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SOVIET NON-LINEAR COMBAT:

THE CHALLENGE OF THE 90s

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SOVIET NON-LINEAR COMBAT: THE CHALLENGE OF THE 90s

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September 1990

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## SOVIET NON-LINEAR COMBAT: THE CHALLENGE OF THE 90s

In this time of turmoil in the Soviet Union, the Soviet General Staff is beset with a series of complex problems: the direction of Soviet doctrine; the shape, size and manning of the Soviet armed forces; the function and future of the Warsaw Pact; the complete redrafting of war plans; and the use of military forces for civil control. However, one key function of the Soviet General Staff remains constant--to determine the nature of future war and then develop the strategy, operational and tactical techniques, force structure, equipment, and training necessary to meet its demands.

As the experience of the 1920s and 1930s demonstrates, Soviet theoretical concepts were quite visionary and accurate. Today, the General Staff is again attempting to forecast the nature of future war in light of the current "revolution in military affairs"--a revolution whose key components are high-precision weapons, improved conventional munitions, microcircuitry, genetic engineering, and weapons employing new physical principles.

### FUTURE WAR

The General Staff's view of future war envisions dynamic, high-tempo, high-intensity land-air operations which will extend over vast expanses and include new areas such as space. Tactical combat will be even more destructive than in the past and will be characterized by fragmented [ochagovyy] or non-linear combat. The front line will disappear and terms such as "zones of combat" will replace the outdated concepts of FEBR, FLOT and FLET. No safe havens or "deep rear" will exist. Nuclear war must be avoided at all costs, as it could escalate to strategic exchange and the "destruction of all the world's people."<sup>1</sup>

The announced Soviet "defensive" orientation during the initial period of future war (adopted to support the Warsaw Pact's "defensive doctrine") is now seen as a way to inflict severe losses on the enemy with fewer forces, stop that enemy and create conditions necessary for a counteroffensive. Even with CFE-induced parity of forces, Soviet planners believe it will be possible to achieve requisite superiorities of forces on main axes of offensives and counteroffensives by exploiting qualitative improvements in firepower and mobility and the effects of surprise.<sup>2</sup> Surprise, coupled with powerful air and artillery fire strikes, will allow a combatant to rapidly insert ground units, air-assault forces, and other specially-trained forces into the depths of his opponents' territory while covering his own flanks with long-range fires. Aviation and long-range, high-precision fires will attack reserve forces and support bases which could influence the operation.<sup>3</sup>



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There are many similarities between the problems facing the General Staff today and the problems they faced in the 1960s. In the 1960s, the Soviets envisioned future war in terms of a non-linear, nuclear battlefield in which atomic weapons created maneuver corridors through which Soviet ground forces advanced to conduct meeting battles. The tempo of the offensive provided [flank] security to the attacker who attempted to maintain the initiative while advancing deep into the communications zone of the enemy. Due to the expected wide-spread use of nuclear weapons,

combat has become exceptionally dynamic and highly maneuverable, forcing subunits to change rapidly from attack to defense and back again, and to change frequently its combat formation. The attack will develop extremely irregularly with the absence of a continuous front line and will be conducted in wider zones along axes. Under these conditions, combat will have a fragmented [ochagovyy, non-linear] nature at the various troop echelons.<sup>4</sup>

Indeed, "the broken nature of the front line, the presence of intervals and gaps formed in the enemy's combat formation by nuclear strikes, and the conduct of the attack along axes create favorable opportunities for the employment of maneuver."<sup>5</sup>

In the 1970s and 1980s, the Soviets envisioned future war as being fought conventionally under nuclear-threatened conditions and adapted tactics and reemphasized operational art in order to meet this new vision.

Today, the Soviets perceive that nuclear weapons are less likely to be employed. Instead, they see their role taken over by high-precision weapons systems such as PLSS, JTACMS, and JSTARS and their Soviet analogues.<sup>6</sup> Consequently, future tactical commanders need to be capable of displaying initiative and conducting separate actions.<sup>7</sup>

Linear warfare is roughly analogous to US football. An attacking and defending side face one another on line. After a short period of concerted effort to gain or deny ground or advantage, both sides regroup and reform to try again. Non-linear warfare, as the Soviets envision it, is roughly analogous to soccer. There is constant activity with players on the same team simultaneously defending, attacking or making the transition between the two. Team members rapidly coalesce into temporary attack or defensive groups and then disperse again.

The Soviets see non-linear battle as one in which separate "tactically independent" battalions and regiments/brigades fight meeting battles and secure their flanks by means of obstacles, long-range fires and tempo. There are no safe areas and

combatants will suffer heavy attrition. Large units, such as divisions and armies, may influence the battle through employment of their reserves and long-range attack systems, but the outcome will be decided by the actions of combined arms battalions and regiments/brigades fighting separately on multiple axes in support of a common plan and objective. Attacks against prepared defenses will be a rarity, as neither side will be able to tie in their flanks or prepare defenses in depth.<sup>8</sup>

The Soviets have historical experience and theoretical grounding in non-linear war. Russian Civil War operations were conducted by separate columns over vast areas with little concern for flanks. Soviet war-planning in the 1960s envisioned a nuclear, fragmented battlefield characterized by meeting battles of separate battalions and regiments.<sup>9</sup> Soviet desert fighting methods and planning and experience in the employment of airborne, airmobile and deep battle forces have all emphasized non-linear war-fighting techniques.

Many of the 1960s tactical concepts for fighting and surviving on the nuclear battlefield are being reexamined today for applicability on the high-technology battlefield of tomorrow. For example, in the early 1970s, the Soviets developed the concept of anti-nuclear maneuver [protivoyadernyy manevr] which they defined as "the organized shifting of subunits with the aim of withdrawing them from under the possible blows of enemy nuclear means, to protect their survival and subsequent freedom of action to strike a blow on the enemy."<sup>10</sup> This form of defensive maneuver also had an offensive aspect which implemented measures "to rapidly disperse subunits or change the direction of their offensive... and to conduct other measures related to defense against weapons of mass destruction."<sup>11</sup>

The Soviets concluded that operational and tactical maneuver provided the most effective means of implementing anti-nuclear maneuver. This led to the further development of the concepts of operational maneuver (by operational maneuver groups-the OMG) and tactical maneuver (by forward detachments). The Soviets refined and fully developed these concepts by 1980.

Avoidance of enemy nuclear and high-precision weapon targeting has driven Soviet planners to study future non-linear warfare. Maneuver is the basis for Soviet operational and tactical techniques designed to preempt, prevent or limit enemy use of nuclear weapons.<sup>12</sup> Since high-precision weapons pose the same threat as tactical nuclear weapons and may be employed more readily and extensively than nuclear weapons, the Soviets have applied maneuver to the problem of surviving high-precision weaponry as well.<sup>13</sup>

The Soviets are preparing for future, non-linear combat by reexamining and reshaping their war-fighting concepts and

structure. Results of this examination are evident in Soviet future force structure, tactics, fire support, logistics, and troop control.

### FORCE STRUCTURE

The Afghanistan war provided the Soviet Union's latest experience with non-linear warfare. During that conflict, the Soviets found that separate combined arms brigades composed of motorized rifle, tank, air-assault and artillery battalions and support elements were more responsive and effective in a number of combat situations. At this same time, the Soviets experimented with various battalion and brigade structures and a limited number of "new army corps" in their quest for the optimum force structure for waging future war. Apparently, the economic cost of the corps/brigade structure prevented its current, universal adoption as a replacement for the division/regiment structure.<sup>14</sup> However, separate, combined arms brigades remain within the Soviet force structure.<sup>15</sup>

In their search for increased combat power and maneuverability, the Soviets have normally extended the combined arms concept to maneuver-battalion level by constituting battalion tactical groups for exercises and war.<sup>16</sup> These battalion tactical groups are modern tank or motorized rifle battalions

with significant tailored reinforcements. The tank or motorized rifle battalion may be furnished with considerable quantities of reinforcements--an artillery battalion or battery, antitank weapons, an antiaircraft battery (platoon) and engineer and chemical troop subunits. Tank subunits may be added to a motorized rifle battalion and motorized rifle subunits may be added to a tank battalion.<sup>17</sup>

In future non-linear warfare, there will be no time to reorganize and regroup formations and units after the fighting begins. The meeting battle and combat in the depths of enemy territory will require that all necessary force elements be on hand and fully integrated prior to combat.<sup>18</sup> The Soviets are studying the feasibility of creating permanent battalion tactical groups or combined arms battalions so that they will be trained and organized before time of crisis or war.

The Soviets have developed the combined arms concept further and are currently considering combined arms integration at the platoon level. A May 1990 Voyennyy Vestnik article proposes the routine creation of combat groups of two tanks and a BMP or two BMPs and a tank. These teams would be formed by cross-attachment, not traditional attachment, and would move by bounds

using fire and maneuver. Companies would routinely form two platoons into these teams and retain the third, nonintegrated platoon as a reserve.<sup>19</sup>

### TACTICS

Future, non-linear combat is sharply affecting maneuver force tactics. Defensive positions, attack options and methods of defense are all being debated.

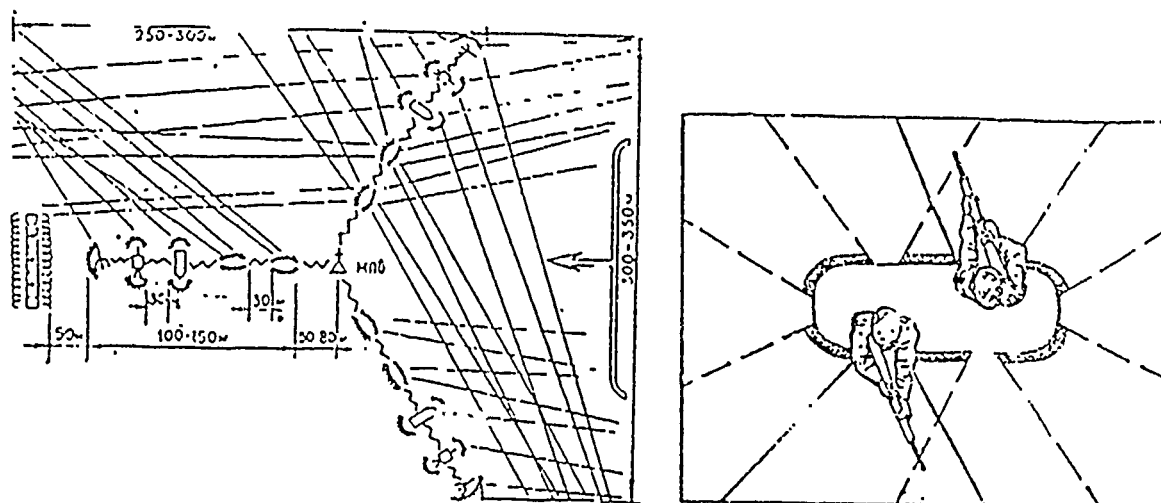


Figure 1

Figure 1 demonstrates a trefoil defense and shows a US mechanized infantry platoon with the platoon CP at the hub of the trefoil and a rifle squad deployed along each axis. The squad axis (beginning at the platoon CP) consists of two-man fighting positions, the squad APC, an ATGM and a ground-mounted heavy machine gun. The 1985 Soviet article in which figure 1 appeared claimed that the US Army believed that this configuration allowed fire to be concentrated on an enemy approaching from any direction. However, the US Army does not and never did deploy its mechanized infantry platoons in this manner.<sup>20</sup>

In July 1987, the trefoil reappeared as a Soviet concept. This time it depicted a defending Soviet tank company and tank battalion. This article initiated a debate that continues to this day as to the advantages of the trefoil, the quatrefoil, and the standard position defense.<sup>21</sup> Figure 2 depicts only tanks, but as the debate unfolded, it became clear that it was a debate on a combined arms battalion defense.<sup>22</sup>



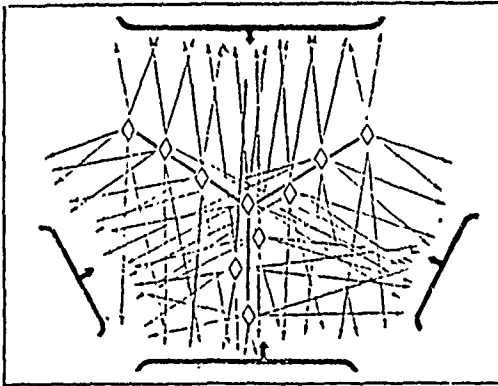


Figure 2

The figure clearly shows the trefoil and its advantages of all-round fire capability, the lessened time and field fortification work required to prepare a battalion defense, and, when properly camouflaged, the difficulty in determining the defensive area and attacking it with high-precision weapons.

The Soviets have begun a new tactical debate focusing on how a combined arms battalion should fight. As in the past, they have disguised this debate using as an analogy how the US Army employs a battalion tactical group. Figure 3 shows how the Soviets portray the US Army battalion tactical group:<sup>23</sup>

US BATTALION TACTICAL GROUPS CONSIST OF EITHER A

- Mech Bn with 1-2 attached tank companies
- Tank Bn with 1-2 attached mech companies
- Balanced Bn with equal number of tank & mech companies

POSSIBLE REINFORCEMENTS:

- Vulcan platoon (4) with Stinger section (4).
- Engineer platoon or mobility/countermobility platoon (4 ALB & up to 6 earthmovers).
- Chemical/biological recon squad.
- SP artillery battery to artillery battalion.
- Up to a company of AT helicopters.
- From 4 to 6 jet aircraft.
- An aviation/helicopter antitank group (with 2 to 4 A-10 and 4 to 6 AH-64).

Figure 3

There are several anomalies in this chart. The first two type groups are portrayed as having attached companies, instead of the US system of cross-attaching companies.<sup>24</sup> Some of the reinforcements are more typically Soviet than US (e.g., the chemical/biological reconnaissance squad). Whereas the US Army will reinforce a battalion with an artillery battery, it will not normally attach an artillery battalion to a maneuver battalion--a common Soviet practice.<sup>25</sup> While the US Joint Air Attack Team

(JAAT) resembles the aviation/helicopter antitank group, it is seldom attached below US brigade level. Indeed, the "battalion tactical group" most closely resembles the future Soviet combined arms battalion postulated by the Soviet Army Studies Office (SASO) in 1989 (Figure 4).<sup>26</sup>

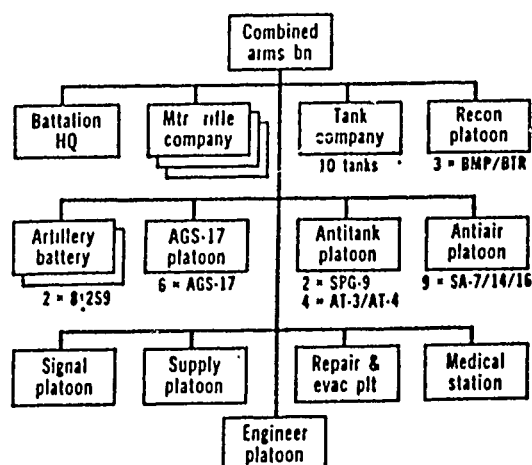


Figure 4

When the Soviets write about a US maneuver battalion deployed for combat, they describe a combined arms organization. Figure 5 depicts a mechanized battalion in march column with three mechanized infantry companies, a tank company, an artillery battery, an antitank company, mortar platoon, vulcan platoon and a single CP (circled).<sup>27</sup>

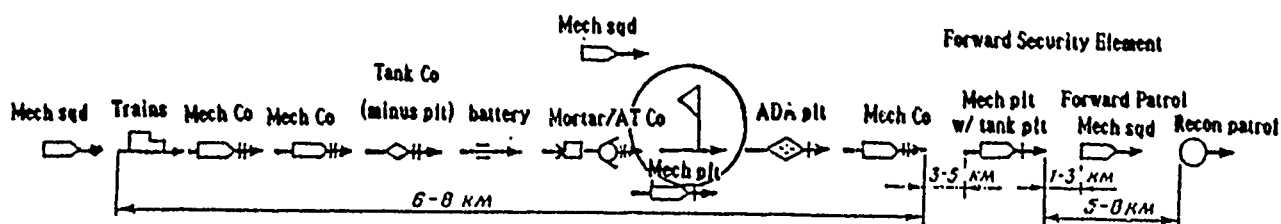


Figure 5

However, when the Soviets write about the battalion tactical group, there are three CPs incorporated in the formation. Figure 6 depicts a battalion in march column with four company task forces, a mortar platoon, an air defense platoon, and engineer platoon and three control points (circled).<sup>28</sup>

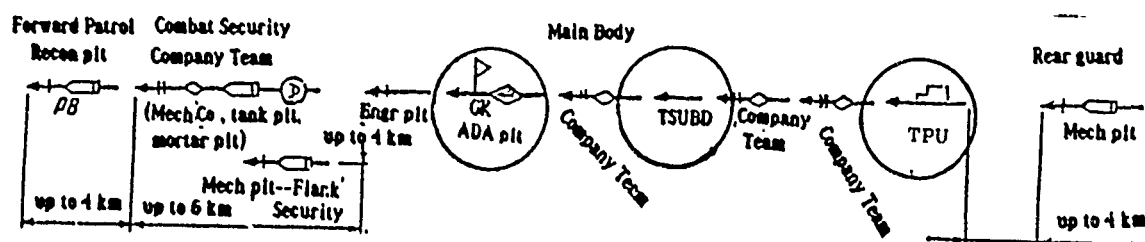


Figure 6

The first control point is the Command Group [gruppa komandira/GK]. It consists of the battalion commander, chief of staff and signal officer. Its function is to control maneuver forces. The second control point is the Center of Control of Combat Actions [tsentr upravleniya boyevymi deystviyami/TSUBD]. Its members are the battalion deputy commander, artillery commander, air defense platoon leader, engineer platoon leader and aviation forward controller. Its function is to control fire support and provide protection for the formation. The third control point is the Rear Point of Control [tylovoy punkt upravleniya/TPU]. It consists of the deputy for the rear, chief of armaments and support platoon leader. Its function is to provide combat support for the formation. This differs from the US system for command and control in a battalion, but is identical to the one predicted for the Soviet combined arms battalion by SASO in 1989 (Figure 7).<sup>29</sup>

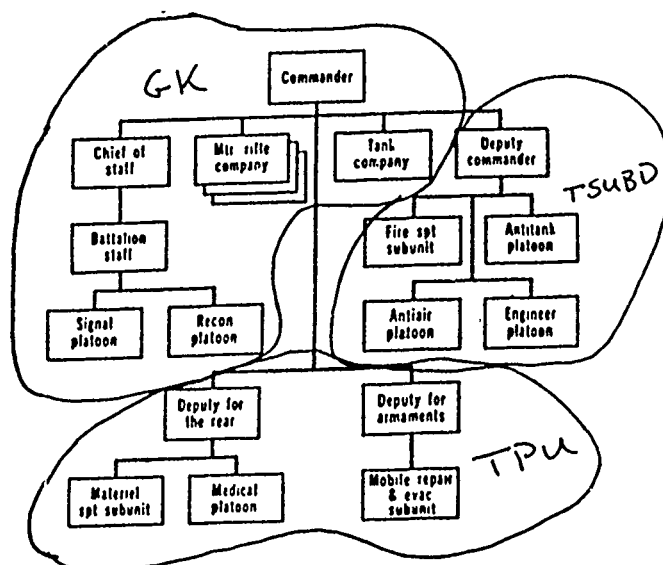


Figure 7

The Soviets believe the meeting battle will be the most common feature of non-linear warfare. Meeting battles permit one to force his will on the enemy, support a high tempo of advance and a high intensity of combat, and use maneuver to concentrate forces to strike an enemy's vulnerable spot (the center of

tactical equilibrium). A Soviet analyst portrayed such a battle in a 1989 article (Figure 8).<sup>30</sup>

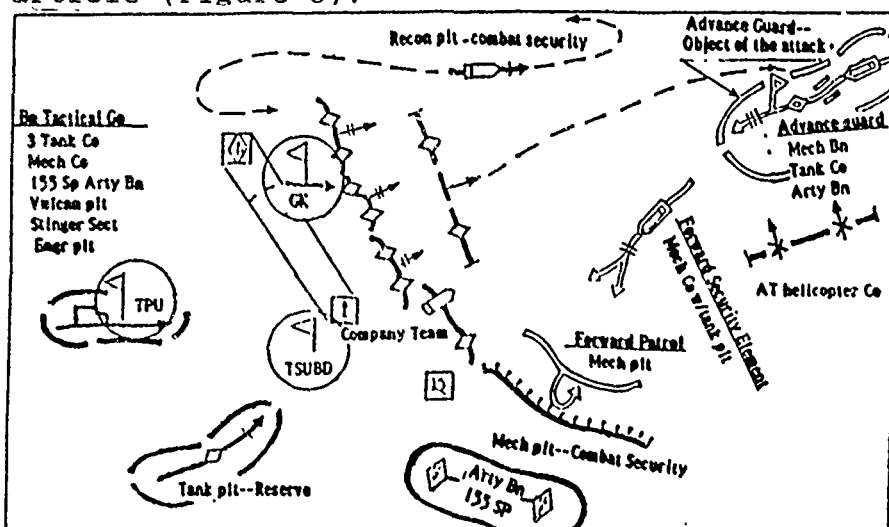


Figure 8

Figure 8 depicts a battalion tactical group, armed with US systems, in a meeting battle. It has the three Soviet control points (circled). The battalion on the left consists of three tank companies and a mechanized company organized into three company teams, an artillery battalion of 155-mm SP howitzers, a Vulcan platoon, a Stinger section, an engineer platoon and an antitank helicopter company. Despite the portrayal of US Army organizations and weapons systems, the tactics depicted are Soviet.

A 1987 battalion tactical group attack on a hasty defense is illustrated in Figure 9.<sup>31</sup>

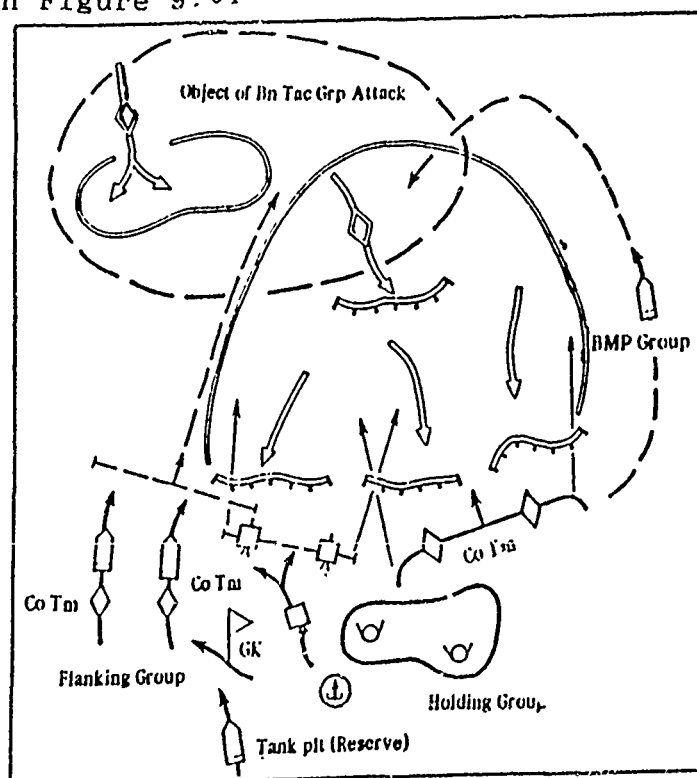


Figure 9

The battalion tactical group attacks from the march from the south with a dismounted company team and an antitank reserve to hold the nose of the enemy. Two company teams, followed by the command group, attack on the left to bypass the defending enemy and to seize a "goose egg" objective. The "goose egg" is force oriented (not terrain oriented) and contains the assembly area for a tank-heavy counterattack force.<sup>32</sup> On the right, the IFVs from the dismounted company team attack on an independent axis to envelope the defending enemy. A mortar battery provides fire support while an air defense platoon defends the force.

This use of IFVs, minus their dismounted infantry, on a separate axis is a key feature of proposed Soviet combined arms battalion tactics. US commanders normally leave their IFVs in support of dismounted infantry and do not separate the two. In the US view, dismounted infantry are essential to defeat the AT-threat against the IFV, while the IFV's ATGM capability would not be up to a direct confrontation with enemy armor.

The Soviets feel that a group of BMPs, without their infantry squads, acting as an armored group [bronegruppa] on an independent axis is an effective, survivable force. The Soviets further believe that the 30-mm chain gun on the BMP-2 is an effective match for any enemy AT-weapons. The BMP-2 also mounts an ATGM system, but probably cannot contend with a direct confrontation against enemy armor.<sup>33</sup>

In 1990, the Soviets updated their concept of a battalion tactical group attack on a hasty defense (Figure 10).<sup>34</sup>

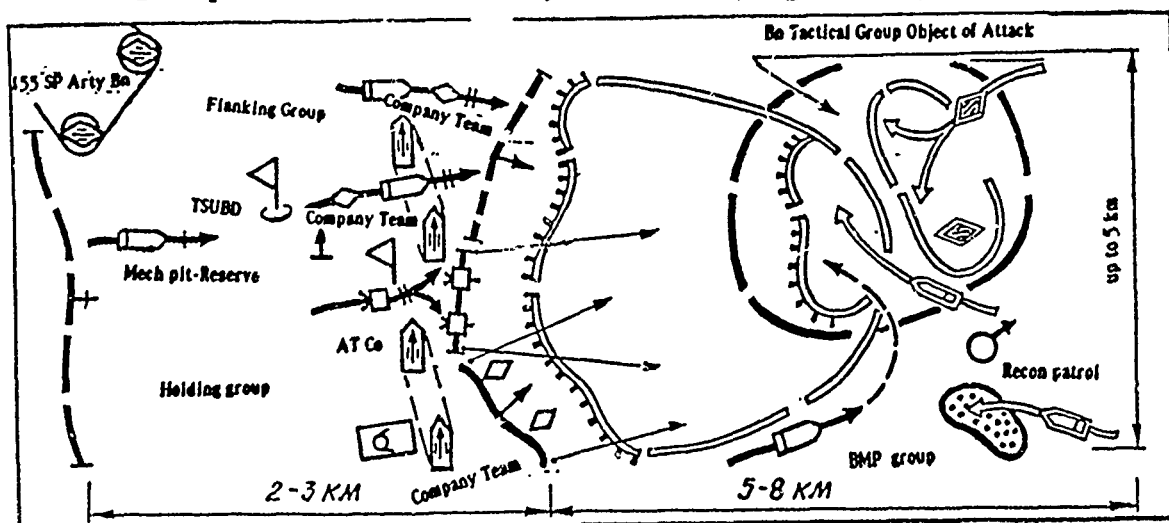


Figure 10

In this case, the battalion tactical group is attacking from the march with an antitank reserve and a dismounted company team (in the south) holding the nose of the enemy. Two company teams

are attacking in the north from the march to roll up the enemy flank, envelop the defending enemy and seize a "goose egg" objective (containing an arriving self-propelled artillery unit and a mechanized force). In the south, the IFVs from the dismounted company team are again attacking on an independent axis to envelop the defending enemy. A mortar battery and self-propelled artillery battalion are providing fire support while an air defense platoon is defending the force. A FASCAM strike is delaying further mechanized reinforcements into the area, while a reconnaissance patrol is pushing deeper into the enemy area.

Should the enemy have had twelve hours or more to prepare his defenses, the battalion tactical group would have conducted an attack against a prepared defense. It would attack in an area up to five kilometers in width and up to eight kilometers deep. The attack may be initiated up to ten kilometers from the enemy defensive position. The battalion tactical group's attack on a prepared defense is illustrated in Figure 11.<sup>35</sup>

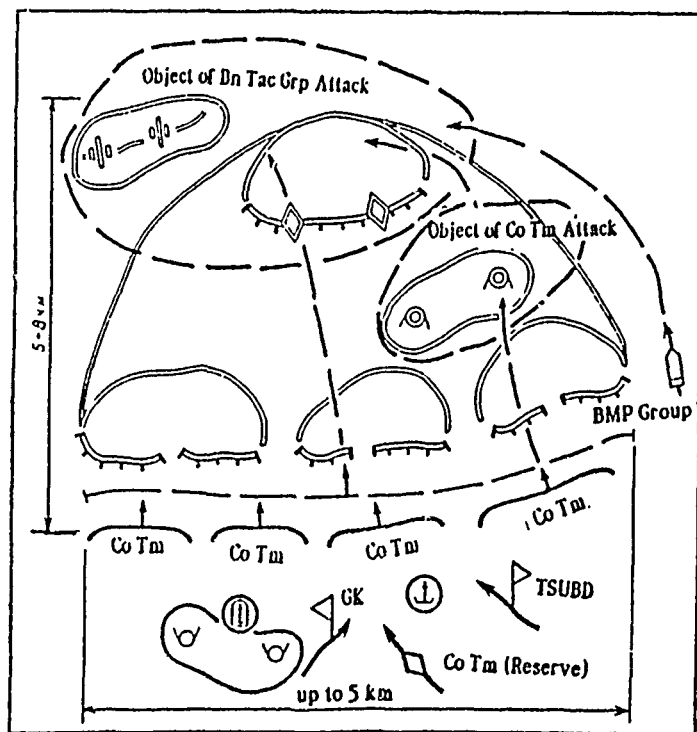


Figure 11

Here, following an intense preparation by organic, attached and supporting artillery, company teams attack through breaches in mine fields. Company teams attack dismounted with tanks followed by dismounted infantry followed by IFVs, or with dismounted infantry leading the tanks and IFVs. A mortar battery, an air defense platoon and an air defense section and two of the three control points are shown. Not all of the IFVs are involved in the frontal assault however, since, once again, an armored group [bronegruppa] of IFVs without infantry is formed to attack through a gap on the flank of the enemy position. This time, the bronegruppa does not envelop the

defending force. Rather, it seizes part of the "goose egg" objective where enemy artillery is located.

In 1990, the Soviets updated the attack on a prepared defense as shown in figure 12.<sup>36</sup>

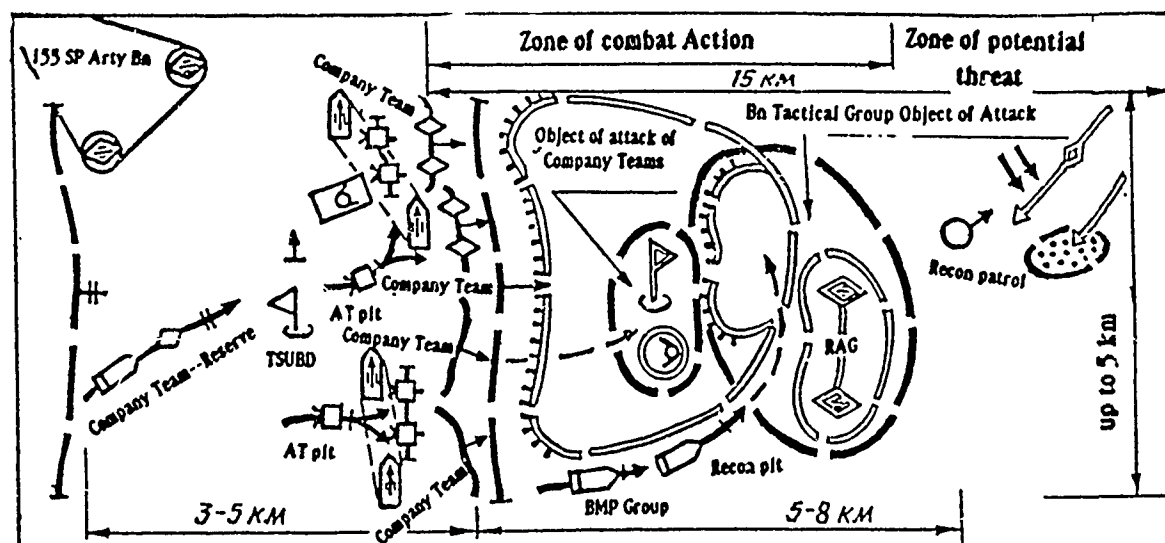


Figure 12

After an intense preparation by organic, attached and supporting artillery, company teams are attacking dismounted. A self-propelled artillery battalion, mortar battery, air defense platoon and air defense section are supporting the attack. Not the IFVs are involved in the frontal assault, however, since an armored group [bronegruppa] of IFVs, less its dismounted infantry, is attacking on the southern flank of the enemy position. A reconnaissance platoon precedes the platoon-sized bronegruppa.<sup>37</sup> The bronegruppa's objective is to attack the reserve company of the defending battalion, while air and FASCAM strikes seal off the area from counterattack forces.

The bronegruppa concept is clearly Soviet and was apparently developed during the Afghanistan conflict. The Soviets are now openly attributing the bronegruppa concept to their own forces and discuss the use of the bronegruppa in the offensive and defensive.<sup>38</sup> In March 1990, the following tactical example was published (Figure 13).<sup>39</sup>



Figure 13

A tank battalion conducts a heliborne landing using its attached motorized rifle company to seize a river crossing site, and then attacks to link up with that company in its bridgehead. Company BMPs are placed under the command of one of the platoon leaders as a bronegruppa to attack on an independent axis within the battalion scheme of maneuver. The circles show the bronegruppa in an assembly area separate from the dismounted motorized rifle company, and then attacking around the flank of a village to conduct a river crossing.

The battalion tactical group's defensive posture looks even more Soviet. The Soviets almost always form internal fire sacs within their battalion and higher defensive positions, and channel the enemy attack into these sacs so that he can be destroyed by fire from three sides.<sup>40</sup> Figure 14 shows a battalion tactical group in a defensive setting.<sup>41</sup>

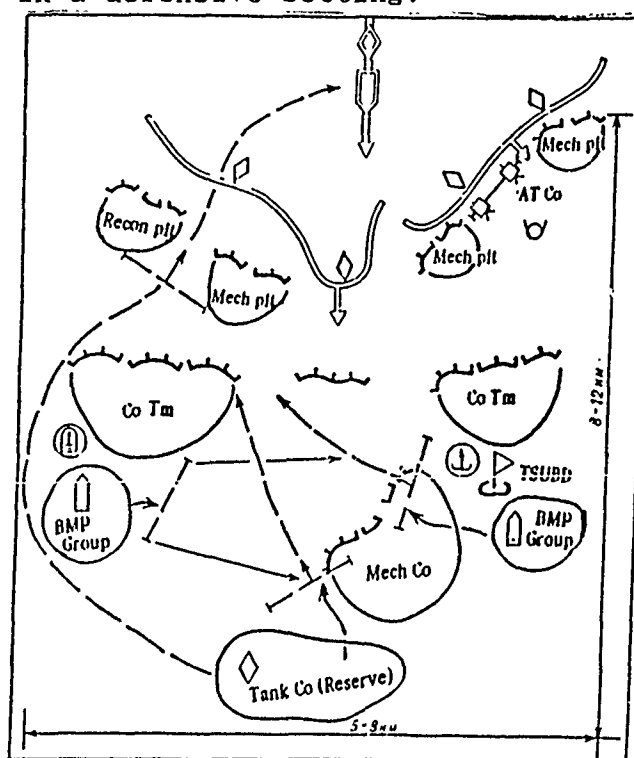


Figure 14



This battalion tactical group defends an area 5-8 kilometers wide and 8-12 kilometers deep. Forward of the main defense, it deploys combat outposts consisting of a reconnaissance platoon, three motorized rifle platoons, an antitank company and a mortar battery. Combat outposts channel the enemy attack through a false position and into an internal fire sac. The battalion main defense consists of two company teams forward with a mechanized company defending in depth. Two bronegruppa are formed with the IFVs of the two forward-defending company teams. They and a tank company serve as mobile reserves. The left bronegruppa moves from an assembly area to a firing line from which it fires into the flank of the fire sac. The right bronegruppa counterattacks in conjunction with the tank company to destroy enemy forces within the fire sac. The tank company also has a counterattack mission forward of the combat outposts. Air defense forces are positioned to provide coverage of the entire force. The TSUBD is located where it can control fires external to and within the fire sac. The other two control points are not shown.

A later variant of this concept is shown in Figure 15.<sup>42</sup>

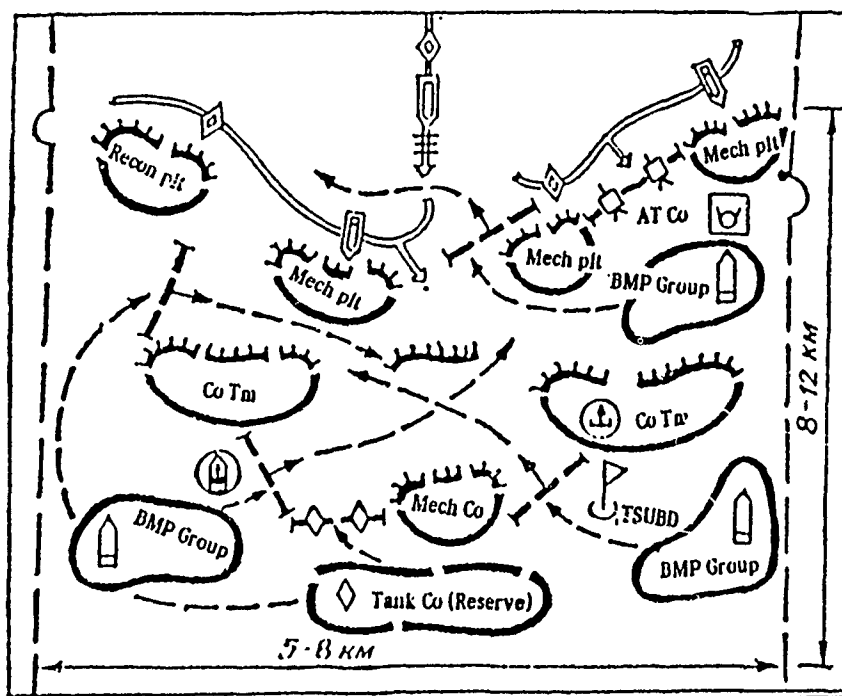


Figure 15

In this variant, a third bronegruppa is formed from IFVs belonging to mechanized platoons in combat outposts. It has a counterattack mission forward of the main defense. Both of the original bronegruppa now have counterattack missions. The tank company's counterattack missions have been redrawn to a blocking position on line with the mechanized company and a single

counterattack to seal the base of the penetration (a traditional mission of supporting artillery).

The Soviets currently employ bronegruppa in the defense. They constitute battalion and company bronegruppa from tanks and BMPs (minus their infantry). Bronegruppa are formed from second-echelon or reserve formations and are used to secure flanks, close gaps created by enemy use of high-precision weapons, and destroy air-assault forces.<sup>43</sup>

Figure 16 depicts a defense by a balanced battalion tactical group:<sup>44</sup>

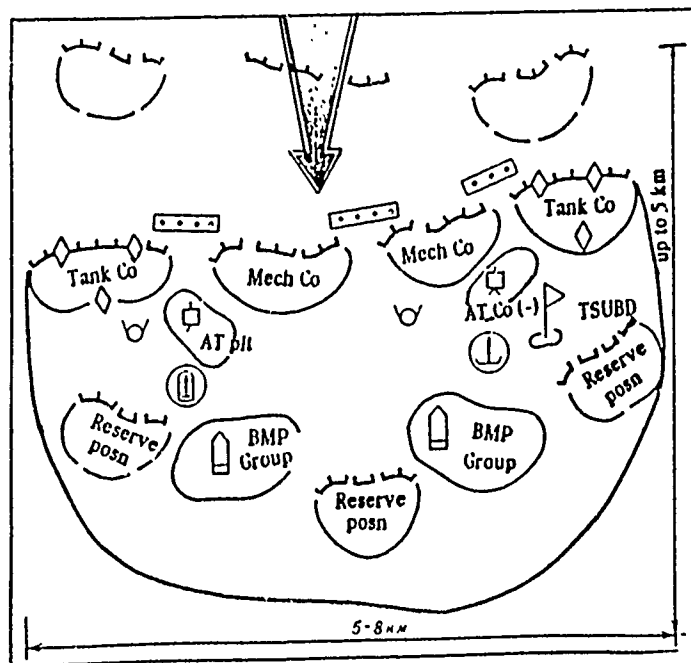


Figure 16

The defensive area has the same 5-8 km width, but the depth of the defense has been reduced from 8-12 kilometers to up to five kilometers. Two tank companies defend on the flanks of the formation. These companies position forces forward as combat outposts to help channel the attack. Two mechanized companies defend in the center of the formation and have reserve positions at a depth to which they can retreat and contain the fire sac. The mortar battery is split into two platoon firing positions and air defense forces are split to provide complete coverage. The antitank reserve is also split into two groups. As before, two bronegruppa have been formed from the IFVs of the forward defending mechanized forces. The TSUBD is located where it can control fires external to and within the fire sac.

A later version of this example is Figure 17.<sup>45</sup>

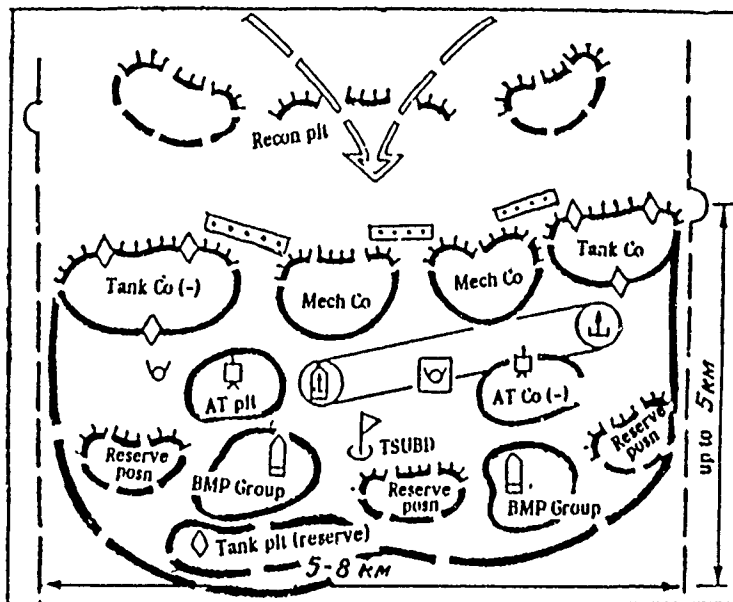


Figure 17

A tank platoon reserve has been constituted to the rear of the left bronegruppa and the TSUBD has been moved to a central location, but at the base of the fire sac.

The battalion tactical group also has a point defense mission (Figure 18).<sup>46</sup>

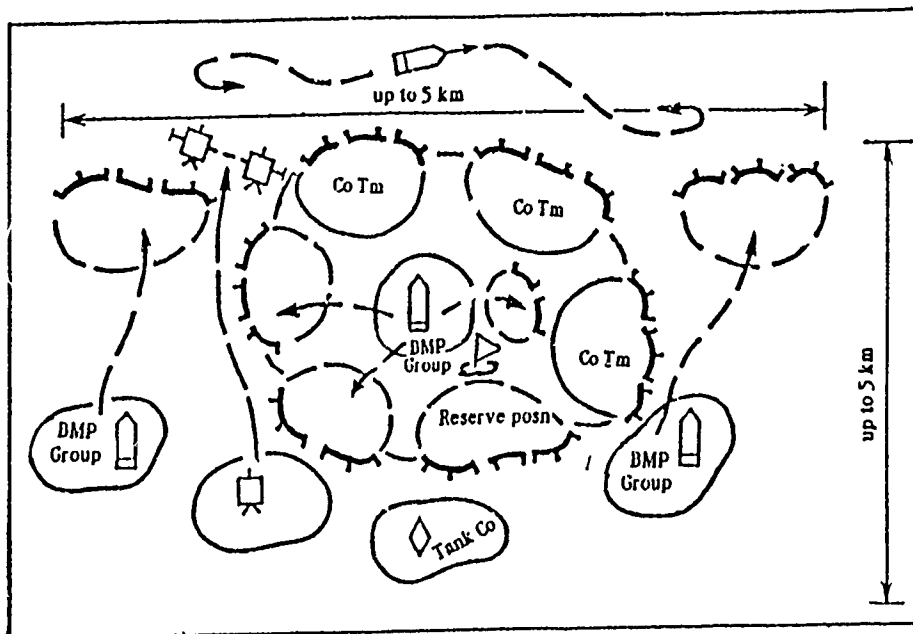


Figure 18

The point defense can cover up to a 5 x 5 kilometer area. Company teams, without their IFVs, occupy strongpoints facing the most likely enemy avenue of approach. Patrols provide early warning on these approaches. Three bronegruppa are formed from the company IFVs. One bronegruppa serves as a reserve within the

point defense and occupies any of three reserve positions on order. The two other bronegruppa, the tank company, and the antitank reserve occupy assembly areas and prepare on-order defensive positions, firing lines and counterattack lines.

Clearly, the Soviets have been debating the formation and tactics of the future combined arms battalion under the rubric of the US battalion tactical group. Linear missions to specific objective depths have been replaced by force-oriented "goose egg" objectives at varying depths. Bronegruppa, which the Soviets acknowledge as their own concept, are constituted from BMPs, without accompanying infantry. Rather than performing the traditional role of infantry support, these bronegruppa accomplish independent missions. An unprecedented level of maneuver is being built into the low-level tactical defense.

### FIRE SUPPORT

Aviation will continue its important role in supporting ground combat in future non-linear war. One current problem that the Soviets are addressing is how to employ and control high-speed jet aircraft and helicopters in the same airspace. As shown earlier, the Soviets credit the US with routinely attaching an "aviation/helicopter antitank group" to battalion tactical groups. This group nominally consists of 2-4 A-10 "Warthog" close support aircraft and 4-6 AH-64 "Apache" helicopters. As previously mentioned, the battalion tactical group is a euphemism for the Soviet combined arms battalion, and one assumes that the Soviets are not discussing the JAAT, but rather a new Soviet close support concept.

In January 1990, a Soviet article provided an open-source glimpse at what may be the prototype Soviet "aviation/helicopter antitank group" (Figure 19).<sup>47</sup>

Figure 19

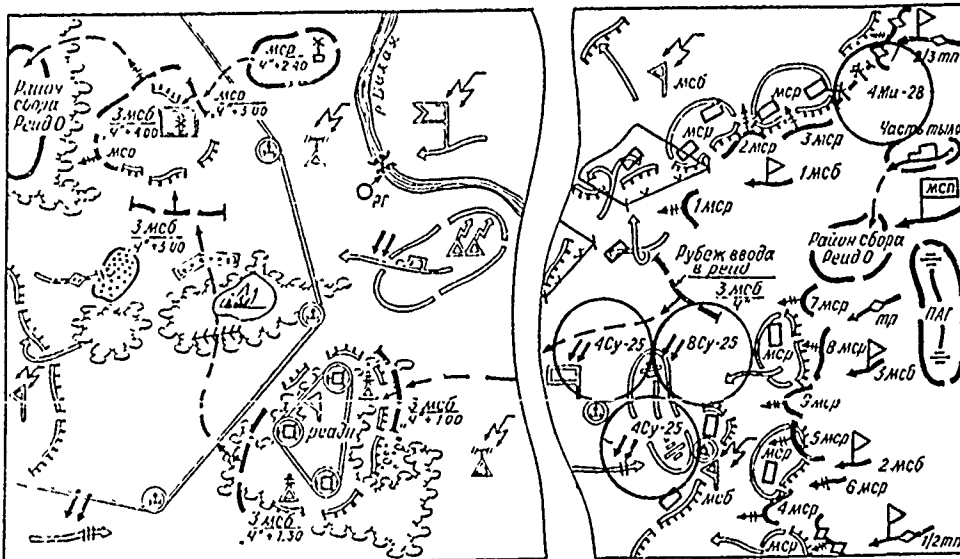


Figure 19 shows a regiment supported by eight SU-25 "Frogfoot" ground support aircraft (bottom circles) and four MI-28 "Havoc" helicopter gunships (top circle). The eight "Frogfoot" aircraft initially attack an enemy artillery battalion and then split into two groups of four to attack a battalion CP and a reinforcing company. The four "Havoc" attack a defending motorized rifle company in coordination with the artillery fires of the regimental artillery group. Although this "aviation/helicopter antitank group" is not hunting tanks, and although it is supporting a regiment and not a battalion, this example represents an effort to employ and control high-speed aircraft and attack helicopters in the same airspace. Further, the aircraft are quite similar in mission and design to the above-mentioned US "Warthog" and "Apache" aircraft. This concept, when refined, should prove a valuable asset on the non-linear battlefield. It could also provide a deep-battle role for Soviet attack helicopters. Currently, the Soviets are reluctant to conduct cross-FLOT helicopter flights without air cover from fighter aircraft. On a non-linear battlefield (with no FLOT), the aviation/helicopter antitank group mix may be able to survive in deep battles away from friendly air defenses.

As the Soviets seek to avoid nuclear exchange in future war, they see that theater operations, employing new, lethal, high-precision weaponry and initial surprise/deception, must achieve their objectives rapidly before the enemy can deploy and utilize surviving nuclear and high-precision weapons. High-precision weapons include reconnaissance-strike and reconnaissance-fire complexes, automated fire control systems, antitank rocket systems, field artillery homing munitions, various guided missiles, radar seeking missiles, guided bombs and cassette munitions.<sup>48</sup>

The reconnaissance-strike and reconnaissance-fire complexes now figure prominently in Soviet writings on future war.<sup>49</sup> The reconnaissance-strike complex (razvedyvatl'no-udarnyy kompleks/RUK) is the unified, automated system which provides support and combat employment of high-precision, long-range weapons. This system provides real-time reconnaissance, target designation, and vectoring to an intelligence fusion and fire direction center. The center provides guidance to dedicated high-precision weaponry which destroys the target in real or near-real time.<sup>50</sup> Reconnaissance-strike complexes employ weapons systems which can function effectively at operational depths (surface-to-surface missiles and aircraft-delivered "smart" munitions) and are represented by such Western technology as "Assault Breaker," PLSS, JSTARS and JTACMS. A system usually includes four main interconnected components: an automated reconnaissance and guidance system, a mobile ground control center, the high-precision weapons, and a means for the precise determination of the location of all the system components.<sup>51</sup>

The reconnaissance-fire complex (razvedyvatel'no-ognevoy kompleks/ROK) is similar to the reconnaissance-strike complex, but functions at tactical depths and employs artillery, multiple rocket launchers and short-range, surface-to-surface missiles for target destruction.<sup>52</sup>

Due to the revolutionary expansion of the destructive capability of new weaponry, battle will be initiated at ever-greater ranges, forces and weapons will disperse even more and become more mobile to survive, and maneuver forces will quickly intermingle with enemy forces or hug cities to avoid effective targeting.<sup>53</sup> The significant expansion of weapon range, along with increased reconnaissance and rapid information-processing capability have enhanced the ability of "defensive" systems to actively influence the battle long before ground forces come into physical contact. The ability of "defensive" systems to identify deep targets, reach out and destroy them has enabled the modern defense to assume many of the advantages previously enjoyed only by the offense.<sup>54</sup> Thus, in the Soviet perspective of the future battlefield, the distinction between the offense and defense is disappearing.

In this new environment, the role of conventional artillery will increase. Sufficient artillery must be immediately available to seize fire superiority from the very beginning of the conflict.<sup>55</sup> Revolutionary improvements in munitions, ordnance, reconnaissance and control systems will force the Soviets to shift from their current normative-based firing (which expends vast amounts of ammunition and creates a sizable logistics burden) to accurate, point-target engagements. The range of guns and mortars will increase to 30-40 kilometers. Conventional and nuclear projectiles will also increase in lethality. Multiple rocket launchers will fire fuel-air, remote-mining and antitank smart munitions. Since these systems will be more mobile, they will be able to fire at greater depths and service larger areas without having to form into the presently employed large artillery groups.<sup>56</sup> Improved, automated fire control systems will computerize the planning and control of artillery fires to allow effective fires separate from artillery groups and in support of non-linear combat.<sup>57</sup> Artillery will be re-integrated into maneuver battalions to support this non-linear combat.<sup>58</sup>

#### THE RECONNAISSANCE-FIRE GROUP

While the Soviets are developing technology to implement the reconnaissance-fire complex concept, they have already fielded a timely and less costly substitute using current systems to serve as a stop-gap reconnaissance-fire complex while the next-generation complex is being developed. The reconnaissance-fire group (razvedyvatel'no-ognevaya grupp/ROG) links dedicated reconnaissance assets to a firing group headquarters and firing

battalions to provide near-real time destruction of tactical targets.<sup>59</sup> It provides flexible, lower-level, decentralized and responsive artillery support coupled to tactical commanders.

The ROG consists of several artillery battalions, a dedicated artillery reconnaissance subunit, a group headquarters (and sometimes a helicopter for adjusting fires), and is constituted from an existing artillery group (normally a division artillery group--DAG or army artillery group--AAG) for the purpose of suppressing or destroying particularly important enemy tactical targets. Priority targets include tactical nuclear delivery means, self-propelled artillery and mortar batteries, FASCAM delivery systems, command posts, reconnaissance systems, and combat helicopters located on aircraft carrier decks.

A ROG, employed in both the offense and defense, is assigned a region or zone of fire responsibility. Figure 20 shows a two-battalion ROG with two dedicated sound-ranging platoons.

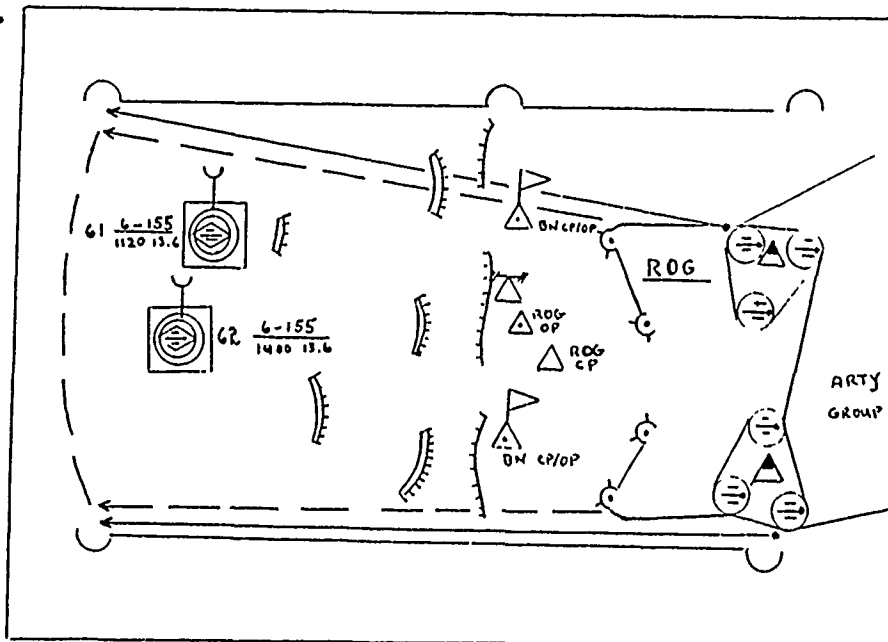


Figure 20

This ROG, part of a defending division's DAG, has a zone of responsibility covering most of the division's sector to the range of participating reconnaissance and artillery subunits (in this case 20-25 kilometers). Each artillery battalion and the ROG headquarters have a forward observation post. A divisional artillery radar surveillance unit is also providing support. Although not part of this particular ROG, the artillery surveillance unit provides target information and fire adjustment to the ROG. The sound-ranging platoons have detected two batteries of 155-mm howitzers designated as targets 61 and 62.

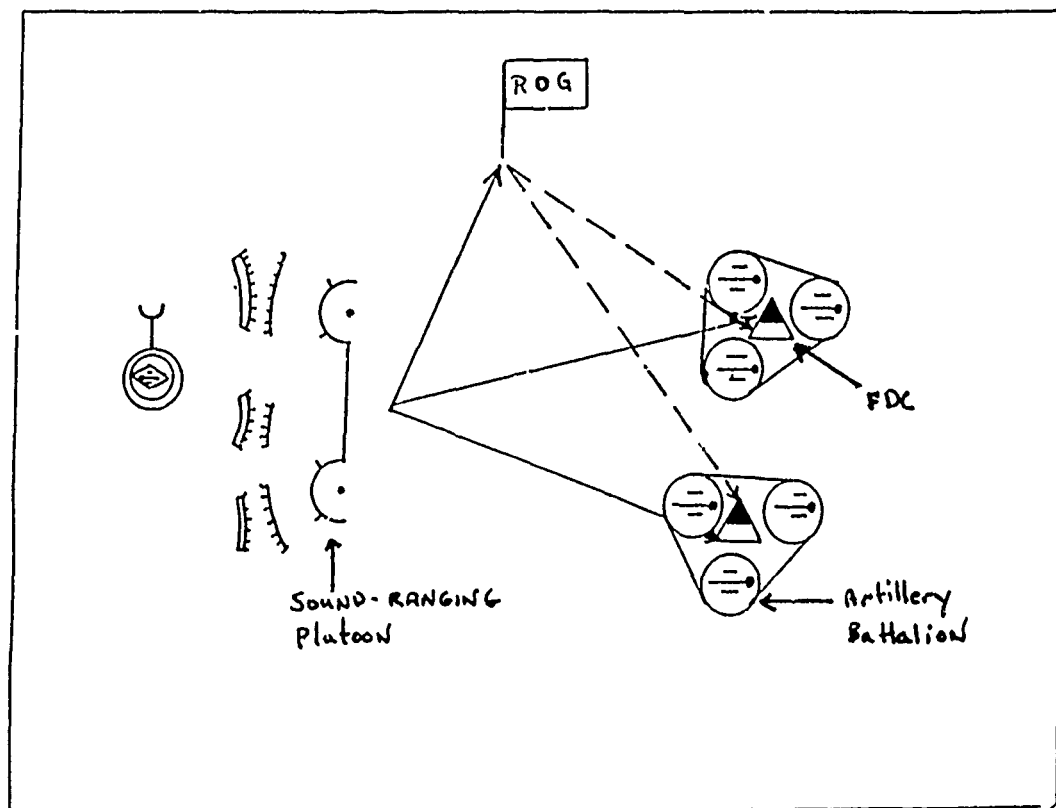


Figure 21

Figure 21 depicts the control sequence of the ROG. A defending division has constituted a ROG and designated an artillery regiment headquarters as the ROG headquarters. A sound-ranging platoon, which is part of the two-howitzer-battalion ROG, locates an enemy howitzer unit and passes this information simultaneously to the ROG headquarters and the FDCs of the firing battalions (three solid lines). The FDCs compute firing data and pass it to their batteries while the ROG commander decides whether to attack the target, when to attack it, and whether to suppress or destroy it. The ROG FDC and battalion FDCs compare firing data as they are determined. Once the ROG commander decides to attack the target, the fire mission is passed to the firing battalions and the sound-ranging platoon (dashed lines). The sound-ranging platoon then adjusts fires on the target. Should other targets be identified by senior artillery commanders, the ROG can rapidly reintegrate into the parent artillery group to conduct necessary fires.<sup>60</sup>

### LOGISTICS

Provisioning and maintaining a force on a non-linear battle field may prove to be the ultimate logistician's nightmare. The Soviet experience in Afghanistan has provided them with a recent demonstration of the vulnerability of lines of communication and the need for maneuver units to carry extra ammunition and POL.<sup>61</sup> The Soviets are also reviewing their experience in resupplying



operational maneuver groups (OMGs), airborne drops, air-assault landings and forward detachments for lessons learned on how to resupply forces and maintain equipment on a nonlinear battlefield. Several steps were taken throughout the 1980s to better equip the Soviet forces for future war:

- the establishment of a materiel support battalion at division and a materiel support company at regiment levels.<sup>62</sup>

- the establishment of a deputy for the rear at maneuver battalion level.<sup>63</sup>

- the heavy use of helicopters to move troops and supplies, coupled with increased aviation resources and materiel support airfields engaged in resupply.<sup>64</sup>

- research and development in caseless ammunition, liquid propellants, fuel efficient engines, and wing-in-ground (WIG) technology.<sup>65</sup>

- development of the reconnaissance-fire complex and point target engagement to replace normative artillery fires.

The Soviets may also be planning to increase their supply and maintenance organization within a combined arms battalion.<sup>66</sup>

#### TROOP CONTROL

The Soviets place great trust in the mathematical modelling and support of operations and combat. At least 43 tactical calculations are routinely used at the maneuver battalion level. Approximately one-third of these calculations have been converted to easy-to-use nomographs, another third have been converted to handy computing forms, and most have been formatted for use in the battalion programmable calculator. These formulae are primarily concerned with computing time and tonnages, exposure and expenditure rates, and optimization and determination of effectiveness in various actions and activities.<sup>67</sup> The assistant battalion chief of staff normally calculates the necessary data for the battalion.<sup>68</sup>

In the past, qualitative correlation of forces and means calculations and "scientific" (mathematical) verification of the plan was done at army and front level. The Soviets devised a methodology whereby coefficients of commensurability (or standard units of armament) were determined for individual weapons systems. Using such factors as firepower, range, speed, combat radius, survivability and cross-country mobility, the Soviets determined coefficients of commensurability for all weapons systems. This gave them a qualitative basis with which to compare similar and dissimilar weapons systems. This method could then be extended by comparing TOE units on the basis of

their equipment, which enabled the army or front commanders to determine quantitative and qualitative combat potentials and calculate the correlation of forces and means. The Soviets expanded this methodology to modify the qualitative combat potential of units by factoring mathematical values for terrain, weather, morale, training, mobilization, combat fatigue, type of combat action, direction and location of attack, and artillery and aviation fires. This operational methodology provided a more accurate representation of a planned action and enabled commanders to envision the operation, verify its success, and determine friendly and enemy losses, tempo and rates of advance. Computer support has enhanced and supported this process.<sup>69</sup>

At the tactical level, a quantitative or "finger drill" correlation of forces and means was conducted. As the Soviets look to future, non-linear war, however, they see a greater need for more finite, tactical planning tools to determine tactical correlation of forces and means. The tactical commander cannot rely on operational commands to provide "scientifically substantiated" input in a timely fashion useful at the tactical level. Instead, the tactical commander must be capable of rapid, substantiated decisions and must be provided with rugged, reliable planning aids. Thus, new formulae are being developed to support qualitative correlation of forces and means computations at battalion level. Two such recently-published formula sets provide a methodology for analyzing possible outcomes of combat to select optimum potential courses of action in a comparatively short time, using predefined data and employing normal weather and terrain.

The first example is a formula for determining the strike potential of subunits in combat. It is used to calculate the expected depth that an attacking subunit will achieve as a function of its strike potential.

$$\Gamma = \frac{N_B[Y_B(1 - \Pi_B) - (1 - \Pi_B^K)]\Phi_0\Gamma_0}{N_0[Y_0(1 - \Pi_0) - (1 - \Pi_0^K)]\Phi_BK},$$

when  $Y_B(1 - \Pi_B) > (1 - \Pi_B^K)$  and  $Y_0(1 - \Pi_0) > \Pi_0^K$ ,

where  $N_B$   $N_0$  -are the strengths of the subunits of the attacker and defender, expressed in terms of combat units or of the combat potential of the subunits.

$\Pi_B$   $\Pi_0$  -are the expected casualties of the subunits of each side during close combat (expressed as a fraction of the whole).

- $\Pi^{\kappa}_{\text{B}}, \Pi^{\kappa}_0$  -are the critical loss points of the attacker and defender beyond which they will lose their capability to conduct coordinated combat (expressed as a fraction of the whole).
- $\Phi_{\text{B}}$  -is the width of the attack in kilometers.
- $\Phi_0, \Gamma_0$  -is the width and depth of the defenders position in kilometers.
- $\gamma_{\text{B}}, \gamma_0$  -are the percentage of TOE personnel manning of the sides expressed as a decimal.
- $K$  -is the coefficient of combat effectiveness of the combat unit of the defending side.

An example would be to determine the expected depth an attacking subunit would attain, which had a given combat potential of 150, was at 100% TOE manning (1.0) and attacked a defender with a given combat potential of 194 which was at 85% (0.85) manning. The expected casualties to the attacker during close combat are 0.1 (10%) and 0.4 (40%) to the defender. The degree of combat loss at which combat effectiveness is lost is 0.5 (50%) for the attacker and 0.7 (70%) for the defender. The width of the attack zone is 5 km. The defending subunits occupy an area 8 km wide by 10 km deep. The coefficient of combat effectiveness of the defending combat unit is 2.5.

$$\Gamma = \frac{150[1.0(1 - 0.1) - (1 - 0.5)] \cdot 8 \cdot 10}{194[0.85(1 - 0.4) - (1 - 0.7)] \cdot 5 \cdot 25} \approx 9.5 \text{ km.}$$

In this example, the attacking force will penetrate to a depth of 9.5 kilometers.<sup>70</sup>

The next tactical formulae are designed to provide a methodology for analyzing the possible outcomes of combat to select the optimum potential action in a comparatively short time using predefined data and employing normal weather and terrain.<sup>71</sup> Unlike the previous formula, which did not discuss how combat potential and critical loss points were derived in tactical modelling, these formulae consider the types of military equipment and weaponry, their coefficients of commensurability, the calculations of their qualitative characters, permissible casualties, and the mathematical expectation of the degree of destruction of a side by firepower. Figures 22 and 23 are data tables which support such computation.

Nation	Type of Military Equipment	Coefficient of Commensurability
A	Tank "5"	1.0
	Tank "6"	1.12
	Tank "7"	1.5
	IFV	1.6
	RPG	0.3
B	Tank "60"	1.02
	IFV	1.4
	AT rocket complex	0.95
	AT launcher	0.3
C	Tank "1"	1.09
	IFV	0.45
	AT rocket complex	0.78
	RPG	0.12

Figure 22

National Forces	Defense %		Offense %		Meeting Battle %
	Prepared	Unprepared	Against Prepared Defenses	Against Unprepared Defenses	
B	55	45	30	35	40
C	60	50	35	40	45

Figure 23

Figure 22 shows representative coefficients of commensurability for equipment of three nations (nation A is presumed to be the Soviet Union).<sup>72</sup> Figure 23 shows the degree of destruction that the subunits of nations B and C endure before they lose their combat effectiveness in various types of combat.

The formulae to determine the possibility for a subunit to destroy an enemy in the course of a mission are as follows:

a) In the offense

$$C_n = \frac{(K_{c1} \cdot i + K_{c2} \cdot i + \dots + K_{cn} \cdot i) \cdot [1 - (Z_1 + Z_2 - M)]}{K_n (K_{s1} \cdot i + K_{s2} \cdot i + \dots + K_{sn} \cdot i) \cdot (1 - M)} ;$$

b) In the defense

$$C_o = \frac{K_n (K_{c1} \cdot i + K_{c2} \cdot i + \dots + K_{cn} \cdot i) \cdot [1 - (Z_1 + Z_2 - M)]}{(K_{s1} \cdot i + K_{s2} \cdot i + \dots + K_{sn} \cdot i) \cdot (1 - M)} ,$$

where  $K_{c1}, K_{c2}, K_{cn}$  = coefficients of commensurability of the military means of subunits of nation A;

$K_{s1}, K_{s2}, K_{sn}$  = coefficients of commensurability of the military means of subunits of nations B & C;

$i$  = quantity of means of a given type;

$Z_1, Z_2$  = degree of destruction by which combat potential may be lost;

$M$  = mathematical expectation of the degree of destruction by artillery and aviation;

$K_n$  = the coefficient of superiority of the defense over the offense;

$C$  = the combat potential of the subunit.

When calculating the combat potential in a meeting engagement, the offensive formula is used, but the factor for the coefficient of superiority of the defense over the offense is not included.

An example is an attack by a tank platoon of country A armed with type "7" tanks, which has an attached motorized rifle squad mounted on an IFV. The attack is conducted from the march against a defending squad of country B.

Data:

a) Type of combat action: offensive.

b) Types of military equipment of a side, its quality and coefficient of commensurability:

The attackers:

--Tank "7"  $K_{c1} = 1.5$ , quantity  $i = 3$

--IFV,  $K_{c2} = 0.8$ , quantity  $i = 1$ .

The defenders

--IFV,  $K_{s1} = 1.4$ , quantity  $i = 1$

--Antitank launcher,  $K_{s2} = 0.3$ , quantity = 3.

c) Mathematical expectation of the degree of destruction of the defenders in the period of fire preparation and support of the attack:  $M = 0.4$ .

d) Losses to the subunit in the period approaching the attack line cannot exceed  $Z_1 = 0.3$ .

e) Degree of destruction to the defender, at which they lose combat potential (2d table),  $Z_2 = 0.55$ .

f) Coefficient of superiority of the defender over the attacker = 3.

$$C_n = \frac{(1,5 \cdot 3 + 0,8 \cdot 1) \cdot [1 - (0,3 + 0,55 - 0,4)]}{3 (1,4 \cdot 1 + 0,3 \cdot 3) \cdot (1 - 0,4)} = 0,7.$$

If the combat potential is greater than or equal to 1, then the subunit will fulfill its mission. If, (as in this case-0.7), the combat potential is less than 1, the defenders can defeat the attacker. That means that a way must be found to allow the attacker to fulfill his assigned mission. The commander decided to first attack the IFV with tank platoon fire from 2000 meters out. Then, having destroyed the IFV, he decided to close with and destroy the short-range antitank launchers. Testing his decision for the two phases discloses the following:

$$C_{n1} = \frac{(1,5 \cdot 3 + 0,8 \cdot 1) \cdot [1 - (0,3 + 0,55 - 0,4)]}{3 \cdot 1,4 \cdot (1 - 0,4)} \approx 1,19.$$

$$C_{n2} = \frac{(1,5 \cdot 3 + 0,8 \cdot 1) \cdot [1 - (0,3 + 0,55 - 0,4)]}{3 \cdot 0,3 \cdot 3 \cdot (1 - 0,4)} \approx 1,9.$$

Thus, moving the attack line back to 2000 meters and conducting the attack in two phases would allow the commander to succeed.

These formulae have been programmed for the battalion programmable calculator to save time and prevent mathematical errors.

The importance of these formulae is that they allow the battalion commander to function much more independently than he could under the old troop control system. It provides a rapid way of verifying his decision and can serve as a substitute for combat experience and intuition. The Soviet tactical commander will need more such troop control aids to lead on the fragmented, non-linear battlefield.

#### CONCLUSIONS

The Soviet General Staff faces severe problems, but continues to perform the critical function of studying future war. They do not consider current problems of the Soviet Union as terminal, and will continue to serve in adversity, as they

have in the past. As the Soviets ponder modern technology, they find themselves on the beginning of another, daunting revolution in military affairs which will require them once again to readjust their war-fighting methods. As they prepare for future, non-linear war fought with new, expensive technologies, they are experimenting and preparing to make major changes in force structure, tactics, fire support, logistics support and troop control. Although the Soviet Union lacks an economic base strong enough to implement these changes fully, many of the precursors to these changes are now becoming apparent. The resolution of the many complex problems now facing the Soviet military and Soviet state will determine the extent to which these changes can be realized.

## ENDNOTES

1. V. G. Reznichenko, Taktika [Tactics] (Moscow: Voenizdat, 1987), 63, 181, 194. Much of the General Staff's examination appears to be a reexamination of the non-linear war-fighting techniques developed in the early 1960s for combat on the nuclear, non-linear battlefield. This is logical, as high-precision weapons can now perform many of the missions of nuclear weapons without the collateral damage. Today, however, the traditional role of the General Staff in determining defense policy is being challenged by civilian theoreticians from outside the Ministry of Defense. Many of these theoreticians are from The Institute for the Study of the USA and Canada. The civilian viewpoint is often at apparent odds with that of the General Staff, but has succeeded in implanting the vision of a "nuclear winter" and the non-utility of nuclear weapons among the general Soviet populace.

2. G. I. Salmanov, "Sovetskaya voyennaya doktrina i nekotoryye vzglyady na kharakter voyny v zashchitu sotsializma" [Soviet military doctrine and several views on the nature of war in the defense of socialism], Voyennaya mysl' [Military thought] (December 1988), 9.

3. Ibid., 9-10.

4. D. F. Loza, G. I. Garbuz and I. F. Sazonov, Motostrelkovyy batal'on v sovremennom boyu [The motorized rifle battalion in contemporary combat] (Moscow: Voenizdat, 1965), 4.

5. Ibid.

6. "In terms of their capabilities, high-precision weapons systems such as reconnaissance-strike complexes and future hypersonic guided missiles and smart bombs resemble the capabilities of tactical nuclear weapons. They could sharply increase the losses of personnel, armament and equipment as a single rocket could knock out entire tank or motorized rifle companies." These weapons systems "change the nature of modern combined-arms combat....Combat is becoming increasingly dynamic and fluid and the significance of the long-range fire battle to the course and outcome of combat is growing dramatically." Reznichenko, 28-29. Respectively, PLSS, JSTARS, and JTACMS are Precision Location Strike System, Joint Surveillance and Target Acquisition Radar System, and Joint Tactical Missile System.

7. "Non-linear [ochagovyy] combat increases the impact of independent actions by battalions and regiments fighting in isolated sectors and the importance of securing their flanks, intervals and rear....[It] requires swift penetrations deep into enemy territory, and frequent flanking movements and envelopments



to strike the enemy flank and rear."Ibid., 63.

8. "Absence of a continuous front, considerable dispersal of the forces and presence of exposed flanks and large gaps all promote maneuver, bold envelopments, deep encirclements, rapid advances on the enemy flanks and rear, and sudden and decisive strikes from different directions. The highly mobile character of modern battle means that protracted, carefully measured combat actions are not consistent with the potential of modern weapons and equipment and would hinder their effective employment. Contemporary combat emphasizes movements, marches, combat from the march, and dynamic mobile battle. Forces will often switch from combat to column formation swiftly advancing and widely maneuvering to achieve varied goals and missions." Ibid, 60.

9. In the late 1950s, the US Army attempted to come to grips with non-linear or fragmented warfare by creating Pentomic divisions. These divisions formed five battle groups tailored to function independently on the nuclear battlefield.

10. F. D. Sverdlov, "K voprosu manevra v boyu" [On the question of maneuver in combat], Voyennyy vestnik [Military herald, hereafter VV], No. 8 (August 1972), 31.

11. Ibid.

12. "The continuous conduct of battle at a high tempo creates unfavorable conditions for enemy use of weapons of mass destruction. He cannot determine targets for nuclear strikes precisely and will be forced to shift his nuclear delivery means often." Reznichenko, 72.

13. Yu. Molostov and A. Novikov, "Vysokotochnoye oruzhiye" [High-precision weapons], Sovetskoye voyennoye obozreniye [Soviet military review] (January 1988), 13. Another tactic is to "hug" cities and enemy forces. Soviet forces plan to move adjacent to or into cities and close with enemy forces so that they cannot be readily targeted. Consequently, the composition of the first tactical and operational echelons should change dramatically and their significance will increase. (Reznichenko, 292). "There arises the problem of defining the optimal structure for the first and second tactical echelons. With the enemy using high-precision weapons, the role of the first echelon has to grow. It must be capable of achieving the mission without the second echelon or reserve." (Molostov and Novikov, 13).

14. David M. Glantz and Graham H. Turbiville, Jr., "Force Structure: Meeting Contemporary Requirements", Military Review, Vol LXVIII (December 1988), 64-65.

15. "Vstrechi veteranov" [Veterans' gatherings], Krasnaya zvezda [Red Star, hereafter cited as KZ], 8 May 1990, 6. The article

outlines the visit of veterans to a separate guards motorized rifle brigade named in honor of the 60th anniversary of the founding of the USSR. The brigade is located in the Moscow military district and was apparently reformed as a brigade in 1977. V. Moroz, "Proshu zachuslit' ryadovym..." [I want to enlist as a private...], KZ, 3 April 1990 concerns a forum on military reform. Guards Colonel Boris Nikolayevich Polyakov, the commander of the Guards Motorized Rifle Sevastopol Brigade, was a participant.

16. Lester W. Grau, "Reorganizing for Battalion-level Combat," Military Review, Vol LXIX (December 1989), 65-72; and Lester W. Grau, "The Soviet Combined Arms Battalion--Reorganizing for Tactical Flexibility," (Ft. Leavenworth: Soviet Army Studies Office, 1989).

17. Reznichenko, 208.

18. Ibid., 286.

19. T. Timerbulatov, "Atakuyut boevyye gruppy" [Combat groups attack], VV, May 1990, 68-70. If this concept is adopted, it will change Soviet tactics considerably. It would mean that the Soviets must abandon many of their battle drills, rely less on the protection of artillery, allow greater low-level initiative and modify their emphasis on tempo. It would also seem to require a professional NCO corps in order to make it work.

20. Normally, when the Soviets want to begin a debate or discuss a problem which they are having, they will couch the item in terms of "according to Western experts...." Although Soviet articles on US technology, force structure and tactics are normally very accurate, occasionally they will attribute tactical concepts and procedures to the United States when they wish to begin a debate on tactical concepts and procedures. These may have no relationship to anything the US Army is actually doing or studying. In this example, the Soviets discussed the US platoon in the trefoil defense when they were actually beginning a debate on their own tactics. Figure 1 is from I. Aleksandrov, "U.S. Mechanized Infantry Platoon in the Perimeter Defense", Zarubezhnoye voyennoye obozreniye [Foreign military review, hereafter ZVO], August 1985, 33-34 as translated by FBIS, Foreign Military Review, JPRS-UMA-86-001 dated 8 January 1986.

21. James F. Gebhardt, "Restructuring the Soviet Tactical Defense", International Defense Review, June 1990.

22. N. Surgutanov and T. Timerbulatov, "A shto, esli boyevoy poriyadok postroit'tak..." [And what if the combat formation is this structured...], VV (August 1987), 36-38.

23. G. Fedulov, "Batal'onnyaya takticheskaya gruppa SSHA vo vstrechnom boyu" [USA battalion tactical group in the meeting battle], VV (July 1989), 75-77.

24. The Soviets normally attach a company to another battalion without compensating the losing battalion. The gaining battalion fights reinforced while the losing battalion fights minus that company. The US Army cross-attaches companies. Thus, a mechanized battalion which is reinforced with a tank company will in turn attach a mechanized company to the tank battalion which provided the tank company.

25. Grau, "The Soviet Combined Arms Battalion," 16-18.

26. Ibid., 26.

27. A. Smirnov, "Motopekhodnyy batal'on na marshe" [The mechanized infantry battalion on the march], VV (April 1986), 89-91.

28. Fedulov, 76.

29. Grau, "The Soviet Combined Arms Battalion," 28. This study further predicted that the Soviets would establish a deputy for the rear at battalion level. The Soviets proposed establishing this post in September 1975 in Tyl i snabzheniye [Rear and supply] in Maludin's article "Rear support of a tank battalion on the offensive with a forcing of a water obstacle." The fact that there is now a deputy for the rear at battalion level is confirmed in P. Konoplya, "Vazhnoye usloviye uspekha" [An important condition for success], VV (October 1989), 45; V. Kirillin and S. Agafonov, "V rayone oborony batal'ona" [In the battalion defensive region], Tyl vooruzhennykh sil [Rear of the armed forces] (August 1988), 26; and A. Zuyev, "Batal'on zanyal oboronu" [The battalion occupied the defense], Tyl vooruzhennykh sil (November 1989), 22. Establishment of the deputy for the rear at battalion level will allow the Soviets to do two things support more effectively, control and fight a combined arms battalion, and mobilize forces rapidly. Traditionally, the Soviets have demobilized by collapsing a larger formation into a smaller one. Thus, a division would collapse into a regiment and a regiment would collapse into a battalion. Critical functions would be maintained in the smaller formation to ease mobilization. The deputy for the rear may represent the ability for combined arms battalions to rapidly expand into regiments, should the situation demand.

30. Fedulov, 75.

31. K. Volodin, "Batal'onnyye takticheskiye gruppy sukhoputnykh voysk SSHA" [Battalion tactical groups of the US ground forces], ZVO (November 1987), 19.

32. The Soviets use line objectives in linear warfare and force-oriented "goose egg" objectives for non-linear warfare. See Lester W. Grau, "Changing Soviet Objective Depths in Future War," Military Review, Vol LXIX (December 1989), 44-53, and Lester W. Grau, "Changing Soviet Objective Depths: A Reflection of Changing Combat Circumstances" (Ft. Leavenworth, KS: Soviet Army Studies Office, 1989).

33. Perhaps the Soviet answer is the "BMP-3", which was first displayed at the 9 May 1990 Victory Day parade in Moscow. It appears to be a "stretch" BMP, but has a large (100-mm?) gun, a large caliber co-ax automatic cannon (30-mm?) and two bow-mounted machine guns. With ammunition storage requirements, an automatic loader and a three man crew (driver, gunner and commander), there appears to be little room for additional personnel. Perhaps the "BMP-3" is not a BMP (infantry fighting vehicle). From the size of the gun, it might actually be a rapid fire mortar/artillery piece or an assault gun/light tank. If so, it would fit well into the combined arms battalion concept within the fire support subunit or tank company. It might prove an ideal escort vehicle for a BMP force attacking on an independent axis. Furthermore, labelling an artillery piece or light tank as a personnel carrier may be a ploy to help offset equipment reductions under the CFE agreements.

34. V. Prishchepov, "Batal'onnyye takticheskiye gruppy SShA v nastuplenii" [Battalion tactical groups of the US in the offensive], VV (July 1990), 74.

35. Volodin, 19-20.

36. Prishchepov, 75.

37. As predicted by SASO in 1989, a reconnaissance platoon has been incorporated into the motorized rifle battalion. See V. Ivanov and I. Sotnikov, "Polevoye obustroystvo voysk" [Field facilities for forces], VV (April 1990), 50.

38. An early example of the bronegruppa concept was published in 1983. In the June edition of VV, a tactical problem [Takticheskaya zadacha] was given on page 40. The approved answer was given on page 48 of the September issue. It showed a BMP platoon, minus its infantry, used in an ambush forward of a defensive position. Examples of the bronegruppa in the Afghanistan war are A. Kravchenko, "Gruppa v zasade" [(Armored) group in ambush], VV (July 1989), 45-48 and V. Kurochkin, "Tanky v zelenoy zone" [Tanks in the green zone], VV (January 1990), 57-59. Two discussions of the contemporary use of the bronegruppa are A. Samofalov, "Desant uderzhivayet platsdarm" [The air landing retains the bridgehead], VV (March 1990), 17-19 and Yu. Fotiyev and F. Yonin, "Vedeniye oborony" [Conduct of the defense], VV (March 1990), 13-16.

39. Samofalov, 18.
40. James F. Gebhardt, "Soviet Battalion in the Defense", Military Review, Vol LXIX (December 1989), 54-64.
41. Volodin, 21.
42. V. Zhukov, "Battal'onnaya takticheskaya gruppa armii SSHA v oborne" [US Army battalion tactical group in the defense], VV (June 1988), 87-89.
43. Fotiyev and Yonin, 13-16.
44. Volodin, 21-22.
45. Zhukov, 88.
46. Volodin, 22-23.
47. R. Karasik, "V reylovom otryade" [In a raiding detachment], VV (January 1990), 35.
48. Reznichenko, 24.
49. The bulk of this artillery section and the following reconnaissance-fire group section have been extracted from the author's "Soviet Artillery Planning in the Tactical Defense," (Ft. Leavenworth, KS: Soviet Army Studies Office, 1990).
50. Voyennyy entsiklopedicheskiy slovar" [Military encyclopedic dictionary], s.v. "Razvedivatel'no-udarnyy kompleks" [Reconnaissance-strike complex], 2d edition, (Moscow: Voenizdat, 1986), 616-617.
51. Reznichenko, 24-26.
52. For an in-depth discussion, see Milan Vego, "Recce-strike Complexes in Soviet Theory and Practice," (Ft. Leavenworth, KS: Soviet Army Studies Office, 1989).
53. Harold S. Orenstein, "Warsaw Pact Views on Trends in Ground Forces Tactics," International Defense Review (September 1989), 1149-1152.
54. Christopher Bellamy, "Budushchaya voyna: The Russian and Soviet View of the Military-Technical Character of Future War," Part Two (draft) (Texas A & M University: Center for Strategic Technology, 1990), 32.
55. Salmanov, 10.

56. Teofil Wojcik, Rozwazania spolczesnym natarciu [Reflections on the modern offensive], (Polish Ministry of Defense Publications, 1987), 242 as translated by Harold S. Orenstein, Soviet Army Studies Office.
57. Reznichenko, 25.
58. Grau, "The Soviet Combined Arms Battalion," 29-30.
59. This discussion of the ROG is based on Zygmunt Czarnotta, "Integration of Reconnaissance and Fire," Przeglad Wojsk Ladowych [Ground Forces Review], May 1987, as translated in Harold S. Orenstein, Selected Translations From the Polish Military Press, Volume III: Supplement (Ft. Leavenworth, KS: Soviet Army Studies Office, 1988), 38. The Polish grupa rozpoznawczo-ogniowa/GRO has been translated into Russian as razvedyvatel'no-ognevaya gruppa/ROG and treated as a Soviet concept. The Polish open military press has historically discussed Warsaw Pact concepts well in advance of the Soviet open military press (as was the case with the OMG). The ROG has historical roots in the Soviet fire group of the 1930s. The Polish article provides a detailed description of the training of artillery battalions to function within a ROG.
60. In the offense, the ROG will usually reintegrate into the DAG or AAG for phase 2 (fire preparation) fires. In the defense, the ROG will usually reintegrate for phase 2 fires and could remain as part of the artillery group for phase 3 and 4 fires.
61. Graham H. Turbiville, Jr., "Ambush! The Road War in Afghanistan," Army (January 1988).
62. Graham H. Turbiville, Jr., "Soviet Logistics Support Concepts Change," Army Logistician (March-April 1987), 2-7; and Graham H. Turbiville, Jr. and James F. Holcomb, Jr., "Soviet Desant Forces," Part II, International Defense Review, Vol 21 (October 1988), 9-10.
63. See endnote 29.
64. Turbiville, "Ambush."
65. Graham H. Turbiville, Jr., "Rear Service Support Concepts and Structures," Military Review, Vol LXVIII (December 1988), 76-77.
66. Grau, "The Soviet COMbined Arms Battalion," 23-28.
67. A. Ya. Vayner, Informatika v voyennom dele [Informatics in military affairs] (Moscow: DOSAAF Publications, 1989).

68. Yu. M. Artyunov, Shtab batal'ona v boyu [The battalion staff in combat] (Moscow: Voenizdat, 1988), 9.

69. In 1987, the author and John T. Banks reworked a course on Soviet operational art for the US Army Command and General Staff college. Course exercises utilized this Soviet methodology. Banks created a computer program to compute combat potentials, convert the potentials to reality by inputting situational factors, establish correlation of forces and means, and predict casualty rates, time and rates of advance. The computer program reduced an eight hour process to ten minutes.

70. Vayner, 91-92. Note that the Soviets follow the European custom of using a comma in place of a decimal point in their mathematical formulae.

71. The discussion of these formulae is extracted from R. Ulugbekov, "Modelirovaniye boya" [Modelling combat], VV (March 1990), 44-48.

72. It is interesting to note that some nations' IFVs have a greater coefficient of commensurability than their tanks. This is probably a reflection of the Soviet's belief that the modern IFV is more flexible, survivable and capable on the future, non-linear battlefield than is the tank.