

HOW CURRENT LIGHT FORCES
PERFORM AGAINST A HEAVY THREAT:

Establishing a Base Case

AS WE SAW IN CHAPTER ONE, WHEN LIGHT FORCES WERE USED in a rapid-reaction capacity to confront the heavier forces of Saddam Hussein's Army in Desert Storm, they succeeded in their mission. As noted, however, they succeeded only by default, since the attack never came. In essence, the light forces performed as a deterrent force. But what if deterrence had failed and the attack *had* come—if Saddam's heavy forces had advanced and engaged the much lighter and less mobile American force that was screening the critical Saudi ports? Of course, that was August 1990. Nearly a decade later, how well would a light force equipped with modern capabilities fare in repelling a larger heavy force?

In this chapter we use the modeling tools described at the end of Chapter One to analyze the use of current-capability light forces as a rapid-reaction force against a larger heavy force, working with different scenarios that vary in terms of terrain and mission. The results of that analysis serve as a “base case” for future analysis—the starting point for the analytical excursions in Chapters Three, Four, and Five that examine the impact of the alternative rapid-reaction paths discussed in Chapter One.

In the remainder of this chapter, we define the three scenarios in more detail, first by describing the scenarios themselves and then by describing the weapon systems available to both sides. Then we describe the events in a narrative fashion from the vantage point of a lieutenant participating in the conflict. We then “play” the scenario, using high-resolution constructive modeling to assess force-on-force system performance, making use of the results from the modeling runs to describe outcomes.¹ Finally, we present an “after-action review” of the battle the lieutenant experienced, as well as the battles in the different scenarios, describing the results in more detail by using the actual outputs of the simulation.

Setting the Context for the Base Case Analysis

The base case focuses on how light forces, portrayed here as the 82nd Division Ready Brigade (DRB), as configured at the time of Desert Storm, would perform against a heavy threat. Below we look at the different scenarios and then examine the force mixes (Blue and Red) for each one.

Base Cases for Three Scenarios

One of the key concerns in dealing with the effectiveness of the light forces in a rapid-reaction mission against a larger, heavier force is how well such a force does across a spectrum of plausible cases. Here, we use three scenarios to represent that spectrum—

scenarios that vary across terrain and, in one case, across mission. Table 2.1 summarizes the attributes of the scenarios and their key parameters.

In essence, the first and second scenarios are the same except for the terrain. In the Southwest Asia (SWA) scenario, the terrain is open with long lines of sight (LOS), whereas in the East Europe scenario, the terrain is much closer. Such variation enables us to explore the impact of terrain on force performance, particularly more stressing (i.e., more limited LOS) conditions and their influence on technology. Whereas in the first and second scenarios a full light infantry brigade (DRB) faces a heavy threat in a prepared defense, in the LANTCOM scenario a partially attrited DRB in the second phase of a forced-entry operation faces a slightly less heavy threat from a hasty defense. Next, we look at each scenario in more detail.

SWA scenario. Figure 2.1 shows the SWA scenario graphically, revealing that it takes place in Saudi Arabia. The mission of the Blue light force is to defend a critical junction along the major pipeline road (shown on the figure). A Red division (consisting of two armor regiments and one mechanized infantry regiment) is attacking, its objective to destroy the Blue force and control the road network. The immediate Red objective is to defeat the Blue force, since the road junction has critical strategic value both for access to oil fields and for logistics and resupply in supporting a continued ground offensive. Blue is positioned on high ground, but this is typically only 20–40 meters above the Red force.

Table 2.1—Three Basic Scenarios and Key Distinguishing Parameters

| <i>Scenario</i> | <i>Terrain</i> | <i>Threat</i> | <i>Mission</i> |
|---|---|---|--|
| SWA (Saudi Arabia) | Open and flat, with moderate trafficability; line of sight = 3–5 kms | Red heavy division consisting of two armor regiments attacking along two primary avenues of approach | Blue light infantry conducting prepared defense |
| East Europe | Close and rough, with limited trafficability; line of sight = 1–3 km | Red heavy division consisting of two armor regiments attacking along two primary avenues of approach | Blue light infantry conducting prepared defense |
| LANTCOM (Latin America–Atlantic Command) | Close and rolling hills (partially covered), with limited trafficability; line of sight = 1–5 km | Red heavy division (–) consisting of two brigades and a battalion attacking along three primary avenues of approach | Partially attrited Blue light infantry conducting hasty defense following a forced entry |

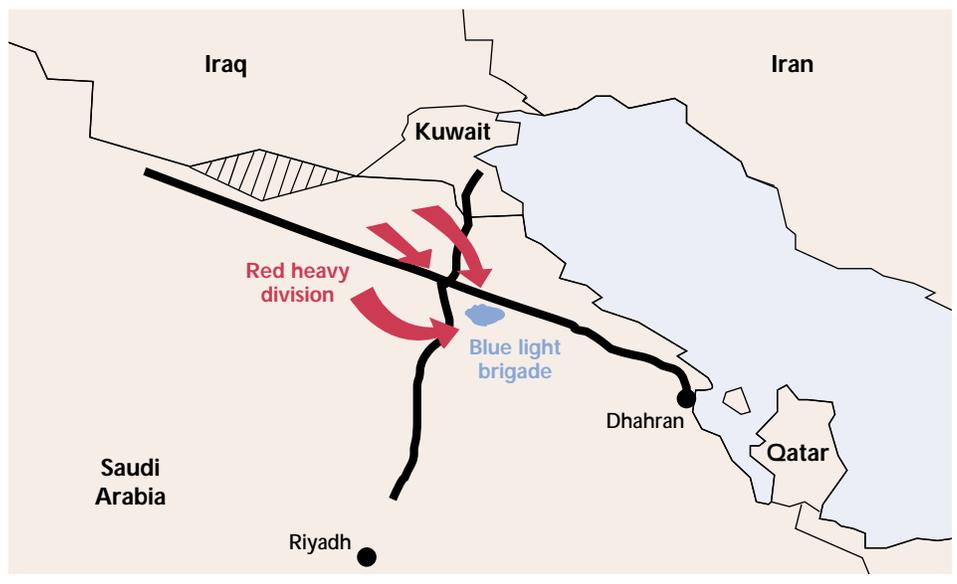


Figure 2.1—SWA Scenario: An Overview

Blue sets up in a large-perimeter (270-degree) hasty defense with a battalion to the north, a battalion to the south, and a company strongpoint in the center (as shown in the JANUS screen image in Figure 2.2). Most of the Blue combat elements, including personnel, are designated as in “defilade” in JANUS and therefore tend to be much less vulnerable to both indirect artillery fire and direct-fire weapons than if they were in the open. Red attempts to envelop the Blue force with two armor regiments to the north and a mechanized infantry regiment to the south. In both the north and south attacks, Red initially uses the existing road networks as much as possible. As the Red force closes with the Blue force, it separates into company-sized columns and then into attack formation. Because the terrain is only moderately trafficable, the travel speed of the Red vehicles is reduced automatically in JANUS as the vehicles move off-road for the attack.

The East Europe scenario. Figure 2.3 shows the East Europe scenario. The basis for this conflict originates from a border dispute, motivated by the goal of ethnic reconsolidation. UN or NATO action involves quick emplacement of allied forces to dissuade an attack. Nonetheless, the attack proceeds without delay and unexpectedly escalates into general warfare involving the U.S. light airborne forces. The figure represents only the U.S. portion of the much larger, allied force defense. (In the graphic, lines represent roads, and cross-hatched areas represent urban centers.)

As in the SWA scenario, Blue once again is in a hasty defensive posture, with Red attacking along multiple axes, and is organized in a large-perimeter defense, optimizing its position in the inherently limited LOS environment (Figure 2.4). In addition to terrain contours that can block LOS, foliage, which is much more prolific in this envi-

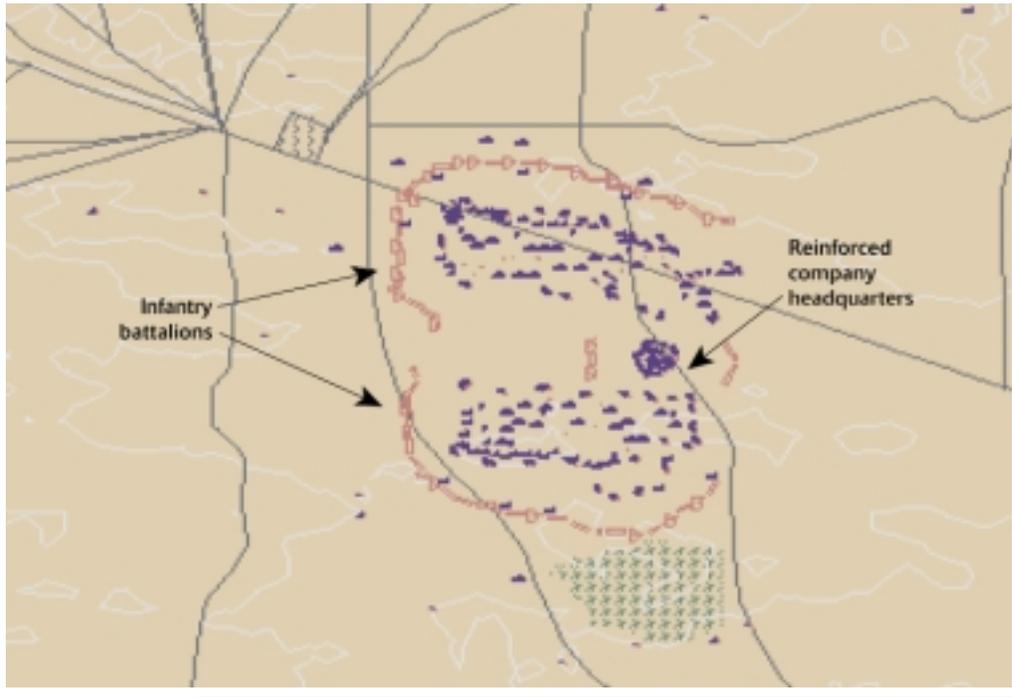


Figure 2.2—Depiction of DRB Hasty Defensive Position in SWA Scenario

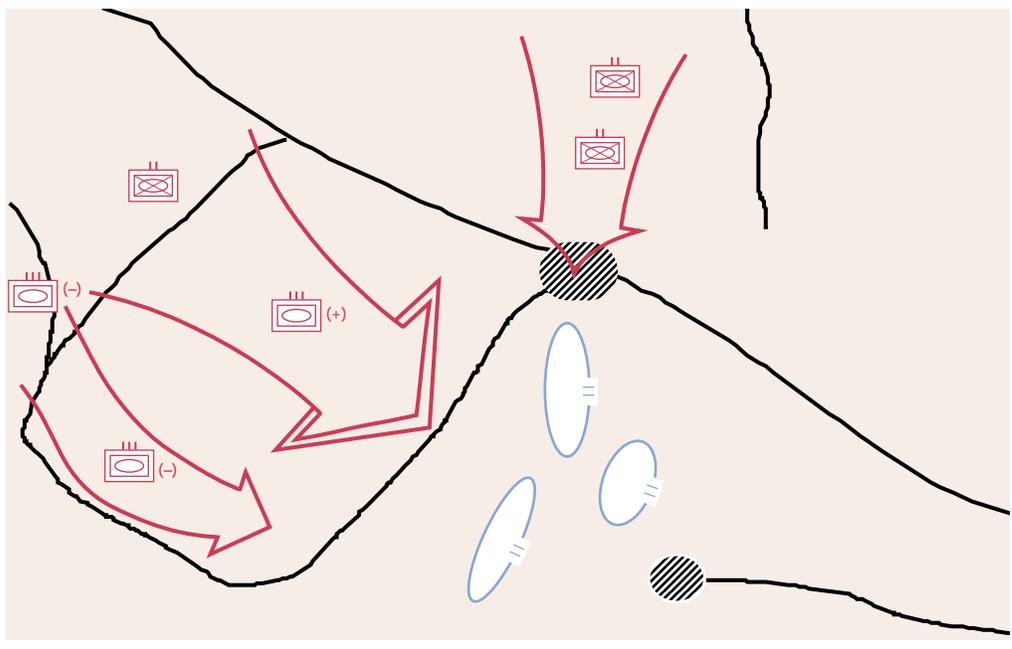


Figure 2.3—East Europe Scenario: An Overview

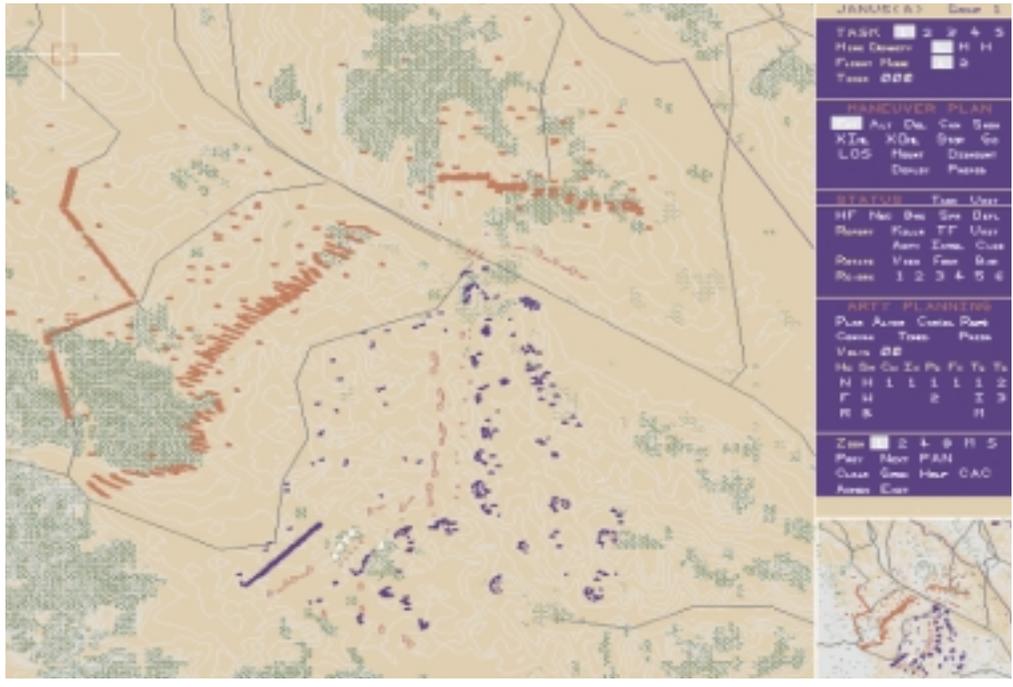


Figure 2.4—JANUS Depiction of DRB Hasty Defensive Position in East Europe Scenario

ronment, provides additional LOS reductions. The armor attack is from the west and the mechanized infantry attack is from the north. The key difference between this scenario and the previous one is the terrain. This environment contains much shorter LOSs and even more limited trafficability, with the typical LOS about 2–3 kilometers in the areas Red chooses to attack.

The LANTCOM scenario. In the LANTCOM scenario, the Blue force objective is to hold a key strategic point, in this case an airstrip for bringing in follow-on forces. Thus, Blue forces need to hold this terrain until heavy reinforcements (which are already en route) can arrive. Figure 2.5 shows the Red and Blue positions at the beginning of the simulation. The Red objective is to destroy the Blue force before reinforcements can arrive. Preparatory fires from Red self-propelled artillery—firing improved conventional munitions (ICMs) and high-explosive (HE) rounds—support the deliberate Red armor attack.

The LANTCOM scenario represents the second phase of a forced-entry operation. The first phase of the scenario involved an engagement with local militia forces, which resulted in some losses to the Blue force. Because the Red main effort does not occur until after this initial engagement, the partially attrited DRB is presumed to have had some time to regroup and establish a hasty defense. In our version of the scenario, we

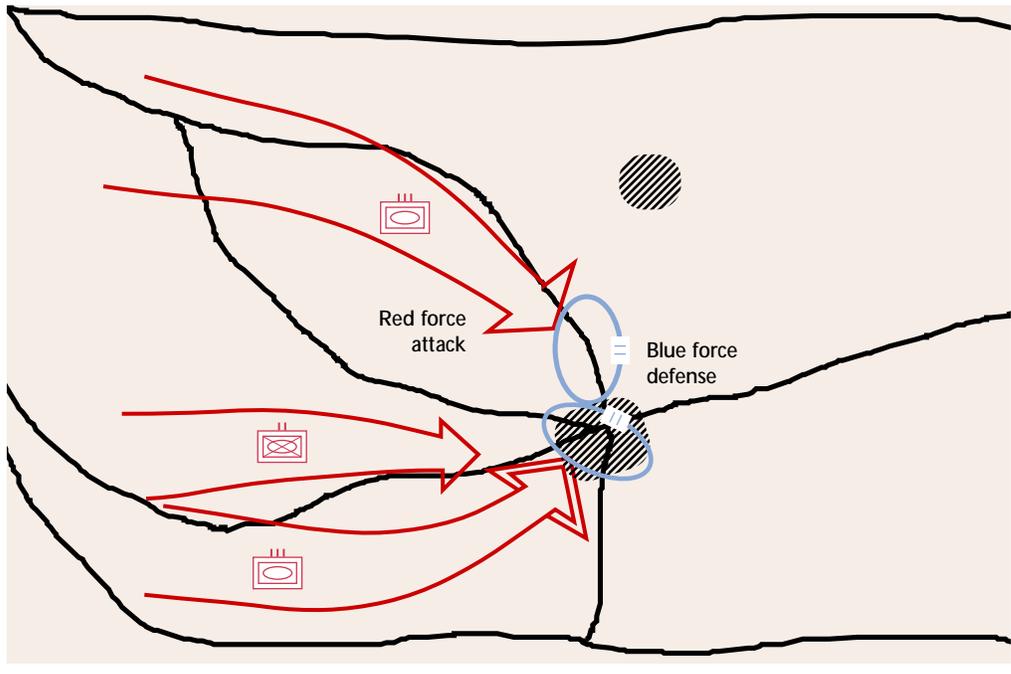


Figure 2.5—LANTCOM Scenario: An Overview

assumed that tactical air (Air Force and/or Navy fixed-wing) was able to conduct interdiction missions as the Red main effort approached the DRB. No close support during the engagement was assumed. Joint Surveillance and Target Attack Radar System (JSTARS) provides initial situation awareness to the Blue commander but does not contribute to the targeting of his indirect-fire weapons. Logistics support elements are not included in the JANUS simulation (although they were included in the airlift analysis).

The LANTCOM scenario is a high-stress variation of a scenario developed by the Army.² Because of its rolling, partially covered terrain, variations of this scenario were used to examine the military usefulness of weapon systems. In this scenario, a partially attrited Blue DRB (following forced entry) faces a substantially larger Red force, a division (-)³ consisting of two brigades and a battalion attacking along three primary avenues of approach, as shown in Figure 2.6.

The attrited DRB (assumed to be at roughly 66 percent strength) is assumed to have enough time to set up a defensive position, complete with extensive ground-based RSTA, before the Red attack. The main body of the Blue force (two battalions) is positioned around a town. Forward of this (to the west) are RSTA systems spread over the likely Red areas of advance. The Red forces in the northeast are moving to block reinforcing Blue heavy forces marching from a seaport off the screen. The area shown is approximately 60 by 60 kilometers.

Table 2.2—Base Case Force Mix for the Three Scenarios

| <i>Scenarios</i> | <i>Blue Forces</i> | <i>Red Forces</i> |
|-----------------------|---|--|
| SWA (Saudi Arabia) | 15 HMMWV-Scouts 58 HMMWV-TOWs 54 Dragons 18 Stingers 6 Apaches 14 Sheridans 8 155mm howitzer 18 105mm howitzer | 323 T-72S (tanks) 219 BMP-2 (APCs) 35 BTR-60 (APCs) 30 120/180 MRL (rocket artillery) 72 152 SPH (cannon artillery) 16 HAVOC/HIND (helicopters) |
| East Europe | Same as above | Same as above |
| LANTCOM | 34 HMMWV-TOWs 4 AGS 24 Javelin 6 Apaches 8 155mm howitzer 18 105mm howitzer | 131 T-72S 131 BMP-2 6 120/180 MRL 12 152 SPH 6 HAVOC/HIND |

The Blue forces shown in Table 2.2 for the first two scenarios are comparable to what the 82nd Airborne DRB consisted of in the Desert Storm time frame (around the time that the initial analysis was performed). Generally, this DRB has one airborne brigade headquarters company, three airborne infantry battalions, one artillery battalion (105mm towed), one air defense artillery battery, one attack helicopter company, one armor company, and one artillery battery (155mm towed). Several points should be highlighted about the DRB's equipment. First, when the analysis was performed the 82nd Airborne was still armed with Dragon anti-tank missiles. Today, the Army has replaced the Dragon with the much more effective Javelin system. Additionally, we included corps-level Apache attack helicopters rather than the Kiowa Warrior, modified OH-58s that the 82nd was armed with at the time we were conducting this simulation. As of the time of this writing, the 82nd is still equipped with the Kiowa Warrior. All told, the DRB includes 4,297 tons of equipment and contains 3,450 soldiers.

The Red forces possess some sophisticated weapons, including T-72S tanks with AT-11 (fire-on-move) missiles, BMP-2 and BTR-60 armored personnel carriers (APCs) with BMPs armed with AT/P-6 missiles, self-propelled 120mm and 180mm multiple rocket launchers (MRLs), and 152mm self-propelled howitzer cannons (2S3), and mobile air defense units (2S6) with radar track linked to both guns and missiles. The enemy does not have sophisticated overhead RSTA and must rely on command vehicle forward-looking infrared (FLIRs) and visual recognition for the direct-fire engagement.

The force mix for the LANTCOM scenario is similar to the one used for the first two scenarios, except that both sides are attrited to reflect the scenario described above. Four armored gun system (AGS) platforms were included in the analysis, since they were envisioned to be a key direct-fire system in the force. Although acquisition decisions have since eliminated this particular program, they are included here as a surrogate for a notional future direct-fire capability.

The SWA scenario is intended to represent the Operation Desert Storm scenario from the Gulf War. Here, we use it to replay Desert Storm—referred to here as Desert Storm II—sometime shortly after the first incursion in 1990 but well before current day. In this base case, the Iraqi active protection system (APS) Shtora present in 1990 was assumed to be upgraded to include direct anti-chemical energy capability. Also, the ZSU-23/4 systems were upgraded to 2S6 systems, which have been on the arms market for some time. Below, we show how the scenario plays out from the perspective of a lieutenant in command of one of the infantry platoons in the DRB.

Experiencing Desert Storm—As It Might Have Been

IT WASN'T UNTIL THE FIRST ROUND ACTUALLY EXPLODED no more than 100 meters from his position that the lieutenant realized that the attack was for real. After the blinding flash from the explosion followed by the thundering boom, there was a numbing moment of reverberating silence. His only real protection was the shallow bunker he and his radio operator had been able to dig less than 24 hours before. He could see no movement around him in the darkness, but he knew enough to know not to move out of position. For it was this shallow cavity that had saved him from the white-hot metal fragments that splintered everywhere just moments ago. With his heart racing, the lieutenant felt that this was by far the most surreal moment of his life. Although they had practiced this kind of mission many times at the NTC (National Training Center at Fort Irwin), now the attack was happening for real. Their objective was to protect a critical road junction that led to both the oil fields to the southeast and the Saudi capital to the southwest. Failure in this mission would mean a much more difficult and drawn-out campaign for the allied force in the future.

That first explosion was only a calibration round. It was followed by a deafening barrage, which landed even further behind him. He knew that the Iraqi forces were trying to destroy his unit's C2 network, but he also knew that they were guessing as to its exact location. His brigade, the 1st Brigade, was the designated DRB of the 82nd Airborne Division. The brigade had reached its defensive positions less than 48 hours earlier. Its soldiers had had enough time to spread out into a hasty defensive position on the desert's local high ground and find the best cover and concealment areas. They fully anticipated a massive artillery prep and took necessary precautions. Nonetheless, as the barrages continued, the lieutenant wondered what losses, if any, had yet occurred.

Because the force airdropped into the area, was foot-mobile, and needed to maintain contact, personnel were only able to disperse over a small area a few kilometers on a side. They were able to dig protective foxholes and use the low-lying brushy foliage for camouflage.

As soon as the enemy artillery fire paused, he heard confirmation coming through his single channel ground and air radio system (SINCGARS) from his company commander that the Iraqi armor was, in fact, on the move. They were 30 kilometers out, northwest. Intelligence was indicating a regiment-sized unit heading east to maneuver for an attack from the north. His infantry battalion was protecting the northwestern front, and his company commander said that

based on the latest information, their company would not see the first of the fighting. Two other Iraqi regiments were reported to be moving in the same area, the first following the lead regiment and the second heading south; neither was fully committed at this point.

The latest round of intelligence reports estimated that contact with the first enemy regiment would occur within two hours on the northern front. Although the artillery bombardment continued, not surprisingly, the effort was now clearly being focused on the northern front to “soften it” for the subsequent maneuver attack.

It wasn't until half an hour after the lieutenant's position started receiving fire that a report came through, passed down from the tactical net (TACNET), that friendly air strikes were inbound. He guessed these were the F-16s coming out of Doha. Although he knew he would not be able to see them, he listened through the bombardment for their presence. Unable to hear or feel the familiar sound of the massive gas turbines mounted on the aircraft (a sound he had learned to appreciate during the exercises at the NTC), he was able to clearly distinguish the “popping” of friendly rounds to his rear. He determined that the enemy must be in range of the 155mm towed howitzers, maybe even the 105mm, about 15 kilometers away. He thought of the DIVARTY Q-36 counter-fire radars he had seen at NTC. Surely these were now directing American fires at the enemy guns. It wouldn't be long now before the enemy arrived.

He envisioned masses of T-72s, the enhanced versions, some equipped with APS, rapidly approaching in attack formation to dislodge his dug-in unit. He knew his unit's job was to stop the attacking armor—as many of them as they could, anyway. His platoon's primary anti-armor weapon was the Dragon anti-tank missile. Although his men had substantial training with the Dragon, he knew its range of less than 1,000 meters would put his gunners well within the range of most enemy direct-fire systems, and casualties were very likely. Nervously, the lieutenant took a quick trip around the platoon's positions, checking on camouflage and reassuring his men.

The report came through from the TACNET. Although transmitted and passed down to him in pieces, the report indicated that the air strike was over. Leaving his platoon sergeant temporarily in charge, he scampered off to company HQ to see what information was available. Once there, it was apparent that the fire support team chief was getting some information by listening in on the DIVARTY Command Fire net. From what information was passed, he was able to determine that a portion of the enemy vehicles were successfully engaged while on the road. The JSTARS provided a good cue for the mixed strike package of F-15Es and F-16Cs, both armed with unguided bombs and Maverick missiles.

Although a large number of aircraft were compressed into enemy airspace, amounting to about two squadrons' worth of strike aircraft (some 48 fighters) dedicated to interdicting the enemy advance, only about 30 vehicles were notably damaged on this attack. Part of the reason for this much lower than expected effectiveness was the enemy's highly automated, preplanned maneuver reaction once the air attack commenced. The enemy formation quickly and methodically dispersed into what was essentially a variation of their attack formation, effectively reducing their density to the massed smart munition attack from above. As a result, most of the smart munitions detonated harmlessly into the soil below, with most of them never even having a chance to engage the enemy armor.

The effectiveness of the 155mm and 105mm tube artillery similarly was lower than expected. Munitions that were fired against the attacking armor consisted of high-explosive (HE) and dual-purpose, improved conventional munition (DPICM) rounds. The ability to kill moving armor with HE and DPICM was truly tested here. The 155mm towed howitzers fired hundreds of rounds during the enemy's attack. Even though updates on enemy movement were being sent by the forward-emplaced scouts, who served as the forward air controllers, only two kills of enemy vehicles were registered. The battlefield damage assessment (BDA) was being confirmed by overhead intelligence assets.

While both air and artillery strikes against the enemy armor clearly should have had a demoralizing effect on the enemy, the latest intelligence reports indicated that the attack was still continuing and moving at a very fast rate. More information indicated that the two-regiment enemy attack from the north was breaking into two distinct attacks, one heading to the north of the DRB and one heading to the northwest. The third enemy regiment was conducting a more extensive maneuver operation, which appeared to be a flank attack to the south of the DRB. All three regiments appeared to be fully committed at this point. Essentially, the enemy had maneuvered to cover nearly 180 degrees around the DRB. The lieutenant's company commander told him that he had better get back to his platoon position. It would not be long now.

The last hope to preclude a direct-fire engagement with the dug-in light forces were the Apache AH-64s from XVIII Airborne Corps that had landed with the ground force. This system was the most taxing of the force to make functional. They were painstakingly reassembled and then carefully readied for attack—each Apache was armed with 16 Hellfire missiles, which were cued by the advanced Longbow millimeter wave (MMW) radar and fire control system. As the enemy closed for attack, the plan was to use the Apaches to provide a circle of protection for the ground forces. Although few in number, these systems had proved in many previous analyses and exercises to be highly lethal against moving armor.

Had it not been for one enemy system, the Apaches might have succeeded in their defense. As it turned out, just a few years earlier the enemy had acquired and trained quite extensively with the state-of-the-art Russian Tunguska 2S6 tactical anti-aircraft system. Not only did this system have two 30mm 2A38 twin-barreled, liquid-cooled guns electronically steered by a radar, it was also equipped with eight laser-guided surface-to-air SA-19 missiles. While the guns could only reach out to 4 kilometers, the supersonic missiles could reach out to 8 kilometers. It was these missiles that were the Apaches' nemesis.

Now back in his foxhole, the lieutenant could see two Apaches move into position to establish their "ring of defense" to protect the men on the ground and the objective behind. He sought and found some comfort in the firepower contained in these systems, which seemed so close. They reminded him of tanks rather than aircraft, especially when they were moving slowly and hovered only a few feet above the ground. Looking around, he could see some of his men peering out from their fighting positions. Clearly, they were excited to see the powerful Apaches. Flying low, it appeared that the Apaches would be almost impossible to see, even by the 2S6 Tunguskas. However, to allow the Longbow radar a chance to "see" the battlefield, the Apaches had to increase their altitude if only

for a moment. As he thought through the range of attack options, in one swift motion he saw the first Apache rise to take its look, getting its cue from the scouts in front. The Apache had risen no more than 30 feet when something happened that he had never seen before. There was a bright streak, a small white explosion, and then a larger yellow-orange one. The helicopter began to cant harshly and awkwardly. It had been hit, and it was on its way back down to the ground. Although he was expecting to hear another explosion, as the Apache fell below his line of sight there was hardly an audible sound of the impact over the other battlefield fire. Perhaps the pilots made it out okay.

While this was occurring, the second Apache was able to complete its look. When it was back in a relatively low, safe position, he saw it launch one, two, and then three Hellfires. He could not hear the subsequent explosions afar or see whether they had found their targets. Already the Apache was moving to a new location to repeat its attack. Of the six Apaches dedicated to the fight, two were lost. The remaining four returned to the forward area arming and refueling point (FAARP) to get a new supply of Hellfires. Getting out of his foxhole, the lieutenant crawled to a small nearby knoll to get a better look. Out in front of the company's position, he could see burning vehicles. All told, the Apaches collectively killed fifteen enemy vehicles—a help but nowhere near enough to stop the attack.

Unlike previous transmissions, this time his SINCGARS roared, seemingly with a life of its own. The messages were loud, frantic, and garbled. The direct-fire battle on the ground had now begun. Although the DRB was occupying a considerable amount of terrain, with the contrast between the darkness of the night and the brightness of the weapons, the battle to his right flank seemed very close. The first direct-fire weapons to be fired were the relatively long-range TOW missiles, which were mounted on high-mobility, multipurpose wheeled vehicle (HMMWV) platforms. He could barely see the outline of the enemy to the north through his FLIR. A quick sweep over the horizon showed no targets in his platoon's area of responsibility.

One thing he had to remind himself of was that he would likely see the enemy well before he could engage them. With the use of a night sight, his gunners would detect enemy targets out to about three kilometers, but the range of the Dragon missile was less than one kilometer. He would have to wait patiently before engaging the approaching enemy.

Although he had tried to mentally prepare for the armor attack over the past two hours, when it came it looked nothing like what he had envisioned. For some reason, he was expecting 10 or 12 targets, maybe a few more that would encroach within a larger wave. As the enemy tanks emerged over the horizon, they were massed in one local area, not nearly as spread out as he had thought. Headed directly toward him were about 50 tanks. His heart sank. Although he knew that there were sixteen HMMWV-TOWs just to his rear, he also knew they were hopelessly outgunned. He also realized that his infantry company had about six Dragon teams protecting that same western front—and they would have to take whatever the HMMWV-TOWs could not.

The TOWs were fired as soon as the enemy entered into range. Through his FLIR, he could see some of what looked like T-72s being hit by the missiles. There were certainly other vehicles, maybe BMPs that were also among the disabled. Oddly enough, he could also make out the hemispheric explosions centered around some of the tanks; these were the telltale signs of the tanks' APS. In the

distance and to his flank, several tanks appeared to be burning or smoking. Yet most of the attack was still coming.

He could see flashes emanating from the enemy tanks' muzzles indicating that they were firing back, but at this point the enemy was still too far away to pose a threat to them. The artillery was different. Within two or three minutes of the TOWs opening fire, the enemy artillery started bombarding the area to his rear from where the TOWs were firing. He hoped that there would be another F-16 air strike, but he knew there was no way the aircraft could be turned around fast enough. Similarly, a second wave of Apaches was not available to help with this fight. No, this battle was now theirs and theirs alone. He anxiously monitored the massive formation of approaching T-72s. As they quickly moved into range, he silently said a prayer and radioed to his Dragon teams to get ready to open fire. The knowledge that the Dragons could not start shooting until they were themselves well within the range of the enemy tanks' onboard machine guns was now his main concern.

After-Action Reports of the Three Scenarios

Clearly, the outcome of the battle in Desert Storm II, played out in the SWA scenario, is not a good one for Blue forces. The real question is, “what happened during the battle?” And, of course, we are also interested in the analogous results for the more stressing scenarios of East Europe and LANTCOM. Here, we take a look at the three base cases for the scenarios in the form of after-action reports—analyses of the outputs of the simulation model runs for the three cases in terms of some key outcome measures.

When we look at the simulation results of battles to determine how well the DRB performed against its adversary (here and elsewhere in the book), we focus on one outcome measure among others: the loss-exchange ratio (LER). The LER captures the ratio of Red losses to Blue losses, and the numbers shown in the results signify the mean of at least 30 JANUS-based runs.⁵ It is important to remember that in all scenarios, Red forces significantly outnumber Blue forces (even in the attrited case of LANTCOM); thus, low ratios (even though positive for Blue forces) still result in poor overall battle outcomes. LERs are used because they constitute one objective measure of force performance. In actuality, the LERs vary considerably across the span of a simulated battle (where possible the LER is shown as a function of time); thus, the “final” LER reported is often only a representative and relative measure of force performance. Beyond LERs, we also examine other outcome measures, including target kills per system for the Blue forces and Blue force survival by system at the end of the battle.

Across all three scenarios we found a number of similarities. Because the DRB was intentionally deployed into a situation where it was greatly outnumbered, it was no surprise that in all three scenarios, *the current or base case DRB could not sustain a defense against the larger attacking armor force*. Interestingly enough, although the DRB does not have the firepower to repel the attack of the larger force, it does achieve respectable LERs toward the end of the battle (between 3:1 and 5:1, depending on scenario). Most of this is a result of a very intense direct-fire battle. Also similar

across all three scenarios, the DRB either draws or loses the initial indirect-fire portion of the battle. Although such simulation results need to be taken in context, we believe that there is enough evidence to suggest that this part of the battle in particular represents one of the key limitations of the current DRB. The following discussion amplifies on this conclusion.

Figure 2.7a shows, for the two similar scenarios, the LER over the course of the simulated battle, which runs 75 minutes for the SWA and East Europe scenarios. (Figure 2.7b shows the LER over 55 minutes for the LANTCOM scenario.) Looking first at the SWA and East Europe scenarios, the LER over time shows how the respective battles unravel. In the first few minutes, during the indirect-fire battle, very little attrition occurs, simply because the forces are positioned out of range of each other. As the Red force begins its advance toward the DRB, the DRB begins to fire its artillery. Although the attacking Red combat vehicles are relatively lucrative targets at this initial phase (when they are moving in columns), the limited lethality of the dual-purpose improved conventional munition (DPICM) rounds and the inability of HE rounds to hit moving targets produced very low lethality. Likewise, because the DRB is in defilade, the Red artillery preparatory fires also yielded relatively low lethality. LERs were between 1:1 and 2:1 for the DRB across both scenarios at this stage of the battle, being slightly higher in East Europe because the Red armor, with its slower-moving vehicles in the tougher terrain, is more susceptible to artillery fire.

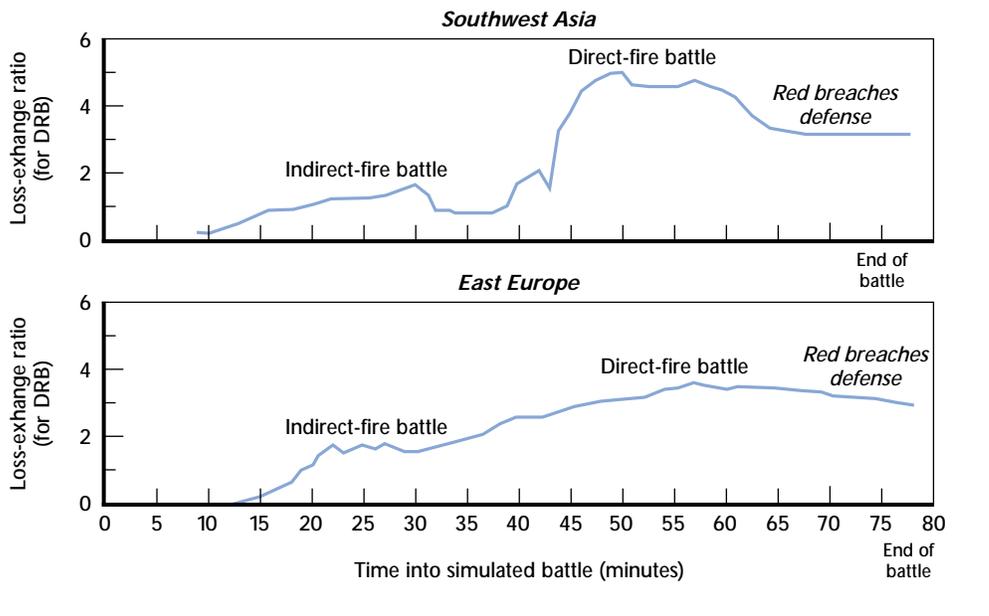


Figure 2.7a—LERs Over Time for SWA and East Europe Scenarios:
Base Case DRB (Fixed-Wing Aircraft Kills and Losses not Included)

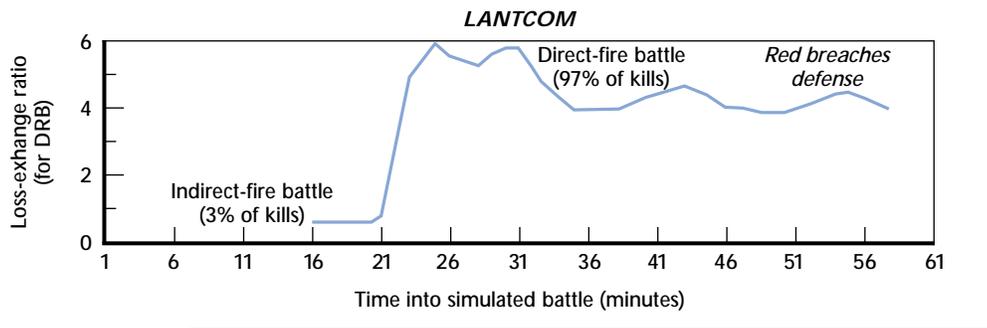


Figure 2.7b—LER Over Time for the LANTCOM Scenario: Base Case DRB (Fixed-Wing Aircraft Kills and Losses not Included)

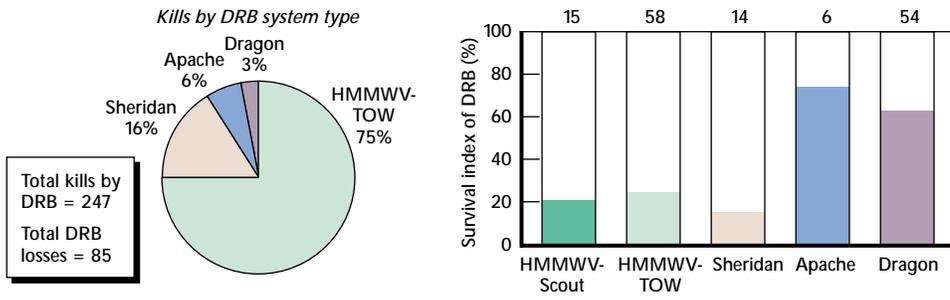
Attrition on both sides begins to occur at a more rapid rate during the direct-fire, close battle. The front line of the direct-fire battle for the DRB is the Apache/Hellfire attack. Even though the Apaches are assumed to stand off (because of Red’s highly capable enemy air defense), they typically can see farther and attack first because of their ability to improve their LOS with altitude. This was the case in SWA; however, the terrain in East Europe precluded a successful Apache standoff attack. As the direct-fire battle progressed, other direct-fire assets—HMMWV-TOWs, Sheridans, and Dragons—participated. Although the DRB systems tend to have a range advantage over the enemy systems, the massive attack by Red quickly became the deciding factor. The LER in both cases—which rose as high as 5:1 in SWA and 3:1 in East Europe—dropped as the DRB defense was breached at the end of the simulated battle. As was mentioned earlier, it should be noted that the Army has replaced its Dragon systems with Javelins. However, since the cancellation of the AGS, there is no immediate replacement for the Sheridans that were included in this base case scenario.

Turning to the LANTCOM scenario shown in Figure 2.7b, we see a similar story. The base case Blue DRB shows a very low LER for the indirect-fire battle in the first 20 minutes. In effect, it is losing the indirect-fire battle against the overmatching Red long-range artillery. The Blue LER increases as the engagement moves into the direct-fire phase, but Blue is still penetrated and overrun. The final LER—as shown in the figure—is 4:1.

We now turn to how individual systems performed during the simulated battle. Figure 2.8a shows simulation results at the end of battle (after the breach of the DRB defense) in terms of kills for the individual systems for SWA and East Europe; Figure 2.8b shows the detailed results for LANTCOM. Again, we start with the similar SWA and East Europe scenarios.

In the SWA scenario, 247 Red systems were destroyed by the Blue force, while in East Europe 279 systems were destroyed—mostly by the HMMWV-TOWs, as shown in the pie charts. Looking at the bar charts to the right, however, we see that relatively few systems of the original Blue force remain. The numbers above the bars show the

Southwest Asia



East Europe

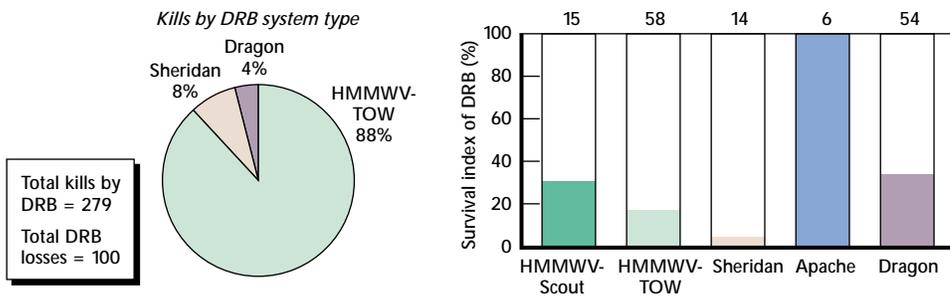


Figure 2.8a—Simulation Results at the End of the Battle for SWA and East Europe Scenarios: Base Case DRB

total number of systems at the start of the conflict; the colored bars reflect the percentage of the force remaining. Thus, in the case of the HMMWV-TOWs in the SWA scenario, there were originally 58 at the start of the battle, with only about 25 percent or 15 remaining at the end of the battle. With the exception of the Apaches, which fly only a single mission in the 78 minutes of simulated SWA battle (and which do not play at all in the East Europe battle), the Blue force suffers very high attrition.

In the SWA scenario, the Red force penetrated the DRB defense in the north by committing one armor regiment to lead the attack, with the second armor regiment following closely in reserve. At the time of breach, the second regiment was almost completely intact. In the East Europe scenario, the Red force was able to turn the southern flank, penetrate the Blue force, and destroy it.

What is the primary reason the Blue force does not survive the Red attack? We can directly attribute the outcome to the “close-in” location of the engagements. More specifically, Blue’s two primary killers, the HMMWV-TOWs and the Sheridans, engage at points on the battlefield where they are exposed (within the LOS of the missiles and main guns of enemy systems). Even though the DRB has some sensor and weapons range advantages over the assumed capabilities of the attacking force, it is only a mat-

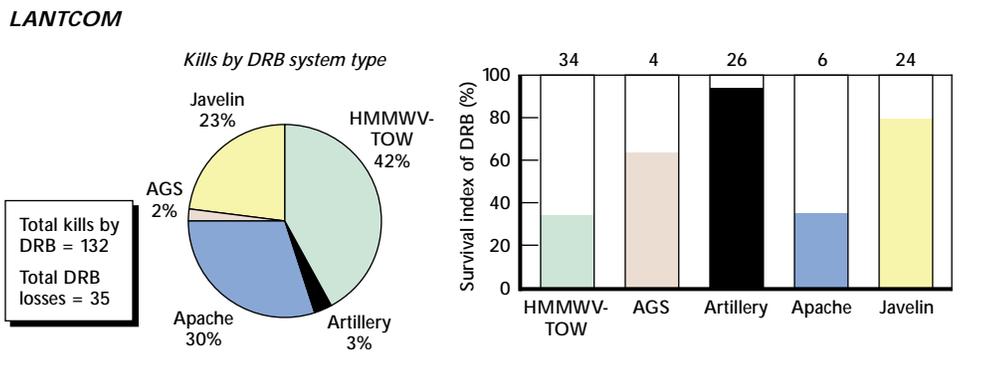


Figure 2.8b—Simulation Results at the End of the Battle for the LANTCOM Scenario: Base Case DRB

ter of time before Blue is overwhelmed by Red’s larger force. Many of the engagements occur relatively late in the simulated battle at relatively close range (well within 4 kilometers), even in the relatively open terrain of the SWA scenario.

When we look at the LANTCOM scenario target kills per system in Figure 2.8b, we see that about 132 Red systems are destroyed by the Blue force. As was true in the SWA and East Europe scenario, most of these kills come from the HMMWV-TOWs. And once again, the Blue force suffers very heavy attrition, losing more than half its TOWs and Apaches, as well as about half its AGS platforms.

In summary, then, when we analyze the DRB performance in the different “spaces” of the battle—indirect fire and direct fire (close battle) for the three scenarios—we see a fairly clear story. First, in examining the indirect-fire battle, we see that the current artillery systems, towed 105mm and 155mm howitzers and the associated rounds (DPICM and HE) do not provide significant attrition against the armored, mobile Red force. Next, in the close battle, we see that the direct-fire weapons of the DRB outperformed those of the attacking force. With longer-range sensors and weapons reach, the DRB was generally able to start the close fight before the attacking force could. But this advantage was short-lived. As the Red force continued its advance, the DRB range and reach advantage was reduced, resulting in a notable drop in the overall LER.

At the end of the close battle or time of breach of the DRB defense (58 minutes into the simulation),⁶ we gathered statistics to determine whether the Red force was likely to continue the attack. As it turned out, at this time in the battle, both forces suffered relatively high attrition. The Red force had roughly 70 percent of its forces intact. Likewise, the DRB had 70 and 65 percent of its forces intact, in the SWA and East Europe scenarios respectively. However, because of the much closer parity of exchange at this time in the battle, with Red having a much larger overall force remaining and Blue having very few mobile systems, the breach of the DRB defense is altogether likely, resulting in a catastrophic loss.

Chapter Summary

This chapter examined how a current DRB from the 82nd Airborne Division might fare against a capable, division-sized enemy armor heavy force. The results are not encouraging. Even with air and attack helicopter support, the current-generation light force proves to be at a significant disadvantage.

The main shortfalls across all the scenarios were as follows:

- Limited capability to locate the rapidly approaching enemy force.
- Inability to inflict enough damage on the advancing enemy armor with today's indirect-fire weapons, leading to an intense direct-fire engagement.
- Vulnerability of the current generation of direct-fire systems.
- Very limited tactical mobility.

Finally, the current U.S. force was not well protected from enemy fires of all types.

The results did vary by terrain type. Interestingly, the DRB did relatively better in the open terrain of SWA, where its TOWs could exploit their long range, whereas in the closer terrain of Eastern Europe and LANTCOM, the outcomes were worse, since the enemy could close the range into a more advantageous direct-fire battle.

Although the DRB always destroyed more enemy systems than it lost, the kill ratio—the LER explained earlier—was not sufficient to prevent the enemy from penetrating the DRB's positions, because of the enemy's numerical advantage. In the next three chapters, we explore the three different paths outlined earlier for improving rapid-reaction force capability.

CHAPTER TWO ENDNOTES

- 1 Modeling and simulation is used here as a method for analyzing force-on-force performance only. Although battlefield systems are played down to the vehicle and soldier level, they are treated as entities and are "played" out by their physical characteristics and performance limitations rather than psychological or behavioral ones. Also, the simulations are often run well beyond the likely termination of a battle, for the purposes of collecting data in an effort to answer the question "What might have happened?"
- 2 TRAC High-Resolution Scenario 33.7.
- 3 The designation "division (-)" indicates a division made up of less than the normal three brigades.
- 4 Detect, recognize, and identify are formally distinguished in the JANUS combat simulation through application of the Johnson criteria; JANUS uses the U.S. Army Night Vision electro-optical detection algorithm to determine sensor-to-target performance.
- 5 In general, the lower the ratio, the worse the outcome is for Blue forces in the battle. In other words, LERs below about 5:1 or 6:1—i.e., the loss of 5 or 6 Red systems (elements) for every 1 Blue system (element)—usually mean that Blue forces lose the battle. LERs up to around 9:1 generally signify a draw for Blue forces, while LERs above 10:1 usually constitute a Blue win—i.e., Red is defeated in place and Blue has sufficient systems to continue to fight another engagement.
- 6 Approximately one hour (more specifically, 58 minutes) is an important time in the battle, nearing the end of the close fight; this represents Red's likely decision time for its forces to continue or call off the attack.