Desert Defense and Surviving PGMs: the New Russian View

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In the pre-Desert Storm Soviet Union, combat in the desert was planned for and discussed, but was hardly the primary topic of most tactical discussions. There were, however, continual reminders which refocused attention on the desert. Many of the Soviet Union's foreign students came from dry, desert country and had difficulty relating to an advance across Europe. Soviet client states, such as Syria, Ethiopia, South Yemen, Iraq and Libya conducted heavy fighting in the desert. The Soviet invasion of Afghanistan turned into a bitter nine-year war in mountains and desert. Desert Storm clearly demonstrated the vulnerability of stationary weapons systems in the desert when confronted with modern reconnaissance systems and precision-guided munitions (PGM). Today, Russian troops and border guards are again fighting in the desert as they field contingents in the former Soviet republics of Central Asia and the Caucasus. Combat in the desert on a PGM-dominated battlefield is now a very hot Russian topic. The following describes Russian tactical adaptations to the new threat environment.[1]

Desert Storm clearly demonstrated the vulnerability of stationary weapons systems in the desert when confronted with modern reconnaissance systems and precision-guided munitions (PGM).

Continuous lines of defense in the desert are a rarity. Normally, defensive positions are sited to defend built-up areas, water sources and road and caravan route junctions. Battalion defensive areas and company strongpoints are constructed so that

they can provide 360 degree protection yet maintain a directional orientation. In the desert, a platoon still occupies a position with a 400 meter front and a 300 meter depth, but the size of a company strongpoint and a battalion defensive area can expand if there are sand dunes, broken-up lava beds, wet salt flats or other difficult terrain in the defensive area.

The tactical map shows a motorized rifle battalion with an attached tank company defending in the desert. The soft sand and salt lake canalizes the enemy's approach routes into the area and so the battalion defends with three companies forward on a frontage of approximately 6.5 kilometers. The most likely enemy avenue of approach is the center east-west axis. The battalion reserve is a tank platoon and a motorized rifle platoon plus another maneuver reserve--the battalion *bronegruppa* (armored group).[2] The reserve occupies a prepared defensive site and has five prepared, on-order sites for the motorized rifle platoon. The *bronegruppa* occupies an assembly area and has three prepared, on-order positions. The battalion command post and trains are covered by three ZSU 23-4 air defense guns. BMPs with SA-14 SAM missiles are deployed-one directly behind the 3rd MRC, one in the middle of the battalion defensive area and one covering the battalion command post and trains. Enemy avenues of approach are mined and remotely delivered minefields (RDM) are planned on all likely avenues of approach. A "bouncing betty" minefield is emplaced to the north in a wadi which is not under continuous observation. On-call minefields are planned within the defensive sector.

The northern company strongpoint is the pivot of the defense and likely to hold since this enemy avenue of approach is over a clay surface which, at points, is thinly layered over ground water. The middle and southern company strongpoints have an on-order strongpoint behind their primary positions. Unlike the traditional defense, there is no internal battalion fire sack.[3] Patrols monitor the difficult terrain between strongpoints. There are three east-west routes through the battalion area and a company defends astride each. Each route is marked by light posts which are positioned so that the low-powered lights are facing away from the enemy. The purpose of these light posts are to guide resupply vehicles (all resupply is done at night) and to guide counterattack forces. These routes have been improved and are repaired and reinforced where needed. The north-south route is blocked by an on-order position. Each strongpoint has a water point. The eight mortars and their trucks are positioned behind the middle company. Each mortar crew has a dugout at the primary and reserve position. The fighting positions and communications trenches are covered and camouflaged.

A great deal of effort has gone into protecting this defense from aerial reconnaissance and precision-guided weapons. All vehicles are dug in and protected from observation. All fighting positions and communications trenches have overhead cover. Each primary company strongpoint as well as the reserve position, battalion command post and battalion trains has a flare dispenser and a radar reflector or decoy to draw-off precision-guided weapons. Visible light beacons are positioned within the defensive area, but away from defending forces where they can be switched-on to draw-off enemy fire. A string of corner reflectors is strung in the northeast quadrant to simulate movement and draw-off fire into that area.

Figure 1 - A motorized rifle battalion reinforced with a tank company in a desert defense (See Legend Figure 1a).

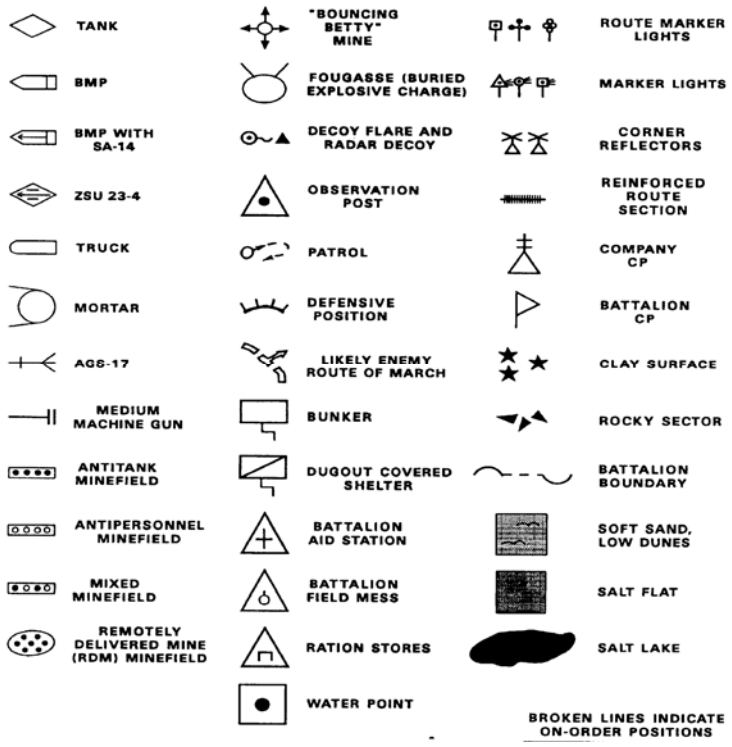

Figure 1a - Map Legend

The Russians used a lot of flare dispensers against heat-seeking warheads in the Soviet-Afghanistan War. Soviet aircraft and helicopters dispensed a continuous string of flares while taking off and landing in order to draw off the *mujahideen's* heat-seeking, shoulder-fired surface-to-air missiles. These efforts enjoyed some success. Radar decoys, corner reflectors, dummy positions and dummy systems are all efforts to divert precision-guided systems away from the well-concealed weapons systems. The Soviets have employed such systems since the early 1980s.. The locally-produced polyurethane shelters are an new, effective counter to many precision-guided munitions. They disperse heat, hide the vehicle radar signature and can be built to a variety of shapes. They are not as light as camouflage netting and could restrict the lateral movement of a gun turret, but the crew can quickly drive the vehicle out from the shelter or tip it off when required.

Digging in

Constructing field fortifications and camouflage in the desert is complicated by the absence of trees and heavy vegetation, the nature of desert soils and the abrasive nature of desert sand and dust. Materials must be transported to the site and more engineering equipment is needed since the plows and blades on tanks and BMPs have difficulty working hard desert soils. Camouflage and deception measures take up to three times as much effort in the desert as in European terrain. Desert heat also affects men and equipment. Mechanics need to replace fuel and air filters frequently. Overheating and working in the desert soils increases wear on engines, running gear and hydraulic systems. Engineer planners expect a 20-25 percent decrease in equipment performance in

a desert environment. Further, engineer equipment cannot always be used in constructing forward defenses, since the enemy can observe out to ten kilometers over flat desert during daylight. Vehicles should be completely dug in, but in hard or rocky ground, they may only be partially dug in. Lack of local timber dictates that prefabricated structures such as the KVS-U corrugated steel bunker be used.[4] Other material, such as sandbags, metallic mesh, FVS arched steel beams, prefab entries and prefab bunkers can be used.[5] Sandbags and local rock can lower the cost and reduce labor. The following table outlines the norms for constructing standard positions in the desert:

Field fortification	Manual Man-hrs	Man & Machine together Man-hrs	Machine-hrs	Sandbags	Arch
Individual fighting position	9	---	---	140	---
MG or 3-man fighting position	30	---	---	270	---
Squad fighting position	230	170	0.7 (PZM)	3500	---
Tank or BMP fighting position	60	36	0.8 (BTU)	440	---
Artillery firing position	140	102	4.4 (excavator)	700	---
Mortar firing position	24	---	---	210	---
100 meter trench w/ sloping sides	170	---	---	5200	---
Observation post	85	35	1.4 (excavator)	310	26
Slit trench w/ paper sandbags	65	38	1.1 (excavator)	1.1 (excavator)	---
Dug-out w/ paper sandbags & fascines	145	90	2.4 (excavator)	395	---
Dug-out w/ sandbags & prefab "Laz" entry	105	60	2.4 (excavator)	275	22
Dug-out from prefab arched "Obolchka-1" set	24	---	---	---	set
Dug-out from FVS steel beams & paper sandbags	120	55	2.6 (excavator)	450	10 FVS
Bunker w/ prefab entry	175	90	3.1 (excavator)	240	56
Shelter for truck or jeep	--	60	0.4 (MDK)	900	---

Table 1 - Labor and Material for Standard Field Fortifications: *E. S. Kolibernov, V. I. Kornev, A.A. Soskov, Spravochnik ofitsera inzhenernykh voysk [Engineer officer's handbook], Moscow: Voyenizdat, 1989, 222-223. The excavator is the E-305V Universal Crane shovel, the MDK is a heavy tracked ditching machine, the PZM is the regimental earthmoving vehicle or BAT-M, and the BTU is the multipurpose bulldozer tank.*

Weapon systems not only have to be dug-in as protection from enemy direct fire, but they have to be concealed from enemy observation and precision-guided weapons. The best overhead concealment is offered by light-weight, sturdy screens which alter the thermal and radar signatures of armored vehicles. Camouflage nets are of limited value against some modern systems. The Russians devised a relatively inexpensive, effective way of fabricating screens in the field. Figure 1 illustrates their method. While the fighting positions are being dug, soil or sand is piled on the ground in the desired shape of the screen. This earth is then covered with a polyethylene film and then polyurethane foam is sprayed over the film-covered form. Once the polyurethane hardens, four soldiers lift it off and install the new screen at the desired location (a 5x3.5 meter screen weighs approximately 150 kilograms). The screen is then covered with dirt to blend in with the rest of the site.

Foxholes and other fighting positions are covered with a poncho, shelter half, scrap canvas or other material. Figure 2 shows that 10-15 centimeters of sand or soil is piled on the material which has been securely pegged to the ground:
Trench walls need to be reinforced with rock, brush wood, metal panels, mesh and whatever else is available. The soil or sand around the field works needs to be stabilized or else a sand storm could quickly expose the entire position. Nerosin, a Russian hydrocarbon used to control soil erosion and stabilize the soil around pylons and pipelines, can be sprayed around the positions to bind the soil or sand in place. A 4-5mm layer is sufficient.

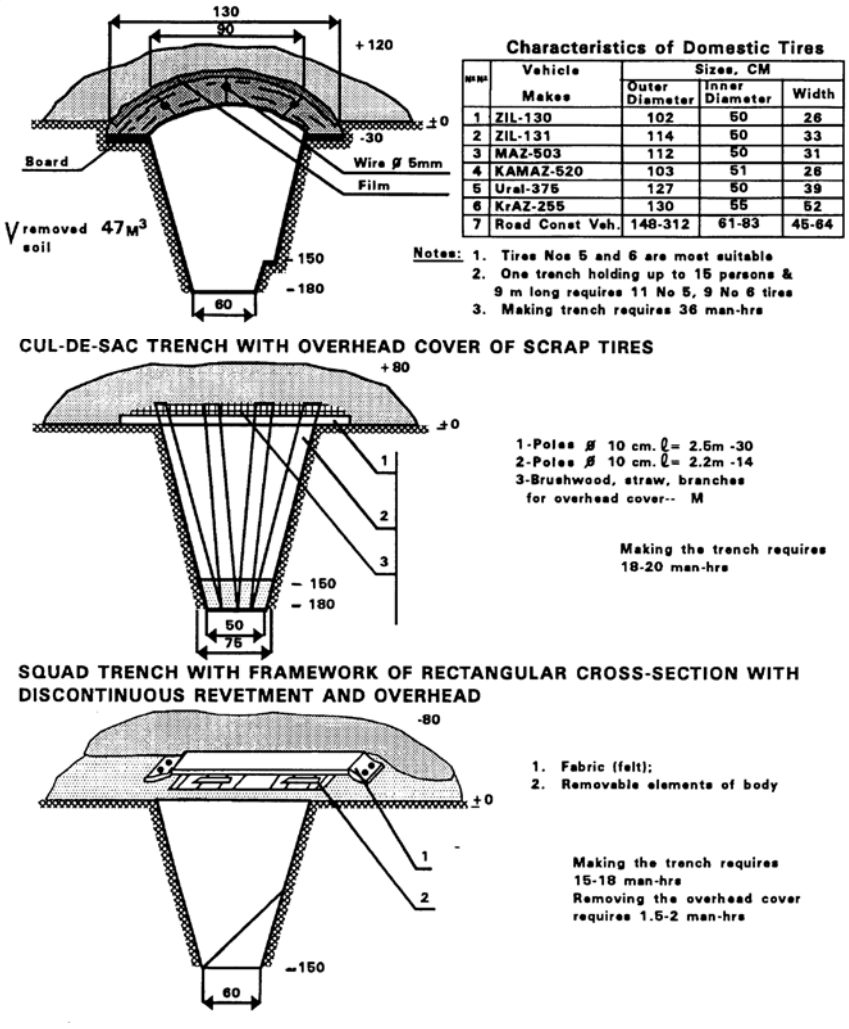

Figure 2 - Fighting trenches and communications trenches can be covered with boxes of rocks, sandbags and worn-out truck tires.

Maskirovka (camouflage and deception) measures must be practised and constantly checked to enable the force to survive. Positions must be hidden, tracks leading to positions must be swept away, all indications of the forces presence must be concealed. Radio and radar emissions are a giveaway and so radio listening silence is usually imposed. Wire communications are used, but the wire must be buried (and remain buried). Forward radar sets remain turned off until needed.

Active protection against overhead reconnaissance and precision-guided weapons

Smoke with particulants, fog oil, and dust can defeat PGMs, particularly when the smoke, fog or dust is mixed with radar decoys and thermal sources. The electromagnetic radiation from ruby, glass, yttrium-aluminum, helium-neon and semi-conducting lasers are screened by smoke.[6] Russian field experience dictates a 30-40 minute wait for the dust to settle after an artillery strike before employing parachute-rigged smart bombs from ground-attack aircraft. Artillery-delivered PGMs require a 50 minute wait for the dust to settle whileemployment of suface-to-surface missiles carrying a PGM warheads requires a 60 to 70 wait for the dust of an artillery strike to settle.[7] Dust clouds can also be used to simulate movement and massing in the desert in order to draw-off enemy PGM fire. Care must be taken to suppress or mask dust raised in actual movement, but a few vehicles dragging chains can simulate a large force.

Dummy positions and dummy equipment should be incorporated in the defensive plan. The Russians studied the Persian Gulf War and understand that the Iraqi Army prepared 700 artillery firing positions and 750 antiaircraft artillery positions (and occupied 200 and 250 of them respectively). The Iraqi army built entire reserve and dummy positions in the strongpoints of their motorized infantry and tank units. Iraqi radar operated from dummy SAM positions. The Iraqis built fiberglass mockups of weapons systems. They coated these with metallic paint and equipped them with heat emitters. The Iraqis also deployed inflatable mockups which have radar and thermal signatures analogous to the real systems. The Iraqis claim that up to 90 percent of the air strikes in the first week of Desert Storm were delivered against dummy positions and that the coalition had to conduct special training for flight crews during the war to improve their ability to differentiate between real and dummy systems.[8] Deception efforts, employing dummy equipment and dust, can aid in drawing off PGM fires.

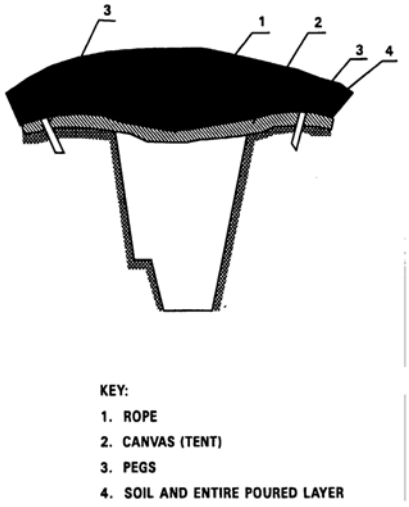

Figure 3 - Various overhead coverings for trenchwork.

Flares and other heat sources, corner reflectors and other radar decoys are also a good resource in the counter-PGM effort. As the tactical map demonstrated, these systems are deployed in and around positions to protect equipment and away from the position to deceive the enemy.

Implications

Presently, Russia is more concerned with her southern border than with her European border. Large stretches of that Russian southern border are on desert terrain. PGM

systems are now sold on the world market at relatively inexpensive prices and are available to potential adversaries along Russia's southern border. The Russians are studying Desert Storm to prepare for future war against an enemy which fields modern reconnaissance systems and precision guided munitions.

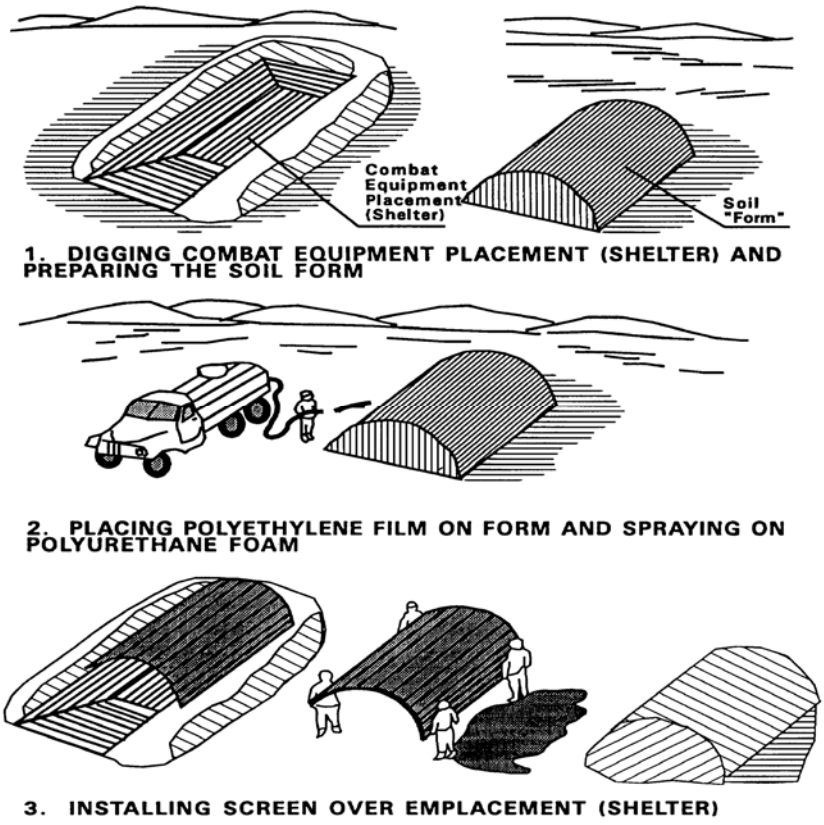

Figure 4

The reality of the PGM-dominated battlefield is that if something can be seen, it can be hit and killed. The trick is not to be seen. In forest and jungle, this is not a particularly arduous challenge, but in the desert, it is a great challenge. Combat and survival in a desert environment is very demanding and the Russians are addressing these concerns now so that they can take adequate countermeasures for the future.

The position shown on the tactical map is very labor-intensive and would require tremendous engineer support. It is the type of position built before the start of hostilities in a fortified region or prior to the initial period of war. During combat, forward forces will not have the time or resources to build such a complete position, but the basic principles of hiding and drawing fire away from the hidden positions remain. The position makes excellent use of terrain and is designed to escape enemy detection until the enemy is too close to employ PGMs.

The defense portrayed in this article is static. The unresolved problem is how to move on a PGM-dominated battlefield, particularly in the desert, and survive. The Iraqis had no solution during the Gulf War. The Russians have published some tentative articles about mounting various ageometric-shaped screens above vehicles and moving behind minature robot vehicles which mimic the shape and signature of primary weapon systems, but there seems to be no present, effective solution. Currently, the only realistic solution appears to be to ride out the initial period of the war. Future conventional war, in the Russian view, would be fought in two phases. The first is the defensive, counter-PGM phase, during which border troops, air forces, defensive forces dug in and concealed in key points, limited-scale forces optimized for nonlinear combat, *Spetsnaz*, and forces

equipped with high-technology weapon systems would attempt to gain the advantage. Meeting battles and meeting engagements, combat for point defenses and tactical-scale counterattacks would be the main forms of ground combat. Each side would target the other's PGMs and supporting systems to destroy enemy combat power, defeat/suppress enemy troop control and force him to deplete his PGM munitions. Once the PGM stocks were depleted to the point where they lacked operational impact, phase two (counteroffensive) would be launched and the war would develop along conventional lines.[9]

Clearly, the PGM threat cannot be disregarded when facing a foe with modern weaponry. PGM weaponry is most effective in the desert, but even in this open country, effective, inexpensive countermeasures can be devised. The Russian Army is just one of many armies looking for such countermeasures.

Endnotes

1. This article is derived from an article by V. Shamshurov, I. Nikolaev and V. Cumin, "Oborudovanie mestnosti pri oborone v pustynnykh rayonakh" [Engineer preparation of the defensive site in the desert], *Armeiskiy sbornik* [Army digest], Number 2, August 1994, 27-31. BACK

2. The *bronegruppa* (armored group) is a temporary grouping of 4-8 tanks, BMPs, BTRs or any combination of such vehicles. The BMPs (tracked combat vehicles) or BTRs (wheeled combat vehicles) are deployed without their normally assigned infantry squad on board and fight away from their dismounted troops. The grouping has a significant direct-fire capability and serves as a maneuver reserve. In this case, the *bronegruppa* consists of three tanks and five BMPs. The vehicles are dug in and the crews are in four covered dug-outs.BACK

3. The Russian concept of a fire sac differs from the US concept. The Russian fire sac is an internal position within a main defensive position designed to be entered by the enemy at cost. The fire sac is lined with obstacles and ringed with firing positions. The enemy is drawn into this sac and then destroyed by fire and counterattack.BACK

4. The KVS-U (ubezhishche, postroennoe iz komplekta volnistoy stali) is a prefabricated shelter built of corrugated steel, designed to be buried in defensive positions and used as a command bunker, living quarters or other personnel shelters.BACK

5. The FVS (fonar' volnistoy stali) is a corrugated steel field shelter which is assembled on site and buried in defensive postions for use as a personnel shelter. When assembled, it resembles a quonset hut or clerestory. The curved steel beams of the FVS are widely used in field fortifications.BACK

6. Ireneuisz Nowak, "Use of Smoke Screens against Reconnaissance", *Przeglad Wojsk Ladowych*, July 1988, 100-103.BACK

7. V. Tkachev, "Shturmoviki nad polem boya" {Ground-attack aircraft over the battlefield], *Aviatsiya i kosmonavtika* [Aviation and cosmonautics], September 1990, 7.BACK

8. Interviews with U.S. officers and captured Iraqi officers indicate that the bulk of Iraqi ground combat vehicles were destroyed during the ground offensive. They were destroyed by helicopter-delivered PGMs, A-10 close air support aircraft and ground systems. The exception was the Iraqi 52d Armored Brigade which was caught on the move by A-10s on 12 January, before the ground offensive, during the attack on Khafji. There are solid indications that battle damage assessment (BDA) figures of aircraft kills against dug-in vehicles were exaggerated.BACK

9. See Lester W. Grau, "Continuity and Change: A Soviet General Staff View of Future Theater War", *Military Review*, December 1991 for a discussion of the phasing of future war.BACK