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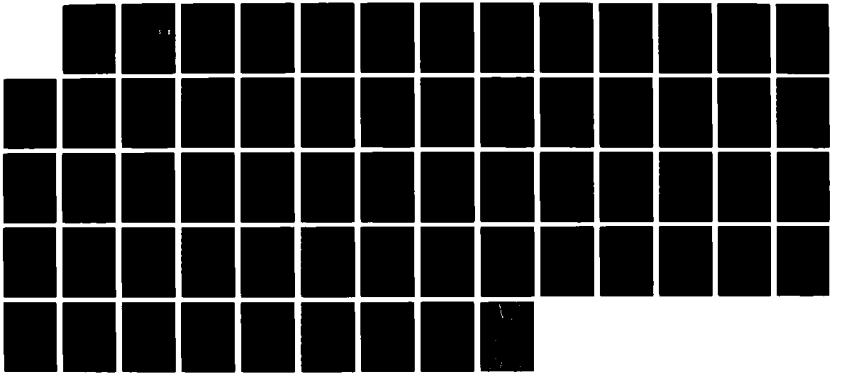

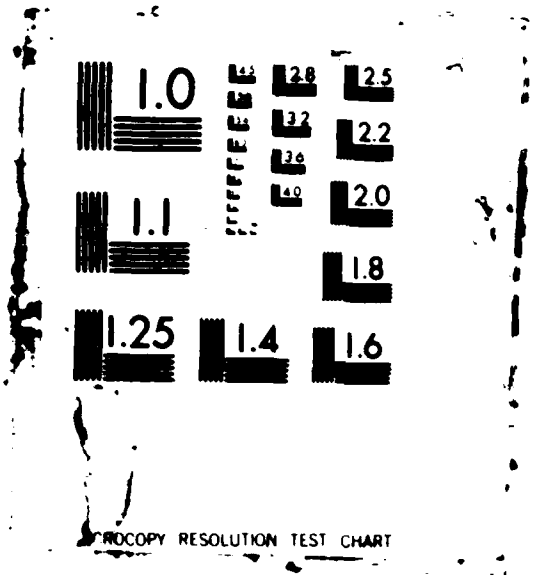
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TIME-ON-TARGET:
Tactical Organization and the Massing of Divisional Field Artillery Fires on the AirLand Battlefield.

by

Major Philip L. Idiart
Field Artillery

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School of Advanced Military Studies
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas

5 December 1986

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This monograph is a historical analysis of Soviet and American World War II experiences in the organization of artillery at division level to mass fires. Both country's artillery experiences, organization, methodolgy, and techniques are examined based on the available historical records and contemporary literature to isolate relevant sets of principles for organizing artillery tactically at division to mass. These principles are then contrasted to reveal similarities and differences to isolate a set of historically derived principles. Subsequently, these principles are compared to evolving battlefield changes since World War II, AirLand Battle doctrine and a vision of the future battlefield to determine what effect these have on the historical

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Among the conclusions drawn from this analysis to organize artillery at division to mass are: the necessity of maximum centralized control by division, specifically fire planning, first priority in calls-for-fire, and positioning authority; the retention of sufficient artillery in general support; and the necessity to weight the main effort decisively with the fires of the general support artillery. Finally, this study concludes that current doctrine for the organization of artillery at division is both adequate and sound.

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ABSTRACT

TIME-ON-TARGET: TACTICAL ORGANIZATION AND THE MASSING OF DIVISIONAL FIELD ARTILLERY FIRES ON THE AIRLAND BATTLEFIELD, by Major Philip L. Idiart, USA, 54 pages.

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I. INTRODUCTION

Throughout modern military history, mass — the concentration of forces — has significantly contributed to victory. Prominent military theorists such as Sun Tzu, Clausewitz, Jomini and Fuller have long noted this principle and recorded it in their writings. In his book, On War, Clausewitz wrote that "superiority in numbers is the most common element in victory."[1] The Great Captains, Frederick the Great and Napoleon, applied mass decisively by the concentration not only of forces but of firepower as well. To support his attack by oblique order at the battle of Leuthen, Frederick the Great kept his cannons massed, using them to break up the Austrian infantry. This employment of concentrated artillery contributed decisively to his victory. After the Seven Years War, Frederick recognized this factor by stating, "artillery decides everything."[2] Napoleon, whose practice of the art of war influenced Clausewitz and Jomini, handled massed artillery with masterly efficiency. To support his maneuver, he consistently concentrated his artillery in large batteries. He then used them at the point of attack to hammer the weak point in the center of the enemys' line.[3] Himself a trained gunner, Napoleon appreciated the potential decisiveness of massed artillery, attaching more and more importance to it. Reflecting this, he wrote Prince Eugene in 1813 that "great battles are won by artillery."[4] This employment of massed artillery fire continued throughout the nineteenth century into the twentieth century.

The First World War saw extensive use of concentrated artillery fire. As maneuver stagnated, nearly all combatants concentrated ever-increasing amounts of artillery. In attempts to return mobility to the checkmated battlefield, offensives were preceded by intense artillery preparations. This

use of massed artillery fires became so prevalent that Marshal Petain remarked, "Artillery conquers, infantry occupies".[5] Although the Second World War found battlefields with increased mobility and fluidity, the use of massed artillery continued. Artillery preparations preceded tactical attacks as well as operational offensives. Massed fires were used to disrupt enemy counterattacks as well as enemy main attacks in the defense. Even recent Israeli experience during the Yom Kippur war demonstrated the effectiveness and desirability of massed artillery fire.[6] However, evolving conditions on the battlefield throughout the twentieth century such as greater lethality, increased dispersal and force structure changes may alter this.

Today's artillery possesses capabilities for destruction unmatched in the annals of war. Technological advances have provided field artillery delivery systems with unprecedented range and lethality. Improved Conventional Munitions dispensing submunitions from a projectile can now kill both light armored vehicles and personnel with enhanced effectiveness over older conventional high explosive shells. Terminal-homing submunitions now under development promise to provide artillery with the means effectively to destroy massed tank formations.[7] In turn, this ever-increasing lethality on the battlefield has led to greater dispersal. Tactical formations -- divisions and corps -- will occupy unprecedented frontages. Concurrently, emerging changes in artillery force structure promise to influence the successful massing of fires. In the AOE heavy divisions, general support cannon battalions have been shifted to corps artillery and replaced with a battery of MLRS. Considering these conditions, the propensity to parcel out artillery organizations in "fair share" slices -- direct support battalions to maneuver brigades and FA brigades to committed divisions -- and the competing demands

of close, deep and rear operations envisioned in AirLand Battle doctrine, an important question must be posed. Given that massed fires remain desirable and may be feasible, what principles must govern the tactical organization of artillery at the division level to mass fires on the modern battlefield? In an attempt to answer this question, this paper will examine in detail the concept of massing division artillery fires — what it has meant historically and what it means today.

In his book On War, Clausewitz reminds us that "historical examples clarify everything and also provide the best kinds of proof in the empirical sciences. This is particularly true in the art of war."[8] Clausewitz goes on to state that there are four levels of historical analysis characterized by the different uses of historical examples. First, historical examples may simply explain an idea. Secondly, they may serve to demonstrate the application of an idea. Third, one can appeal to historical facts to support a statement. Finally, the detailed presentation of a historical event, and the combination of several events, makes it possible to deduce a conclusion wherein the proof is in the evidence itself.[9] Therefore, a detailed analysis and presentation of historical examples of massing division artillery fires should allow us to isolate those imperatives that enable it to mass its fires. Given that World War II provides the most commonly known examples of mass fires relevant to today, which armies of that conflict would provide us the most meaningful examples? The on-going potential confrontation between Warsaw Pact and NATO suggests that the critical arena for future conventional combat remains Central Europe.[10] However, conflicting U.S. and Soviet interests in the Middle East also suggests Southwest Asia as a potential combat theater. In either case, the major combatants are the Soviets and the

Americans. Therefore, a historical analysis of Soviet and U.S. experiences in the massing of artillery fires at division is most relevant today. As conflict potentially exists in Europe or Southwest Asia, this study examines the American experiences at Kasserine Pass and the Ardennes, while the Soviet experience during the Belorussian offensive is explored. These historical examples are then analyzed to uncover those essential elements that allow a division to mass fires successfully. Having determined these, those ingredients that govern the tactical organization of artillery at division level to mass fires are then isolated and a set of relevant principles derived. We will then compare these principles with the evolving battlefield changes since World War II, the tenets of Airland Battle and a vision of the future battlefield to determine what effect these have on the historically derived principles. Finally, the conclusions of this analysis will be compared to current doctrine to determine doctrinal implications for the tactical organization of artillery at division level to mass fires.

MASS FIRES AND DIVISION ARTILLERY

To further narrow the scope of this paper and to provide a common understanding, some explanation of terms is required. First, we will examine what is meant by the term mass fires, how it is accomplished theoretically and why it is important. Having done so, we will continue by clarifying what is meant by division artillery versus DIVARTY. Finally, we will define what is meant by tactical organization of artillery at the division level.

FM 6-20, Fire Support in Combined Arms Operations, defines mass fires as many elements accurately attacking the same target simultaneously.[11] This

definition provides a startpoint, but let us examine it further. Mass fires in a theoretical sense are a derivative of the principle of mass. In On War, Clausewitz wrote that there is no simpler law in strategy than keeping one's forces concentrated.[12] Jomini, also recognizing the importance of concentration, wrote that the fundamental principle of war is to throw the mass of an army successively upon the decisive points.[13] The doctrinal capstone manual, FM 100-5, Operations defines mass as the means to concentrate combat power at the decisive place and time. Elaborating further, it states that "in operational and tactical dimensions, this principle [of mass] suggests that superior combat power must be concentrated at the decisive place and time in order to achieve decisive results."[14] As combat power is the effect created by combining maneuver, firepower, protection and leadership,[15] we can infer that the decisive impact of mass applies to the concentrating not only of forces but of firepower as well. This concentration of firepower can be accomplished either by the massing of delivery systems or by the massing of their effects. Further, mass fires may be planned or immediate. But, why should fires be massed?

Simply, as discovered by Frederick the Great, Chevalier du Teil and Napoleon, massed artillery fires are devastating. It is fairly obvious that greater quantity yields greater effect. However, it must be stated that mass is not simply volume. Although one artillery system firing two volleys provides the same volume as two systems firing one volley, the target effect is not the same. Surprise is gained only on the initial volley as the target is caught unaware. Thereafter, subsequent volleys strike a target that is taking protective measures. Consequently, the firepower effect is degraded. The massing of fires from multiple firing units places more lethal fragments

onto a target in the shortest possible time achieving a synergistic effect by combining volume, suddenness, weapons/munitions capability and surprise. The more firing units massed, the greater the synergistic effect.

Having examined what massed fires are in the doctrinal and theoretical sense, and why they are important, let us proceed further to narrow the focus of this paper by defining what is meant by division artillery versus DIVARTY. FM 6-20 defines division artillery as field artillery that is permanently an integral part of a division; for tactical purposes, all FA placed under the command of a division commander is considered division artillery.[16] This defintion will suffice for the purpose of this study, but we will need to differentiate between division artillery and DIVARTY. For our common understanding, DIVARTY will refer to the organizational headquarters whose commander is both a commander of fire support delivery assets and a fire support coordinator for the division. As such, DIVARTY plans and coordinates fire support for the division and provides tactical control of the divisional cannon battalions and FA battalions attached to the division.[17] Thus, for the purpose of clarity in this paper, division artillery refers to any and all field artillery elements organic, assigned or attached to the division; whereas DIVARTY will refer to the headquarters that provides tactical control of artillery units firing for the division.

As organization entails both organizational design and tactical organization, we must clarify the distinction between the two. Organizational design refers to the force design or the building of fixed Tables of Organization and Equipment (TOEs). By contrast, tactical organization as addressed in this study encompasses how a division tactically organizes

available artillery, both organic battalions and those under its control from corps, in order to mass fires. As this study focuses on isolating those principles that govern the tactical organization of artillery, it will not address division artillery force design issues.

II. MASS FIRES - THE AMERICAN EXPERIENCE

The contribution to World War II made by American artillery has been noted by numerous historians. Professor Russell F. Weigley in his book Eisenhower's Lieutenants noted that "the artillery was the American army's special strong suit."[18] Of particular note was its ability to mass fires at critical points time after time.[19] So significant was this capability that fire control procedures permitted the conduct of fire by any front-line soldier who had observation and communications. Further, fire direction centers had so refined massing techniques and adapted existing communications to speed up the delivery that massed fires by as many as 10 battalions onto a single target were not uncommon.[20] Although U.S. artillery's ability to mass fires rapidly and accurately irrespective of battery location became a strong suit, its baptism at Kasserine Pass revealed serious shortcomings in its capacity to do so.

KASSERINE PASS

On 14 February 1943, the Germans renewed offensive operations by attacking the weak II (US) Corps sector. Striking Sidi Bou Zid with elements of the 10th and 21st Panzer Divisions, the Germans soon cut off and destroyed a number of American units, forcing a withdrawal to Sbiba.[21] Following this

success, Rommel continued his offensive toward Kasserine Pass and Sbiba. Capturing Kasserine Pass on the 20th, Rommel was in a position to threaten Thala and Tebessa. However, a successful defense at Sbiba allowed the Allies to shift their efforts to the west. Therefore, when Rommel struck for Tebessa and Thala the next day, both attacks were stopped.[22] The momentum of his attack now gone, Rommel ordered the retirement of his forces.

Kasserine Pass not only served as a baptism of fire for the inexperienced American artillery but also awakened it. Throughout the battle, serious shortcomings in tactical employment produced near-disastrous results raising serious lessons to be learned. The single greatest failing throughout the battle was the inability to mass fires.[23] Aside from the numerous contributing causes,[24] the foremost reason was the failure to employ field artillery under a central field artillery commander. The lack of an artillery headquarters charged with controlling specific units and coordinating their fire direction proved costly. The employment of the 1st Armored Division Artillery and DIVARTY exemplifies this point.

Prior to and throughout the battle, the 1st DIVARTY did not exercise any control of its battalions. Instead, it was employed as the headquarters of the makeshift Combat Command D for the Faid-Maknassey operation and later as the II Corps reserve.[25] As such, it was unable to exercise any control or coordinating influence over the division artillery. Without it, battalions were attached to the various combat commands. During the defense of the Tebessa, the 7th Field Artillery (FA), 27th Armored Field Artillery (AFA), 33d FA and 68th AFA battalions were attached to Combat Command B. However, instead of supporting the entire force or weighting the most vulnerable area,

these battalions were placed in direct support of subordinate formations. Without DIVARTY to coordinate survey, observed fire charts and defensives fires or establish support relationships, each battalion supported its own individual battle. As a result, fires were uncoordinated and support dissipated and decentralized. Thus, despite the availablity of four battalions, there was no capability to mass more than one. The failure to weight the main effort and the lack of central control was illustrated by the 27th and 68th AFA battalions. In the course of the defense, the 27th AFA Battalion was particularly effective. It fired 51 missions while the 68th AFA Battalion within range of much of the ensuing action fired only 2 missions. When even 18 weapons were massed as in the case of the 27th AFA Battalion, the effects were substantial.[26] In fact, their effectiveness was devasting according to Germans.[27] One must wonder how much more effective artillery fires could have been had DIVARTY been present to assign the 68th AFA battalion a reinforcing mission or to mass the fires of all four battalions. Finally, their positioning by maneuver commanders and the tendency of armor commanders to employ and position field artillery as anti-tank weapons in their defensive schemes not only indicated a less than complete understanding of artillery employment doctrine but proved costly.[28]

Just as this action illustrated the inability to mass fire if no central artillery headquarters was present, the defenses of the Thala approach demonstrated that massed fires were not only possible but effective when artillery was employed under DIVARTY control.

As part of its countermeasures, II Corps directed the 9th Infantry Division Artillery to Thala to support the British forces there.[29] Upon

arrival, recon parties were ordered forward and liaison was effected with the supported force. To facilitate the occupation of firing positions, the British extended survey control to the American positions. So complete were these preparations that British guides led the American firing batteries into position and provided them with survey information and azimuths of fire.[30] Thus, division artillery was in position, on common survey, had registered and battalion observed fire charts were coordinated.[31] Further, communications were established, liaison was maintained by the collocation of a DIVARTY forward command post with the command post of the 26th Armored Brigade, and control was centralized.[32] In the following days, the 9th DIVARTY fired several division artillery concentrations, provided counterbattery fire and supported a counterattack by elements of the 26th Armored Brigade. This artillery support was both effective and a surprise to the Germans.[33] Numerous historians credit the 9th DIVARTY with stopping the German offensive at its zenith. In his book, Kasserine, Martin Blumenson comments, "of all the units making their way to Tunisia, the 9th Infantry Division Artillery reached the vital point at the decisive moment and exerted the conclusive influence on the Battle of Kasserine."[34] The significance of its presence was its contribution to influencing the battle with massed and long range fires.

Artillery support at Tebessa and Thala provided many valuable insights. Its greatest potential contribution, the ability from remote positions to influence the action at the decisive point through massed fires, was not realized consistently at Kasserine. The foremost reason was the failure to maintain centralized control, necessary to insure immediate response by all sources to the decisive point at the critical time as determined by the force

commander. Doctrinal employment in the defense stressed "the ability of artillery to mass its fire in critical areas or on important objectives is paramount; hence, centralized control is paramount."[35] Only the 9th DIVARTY centralized control and consequently massed its fires.

THE BATTLE OF THE BULGE

By late 1944, the war in the west settled into a war of attrition. While the Allies attempted to build up adequate resources to breach the Rhein and continue the war of movement, Hitler was planning a counteroffensive.[36] Hoping to force Britain and the U.S. to sue for peace in order to focus his attention solely on the Eastern Front, Hitler launched his counterstroke on 16 December 1944. The Germans striking through the quiet Ardennes sector caught the Americans by surprise. Attacking with three armies -- the 5th Panzer, the 6th SS Panzer and the 7th Armies, the Germans penetrated the VIII Corps front and were soon advancing to obtain crossing sites over the Meuse river toward their objective of Antwerp. However, stubborn and heroic efforts on the part of small individual units and the constricting terrain of the Ardennes served to slow the German offensive. By 22 December, with the penetration contained and the initiative passed to the Allies, counterattacks began the reduction of the salient. Conceding his gamble could no longer succeed, Hitler authorized a withdrawal to the Ourthe river on 8 January 1945 and by the 28th, the Bulge was reduced.[37]

Throughout the battle, U.S. artillery consistently and effectively massed its fires with devastating effect. Time and again, massed fires were used to disrupt and defeat German attacks. The American defensive efforts are replete

with such examples. However, of particular note was the maturing of massed fires where a division would mass up to 9 battalions. During the battle, significant amounts of nondivisional artillery were available. In addition to the fires of the 11 division artilleries at the outbreak of the battle, the American defenders had 52 nondivisional battalions in the V, VII and VIII Corps Artilleries and the 32d FA Brigade (1st Army Artillery).[38] These battalions were controlled either by the divisions or FA Groups. In turn, these FA Groups were controlled by the divisions they reinforced or retained under corps control. The additional fires provided by the FA Groups were used effectively time and again.[39] Consequently, division artilleries massed not only their own battalions but also those of adjacent divisions and nondivisional artillery. Two such examples by the 1st Infantry and 6th Armored Division Artilleries illustrate this point.

During the early stages of the battle, the 1st and 2d Infantry Divisions were defending the northern shoulder of the penetration. To augment its defense, the 1st Infantry Division was reinforced by the attachment of the 955th FA Battalion. Further, lateral communications and liaison were established between the two DIVARTYs.[40] On 19 December, an attack by the 12th Volksgrenadier Division threatened to penetrate the defenses of G Company, 2/26th Infantry. Responding to a request for all available fires, the 1st DIVARTY massed 4 battalions — the 5th FA, 33d FA, 955th FA battalions and a battalion of the 2d Division Artillery thereby halting the attack.[41]

On 2 January 1945, the 6th Armored Division reinforced by the attachment of 4 artillery battalions under the 197th FA Group, was continuing its attack

east of Bastogne to reduce the salient. Attacking with 5 task forces across a wide front, the division organized its artillery as follows: Group "Cooney" consisting of the 197th FA Group headquarters and the 128th AFA, 253d AFA and 776th FA battalions was assigned direct support of Combat Command A. Group "Riley" consisting of the DIVARTY and the 212th AFA, 231st AFA and 177th FA battalions was assigned direct support of Combat Command B. The 696th AFA Battalion was retained in general support.[42] As Combat Command A was attacking toward the town of Wardin, it was threatened by a counterattack. As the 167th Volksgrenadier Division was forming a battalion-sized counterattack in Wardin, the 6th DIVARTY massed its own battalions as well as elements of the reinforcing 101st Airborne Division Artillery in a 9 battalion TOT forcing the threat to melt away.[43]

SUMMARY OF AMERICAN WW II EXPERIENCE

U.S. field artillery entered the war with sound doctrine and innovative tactics and techniques, specifically the ability to mass the fires of widely dispersed firing units. However, at Kasserine Pass, it failed to provide mass fires consistently. Following the North Africa campaign, American artillery began efforts to perfect techniques to mass fires. In the subsequent campaigns in Italy and France, it enhanced this ability, to include the adoption of the British TOT technique.[44] Further debates in military journals ensued, arguing the need of centralized control and identifying inherent principles in the massing of fires.[45] These included the following precepts: establishment of common control between firing units by registration or survey; positioning of battalions reasonably close together in order to mass their fires into common areas; establishment of electrical

communications between DIVARTY and the battalions; finally, training in the methods of battalion fire direction.[46] The performance of the 9th DIVARTY at Kasserine validated these principles. However, an analysis of the 1st and 9th DIVARTYs reveals two additional key ingredients to the successful massing of fires not emphasized by these authors. First is the acquisition of a target and communication of the requirement to mass fires, whether by forward observer, air observer in a Piper Cub or liaison officer with the supported unit. Second is liaison higher, lower and laterally to initiate, coordinate, plan and execute mass fires. Examination of doctrine reveals that all these fundamentals were clearly stipulated, particularly the establishment of radio communication to enable commanders to place mass fires on critical areas with the least possible delay. The 1944 revision of FM 6-20 continued to stress the necessity of centralized control in the defense where massed fires were used to break up the enemy main attack and in the offense to disrupt enemy counterattacks.[47] Throughout the war, experience continued to demonstrate and validate the desirability and necessity of centralized control to mass fires. The performance of the 1st and 9th Infantry Division Artilleries illustrates this. However, unlike its infantry counterparts, the 6th Armored Division tactically organized and controlled its artillery differently.

During rapidly moving situations or attacks across wide frontages, maximum centralized control at division proved infeasible. Instead, armored divisions extensively grouped artillery at echelons below division. Armored DIVARTYs, typically reinforced with nondivisional artillery, grouped battalions under the control of a battalion or FA Group, decentralizing control to these groups. However, DIVARTYs normally retained control of 1-2 battalions in general support to augment the fires of subordinate groupments,

thereby maintaining the ability although limited to mass fires and influence the battle. Finally, battalions, groupments or FA groups were normally assigned tactical missions — direct support or general support — rather than attached.[48] The tactical organization of artillery of the 6th Armored Division in the Ardennes typified this practice.

KEY AMERICAN PRINCIPLES

An analysis of the 1st Armored, 1st Infantry, 6th Armored and 9th Infantry Division Artilleries' performance reveals several necessary elements that allow artillery to mass its fires successfully. In essence, these are:

- o Common [survey] control among division artillery battalions, achieved by registration or position area/directional survey.
- o Reliable communications and liaison between DIVARTY, division artillery, target acquisiton sources and the supported unit(s).
- o Common technical fire direction among the division artillery battalions.
- o Positioning of division artillery battalions with respect to the target ensuring it is within weapons range and zone of fire.
- o Target acquisition sources to locate and identify targets then communicate the requirement to mass to the fire direction centers.
- o Centralized control.

Foremost of these conditions and the only one that is organizational in nature is centralized control. However, if centralized control is to have any meaning to us, we must further examine to which degree control is centralized at division as well as which functions are centralized. To the maximum extent permitted by the situation, the bulk of artillery is retained in general support. As such, these battalions are positioned and assigned zones of fire by DIVARTY. Further, displacements are controlled by division. Additionally,

preparations are planned, initiated and controlled at division. This centralization at division ensures not only unity of effort, economy of resources and common fire direction but also ensures that those critical areas and oojectives of concern to the division commander are covered by fire. Also included is the centralization of air observation assets at DIVARTY level as well as communications to other target acquisition sources. This degree of centralization proved necessary in the defense. However, in the offense, a lesser degree of control was required in the armored divisions. Instead of centralization at division, quite often control was decentralized to the groups in support of the combat commands. Such control was demonstrated by the 6th Armored Division where control was decentralized to DIVARTY and the 197th FA Group, each of which supported a combat command. Considering these conditions, the following principles for the tactical organization of artillery at division to mass fires are distilled.

- o Control was centralized appropriate to the situation.
  - oo In relatively static situations such as offensive operations in the Hurtegen Forest or in the defense, control was centralized at division. As such the bulk of the artillery was placed in general support of the division.
  - oo In rapidly moving situation such as the pursuit across France or attacks across a wide front, control by division was not feasible. In such situations, the bulk of the artillery was decentralized and controlled by subordinate regiments or combat commands. As such, division retained and controlled only the minimum artillery in general support.
- o General support battalions were positioned and zones of fire assigned by division such that the bulk of their fires were maneuvered to maintain flexibility and influence the course of the division battle.
- o Liaison and communications was established with reinforcing corps artillery, subordinate general support battalions, direct support battalions or groupments and laterally to adjacent DIVARTYs as well as the supported echelon of command.

Having examined the American World War II experience and determined a preliminary set of historically derived principles, let us now turn our attention to another combatant whose ability to mass fires, although different, was equally impressive.

III. MASS FIRES - THE SOVIET EXPERIENCE

During World War II it became accepted doctrine in the Red Army to concentrate artillery units hub-to-hub to fire sustained barrages designed to pulverize German defenses prior to any attack. These fire tactics became so important and the Soviets attached such value to their artillery, that Stalin referred to it as the God of War. However, Soviet artillery did not possess the ability to mass overwhelming fires in the early stages of the war. Instead, these tactics evolved over the course of war, developing with increasing effectiveness, devastation and sophistication. If the Soviet experience in massing fires during the Belorussian operation is to have any relevance for us, we must briefly examine Soviet artillery's initial performance and organizational and tactical evolution.

In June 1941 the vast majority of Soviet artillery was distributed among the rifle divisions while less than 10% was assigned to the Supreme Reserve Command (RVGK). Each division possessed 2 regiments while RVGK possessed only 74 regiments.[49] Despite this impressive amount of artillery, its initial performance was inadequate and ineffectual. Lacking the communications or fire control means of the Western armies, it relied on World War I techniques. As such, its fires tended to be distributed over the front lines and often it had no primary targets. Instead, entire areas were covered with the same

intensity. Hence, it had little effect against the Germans and became vulnerable to counterbattery fire.[50] Following initial reversals, the Soviet High Command (Stavka), in an attempt to simplify a division commander's span of control, directed the reduction of specialized units. Consequently, an artillery regiment from each rifle division was reassigned to RVGK.[51]

The Soviet offensive conducted during the winter of 1941-1942 revealed additional shortcomings. Frequently, attacks lacked methodical preparation by concentrated artillery fire. Although support was active, it was often without a definite fire plan. The usual methods of supporting the infantry by creeping barrage or successive fire concentrations proved impractical and did not achieve their purposes. This resulted in interruptions in artillery fire and a lack of coordination with attacking troops. Control rigidity coupled with the immobility of the artillery tended to restrict and disrupt the momentum of an attack. Therefore, attacks often failed or petered out before breaking into the open.[52] Stavka, disappointed with the limited progress of the winter's offensive, began to re-examine its artillery doctrine and organization. Artillery support not only revealed the need to improve artillery preparation tactics, but also demonstrated the need to augment the division artillery regiments. Hence, beginning in March and continuing throughout 1943, rifle divisions were strengthened with the addition of a third battalion to each divisional regiment.[53] To improve artillery preparations, the "artillery offensive" was implemented, requiring the massing of artillery support. Its essential features according to Major General F. Samsonov were:

> Concentration of a superior bulk of artillery on the sector

> where the attack is planned, borrowing artillery units from the neighboring formations. Maintenance of uninterrupted artillery fire during the whole period of the attack, coordinating it with the movement of the attacking troops. In other words, the infantry and tanks attack to the music of the artillery.[54]

The artillery offensive consisted of 3 phases. The first phase was the preparation for the attack. In the second phase artillery fire accompanied the infantry and tanks to the nearest points of the enemy's defenses. In third phase, it accompanied them in their attack on the enemy's inner defenses. Preceding the artillery offensive, Soviet artillery, lacking sophisticated fire direction techniques, conducted a thorough and extensive reconnaissance to obtain accurate target locations. Unlike Western artillery which sought the neutralization of targets and attainment of fire superiority during the preparation, the artillery offensive sought destruction as the means to attain fire superiority. As General Samsonov would state, "they had to be smashed to atoms."[55] During phase 2, self-propelled artillery accompanied the infantry to engage targets of opportunity with direct fire. Further, observers moved forward to coordinate support and direct the attack of on-call targets. To mass fires, artillery was concentrated into support groups.[56] To support first echelon rifle regiments, a typical infantry support group consisted of 2-3 RVGK battalions and 1-2 battalions from the division's artillery regiment. However, initial artillery offensives in 1942 and early 1943 revealed further shortcomings, particularly poor planning and a lack of fire support when mobile groups were introduced into battle.[57] In response, additional improvements were directed.

By 1943, Soviet artillery underwent four major changes. First, significant amounts of self-propelled artillery were produced and subsequently

included in the mobile groups and RGVK. Secondly, RGVK artillery was expanded and reorganized. Beginning in late 1942, RGVK artillery regiments were consolidated into artillery divisions and independent brigades. Additionally, powerful artillery breakthrough corps consisting of 2-3 artillery divisions were formed. Thus, RVGK expanded to an artillery pool of 6 corps, 26 artillery and 7 MRL divisions.[58] These improvements allowed additional artillery groupings from RVGK pools to be used at corps and army level to further reinforce the fires of the divisions. Third, concurrent with the establishment of the Combined Arms Army proper, Soviet armies previously lacking their own artillery now had 4 artillery regiments assigned.[59] In the ensuing operations, army artillery groups were continuously strengthened with RGVK assets and subsequently sub-divided into sub-groups. At division level, this additional RVGK and army artillery was pushed forward and support groups under division control were expanded. The fourth and perhaps the most significant change in view of the growing number of artillery assets and previously poor fire planning was the creation of the Chief of Artillery at regiment, division, army and front. Commanders would no longer plan and coordinate artillery as an artillerymen would be on their staff.[60]

While the process of reinforcing and augmenting artillery continued in 1943, it was not until 1944 that the definitive step was taken toward the standardization of the multitude of different types of artillery groups. Groups were now identified with their tactical role -- regimental, divisional, corps or army support. In 1944, the profusion of artillery made it possible to furnish artillery groups at all levels from regiment to army.[61] Thus by adding more artillery, the artillery preparation achieved greater synergism and ever increasing importance. The Belorussian operation illustrates this.

THE BELORUSSIAN OFFENSIVE

Beginning 22 June 1944, Operation Bagration, as the Soviets named it, struck the German Army Group Center with the forces of 4 Soviet fronts. Its aim was the encirclement of 3 German armies. The initial penetrations and subequent breakthroughs were preceeded by "artillery offensives." In the ensuing envelopments and exploitation, Soviet armies advanced into the operational depth of the German defenses, trapping the 4th and 9th German Armies. In less than two weeks, the Germans lost 28 divisions.[62]

An important feature of the Soviets' rapid penetration was the artillery offensive, particularly its concentration of large volumes of artillery. During the operation, the First Belorussian Front attained a density of 210-225 guns and mortars per kilometer of front along the the breakthrough sector.[63] Augmentation of clearly defined main efforts with RVGK assets permitted such densities of artillery. These assets and those regiments organic to the armies were then formed into groups and sub-groups. In turn, each groupment was pushed forward in concert with its assigned tactical role. The augmentation of the 26th Guards Rifle Division of the 11th Guards Army illustrates this principle.

As a first echelon division, the 26th Division was assigned an attack frontage of 1.5 kilometers and its first echelon regiments were significantly augmented. The 79th Guards Rifle Regiment attacked on a 1000 meter front supported by a 3 battalion group located behind its lead battalions. The division main effort, the 75th Guards Rifle Regiment, attacked on a 500 meter front augmented by a 1 battalion group behind its lead rifle battalion and a 3

battalion group in the regiment's second echelon. Grouped under division control were a mortar brigade and an artillery regiment positioned in the division's second echelon. Additional artillery available to the division included a 5 battalion breakthrough group from the 8th Guards Rifle Corps, 2 sub-groups of an MRL regiment, and 3 artillery brigades from the 11th Guards Army. Hence, the 26th Guards Rifle Division had 218 guns, 24 MRLs and 86 mortars to support its attack in phase 1, of which it controlled half.[64]

SUMMARY OF SOVIET WW II EXPERIENCE

Despite early shortcomings, Soviet artillery evolved into an excellent and extremely dangerous arm. Its fires became effective, rapid and accurate. Particularly during the large scale attacks such as the Belorussian and Vistula-Oder operations, it became apparent that the Red Army had learned well how to mass and employ large numbers of artillery units. During the Vistula-Oder offensive, artillery density increased to an unprecedented 350-400 guns and mortars per kilometer.[65] By the spring of 1945, Soviet artillery power reached a level unsurpassed in the annals of conventional warfare.

Analysis of the artillery offensive and the tactical organization of artillery in support of the 26th Guards Rifle Division reveals several essential conditions that permitted the massing of fires. Foremost was centralized control. The formation of artillery battalions into groups and sub-groups achieved this control. Positioning, firing and displacements were controlled by the senior artillery commander within the group in coordination with the Chief of Artillery of the supported echelon. However, control of

these groups was initially centralized then decentralized. For fire planning and phase 1 execution, control was centralized at division, army and front level. Conversely, during phase 2 and 3 execution, control was decentralized to the groups and their supported echelon. Centralized control at the highest levels during planning and initial execution permitted unity of effort in seeking mass, surprise and allocation of logistical effort.[66] By contrast, decentralized control in the ensuing phases permitted flexibility and responsiveness. The economy of force afforded by centralized control was critical with respect to experienced personnel. In the early stages of the war, Soviet artillery suffered horrendous losses. By concentrating their artillery, the Soviets made best use of their surviving commanders and experienced personnel. However, while skilled and experienced personnel were creamed off for RVGK and army artillery regiments, division artillery regiments without these personnel were forced to play a limited role, either controlled by groups or confined simply to direct fire during phases 2 and 3 of the artillery offensive.[67]

The support of the 26th Division illustrates an additional condition. The Soviets, rich in artillery, compensated for their lack of technical means to mass the fires of widely dispersed batteries with overwhelming volume, thereby achieving the same effect. However, to concentrate such large masses of artillery to achieve the destruction desired required well-defined main efforts. By designating specific units as the main effort, Soviet artillery could concentrate. Therefore, its effects were no longer dissipated as was the case in 1941-1942.

KEY SOVIET PRINCIPLES

In essence, Soviet artillery massed its fires by concentrating units rather than effects. Considering these conditions and the performance of its artillery in 1944-1945, the following principles for organizing artillery tactically at division to mass are suggested:

- o Control was centralized at division. Divisional and reinforcing battalions pooled into regimental and divisional artillery groups, were controlled by their assigned groups. In turn, division centralized the control of these artillery groups.
- o Planning was centralized at division to achieve unity of effort and economy of resources. In concert with army and front, division coordinated and planned the fires of the artillery groups under its control.
- o Execution in the defense and the early stages of the offense was centralized at division; thereafter, execution was decentralized to the regimental and divisional artillery groups.
- o To concentrate the large masses of artillery, a division main effort or critical sector was identified.

IV. SUMMARY OF WW II EXPERIENCES

To this point, we have examined two methodologies for massing fires and distilled sets of relevant principles for tactically organizing artillery at division to accomplish this. We must now contrast these two organizational techniques. To do so, we will examine their organization, methodology and philosophy to refine the principles we have isolated thus far.

Soviet division artillery was considerably weaker than its American counterpart. The Soviet artillery regiment assigned to each rifle division consisted of 2 battalions equipped with 12 76mm guns each and 1 battalion equipped with 8 122mm howitzers.[68] Conversely, a U.S. infantry division

artillery consisted of 3 battalions with 12 105mm howitzers each and 1 battalion with 12 155mm howitzers.[69] When constrasting the two, we note that Soviet divisions had 32 howitzers vice 48 for the American divisions. Of particular note is the differences in caliber, 76mm/122mm for the Soviets versus 105mm/155mm for the Americans. A further and perhaps more significant difference was the lack of a DIVARTY headquarters equivalent in the Soviet division; its assigned regiment was only a tactical headquarters and did not perform the functions of a DIVARTY.[70] It was not until the addition of the division Chief of Artillery that Soviet divisions possessed the means to coordinate fire support. Conversely, American DIVARTYs provided fire support coordination for their division. Additionally, their headquarters batteries possessed their own air observers, liaison personnel, communications, FDC and the means to coordinate survey, observation and metro. For these, Soviet divisions were relatively dependent on RGVK assets.

As the war progressed, Soviet artillery supported its infantry with the formation of support groups. These groups provided support to specific regiments or the division as a whole, dependent on their assigned tactical role. Dependent on their mission, divisions were augmented by as few as 1-2 battalions or as significantly as the 26th Guards Rifle Division in the Belorussian operation. By contrast, committed U.S. regiments or combat commands typically received a battalion in direct support or attached. Remaining battalions were retained in general support. Typically, a U.S. division, depending on its mission, received as little as 1 battalion or as much as an FA Group(s) of several battalions. However, U.S. divisions infrequently received the masses of artillery that their Soviet counterparts did. Hence, an essential difference was the U.S. ability and Soviet inability

to mass the fires of widely dispersed firing units. As U.S. artillery massed through effects, divisions could be augmented simply by assigning them priority of fires. By maneuvering fires and concentrating effects, U.S. divisions massed without large attachments of artillery. Conversely, Soviet artillery massed through volume by maneuvering and concentrating firing units. As such, their divisions required physical augmentation.

U.S. divisions required maximum centralized control appropriate to the situation to mass fires. In order for division artillery to retain the flexibility to influence the division battle, centralized control of positioning and assignment of zones of fire by division was necessary. Further, division artillery required communications and liaison with all delivery means and the supported echelon of command. Conversely, Soviet artillery required centralized control within the support groups and detailed centralized planning at the highest levels to allow decentralized execution by these groups. Contrasting the two further, we can conclude that since U.S. artillery relative to the Soviets was artillery poor, it had to have a more centralized organizational structure at division level to obtain mass. By contrast, the Soviets with their large volume of artillery achieved mass with a more decentralized organizational structure featuring the formation of artillery groups. Further, both combatants differed essentially in their philosophy for massing fires. In essence, the Americans massed fires by offsetting quantity with technology and method; whereas, the Soviets massed artillery, compensating for their lack of technology and method with quantity.

Considering these differences in experience and philosophy, and their

relevance to tactical organization and mass, we can not simply synthesize our sets of principles without recognizing two relative operating imperatives. In essence, tactical organization and control at division level depends not only on the mission, but also on the quantity of artillery and reliable Command and Control (C^2) available. In an artillery rich environment, mass and decentralized control was possible as evidenced by the Soviet experience. Conversely, as centralization is critical to the economy of resources, centralized control proved necessary in an artillery poor environment as illustrated by the American massing experience. With this in mind, the realization that the Americans relative to the Soviet were artillery poor and will most likely continue to be so, let us now refine our historically derived principles into a single set that governs tactical organization. These are:

- o Abundance of artillery permits and lack of reliable C^2 requires decentralization and mass.
- o Relative to the mission, insufficiency of artillery requires and availability of reliable C^2 permits centralization to mass.
  - oo In the defense, control must be centralized. As such, the bulk of the artillery must be controlled by the division. Only minimal artillery is decentralized to support subordinate regiments or combat commands.
  - oo In the offense, maximum feasible centralized control is maintained by division; however, in rapidly moving situation a lesser degree of centralized control must be accepted. As such, the bulk of the artillery is decentralized to support subordinate regiments or combat commands. Only minimal artillery is controlled by division.
- o The critical sector in the division's defense or its main effort in the offense must be weighted decisively with the fires it controls.
- o Artillery controlled by division must be positioned and zones of fire assigned by it such that its fires can be maneuvered to weight the main effort and influence the course of combat.
- o Liaison and communications must be established with reinforcing corps artillery, subordinate battalions and laterally to adjacent

DIVARTYs as well as the division to facilitate the rapid attack of targets.

V. MASS FIRES - A CONTEMPORARY ANALYSIS

If our set of historically derived imperatives for organizing artillery at division to mass fires is to have any relevance to contemporary application, we must examine what has changed since World War II. There are several obvious changes that come to mind. Foremost among them is that of lethality. Technological advances in weapons and ammunition have greatly increased the lethality of the battlefield as contrasted to the Second World War. Today's weapons are capable of firing significantly more lethal munitions at greater ranges, more quickly and accurately than those of their World War II counterparts. The ranges of weapons systems have increased, increasing artillery units ability to mass while dispersed. Further, this increased lethality, accuracy and dispersion along with technological developments in communications, automation and mobility have altered the tempo of battle. Finally, artillery force design has also changed. With these in mind, let us examine how American artillery has changed since the Second World War.

BATTLEFIELD CHANGES SINCE WW II

As stated earlier, contemporary artillery possesses capabilities for destruction previously unmatched in history. The adoption of the 155mm howitzer for direct support signifies considerable improvements over its World War II counterpart, the M2A1 105mm howitzer. The M109A2 155mm self-propelled howitzer not only offers increased mobility but is capable of firing heavier and more lethal projectiles at greater range. The M2A1 howitzer was capable

of firing a 33 pound high explosive projectile out to 12,205 yards or 11,438 meters.[71] The M109A2 is capable of firing a 95 pound high explosive projectile to a range of 18,100 meters. Moreover, advancements in ammunition such as the Rocket Assisted Projectile extend this range to 23,500 meters for the M109A2 or 30,000 meters for the M198 towed 155mm howitzer.[72] However, the M109A2 unlike its predessor is not limited to firing high explosive, white phospherous, smoke or illumination projectiles. Technology advancements in ammunition have provided Army of Excellence (AOE) division artilleries the means to attack enemy formations with lethality unachieved in World War II. Cannon launched, laser guided projectiles such as the 155mm Copperhead enable artillerymen today to destroy tanks or any armored vehicle with indirect fire. Munitions such as the 155mm Remote Anti-Armor Mine System (RAAMS) and Area Denial Artillery Munitions (ADAM) provide the artillery with the means to emplace hasty anti-tank and anti-personnnel minefields throughout the depth of the battlefield. Improved Conventional Munitions such as DPICM can kill both ooth lightly armored and personnel targets. Dispensing 88 submunitions, 155mm DPICM represents a significant enhancement over the 105mm high explosive projectile of World War II.[73] However, advancements in range and munitions lethality do not represent the only artillery technological developments. Advancements in target acquisition, survey and fire direction computation have greatly increased accuracy.

Artillery available to the AOE divisions possesses the capability expeditiously and accurately to deliver surprise massed fires. The Position Azimuth Determinating System (PADS) enables today's artillery to be on common position and directional survey so essential to accurate surprise fires in a more responsive and timely manner than its World War II predecessor. Radar

Chronographs currently mounted on individual howitzers permit FDCs continually to update and adjust muzzle velocity differences thereby permitting more accurate computation of firing data. Moreover, technological advancements in the automated computation of firing data such as the Battery Computer System (BCS), Back-up Computer System (BUCS) and the Tactical Fire Direction System (TACFIRE) enable artillery FDCs to handle a multitude of near-simultaneous calls-for-fire far above the manual computation methods used in World War II. Finally, advances in communications means, specifically the increased reliability of tactical radios and the use of digital communications, far surpasses the use of wire and more primitive radios in the transmitting of calls-for-fire and fire commands in World War II. These increases in the delivery means, accuracy and lethality coupled with similar advancements in small arms, tank main guns, anti-tank guided missiles and aircraft delivered ordnances have contributed to an already increasing dispersal on the battlefield.

During the Second World War, divisional frontages were consistenly smaller than today. Doctrinally, an infantry regiment defending in open and flat terrain occupied a frontage of 4500 meters with a depth of 1800 meters. An infantry division defending with 2 regiments forward occupied a doctrinal frontage of approximately 9 kilometers. However, if tactically required, an infantry division could increase this frontage to 15 kilometers by defending with all three regiments.[74] However, division frontages would vary in practice. As economy of force, some divisions defended sectors whose width was 30 kilometers; however, defensive sectors of 16 kilometers appeared to be the mean.[75] Although there are no doctrinal divisional frontages whether for the attack or defense, U.S. divisions in Europe today are expected to

defend frontages of 40-60 kilometers. Consequently, brigades could be expected to defend sectors with frontages as great as 30 kilometers.[76] As dispersal increased, fluidity and tempo since World War II have changed.

The lethality, speed and mobility of contemporary maneuver systems have notably altered the tempo and fluidity of the battlefield. During the Second World War, the M4 Sherman tank possessed a road speed of 29 mph with an operating range of 100 miles. While stationary, its 76mm main gun could engage targets at 1000 yards or 913 meters. By contrast, the M1 tank can travel at 45 mph on roads or 35 mph cross country with a range of 310 miles. It can engage targets at 2500 meters while moving.[77] Finally, the introduction of Operational Maneuver Groups and Forward Detachments into battle threatens to transform U.S. forces into isolated islands of resistance. As tempo and fluidity have changed, so has force design.

The World War II infantry division artillery consisted of a headquarters, 3 direct support (DS) battalions equipped with the 105mm towed howitzer and a general support (GS) battalion equipped with 155mm towed howitzers. Slightly different, the armored division artillery consisted of a headquarters and only 3 AFA battalions equipped with 105mm self-propelled howitzers.[78] By way of contrast, AOE division artilleries consists of a headquarters, 3 DS battalions and a GS battery. In the AOE heavy divisions — armored and mechanized infantry — the DS battalions are equipped with self-propelled 155mm howitzers and the GS battery with the Multiple Launched Rocket System (MLRS). The AOE light division resembles the World War II infantry division artillery in that its DS battalions are equipped with 105mm towed howitzers and the GS battery with 155mm towed howitzers.[79] Despite superficial

similarities between World War II and AOE division artilleries, a significant change has occured in the size of the individual firing batteries.

The firing batteries of the World War II infantry division artillery possessed only 4 howitzers for a total of 12 in each battalion and 48 for the division. Slightly different, armored division artillery firing batteries contained 6 howitzers for a total of 18 per battalion or 54 howitzers for the division. On the other hand, AOE firing batteries of the light infantry division artillery possess 6 howitzers for a total of 18 in each battalion and 8 howizters in the GS battery, or a total of 62 howitzers in the division. The AOE heavy division is equipped with 8 howitzers per cannon battery for a total of 72 howitzers and 9 launchers in the MLRS battery. When contrasting the AOE mechanized infantry division with its World War II predecessor, we note a significant increase not only in quantity but in caliber as well -- 36 105mm howitzers and 12 155mm howitzers in the World War II infantry division vice 72 155mm howitzers and 9 MLRS launchers in the AOE mechanized infantry division. Most notable is the doubling of the number of howitzers available to today's direct support battalions. Having examined the changes since World War II, let us now examine doctrine.

AIRLAND BATTLE DOCTRINE

AirLand Battle doctrine describes the Army's approach to the generation and application of combat power. To succeed on the battlefield, the Army must fight in accordance with its basic tenets of intiative, agility, depth and synchronization. Similarly, division artillery to mass fires succesfully on

the AirLand battlefield must also do so in accordance with these tenets. Initiative in the spirit of current doctrine means setting or changing the terms of battle by action. Massed artillery fires provides such means. Massed fires provide a method to change the terms of engagements and battles. Surprise and accurate fires continue to serve as a means to delay, disrupt and disorganize enemy forces. However, to deliver these fires, division artillery must possess the agility to mass its fires. Agility is simply the ability to act faster than the enemy. The successive massing of fires concentrated at the critical time and place allows division to disrupt and disorganize enemy actions and leads to their piece-meal commitment. Moreover, with the increased tempo of battle and the fleeting nature of targets, division artillery must also possess both the physical and mental agility to strike the enemy when the opportunity presents itself. Further, artillerymen and artillery systems must be agile to shift and mass their fires throughout the width and depth allowed by weapons range. Additionally, division artillery must possess depth in space, time and resources in order to mass its fires. Firing units must be positioned so their fires may be massed. Further, these position must be selected to maximize the opportunity to mass fires throughout the maximum depth — with respect to weapons range — of the battlefield and in the least time. Finally, the effects of massed artillery fires must be synchronized with all possible actions to exploit the combined consequences of other combat systems. Moreover, the massing of fires must itself be synchronized to produce its greatest effect on the enemy while conserving resources. Surprise and accurate massed fires ensure the greatest economy of resources while producing the greatest synergistic effect. AirLand Battle doctrine describes the means to generate and apply combat power, but let us now examine the potential battlefield where this doctrine will be tested.

THE FUTURE BATTLEFIELD

According to FM 100-5, Operations, the future battlefield is likely to be chaotic, intense and highly destructive. Increased lethality coupled with the rapid massing of forces afforded by technological advancements in weapons, acquisition and mobility systems promises that units that are acquired and located will be defeated. Further, lethality and electronic jamming developments promise to disrupt Command, Control and Communications (C^3) equipment thereby greatly increasing friction. Moreover, the attack of command control nodes along with casualties among leaders will result in a confused and disordered environment. This potential battlefield will also be characterized as nonlinear. Rapid movement to concentrate or disperse promises that units will become islands of conflict as engagements and battles degenerate. The use of unconventional and special operating forces coupled with the tremendous mobility of conventional forces and fluid nature of combat will add to this condition. Further, this battlefield will likely see the employment of nuclear and chemical weapons adding to its chaos and destructiveness. As mobile units fight throughout their depth, lines of communication will become overextended and vulnerable. The prevalence of obstacles encountered throughout the battlefield will also impede the movement of logistics. Consequently, this battlefield will be characterized by its austere logistic support.[30]

SUMMARY

Having examined the evolving changes since the Second World War, Airland Battle doctrine and the future battlefield, we must now consider what effect

these have on our historically derived principles. First, division frontages in World War II were within the maximum range envelope of the M2A1 howitzer. However, the increased weapons range and mobility of contemporary maneuver systems such as the M1 tank have extended the battlefield faster than the artillery could keep up. Although the range of the M109A2 howitzer doubles that of the M2A1 howitzer, today's division frontages are notably beyond its range. Secondly, the lethality, speed and mobility of contemporary maneuver systems have notably altered the tempo and fluidity of the battlefield. Further, the operational mobility of enemy forces may transform divisions and brigades into islands of resistance. Thirdly, the potential nuclear/chemical environment and nonlinear character of the AirLand battlefield will further influence the tactical organization of artillery and mass fires. Therefore, artillery units must be dispersed not only to support dispersed and isolated maneuver forces, but also to survive. These three conditions will impact on the tactical organization of artillery. A similar situation occured in Vietnam. The wide dispersal of maneuver forces and notably large areas of operation coupled with the range limitations of weapons necessitated decentralization, thereby preventing massed fires.[31] Thus, until on-going developments substantially increase range capability, these conditions may preclude centralized control by division if artillery is uniformly dispersed. Although contemporary weapons range has increased the ability of artillery units to mass while dispersed, it remains true that weapons range versus increased dispersal, tempo, fluidity and nonlinearity will necessitate decentralization.

As suggested by the results of the Legal Mix V study, advancements in artillery lethality and AOE force design may have eliminated the necessity of

massing multiple battalions.[82] Contemporary cannon battalions contain half the howitzers that were available to a World War II 4 battalion division artillery. A 155mm battalion firing DPICM at least equals, but more likely exceeds, the massing effect of a World War II division artillery. AOE divisions also possess a system that may further influence the requirement to mass fires at division. MLRS launchers assigned to each heavy division possess unsurpassed lethality. One launcher firing 12 rockets will deliver the equivalent effect of 11 155mm batteries massed, firing one volley of DPICM.[83] Although a single AOE cannon battalion or MLRS launcher may fulfill the massing requirement that in the past required a division artillery, there will exist situations on the AirLand battlefield where preparations, suppression programs or targets of opportunity will require all available fires. Further, competing close support requirements may preclude the massing of fires by DS battalions. Israeli experience acknowledged that massed fires remained effective in stopping and disabling tanks, but such centralized mass firing was not optimum for direct support. It became apparent during the Yom Kippur war that the best role for DS artillery was the suppression of air defense weapons, anti-tank guided missiles and anti-tank guns, and the screening of friendly forces with smoke.[84] Thus, the probable reduction by technology of massing multiple battalions and the preoccupation of DS battalions in providing close support, will further influence the tactical organization of artillery at division to mass fires.

Finally, the demands of the AirLand battlefield require unity of effort and economy of resources yet its fluidity, dispersion and tempo necessitates responsiveness and decentralization. As divisions must concentrate rapidly and strike hard to win, division artillery must maneuver and concentrate its

fires rapidly to support it. However, tactical organization of artillery at division on the AirLand battlefield poses a dilemma. To mass fires at division level, divisions must retain and control sufficient artillery to mass. As U.S. artillery is considerably poorer in artillery relative to its World War II force structure, divisions must also ensure resources are not dissipated. Therefore, a degree of centralized control is required. As such, tactical organization of artillery must be centralized relative to the mission and possess agility to support the division main effort and influence course of combat.

VI. CONCLUSIONS

We must recognize that the AirLand battlefield, specifically its increased lethality, dispersion, nonlinearity and tempo coupled with the competing environment of close support, pulls heavily toward decentralization. However, to mass fires in support of the division's concentration of combat power at the decisive place and time, and to ensure the maximum economy of artillery resources, centralized control is necessary. Therefore to mass fires successfully, tactical organization of artillery at division must be governed by principles: Centralized control by division relative to the mission, specifically positioning authority, first priority in calls-for-fire and fire planning. Retain sufficient artillery in general support. Weight the main effort decisively with the fires of the battalions in general support. Position general support artillery to retain flexibility and exploit agility to influence the course of the division battle. Finally, maintain liaison and communications to ensure responsiveness.

Further, to facilitate the division tactical organization, artillery

force design must possess the means to accomplish those essential elements required to mass fires successfully identified earlier in this study. In review, the organizational structure must possess target acquisition, communications, fire direction, survey and metro assets or the agencies to coordinate them.

VII. IMPLICATIONS

Current doctrine as espoused by FM 6-20, Fire Support in Combined Arms Operations and FM 6-20-2J, Division Artillery, Field Artillery Brigade, and Corps Artillery Headquarters does not address inherent principles or specific imperatives for organizing artillery at division to mass fires. Rather, both doctrinal manuals stipulate general fundamentals for the organization of field artillery for combat. These fundamentals are: Maximum feasible centralized control; adequate field artillery support for committed combat units; weight to the main attack in the offense or additional strength to most vulnerable area in the defense; facilitate future operations; and immediately available field artillery support for the commander to influence the action.[84]

Constrasting these fundamentals with those historically derived from this study, reveals that both doctrinal and historical principles are essentially the same. Both this study and current field artillery doctrine recognize the necessity of centralized control and organizing division artillery such that the division commander can immediately influence the course of battle. However, a subtle difference exists. Considering the dispersed and nonlinear nature of the AirLand battlefield and current weapons range limitations, division artillery to weight the main effort decisively

must concentrate artillery. Consequently, to mass decisively in support of the main effort, supporting efforts must receive the minimum essential artillery support similar to the Soviet's World War II massing of artillery at the expense of secondary attacks. Stipulating that committed combat units receive adequate field artillery support may dissipate fire support uniformly across the width and depth of the battlefield without significant weight in any one area. Although the doctrinal fundamentals do not address specifically the necessity of positioning authority, first priority in calls-for-fire, fire planning, communications or liaision, these requirements are addressed in the inherent responsibilities of field artillery tactical missions.

An additional commonality between this study and doctrine exists with respect to centralized control in the offense. Although FM 6-20-2J, stipulates maximum feasible centralized control in the offense, it does recognize decentralized control as an offensive consideration for the tactical organization of field artillery.[85] It stipulates that since tactical situations change so quickly in the offense, supported [division] commanders should decentralize control of their field artillery to allow subordinate commanders flexibility and permit responsive FA fires to have the greatest impact on changing tactical situations. Thus, decentralized control of artillery allows the attacker the flexibility to exploit opportunities as they arise. Although decentralized control is an alternative means to ensure responsiveness, it precludes massing at division level.

In summation, this study concludes that current field artillery doctrine for the tactical organization of field artillery at division level to mass fires at division is both sound and adequate. Historical evidence presented

in this study does suotantiate doctrinal fundamentals for the organization of field artillery for combat. Only a subtle difference surfaces with respect to weighting the main effort and the degree of centralized control. Although the doctrinal manual FM 6-20-2J contain general principles, the significance of mass fires is addressed and the necessity of centralization.

ENDNOTES

1. Carl von Clausewitz, On War, (Princeton, 1976), p. 194.

2. Hew Strachan, European Armies and the Conduct of War, (London, 1983), p. 33.

3. Richard A. Preston and Sydney F. Wise, Men in Arms, (New York, 1979), p. 190.

4. Gunther E. Rothenburg, The Art of Warfare in the Age of Napoleon, (Indiana, 1978), p. 143.

5. Timothy T. Lupfer, The Dynamics of Doctrine: The Changes in German Tactical Doctrine During the First World War, Leavenworth Papers no. 4 (Fort Leavenworth, 1981), p. 4.

6. Brigadier T. L. Morony, "Artillery Support in the Yom Kippur War," Field Artillery Journal (September-October 1975), p. 41. Israeli experinece during this conflict demonstrated that massed artillery fire can stop tanks. On several occaisons, the massed fires from three 155mm battalions were able to stop a battalion of tanks. Israeli artillerymen found that three battalions firing 10 volleys fire-for-effect as fast as possible is effective.

7. Thomas G. Waller, "Continuous Thunder: The Challenge of Artillery Support for the Close Battle," (Fort Leavenworth, 1985), p. 1.

8. Clausewitz, p. 170.

9. Ibid, p. 171.

10. Michael T. Chychota, "Field Artillery and the Operational Offensive," (Fort Leavenworth, 1986), p. 2.

11. U.S. Army, Field Manual 6-20, Fire Support in Combined Arms Operations, (Washington, DC, 1984), glossary, p. 2.

12. Clausewitz, p. 204

13. Baron de Jomini, The Art of War, (Philadelphia, 1862), p. 63.

14. U.S. Army, Field Manual 100-5, Operations, (Washington, DC, 1986), p. 174.

15. Ibid, p. 11.

16. U.S. Army, Field Manual 6-20, glossary, p. 1.

17. U.S. Army, Field Manual 6-20-2J, Division Artillery, Field Artillery Brigade, and Corps Artillery Headquarters, (Washington, DC, 1984), pp. ii, 1-9.

18. Russell F. Weigly, Eisenhower's Lieutenants, (Bloomington, 1981), p. 28.

19. Christopher R. Gabel, The Lorraine Campaign: An Overview, September-December 1944, (Fort Leavenworth, 1985), p. 36.

20. Leonard G. Robinson, "Artillery — Arbiter of the Battlefield," Military Review (October 1952), p. 6. See also H. W. Blakely, "Infantry Division in Europe," Field Artillery Journal (May 1946), p. 264.

21. Messenger, p. 49. See also Charles F. Howe, Northwest Africa: Seizing the Initiative in the West, (Washington DC, 1957), pp. 415-422. American losses suffered by Combat Command A on 14 February 1943 included the loss of two battalions of the 168th Regimental Combat Team, 44 tanks destroyed of the 3d Battalion, 1st Armored Regiment, 9 howitzers of the 91st Armored Field Artillery (AFA) Battalion and all the howitzers of the 2d Battalion, 17th Field Artillery Regiment. A counterattack the next day Combat Command C only resulted in the annihilation of the 2d Battalion, 1st Armored Regiment.

22. Howe, p. 464. Kampfgruppe DAK driving for Tebessa was stopped by Combat Command B and elements of the 1st Infantry Division on the 21st and 22d. The attack toward Thala by the 21st Panzer Divison was halted by the British 26th Armored Brigade and elements of the Nick Force.

23. David W. Hazen, "Role of the Field Artillery in the Battle of Kasserine Pass," (Fort Leavenworth, 1973), p. 147.

24. Ibid, pp. 149-150. See also Howe, pp. 402-405. According to Hazen (p. 149), the foremost contributing casue was the failure of commanders to employ their formations as integral units. Throughout, the battle was a series of unplanned and disjointed actions involving regiments, battalions and even companies. In no case did a division fight as a unit. Instead, nearly every command arrangement was makeshift, temporary and too often unclear. Similarly, artillery support was also makeshift and disjointed. For reasons why tactical commanders organized as they did without consideration for the proper employment of their field artillery, Hazen (p. 150) suggests that maneuver commanders may have believed that the tank had eliminated the need for massed fires or that the airplane had replaced artillery as the primary fire support means.

25. U.S. Army, "II Corps Report of Operations," (II Corps, 1943), pp. 5-6. Cited in Hazen, p. 41. See also Hazen, p. 152.

26. Hazen, p. 153.

27. B. H. Liddell-Hart, The Rommel Papers, (New York, 1982), p. 407. Rommel, in his papers, noted that Buelowius' men [Kampfgruppe DAK] had been astounded at the flexibility and accuracy of the American artillery, which had put a great number of our tanks out of action.

28. Howe, p. 463. See also Hazen, p. 107. At Sidi Bou Zid, the 91st AFA battalion (less C Battery) and the 2-17 FA battalion were positioned astride the Sidi Bou Zid - Ain Rebaou road by Combat Command A. At the defense of the Tebessa road, the 33d FA battalion was directed by Combat Command B to occupy a position between two infantry units. This poor positioning contributed to the loss of all the howitzers of the 2-17 FA battalion and 9 howitzers of the

91st AFA battalion at Sidi Bou Zid, and the loss of 5 howitzers of C Battery 33d FA battalion at Tebessa.

29. Evert E. Strong, "Thala Engagement: February 21-24, 1943," Field Artillery Journal (August 1943), p. 573. See also Howe, p. 466 and Hazen, p. 126. On 17 February, as part of Allied countermeasures, the 9th Infantry DIVARTY under BG Irwin was ordered to dispatch all available artillery to Tebessa. In the following three days the 9th Infantry Division Artillery consisting of the DIVARTY headquarters, the 34th FA, 60th FA and 84th FA battalions, and two attached cannon companies from the 47th and 60th RCTs, artillery force road marched 800 miles to Tebessa. However, prior to its arrival, Brigadier Nicholson, commander of the British Nick Force, requested an additional artillery battalion to augment the defenses he was establishing at Thala. Instead of one battalion as was requested, he was to receive three under the control of the 9th DIVARTY. On 21 February, II Corps directed BG Irwin to Thala to support the Nick Force.

30. Hazen, p. 127.

31. Strong, p. 573.

32. Ibid, p. 573.

33. Ibid, p. 573. See also Hazen, p. 130.

34. Martin Blumenson, Kasserine, (New York, 1983), p. 273. For their action, the 9th Infantry Division Artillery was awarded a Distinguished Unit Citation.

35. U.S. Army, FM 6-20, Field Artillery Field Manual — Tactics and Techniques (Washington, DC, 1940), p. 139.

36. Gregory Fontenot, "The Lucky Seventh in the Bulge: A Case Study for the AirLand Battle," (Fort Leavenworth, 1985), p. 13.

37. Stokesbury, p. 355. See also Thomas E. Griess, editor, The Second World War: Europe and the Mediterranean (Wayne, 1984), pp. 383-385.

38. Joseph R. Reeves, "Artillery in the Ardennes," Field Artillery Journal (March 1946), pp. 139-140.

39. Ibid, p.142. An example, and perhaps the best to illustrate the decisive impact of massed fires by nondivisional artillery, occured in the Monschau sector. It was in this sector that a thin cavalry screen by the 38th Cavalry Reconnaissance Squadron augmented with support from the 62d AFA Battalion stopped a determined attack by the 326th Volksgrenadier Division. The action began at 0500 hours 17 December with the 62d AFA Battalion firing a counterpreparation that together with the defensive fires of the 38th Cavalry Squadron stopped the initial attack. As a subsequent attack was similarly stopped, the 326th Volksgrenadier Division now reinforced with armor, began a third all-out attack to take Monschau. However, by this time the 62d AFA Battalion had been augmented by the 187th and 406th FA Groups of the V Corps Artillery and 78th Infantry Division Artillery. The massed fires of these 12 battalions decimated the attack. See Cole, pp. 87-88 and Charles B. MacDonald, A Time for Trumpets, (New York, 1985), pp. 163-165.

40. U.S. Army, "After Action Report, 1-31 December 1944," (1st Infantry Division Artillery, APO 1, 1945), p. 17.

41. Ibid, p. 6. See also Hugh M. Cole, The Ardennes: Battle of the Bulge (Washington, DC, 1965), p. 130.

42. Reeves, p. 181. See also U.S. Army, "Action Against the Enemy Report, 1-31 January, 1945," (6th Armored Division Artillery, APO 256, 1945), p. 1 and George F. Hofmann, The Super Sixth, (Louisville, 1975), pp. 285-288.

43. Cole, p. 632.

44. Lewis J. Gorwin Jr, The Cannon's Mouth: The Role of the U.S. Artillery during World War II, (New York, 1973), p. 79. See also A. L. Pemeberton, The Development of Artillery Tactics and Equipment, (London, 1950), p. 129. According to Pemeberton the TOT technique was invented by the British in May 1942. He goes on to state "the superiority of the sudden and concentrated burst of fire over the desultory bombardment had long been recognized, and if the number of guns involved was large and the time of flight of the shells were very different, it was found desireable that the time laid down in orders should indicate the moment, not at which the guns were to fire, but at which the shells were to arrive at the target. Thus originated T.O.T. (time on target) procedure, which subsequently became very popular.

45. Examples of this professional debate are: E. B. Gjelsteen, "Massing the Fires of Division and Corps Artillery," Field Artillery Journal (June 1943), pp. 426-429; John A. Crane, "What Makes an Army," Military Review (September 1944), pp. 3-7; and John A. Crane, "Full Use of Field Artillery," Field Artillery Journal (June 1945), pp. 354-358. In his article, Gjelsteen identified several fundamental conditions for the massing of fires. First, common control between firing units must be established. This may be accomplished either by survey or by registering each battery on a common point. Once individual battalions have common control, common control among the battalions of the division artillery must be established. One method is to have one battery from each battalion register on a common point to all elements of the division artillery. Again, the alternate method is achieved by survey where each of the battalions tie their survey into control points established by DIVARTY. In either case, once common control is established, the division can mass the fires of all battalions. A second condition is the requirement that battalions are positioned resonably close together in order to mass their fires into common areas. A third condition requires the establishment of electrical communications, either telephone or radio, between DIVARTY and the battalions assigned the division artillery. The final condition identified by the author, required that the battalions be trained in the methods of battalion fire direction technique.

46. Gjelsteen, pp. 427-428.

47. U.S. Army, Field Manual 6-20, Field Artillery Tactical Employment (Washington, DC, 1944), pp. 30 and 44-45.

48. Frederic J. Brown, "Spearhead Atillery," Field Artillery Journal (September 1946), pp. 503, 506.

49. S. A. Tyushkevich, The Soviet Armed Forces: A History of Their Organizational Development (A Soviet View), (Moscow, 1978), p. 237. See also Andrew Mollo, The Armed Forces of World War II, (London, 1981), p. 162.

50. U.S. Army, Department of the Army Pamphlet 20-230, Historical Study: Russian Combat Methods in World War II (Washington, DC, 1950), pp. 19-20.

51. House, p. 100. See also J. Erickson, "Soviet Combined Arms: Theory and Practice Part 1: The Theory and Wartime Practice," (Fort Leavenworth, undated), p. 21.

52. W. R. Young, "Artillery Offensive," Field Artillery Journal (January 1946), p. 26. See also F. Samsonov, "Artillery on the Offensive," Field Artillery Journal (August 1943), p. 584

53. Tyushkevich, p. 278. See also Erickson, p. 22 and U.S. Army, DA PAM 20-230, p. 45.

54. Samsonov, p. 584.

55. Ibid, p. 584.

56. Ian V. Bogg, Barrage (New York, 1970), pp. 85, 88.

57. Erickson, p. 33.

58. Tyushkevich, pp. 280, 316-317. See also Gay, "The Field Artillery in Support of Deep Offensive Operations," (Fort Leavenworth, 1985), p. 24.

59. Erickson, pp. 24-25. See also Gay, p. 23.

60. Ibid, p. 25. See also Tyushkevich, p. 318.

61. Ibid, p. 34

62. D. M. Glantz, Toward Deep Battle: The Soviet Conduct of Operational Maneuver, (Fort Leavenworth, 1985), p. 45. See also Griess, pp. 154-155.

63. Gay, p. 29.

64. Christopher Bellamy, "Destruction By Fire," Field Artillery Journal (September-October 1985), p. 41. In phase 1, the 26th Division controlled the regimental and division artillery groups or 100 guns and 60 mortars.

65. Gay, p. 47.

66. Ibid, p. 25.

67. B. H. Liddell-Hart, The Red Army, (New York, 1956), p. 349. See also Mollo, p. 163.

68. Tyushkevich, pp. 278, 315. See also Mello, p. 163. According to Tyushkevich (p. 315), Guards rifle divisions added a third battery of 4 122mm howitzers for a total of 12 within the battalion.

69. House, p. 74.

70. Tyushkevich, pp. 317-318.

71. Gorin, p. 286. See also Chamberlain, Peter and Gander, Terry, Light and Medium Field Artillery, (New York, 1975), p. 55.

72. U.S. Army, Field Circular 6-20-20, Fire Support Handbook, (Fort Sill, 1986), p. 55.

73. U.S. Army, Technical Manual 9-2350-303-10, M109A2 155mm Self-Propelled Howitzer, (Washington, DC, 1983), p. 4-9.

74. U.S. Army, FM 7-40, Infantry Field Manual - Rifle Regiment (Washington, DC, 1942), pp. 102, 154. See also U.S. Army, FM 7-20, Infantry Battalion (Washington, DC, 1944), p. 190 and Selwyn D. Smith Jr, "The Infantry Division in the Defense," Military Review (November 1949), p. 47. FM 7-40 lists doctrinal frontages for a rifle regiment defending with 2 battalions forward as 2000 yards or 1830 meters in wooded terrain and 5000 yards or 4570 meters in open terrain. It goes on to state that the normal frontage should be 3000-4000 yards or 2740-3600 meters with a depth of 1500-2000 yards or 1370-1830 meters. Further, a regiment conducting the main attack should be assigned a zone with a frontage of 1000-2000 yards or 915-1830 meters. FM 7-20 states a battalion normally defends a frontage of 1000 yards or 915 meters in wooded terrain or 2500 yards or 2290 meters in flat and open terrain. It goes on to state that the normal frontage of a battalion should be 1000-2000 yards or 915-1830 meters with a depth of 800-1400 yards or 730-1280 meters. It does warn the reader that a battalion in an economy of force defense should not be assigned a sector wider than 3500 yards or 3200 meters.

75. Fontenot, p. 11. See also Dwight D. Eisenhower, Crusade in Europe, (New York, 1968), pp. 359, 361 and Hugh M. Cole, The Ardennes: Battle of the Bulge, (Washington, DC, 1965), p. 78. The Ardennes sector at the outbreak of the Battle of the Bulge, serves as an example of extended divisional frontages in order to practice economy of force. According to Eisenhower (p. 359), a portion of this sector was a 75 mile front initially defended by only 3, then later 4 divisions. According to Cole (p.78), the 99th Infantry Division defended a sector whose frontage was 19 miles or approximately 30 kilometers.

76. Waller, p. 4.

77. Peter Chamberlain and Chris Ellis, British and American Tanks of World War II, (New York, 1969), p. 115. See also Janes Armour and Artillery, 1985-1986, (London, 1986), p. 112.

78. House, pp. 74, 109.

79. U.S. Army, Student Text 101-1, Organizational and Tactical Refernce Data for the Army in the Field, (Fort Leavenworth, 1986), pp. 9-4, 9-8. See also Robert S. Riley, "AOE: What is It?" Field Artillery Journal (September-October 1985), pp. 47-48.

80. U.S. Army, FM 100-5, Operations, (Washington, DC, 1986), pp. 2-4.

81. David E. Ott, Vietnam Studies: Field Artillery, 1954-1973, (Washington, DC, 1975), P. 42.

82. Ernest B. Dublisky and Richard D. Moyer, "Mass -- Not Volume," Field Artillery Jounral (May-June 1978), pp. 9, 13. Results of the Legal Mix V (LMV) study — a computer simulation-generated analytical base that quantifies the value of massing and the degree of massing actually accomplished — indicates that today's artillery delivered lethality and AOE force structure may have eliminated the necessity of massing multiple battalions. Of the total missions simulated, 155mm fire units engaged 98% of the targets with the massing requirement of one battalion equivalent. The remaining percentage was accomplished by the massing of two battalion equivalents.

83. U.S. Army, Field Circular 6-60, MLRS Operations (Fort Sill, 1986), p. 3-1. See also FC 6-20-20, p. 59. As one rockect contains 644 submunitions, a 12 rocket ripple will place 7778 submunitions over the target. containing only 88 submunitions, it would take 88 rounds of 155mm DPICM or 11 batteries firing 1 volley to achieve the same coverage.

84. Morony, p. 43. See also Waller, p. 24.

85. U.S. Army, FM 6-20-2J, pp. 3-13 and 4-7. See also U.S. Army, FM 6-20, pp. 1-15 and 1-16.

86. Ibid, p. 3-3.

BIBLIOGRAPHY:

GENERAL RESEARCH AIDS:

Air University Library Index to Military Periodicals. 36 vols. Maxwell Air Force Base: Air University Library, 1949-1986.

The Third Reich at War: A Historical Bibliography. Denver: ABC-CLIO Information Services, 1984.

PRIMARY SOURCES:

Periodicals

"A German Reflects Upon Artillery: Interrogation Of Karl Thoholte, General der Artillerie." Field Artillery Journal 35 (December 1945): 709-715.

Belayev, B., "An Artillery Breakthrough." Military Review 24 (October 1944): 119-120.

Gjelsteen, E. B., "Massing the Fires of Division and Corps Artillery." Field Artillery Journal 33 (June 1943): 426-429.

Samsonov, F. A., "Artillery on the Offensive." Field Artillery Journal 33 (August 1943): 584-585.

_____, "Artillery in the Breakthrough of a Defensive Zone." Military Review 24 (August 1944): 61-66.

"VII Corps Artillery Battle Experiences." Field Artillery Journal 36 (May 1946): 293-296.

"VII Corps Artillery Battle Experiences." Field Artillery Journal 36 (June 1946): 360-364.

"VII Corps Artillery Battle Experiences." Field Artillery Journal 36 (July 1946): 425-429.

Government Reports

United States War Department. The General Board, United States Forces, European Theater. "Report on Study of Field Artillery Operations." Study no. 61, 1945.

United States War Department. The General Board, United States Forces, European Theater. "Report on Study of Field Artillery Gunnery." Study no. 64, 1945.

United States War Department. Headquarters, 6th Armored Division. "Action Against the Enemy Report, 6th Armored Division." U.S. Forces European Theater of Operations, APO 256, November 1944, January - 31 May 1945.

United States War Department. Headquarters, 1st Infantry Division. "After Action Report, 1st Infantry Division Artillery." U.S. Forces European Theater of Operations, APO 1, June 1944 - May 1945.

SECONDARY SOURCES

Books and Theses

Burkhart, Robert W., Brigade Organization and the Airland Battle. Research Monograph. Fort Leavenworth: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1985.

Blumenson, Martin, Kasserine. New York: Berkley Publishing Group, 1983.

Chamberlain, Peter and Ellis, Chris, British and American Tanks of World War II. New York: Arco Publishing Company, 1969.

Chamberlain, Peter and Gander, Terry, Light and Medium Field Artillery. New York: Arco Publishing, 1975.

Chychota, Michael T., "Field Artillery in Support of River Crossing Operations." Research Monograph. Fort Leavenworth: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1985.

Chychota, Michael T., "Field Artillery and the Operational Offensive." Research Monograph. Fort Leavenworth: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1986.

von Clausewitz, Carl, On War. Edited and translated by Michael Howard and Peter Paret. Princeton: Princeton University Press, 1976.

Cole, Hugh M., The Ardennes: Battle of the Bulge. Washington, DC: Office of the Chief of Military History, 1965.

Dupuy, Trevor N., The Evolution of Weapons and Warfare. Fairfax: Hero Books, 1984.

Eisenhower, Dwight D., Crusade in Europe. New York: Doubleday and Company, 1968.

Erickson, J., "Soviet Combined Arms: Theory and Practice, Part 1: The Theory and Wartime Practice." Defense Stusies Monograph, University of Edinburgh. Fort Leavenworth: School of Advanced Military Studies, U.S. Army Command and General Staff College, undated.

Fontenot, Gregory, "The Lucky Seventh in the Bulge: A Case Study for the AirLand Battle." MMAS Thesis. Fort Leavenworth: U.S. Army Command and General Staff College, 1985.

Gabel, Christopher R., The Lorraine Campaign: An Overview, September-December 1944. Fort Leavenworth: Combat Studies Institute, U.S. Army Command and General Staff College, 1985.

Gay, Mark P., "The Field Artillery In Support of Deep Offensive Missions." MMAS Thesis. Fort Leavenworth: U.S. Army Command and General Staff College, 1985.

Glantz, D. M., Toward Deep Battle: The Soviet Conduct of Operational Maneuver. Fort Leavenworth: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1985.

Gorin, Lewis J. Jr, The Cannon's Mouth: The Role of the U.S. Artillery during World War II. New York: Carlton Press, 1973.

Hazen, David W., "Role of the Field Artillery in the Battle of Kasserine Pass." MMAS Thesis. Fort Leavenworth: U.S. Army Command and General Staff College, 1973.

Hofmann, George F., The Super Sixth. Louisville, 6th Armored Division Association, 1975.

Hogg, Ian V., Barrage. New York: Ballatine Books, 1970.

_____, British and American Artillery of World War 2. New York: Hippocrene Books Inc, 1978.

House, Jonathan M., Toward Combined Arms Warfare: A Survey of 20th-Century Tactics, Doctrine, and Organization, CSI Research Survey no. 2. Fort Leavenworth: U.S. Army Command and General Staff College, 1984.

Howe, George F., Northwest Africa: Seizing the Initiative in the West. Washington, DC: Office of the Chief of Military History, 1957.

Jane's Armour and Artillery, 1985-1986. London: Jane Publishing Company Limited, 1986.

Jomini, Baron de, The Art of War. Translated by G. H. Mendell and W. P. Craighill. Philadelphia: J. B. Lippincott, 1862.

Liddell-Hart, B. H., The Rommel Papers. New York: Da Capo Press, 1982.

_____, The Red Army. New York: Harcourt, Brace and Company, 1956.

MacDonald, Charles B. A Time for Trumpets. New York: Bantam Books, 1984.

McKenney, Janice E., Field Artillery Lineage Series: Regular Army and Army Reserve. Washington, DC: Center of Military History, 1985.

Messenger, Charles, The Tunisian Campaign. London: Ian Allan Ltd, 1982.

Mollo, Andrew, The Armed Forces of World War II. London: Orbis Publishing, 1981.

Ott, David E., Vietnam Studies: Field Artillery, 1954-1973. Washington, DC: U.S. Government Printing Office, 1975.

Pemeberton, A. L., The Development of Artillery Tactics and Techniques. London: War Office, 1950.

Preston, Richard A. and Wise, Sydney F., Men in Arms. Fourth edition. New York: Holt, Rinehart, and Winston, 1979.

Rothenburg, Gunther E., The Art of Warfare in the Age of Napoleon. Bloomington: Indiana University Press, 1978.

Stokesbury, James L., A Short History of World War II. New York: William Morrow and Company Inc., 1980.

Strachan, Hew, European Armies and the Conduct of War. London: George Allen & Unwin, 1983.

Stanton, Shebly L. Order of Battle, U.S. Army World War II. Novato: Presidio Press, 1984.

Toland, John, Battle: The Story of the Bulge. New York, Random House, 1959

Tyushkevich, S. A., The Soviet Armed Forces: A History of Their Organizational Development (A Soviet View). Moscow: Defense Publishers, 1978. Translated and published by U.S. Air Force, 1981.

Waller, Thomas G. Jr, Continuous Thunder: The Challege of Artillery Support for the Close Battle. Research Monograph. Fort Leavenworth: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1985.

Weigly, Russell F., Eisenhower's Lieutenants. Bloomington: Indiana University Press, 1981.

Whiting, Charles, Kasserine: First Blood. New York: Stein and Day Publishers, 1984

Periodicals

Bellamy, Christopher, "Destruction by Fire: Soviet Artillery in the 1980s and Beyond." Field Artillery Journal 53 (September-October 1985): 40-45.

Blakely, H. W., "Artillery in Normandy." Field Artillery Journal 39 (March-Arpil 1949): 52-54.

_____, "Infantry Division in Europe." Field Artillery Journal 36 (May 1946): 262-268.

Brown, Frederic J., "Spearhead Artillery." Field Artillery Journal 36 (September 1946): 502-510.

Crane, John A., "What Makes an Army an Army." Military Review 24 (Septemoer 1944): 3-7.

_____, "Full Use of Field Artillery." Field Artillery Journal 35 (June 1945): 354-358.

_____, "Field Artillery Groups." Field Artillery Journal 35 (October 1945): 579-582.

Daugherty, Darrell W., "Soviet Artillery Massing Capability." Field Artillery Journal 45 (November-December 1977): 31-33.

Doniat, Francis A., "Field Artillery Organization, Armored Force." Field Artillery Journal 31 (March 1941): 146-153.

Donnelly, C. N., "The Wind of Change in Soviet Artillery." International Defense Review 15 no. 6 (1982): 737-744.

Dublisky, Ernest B. and Moyer, Richard D., "Mass -- Not Volume." Field Artillery Journal 46 (May-June 1978): 8-14.

Hart, Charles E., "Artillery with an American Army in Europe." Field Artillery Journal 37 (January-Fenruary 1947): 25-26, 53-58.

Jesse, William R., "Bastonge -- An Artillery Classic." Field Artillery Journal 35 (December 1945): 718-720.

Merriam, John H., "Artillery's Part in the Bastogne Break-In." Field Artillery Journal 35 (July 1945): 407.

Morony, T. L., "Artillery Support in the Yom Kippur War." Field Artillery Journal 43 (September-October 1975): 40-43.

Nadisov, Georgi, "Mass Employment of Artillery." Field Artillery Journal 35 (February 1945): 93-94.

Ott, David E., "Making a Painful Choice, Artillery Fire: Fast or Massed?" Army 31 (April 1981): 34-40.

Reeves, Joseph R., "Artillery in the Ardennes." Field Artillery Journal 36 (March 1946): 138-142, 173-184.

Robinson, Leonard G. Jr, "Artillery -- Arbiter of the Battlefield." Military Review 32 (October 1952): 3-10.

Smirnov, V., "Artillery Offensive." Field Artillery Journal 34 (November 1944): 788-789.

Smith, Frederic N., "1812 Overture." Defense & Foreign Affairs 12 (September 1984): 22-23.

Smith, Selwyn D. Jr, "The Infantry Division in the Defense." Military Review 29 (November 1949): 46-55.

Strong, Evert E., Thala Engagement: February 21-24, 1943." Field Artillery Journal 33 (August 1943): 573.

Sunderland, Riley. "Massed Fire and the FDC." Army 8 (May 1958): 56-59.

Toepfer, Horst, "The 1973 Nearest War, Part I." Field artillery Journal 42 (November-December 1974): 36-43.

_____, "The 1973 Nearest War, Part II: The Turning Point." Field Artillery Jounral 43 (January-February 1975): 6-13.

_____, "The 1973 Nearest War, Part III." Field Artillery Jounral 43 (March- April 1974): 12-19, 45.

de Watteville, H. G., "Russian Artillery, 1941-1945." Field Artillery Journal 37 (May-June 1947): 175, 195-199.

Young, W. R., "Artillery Offensive, an Examination of Russian Practice." Field Artillery Journal 36 (January 1946): 26-29.

Field Manuals and Circulars

Department of the Army Pamphlet 20-230, Historical Study: Russian Combat Methods in World War II. Washington, DC: Department of the Army, 1950.

Defense Department Bulletin 1130-8-82, Soviet Front Fire Support. Washington, DC: Defense Intelligence Agency, 1982.

Field Circular 6-20-20, Fire Support Handbook. Fort Sill: U.S. Field Artillery School, 1985.

Field Circular 6-60, MLRS Operations. Fort Sill: U.S. Army Field Artillery School, 1986.

Field Manual 6-20, Field Artillery Field Manual — Tactics and Techniques. Washington, DC: War Department, 1940.

Field Manual 6-20, Field Artillery Tactical Employment. Washington, DC: War Department, 1944.

Field Manual 6-20, Fire Support in Combined Arms Operations. Washington, DC: Department of the Army, 1984.

Field Manual 6-20-2, Division Artillery, Field Artillery Brigade, and Field Artillery Section (Corps). Washington, DC: Department of the Army, 1983.

Field Manual 6-20-2J, Division Artillery, Field Artillery Brigade, and Corps Artillery Headquarters. Washington, DC: Department of the Army, 1984.

Field Manual 6-40, Field Artillery Field Manual — Firing. Washington, DC: War Department, 1942.

Field Manual 6-40, Field Artillery Gunnery. Washington, DC: War Department, 1945.

Field Manual 7-20, Infantry Battalion. Washington, DC: War Department, 1944.

Field Manual 7-40, Infantry Field Manual -- Rifle Regiment. Washington, DC: War Department, 1942.

Field Manual 100-2-1, The Soviet Army: Operations and Tactics. Washington, DC: Department of the Army, 1984.

Field Manual 100-2-3, The Soviet Army: Troops, Organization and Equipment. Washington, DC: Department of the Army, 1984.

Field Manual 100-5, Field Service Regulation — Operations. Washington, DC: War Department, 1941.

Field Manual 100-5, Operations. Washington, DC: Department of the Army, 1986.

Student Text 101-1, Organizational and Tactical Reference Data for the Army in the Field. Fort Leavenworth: U.S. Army Command and General Staff College, 1986.

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