 7-7J (Washington, DC: US Government Printing Office, 1993), pp. B-13 - B-15.

37. US Army, Fire Support in Combined Operations, FM 6-20 (Washington, DC: US Government Printing Office, 1984), p. 3-13.

38. Robert D. Sander, "Top-Down Fire Planning," Field Artillery Journal (June 1989): 17.

39. A complete review of CALL lessons learned documents analysis shows that NTC rotation 88-2 is the first mention of the top-down planning process. The term first appeared in a document by Major Marion L. Burn, III entitled NTC Observation Report 89-3, dated 9 February 1989. The report covered fire support issues for rotations 88-2 through 88-9. This view is also consistent with professional literature such as Field Artillery Journal, where the first articles on top-down fire planning began appearing in June 1989. While I am sure units practiced a similar form of fire planning prior to 1988 the cited NTC report showed that only 34.6% of those units surveyed by the report used this method. Thus, while other units may have practiced top down fire planning they were in the vast minority. The term was formally adopted by the artillery in 1990 and appears in subsequent doctrinal publications.

40. FM 6-20-40, p. 2-13.

41. Peter S. Corpac, "Brigade Top-Down Fire Planning and Execution," Field Artillery Journal (August 1989), 23.

42. Ibid., p. 27.

43. Observed Fire, p. 2-1.

44. Marion L. Burn III, Martin Goldsmith and James Hodges, Applying the National Training Center Experience: Artillery Targeting Accuracy (Santa Monica, CA: Rand Corporation, 1990), p. 1.

45. Ibid., pp. 10-11.

46. Ibid., pp. 9-11.

47. G. L. Harley, Human Engineering Laboratory Battalion Artillery Test (HELBAT) (Aberdeen, MD: Human Engineering Laboratories, 1984), p. 35.

48. An analysis of force on force indirect fire missions for NTC rotations 93-06 through 93-11 was conducted by the author in September 1993. Of the 1186 missions fired, 51% were rated as effective or suppressive. The analysis included 54 task force or brigade battles encompassing offensive and defensive missions of various types. This compares favorably with a similar study done by the Rand Corporation in 1990. That study showed a 40% effective/suppressive rating of indirect fires during force on force operations for rotations 88-10 through 88-14. The Rand study examined 50 battles involving either a task force or brigade.

49. Burn, p. 14. It is significant to note that this study did not separate company FSO and platoon FO call-for-fire percentages. The author suspects this is because there is no observer controller (OC) with the platoon FOs; therefore it is nearly impossible to accurately identify which calls-for-fire originate with the platoon FOs and are relayed by the company FSO and which calls-for-fire actually originate with the company FSO. However, the aggregate of 35 percent confirms that platoon FOs are under used.

50. Burn, p. 23.

51. Ibid., p. 21.

52. Ibid., p. 20.

53. FM 6-20-40, Fire Support for Brigade Operations (Heavy) states that brigade and task force FSOs should be where they can best control fire support coordination. Generally the FSOs are found at their respective TOCs during planning and with their maneuver commanders during a battle. While their position during a battle will allow them to see some of the targets they are engaging, they cannot possibly consistently account for half the calls-for-fire because they are personally observing the target.

54. These comments were the results of interviews conducted by the author with the fire support OCs (Werewolves) at the NTC in September 1993.

55. The author was unable to conduct research at the CMTC and was unable to find any authoritative source of empirical data or studies involving training there. However, interviews conducted with 3 former OCs, LTC Robert Mayes, Major Bill Hadfield, and Major Frank Hull provided useful anecdotal data that correlated with the finding of both the NTC RAND study and my own analysis of NTC rotations 93-06 through 93-11. These views represent the accumulated field

studies of individuals with a total of over 7 years OC experience.

56. Major General Fred F. Marty, "FA On Target in the Storm," Field Artillery Journal (October 1991), p. 1.

57. The author conducted interviews with four former DS battalion commanders who served in that capacity during Operation Desert Storm. The interviews were conducted with Colonel Harry Emerson, Colonel William Engels, Colonel John R. Gingrich, and Lieutenant Colonel Steven Lutz between September-November 1993.

58. This comment was made in reference to the effect of the platoon FOs, from Lieutenant Colonel Lutz's battalion, had on the outcome of battles fought by the 24th ID during Operation Desert Storm. Lieutenant Colonel Lutz made the statement during an interview with the author on 5 November, 1993.

59. Major General Jerry A. White, "Mechanized Infantry - A Blueprint for Modernization," Infantry (November-December 1992), p. 1.

60. Ibid.

61. Major James B. Henderson, IVIS Operational Concept (Fort Knox, Kentucky: 1992), p. 3.

62. United States Army Field Artillery Center, Directorate of Combat Developments Program Summary (Fort Sill, OK: 1992), p. 39-2.

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