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## Chapter 2

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# DESERT SHIELD

*After Highway 127 from Chattanooga tops Signal Mountain, it begins a steep, winding descent into the emerald green Sequatchi River Valley and turns sharply east into Dunlap. Although Ken Stephens made the trip nearly every week, he never tired of driving down the rugged ridge lines thick with birch, oak, and pine. Once over the Sequatchi Bridge, just into Dunlap, he usually grabbed a biscuit and coffee at the Win-Bob Drive-In (two places to eat—here and at home) before passing completely through town and pulling into the old glass-fronted automobile dealership that served as home to the 212th Engineer Company, Tennessee National Guard.*

*Staff Sergeant Ken Stephens' call to active duty came as no surprise. He had quietly resigned himself to that reality some time ago. His wife and friends remarked that he never seemed to get excited about much of anything, even war. He anticipated hardships because he was fairly sure his electrical and plumbing business was not healthy enough to make it through his absence. But if he were lucky, he might find a permanent place in the Signal Mountain police force when he returned. Stephens' brother had been tragically killed in Cambodia in 1970, so he really didn't have to go. But 67 percent of his company were Vietnam veterans, many of them wounded in that conflict, and the town still looked to soldiers, past and present, with a special sense of belonging and pride. He never seriously considered staying back.*

*His vertical construction squad assembled in the armory on October 11, 1990. The 212th was a close outfit. Stephens had spent seven years as an artilleryman in the regular Army, serving in Texas, Oklahoma, and Germany, but he had never been around men more tightly drawn together than this bunch. Steve Brady, a draftsman from Nashville, was also a staff sergeant and his assistant. The others*

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were all highly skilled: an ironworker, a truck driver, a water well driller from Tip Top over in Bledsoe County, and a student from Tennessee Tech who felt somewhat out of place surrounded by so many skilled tradesmen who knew each other so well. All were fiercely independent and, like Stephens, quietly confident. They were used to working for themselves and to working out problems without a great deal of supervision, especially from the top. Stephens was convinced that, collectively, his squad had the experience and practical savvy to build anything. Within 30 days, they would get the chance to prove themselves in the heat and blowing sand of Saudi Arabia.

The peculiar thing about the 212th in Saudi Arabia was that nothing in the outfit seemed to break. The Guardsmen in Stephens' squad had been trained as carpenters and plumbers, but they spent most of their time operating well-used graders, bulldozers, and dump trucks, doing road work. A closer look at the company's night laager would reveal enough disassembled machinery, all scattered out over tarpaulins and greasy plywood sheets, to fill Barker's Garage on Rankin Avenue. Truck headlights illuminated the scene as squad members worked late into the night rebuilding engines, transmissions, and other major assemblies. Radiators that ruptured in the desert heat were a constant problem, but a sergeant in the second platoon who owned a Midas shop in Chattanooga had no trouble jury-rigging the company's arc welder to braze broken radiators. Hydraulic seals ruptured constantly, but Sergeant "Mutt" Mills had less problem fixing those than he did keeping his ancient water well-drilling rig in action back in Bledsoe County.

A few days before the war began, Stephens and his squad carved their way through the border berm and continued to build a six-lane road 6 miles deeper into Iraq. Mistaking them for Iraqis, a combat patrol from the 101st Airborne stumbled on the squad nonchalantly working away in enemy territory. The Guardsmen were stripped to the waist, with handkerchiefs and goggles fixed to their faces. They had neither the time nor the inclination to explain their presence over the berm. Nor were they terribly disturbed to discover that they were among the first American soldiers to drive into enemy territory—in dump trucks and graders.

In less than half a year, tens of thousands of soldiers like those in the 212th Engineer Company transformed a relatively undeveloped region in Southwest Asia into a combat theater capable of sustaining two Army corps. The soldiers from Dunlap were essential elements in a process that, over the course of Operation Desert Shield, picked up the equivalent of the city of Atlanta, with all its population and sustenance, and moved it



Staff Sergeant Ken Stephens, 212th Engineer Company, Tennessee National Guard.

more than 8,000 miles to Saudi Arabia. Accomplishment of this feat required the unloading of 500 ships and 9,000 aircraft that carried through Saudi ports more than 1,800 Army aircraft, 12,400 tracked vehicles, 114,000 wheeled vehicles, 38,000 containers, 1,800,000 tons of cargo, 350,000 tons of ammunition, and more than 350,000 soldiers, airmen, marines, sailors, and civilians. Within the theater, 3,568 convoys of supply trucks covered 35 million miles, traversing 2,746 miles of roadway in Saudi Arabia and Kuwait.<sup>1</sup> Many of these roads were carved out of barren

desert or improved by highly skilled soldiers like the citizen-soldiers from the 212th. More than 70 percent of the manpower dedicated to building the combat theater in Saudi Arabia came from the Army National Guard and the Army Reserve.

### **AMERICAN MILITARY INVOLVEMENT IN THE GULF**

The United States Army acquired an active operational interest in the Persian Gulf after the fall of the Shah of Iran in 1979 precipitated a series of unsettling events that threatened the world's oil supply. No one at the time could foresee how the Ayatollah Khomeini intended to carry out his threat to punish "the Great Satan" for its role in supporting the Shah. Equally disturbing was the growing truculence of the Soviets in the region. Since the days of the tsars, the Russians had sought expansion through Iran to a warm water port on the Indian Ocean. Suspicions became more acute with the Soviet invasion of Afghanistan that same year. Suddenly, a nightmare scenario took shape for the Carter administration. What if the Soviet adventure were just the opening round of a more ambitious scheme to encircle and absorb Iran by invasion from Soviet and Afghan territory? The subsequent Carter Doctrine, which declared any invasion in the region to be a threat to vital United States' interests, was a symbolic first step to counter Soviet expansion. A physical expression of new American resolve came with the formation of the Rapid Deployment Force in 1979.

The forces the Joint Chiefs initially allocated to the Persian Gulf mission were more symbolic than real. The Rapid Deployment Joint Task Force consisted mainly of a planning staff headquartered at MacDill Air Force Base just outside Tampa, Florida. While the Navy had maintained a presence in the Gulf since 1948, plans for committing Army forces in Southwest Asia were not made until Iran was threatened with a Soviet invasion. On January 1, 1983, the task force became one of six United States multi-Service commands and was renamed Central Command, or CENTCOM, with specified theaters of operation in the Persian Gulf and Northeast Africa. Although designated a joint command, CENTCOM had no troops stationed in its area of responsibility. The regional nations, led by Saudi Arabia, were willing to accept assistance in the form of equipment and training, but only Bahrain was willing to allow the stationing of American forces on its soil. Tiny Bahrain welcomed American presence, permitting the Navy to maintain its Middle East Task Force Headquarters at Manama.

Two debilitating and seemingly intractable wars served to lessen the immediate threat to the Gulf oil supply. Saddam Hussein's surprise attack against Iran in 1980 put on hold any inclination by Khomeini to cause mischief. Likewise, any latent Soviet designs on Iranian oil and ports became secondary to the more pressing military challenge posed by

Mujahadeen freedom fighters in Afghanistan who fanatically and skillfully fought the Soviets to a stalemate. Both wars created a tenuous, yet convenient, strategic impasse in the region and made further expansion by any of the three major warring powers unlikely.

Late in the Iran-Iraq War, however, Iranian attacks against Gulf shipping grew more intense, particularly against Kuwaiti tankers in response to the Emirate's support of Baghdad. The United States' response was Operation Earnest Will, the reflagging and limited escort of Kuwaiti tankers in the Persian Gulf, supported by United States Army helicopters. Slightly more than two years later, the United States would again come to Kuwait's assistance, this time against Saddam Hussein.

### ANTICIPATION

General Schwarzkopf became Commander in Chief of CENTCOM on November 23, 1988. Burly, emotional, and brilliant, Schwarzkopf earned the handle "Stormin' Norman" early in his career primarily because of his outspoken personality and his volcanic outbursts. Most often he lost his temper in response to the frustrations that any commander encounters when dealing with the sometimes glacial pace of military bureaucracy. To those unfamiliar with his unique style, he had a dreadful "shoot-the-messenger" reputation. Those who knew him well, however, understood that underneath his awesome exterior was a deeply compassionate soldier who always considered the welfare of his soldiers his first priority.

Schwarzkopf was one of the first to see how the changing world environment might shift the Army's strategic focus from Europe back to his particular corner of the world. Iran and Iraq chose to end their mutually exhausting war in 1988 after more than eight years. Shortly thereafter the Berlin Wall came down, signalling both an end to the Soviet Union as a threat in Europe and a decline of Soviet influence in the Middle East. With a huge, well-equipped Iraqi military at loose ends, Schwarzkopf realized that the Iraqis had replaced the Soviets as the most serious threat in the Persian Gulf. In November 1989 Schwarzkopf directed that the plan addressing a possible Soviet invasion of Iran, OPLAN 1002-90, be revised as soon as possible to reflect an Iraqi invasion of Kuwait and Saudi Arabia. In December the JCS granted him permission to shift the geographic focus of the biennial Joint Chiefs' war game from Iran to Saudi Arabia.

To test how the command might deploy to blunt such an Iraqi invasion, the CENTCOM staff put together in record time a remarkably fortuitous and prophetic exercise, INTERNAL LOOK 90, which ran from July 23 through 28 concurrently at Fort Bragg, North Carolina, and Hurlburt Field, Florida. The exercise postulated an Iraqi attack into Saudi Arabia with six heavy divisions. In the plan's scenario, XVIII Airborne Corps was given sufficient time to deploy to the region and to establish a defense in eastern Saudi Arabia before the attack began. The corps

defended northern Saudi Arabia by blocking the Iraqis with the 82d Airborne and the 24th Infantry Divisions. The 101st Airborne Division (Air Assault) became the corps' covering force. While just a battle on paper, INTERNAL LOOK proved to be a sobering exercise. Iraqi armor, though badly mauled by helicopters and tactical aircraft, continued to advance as far south as al-Jubayl, nearly 200 kilometers deep into Saudi Arabia. The airborne corps succeeded in holding Dhahran, ad-Dammam, and the Abqaiq refineries, but at a cost of almost 50 percent of its fighting strength.

INTERNAL LOOK was a joint exercise with all Services and component commands represented and thoroughly integrated. For example, the corps battlefield coordination element (BCE) deployed to the Ninth Air Force Tactical Air Control Center at Eglin Air Force Base, Florida, and coordinated air and ground operations just as it would later in Desert Storm. INTERNAL LOOK provided an essential common framework to participants during the war. When actual deployments began during Desert Shield, planners would routinely remark, "We did this on INTERNAL LOOK."

INTERNAL LOOK underscored for logisticians the idea that any intervening force in the region would heavily depend on Saudi support for survival. The main tactical lesson from the exercise was that no matter how much Air Force and attack helicopter reinforcement the allocated forces had, they would have a tough time confronting Iraqi armored formations. Most important, INTERNAL LOOK emphatically demonstrated what CENTCOM planners had known for some time, that a serious shortage of sealift posed the greatest single element of risk associated with such an operation. Should the United States move to check an Iraqi invasion, the decisive advantage would rest with the side that managed to arrive at the critical point in the theater first with the most combat power. After the exercise, Schwarzkopf resolved to give ground combat units first priority for deployment by sea.

## THE IRAQI INVASION

In mid-July 1990 Saddam summoned Lieutenant General Ayad Futayih al-Rawi, commander of the Republican Guard Forces Command, to his palace. The Iraqi president ordered al-Rawi to begin preparations to invade Kuwait. While al-Rawi was a Shia in an inner sanctum of Sunni thuggery, he gave Saddam the unquestionable loyalty typical of a grateful interloper. Al-Rawi realized full well that his future in the regime, not to mention his life and the lives of his family, rested on his performance in the coming war against Kuwait.

Al-Rawi had commanded the Republican Guard in its most successful offensive against Iran. In a quick series of battles between April and July 1988, al-Rawi's elite corps made the difference between continued

stalemate and victory. He applied the offensive lessons of those attacks to his plan to conquer Kuwait. His first principle was to apply overwhelming force. Al-Rawi would be killing a flea with a sledgehammer.

At 0200 on August 2, 1990, the Hammurabi Armored and the Tawakalna Mechanized Divisions, two of al-Rawi's elite heavy units, rushed across the border in tightly disciplined formations and quickly overran a single Kuwaiti brigade deployed along the frontier. The Kuwaitis, equipped with only Saladin and Ferret armored cars, had little hope of checking the onslaught of nearly 1,000 T-72 tanks. Al-Rawi coupled the mass of the assault with a rapid ground advance that swept south, capturing most Kuwaiti forces in garrison and reaching Kuwait City by 0500. Meanwhile, three Republican Guard special forces brigades launched a heliborne assault into the city, closing the back door on Kuwaiti withdrawals. Seaborne commandos deployed farther south and cut the coastal road. By early evening the city was reasonably secure despite some sporadic resistance from a few die-hard Kuwaitis. To the west, al-Rawi's third heavy unit, the Medina Armored Division, screened the main attack against the unlikely event that the Gulf Cooperation Council's Peninsula Shield Brigade in northern Saudi Arabia might intervene. Al-Rawi committed four Guard infantry divisions behind the lead armored forces to begin mopping up. All three of his heavy divisions then moved hastily south to establish a defensive line along the Saudi border. Saddam's military machine had conquered Kuwait in fewer than 48 hours.

## THE RESPONSE

On August 2 at 0230 Washington time, General Colin Powell phoned the JCS operations director, Lieutenant General Thomas Kelly, and told him to find General Schwarzkopf and immediately order him back to Washington. Schwarzkopf and Powell met the President and other National Security Council members at the White House at 0800. In the meeting, Schwarzkopf laid out preliminary military options to respond to the invasion and a summary of Iraqi military capabilities. At the regular morning National Security Council meeting on August 3, the President agreed with other members that some force might be needed. Powell told the President that Schwarzkopf and Kelly were working on options and would brief him shortly. At Camp David on August 4, Schwarzkopf expanded his briefing to the President on details for deployment of a defensive force to Saudi Arabia. Shortly after the meeting, King Fahd asked the president for a briefing on the situation from American officials. National Security Advisor Brent Scowcroft hurriedly began to assemble a briefing team to travel to Saudi Arabia in an effort to convince the Saudis to ask for help.

During the evening of August 4, 1990, Lieutenant General John Yeosock, commander of CENTCOM's Third Army, was dining at a neighbor's house at Fort McPherson, Georgia, when the phone rang. Schwarzkopf was on the line and he wasted few pleasantries before telling Yeosock of the requirement to brief King Fahd. Schwarzkopf wanted Yeosock with him on this key Saudi trip and directed Yeosock to report to CENTCOM headquarters at MacDill Air Force Base as quickly as possible. They had no time to waste; if Yeosock could not get a flight out immediately, Schwarzkopf would dispatch his own plane from MacDill to pick him up.

### THE SHIELD'S FOUNDATION

General Yeosock would prove during the Gulf War to be a necessary calming and introspective counterpart to his emotional and extroverted boss. Yeosock's deep, craggy features and measured, methodical way of choosing when to speak gave him a grave appearance and manner. He possessed a keen intellect and a prodigious capacity for work. Often overshadowed in the company of his peers, he exuded a compulsive desire not to take credit or elbow into the limelight. He exercised an indirect approach to decision making by allowing others to posture and vent their frustrations in the highly charged and structured atmosphere of the CENTCOM briefing room. He reserved his time for quiet, one-on-one discussions where he could fully exploit his particular skill at measured debate and logical persuasion.

Yeosock's selection as CENTCOM's Army commander was just as fortuitous for Gulf War planning as INTERNAL LOOK had been. As project manager for the Saudi Army National Guard (PM-SANG) some seven years before, he had been responsible for training and equipping much of the Saudi ground force. That experience, combined with his empathetic personality, suited him well for his new position as the Army's first point of contact with the Arabs. The Saudis, in particular, placed great value on personalities and personal relationships. When faced with impending disaster, they would not relinquish authority to anyone who had not first earned their trust. Yeosock had that essential commodity well in hand.

As soon as he finished talking to Schwarzkopf on August 4, Yeosock called Major General William "Gus" Pagonis who had recently been assigned as the chief logistician in FORSCOM. The men had come to know each other well during numerous REFORGER exercises in Germany. REFORGER was like a national training center for logisticians. The exercise realistically tested logisticians' ability to assemble and transport large bodies of troops and equipment from the United States to Europe. The requirement for 10 divisions in 10 days stressed planners and logistics systems to their maximum. Old REFORGER hands maintained that in



Lieutenant General John Yeosock, commanding general, US Third Army.

spite of detailed plans and extensive automation, the secret of survival once the operation began was the ability to anticipate and react to the unexpected. Logisticians who did well in REFORGER managed from docks and warehouses. Just as the National Training Center experience would prove to be the supreme preparation for desert war, REFORGER would provide an equally realistic training exercise for the movement of American forces to Saudi Arabia.

Pagonis was a systems analyst by training and inclination who had a reputation for breaking down the most complex logistical problems into their component parts to implement logical, sequential solutions. He had

little patience for slow, process-oriented bureaucracies. While accused of micromanagement and overcentralization by those who did not know him well, Pagonis was, in reality, a minimalist. He was capable of absorbing and retaining huge amounts of data and applying a concept of "building-block" logistics. His approach was, in effect, a military adaptation of the "just-in-time" theory of management that demanded very careful monitoring to ensure that exactly the right support, tailored for the mission at hand, would be provided at exactly the time it was required.

Yeosock told Pagonis to have a logistics plan ready to brief to King Fahd once they landed in Saudi Arabia. He needed an outline for all major logistics requirements, including the use of ports and roads and the degree to which indigenous Saudi transportation supplies and labor would be put to best use. Pagonis developed the three primary logistical tasks that would shape the buildup: the reception of forces in the theater, the onward movement of those forces to forward areas within the theater, and the sustainment of forces as they prepared for combat. He briefed Yeosock at about 0700 on August 5, just before Yeosock boarded the aircraft for Saudi Arabia with Schwarzkopf and Secretary of Defense Dick Cheney. The next day, King Fahd issued the invitation for American troops to assist in the defense of Saudi Arabia. On August 8 the President announced the commitment of American forces.

While INTERNAL LOOK 90 provided a conceptual blueprint for Desert Storm, the CENTCOM leadership was obliged to hammer out most of the details of the operation through a process of ad hoc decision making and eleventh-hour improvisation. The American Army had never projected such a large force so quickly over so great a distance. The operation could not progress without capitalizing efficiently on indigenous Saudi support. Here, Pagonis' experience would be the essential planning link between Saudi support and American requirements.

Once in Riyadh, Yeosock outlined his command's missions and tasks. Only a few American forces were permanently stationed in Saudi Arabia to help him. A United States military mission of 38 officers and enlisted men who were training Saudi Arabian land forces and a handful of other soldiers from his old outfit provided some additional help to get things started. Initially, Yeosock relied heavily on the PM-SANG office, appointing the project manager, Brigadier General James Taylor, as his interim chief of staff. Yeosock's small group had little time to prepare as the division ready brigade (DRB) of the 82d Airborne was soon to arrive.

Actually, the first paratroopers on the ground in Saudi Arabia were not the infantry battalions, but 76 soldiers and staff officers of the XVIII Airborne Corps assault command post who arrived midmorning on August 9. Brigadier General Edison Scholes, corps chief of staff, led the soldiers down the ramp into the oppressive heat and humidity of

Dhahran Airport. His C-141 was the only military aircraft in sight. Scholes ordered his soldiers to quickly gather their equipment and prepare to leave because he knew that the gargantuan aerial convoy assembling behind him would soon make sleepy Dhahran the busiest airport in the world. No one was happier to see him than a sweat-soaked but smiling Yeosock and his meager staff. Yeosock pointed to a motley assortment of trucks and buses waiting to take them to a Saudi air defense site 5 kilometers southwest of the air base. Scholes optimistically christened the place "Dragon City" in honor of the symbol on the XVIII Airborne Corps patch.<sup>2</sup>

During the early days, as soldiers and equipment poured into Dhahran under the mounting threat of a preemptive Iraqi strike, Scholes and his staff constantly updated their plan of defense, which changed and grew more bold with each arriving aircraft. Eventually, as the situation on the ground stabilized, this hourly process solidified into three distinct "Desert Dragon" plans, each of which would represent a milestone in the ability of the corps to defend against Iraqi incursion.

### **THE 82D AIRBORNE DIVISION DEPLOYS**

Major General James Johnson's 82d Airborne Division's deployment began in the early evening of August 6 as a typical North Carolina thunderstorm rolled over Fort Bragg. At 2100 sharp, Sergeant First Class Elijah Payne, the corps watch NCO, ended four days of mounting tension with a brief phone call to Staff Sergeant John Ferguson, the division watch NCO. Few words were exchanged. Both sergeants had been through the "sequence" many times, both in training and for real. With further phone calls, the familiar alert began to cascade down Ardennes Street. Within two hours the side streets and parking lots surrounding Ardennes began to crowd with soldiers carrying rucksacks and duffle bags. Cars were parked everywhere, some to stay, others with engines running occupied by tearful wives and girlfriends saying goodbye. When the call came, the division's three brigades stood in varying degrees of readiness. The 2d Brigade, commanded by Colonel Ronald Rokosz and designated DRB 1, was fully prepared to deploy without notice, with one battalion packed aboard the aircraft within 18 hours. Assembly and preparation of the force proceeded rapidly throughout the night in torrential rain. The 1st and 3d Brigades were training in locations scattered from Fort Bragg, North Carolina, to Fort Chaffee, Arkansas. Soldiers not training were on leave or in schools. FORSCOM had anticipated that the deployment would require the entire division in Saudi Arabia as soon as possible, so the call went from division down the chain of command to bring everyone back to Fort Bragg immediately.<sup>3</sup>

The division staff briefed every brigade and battalion commander at midnight. Tension in the room rose markedly when Lieutenant Colonel

Steven Epkins, the intelligence officer, recounted the Iraqis' armored strength. To logical military minds, Saddam's best option seemed to be to continue the attack into Saudi Arabia to seize the airfields, ports, and oil fields. The corps commander, Lieutenant General Gary Luck, told the division to be prepared to fight for the ports if necessary. Presuming that they might arrive unopposed, Luck intended to defend key facilities and to launch long-range preemptive counterattacks with attack helicopters. As a result, deviating from the established sequence, the division's aviation brigade would go in early. For added killing power, Luck gave the division a multiple-launch rocket system (MLRS) battery from 3-27th Field Artillery.<sup>4</sup>

Aircraft scheduling was a problem from the start. An airborne brigade, including the normal contingent from corps and division necessary to support it, required at least 250 C-141 loads. But US Transportation Command (USTRANSCOM), the Defense Department's headquarters for military transportation operations, could initially guarantee only 90 aircraft. While this figure would eventually increase as Schwarzkopf's insistence on greater lift priority began to take hold, the number was still frighteningly low. The airborne soldiers were involved in a deadly race to get to Saudi Arabia first with the most tank-killing power. With Saddam's Republican Guard already on the Saudi border, the Americans had to build a survivable force from bases 8,000 miles away. Every lost movement or unavailable aircraft increased the inherent risk of the venture. With fewer aircraft than expected, the division had to make last-minute compromises. To accommodate more tank killers, thousands of soldiers and hundreds of tons of equipment from the division support command, engineer, and air defense battalions would follow on later aircraft and ships.

While leaders planned, the first units moved into the corps marshaling area, a fenced-off area of barracks and parking lots adjacent to Pope Air Force Base, next door to Fort Bragg. The first troopers of the lead brigade departed at 1000 on August 8, 36 hours after being alerted. The last of the first deploying brigade left four days later. The 82d's load-out and departure process had to be adjusted daily. To make essential departure times from Pope, both Air Force and Army planners worked day and night reconfiguring loads to fit tactical exigencies at the other end of the operation. The initial pulse of combat power needed in the theater immediately required an enormous surge in aircraft. USTRANSCOM dispatched C-141 and giant C-5 aircraft to Pope from bases all over the world. For the first time the President activated the Civilian Reserve Air Fleet. Overnight, crewmen accustomed to relatively simple palletized loading for Air Force aircraft found themselves pondering weight, balance, and cubic-foot requirements for Boeing 747s, which only the day before had been carrying parcels for UPS. The corps ground liaison

officer, Major Drew Young, assisted by paratroopers from each deploying unit, compensated for uncertainty by simply reallocating aircraft and reconfiguring loads on a moment's notice. In one 12-hour period on the third day, eight C-5s arrived unannounced at Pope, and the division scrambled to push combat soldiers and equipment to the loading areas to keep ahead of the Air Force. In seven days an entire division ready brigade—4,575 paratroopers and their equipment—arrived on the ground ready to fight in Saudi Arabia. The remaining two brigades and their equipment flew out between August 13 and September 8 using 582 C-141 sorties. By August 24 more than 12,000 soldiers from all three brigades, including all nine infantry battalions, were on the ground.

### THREE VECTORS

On August 8, 1990, at the conclusion of the first of a long series of briefings on the Gulf, General Vuono swiveled around in his chair to address the crammed balcony of the Army Operations Center (AOC) in the basement of the Pentagon. Warning the audience that it was going to be a long haul, Vuono urged them to "coordinate, anticipate, and verify—make sure of your information; make sure you have the complete picture, and keep the forces in the field informed."

After the adjustments under the Goldwater-Nichols Act to increase the authority of unified commanders and the Joint Staff, the Services retained significant responsibilities under Title 10 of the US Code. The Department of the Army is responsible for manning, equipping, training, and sustaining the forces provided to the unified commands through FORSCOM, the specified command responsible for mustering forces for the Joint Chiefs of Staff. FORSCOM is also the largest command in the Department of the Army. One of FORSCOM's major components is the US Third Army. In fact, many of the personnel assigned to FORSCOM were dual-hatted as members of Third Army so that, with the deployment of Third Army headquarters as ARCENT, the Department of the Army had to assume many of FORSCOM's functions.

To do so, the Army Staff (ARSTAF) organized for emergency operations as it had done under numerous crises ranging from the *Exxon Valdez* oil spill to Operation Just Cause. The difference in this case was that the Gulf crisis appeared to be a long, drawn-out affair with the very real prospect for major combat. The main conduit into the ARSTAF was the Crisis Action Team (CAT), established in the operations center under Major General Glynn Mallory, the director for operations and mobilization. Newly arrived from commanding the 2d Armored Division, Mallory took over the Army operations center at a critical time. With subordinate intelligence, logistics, personnel, and mobilization cells, the CAT operated 24 hours a day handling immediate requirements. For longer-range planning, a strategic planning group concentrated on staying two to three

moves ahead of Saddam. On top of these specially organized cells, the remainder of the ARSTAF continued to function normally.

Vuono was determined that the Army would emerge from the Gulf in as good or better shape than before. Early on, he established three vectors to serve as guideposts for the ARSTAF in dealing with the crisis: the Army forces deployed in the Gulf had to win the war; at the same time, worldwide readiness had to be maintained; and finally, the Army had to proceed with the ongoing reshaping and restructuring brought about by the end of the Cold War. Vuono reserved for himself the responsibility of adjudicating among those often conflicting priorities. To aid in his decisions, he used "executive board" meetings of staff principals and selected special staff to consider and recommend options. Vice Chief of Staff General Gordon Sullivan served as the director of the board. Members included Lieutenant General Dennis Reimer, the deputy chief of staff for operations, who coordinated with the Joint Staff and accompanied Vuono on his trips to the theater; Lieutenant General Charles Eichelberger, the deputy chief of staff for intelligence, who represented the Army in National Foreign Intelligence Board meetings; Lieutenant General William Reno, the deputy chief of staff for personnel; and Lieutenant General Jimmy Ross, the deputy chief of staff for logistics.

First, and of prime importance, was assuring overwhelming success in Desert Shield and later Desert Storm. Vuono's guidance was straightforward: "Maintain a trained and ready force"—an imperative that had enormous ramifications for mobilization and training of Reserves as well as for modernization of the Active components. Sending the 24th Infantry Division as part of the XVIII Airborne Corps raised the issue concerning the deployability of the 48th Infantry Brigade, Georgia National Guard. Under existing war plans the 48th was the roundout brigade for the 24th. The Army leadership wanted to deploy the brigade because, at the time, the shortage of combat power available to confront Saddam was so acute that Schwarzkopf needed every unit the Army could provide. However, the Army was reluctant to deploy the brigade immediately as part of the 24th's deployment to Saudi Arabia for several reasons. Under US Title 10, the President could call up a Reserve unit for 90 days and, if required, extend it an additional 90 days. Peacetime planning called for the brigade to be a late-deploying unit in order to allow time for postmobilization training to prepare for combat. Defense guidance to the Army on August 24 reflected General Schwarzkopf's priorities and authorized call-up of only combat service and combat service support Guard and Reserve units. Combat units were specifically excluded since the length of the operation was unknown and postmobilization training, deployment, and redeployment would leave the roundout brigade fewer than three months in theater. After the President's decision to reinforce the

theater for offensive operations, Congress granted authority for the combat units to be called up for one year on November 30, and the Army activated the 48th Brigade and later the 155th from Mississippi and the 256th from Louisiana.

In order to meet the immediate need for additional combat power to augment the 24th Infantry Division, the Army decided to send the 197th Infantry Brigade from Fort Benning, Georgia. If the Iraqis did launch a preemptive attack in the early fall, the 48th Brigade, even if activated in August, would still be tied up in postmobilization training. The mobilization plan called for crew and small-unit training to begin immediately after call-up, but collective training had to be delayed until individual soldier skills were brought up to standard. The brigade also had difficulty with maintenance of equipment due to a general lack of operator knowledge, mechanic diagnostic skills, and knowledge of the Army maintenance system. While officers and NCOs understood the tenets of AirLand Battle, they were not sufficiently practiced in the intricacies of combined arms operations that required the continuous synchronization and integration of many very complex battlefield systems and functions. Vuono pledged that no soldier would deploy who was not trained and ready for combat. He was determined that the Army would not repeat the Korean War experience where hastily mobilized Reserves were thrown into combat unprepared, suffering terrible casualties.

Vuono had promised Yeosock that he would support him with all that he could muster from the Department of the Army. Vuono would offer options, issue guidance, set priorities, and force actions through the system in order to ensure their implementation. In short, the Department of the Army would centrally control the movement, training, equipping, and sustaining of forces deployed to the Gulf.

At the same time, Vuono would not let the Gulf crisis drain the Army dry and prevent a response to another crisis that might arise in some other part of the world. In his second vector, worldwide readiness, Vuono promised to avoid repeating the hollow European Army of the Vietnam era. While stability in Europe was promising, other hot spots were always ready to demand Army intervention. Vuono relied on a base of Active forces and trained Reserves to meet these contingencies. During Desert Shield, General Mallory and the AOC monitored crises in Liberia and Somalia that led to eventual Navy and Marine evacuation operations that might have required Army forces. In any case, the Philippines, Korea, and Latin America required close attention, and Army missions at home, ranging from fire fighting to emergency relief, might require rapid response by forces not involved in the Gulf.

As units were identified to deploy to Desert Shield, Vuono's intent was to shift missions to nondeploying units and, where possible, to

backfill essential functions with Reservists called to active duty. Once XVIII Airborne Corps all but emptied Forts Bragg, Stewart, Campbell, and parts of Hood and Bliss, the Army had to reconstitute its contingency forces. Without knowing how long the deployment to the Gulf would last or that it would grow to its eventual one-half million soldiers, the ARSTAF earmarked I Corps at Fort Lewis, Washington, to become the new contingency corps centered on the 7th Infantry Division at Fort Ord, California, and on the remainder of the inactivating 9th Infantry Division at Fort Lewis.

The third vector involved reshaping the Army. Regardless of what happened in the Gulf, the Army was well down the road to restructuring into a smaller force. Every move and every disbanded unit had an effect on every other unit. Responding to budget pressures and the negotiation of the Conventional Forces in Europe (CFE) Treaty then in progress, Army planners anticipated removing one United States corps from Europe, including two divisions, an armored cavalry regiment, and most of the corps' support structure. The remaining corps would have to develop a new way of operating to cover the old two-corps sector. By August 1990 the communities and soldiers involved anxiously awaited news of base closures. Many measures could be taken to lessen the impact of closures and unit movements on the Gulf crisis, but nothing would stop or reverse the reshaping. The challenge was to reshape the Army and to sustain the deployment of forces in Saudi Arabia at the same time.<sup>5</sup>

### FAMILY SUPPORT

The demographics of the Army that deployed to the Gulf differed significantly from earlier mass-conscripted formations that had fought in World War II, Korea, and Vietnam. Fifty-three percent of the Army was married, and 52,000 soldiers were married to other soldiers. Nine thousand military couples deployed to the Gulf, 2,500 of whom had children. Sixteen thousand of the 45,000 single parents deployed. In sum, the Army of the 1990s went to war with enormous family responsibilities. Having no extra soldiers, the Army could leave few behind. Its readiness, in keeping with Vuono's vectors, absolutely depended upon each soldier's meeting his or her military responsibilities.

Meeting these conflicting demands depended on community support, both within the Army and in surrounding civilian communities. Each unit had ready community support plans to maintain soldiers' ties with families left behind, ensuring that they had access to financial, medical, and social assistance. Single and dual military parents had to establish care arrangements in the event they were deployed. The plans included powers of attorney, appointments of short- and long-term guardians, applications for identity cards, and other requirements that ensured the supported family member had access to military benefits. Commanders

reviewed the plans and could separate soldiers from the Service whose plans failed to provide adequate support. The overwhelming majority proved adequate when tested by the Gulf War.

As each unit deployed overseas, a functioning chain of command and headquarters staff remained in place until that unit returned. Aside from duties like maintaining property and accounting for personnel, the rear detachment command structure also provided dependents with official services, particularly the essential link with the Red Cross in emergencies. More than 150 Family Assistance Centers were established to serve as focal points for that support. A unit "chain of concern" that the families themselves established to help one another often tied directly into the Family Assistance Center. Families of more senior personnel ensured that younger families were not overwhelmed by problems stemming from the deployment of a family member. A noteworthy off-shoot of the chain of concern was an informal telephonic notification system that matched official unit alert rosters and speeded up the sharing of information.

The tremendous outpouring of community support for soldiers and their families also eased the burden of deployment. Communities surrounding military facilities, often economically hard hit by the deployments, organized relief efforts for the needy and special events such as parades and picnics to demonstrate their support for the military. Merchants donated goods for both children and their parents. Toys went to the local military kids, while footballs and frisbees went to their parents in the Gulf.

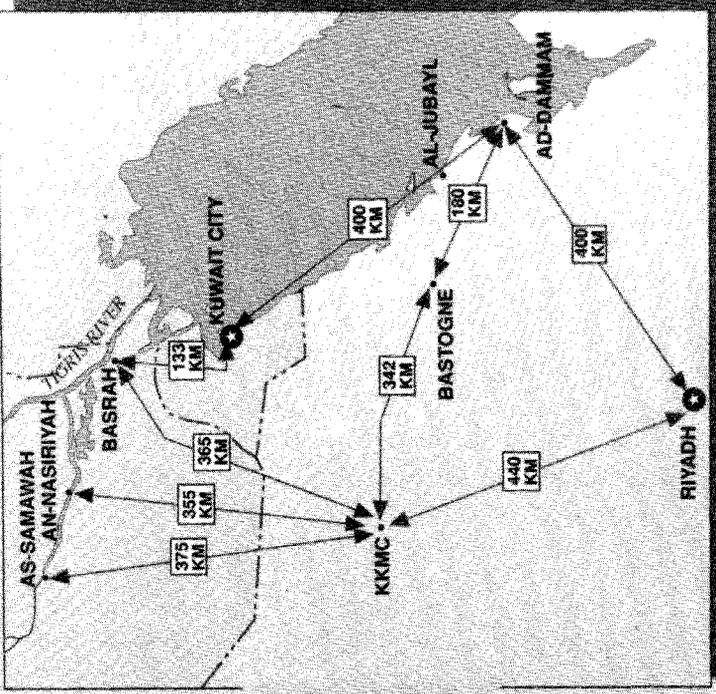
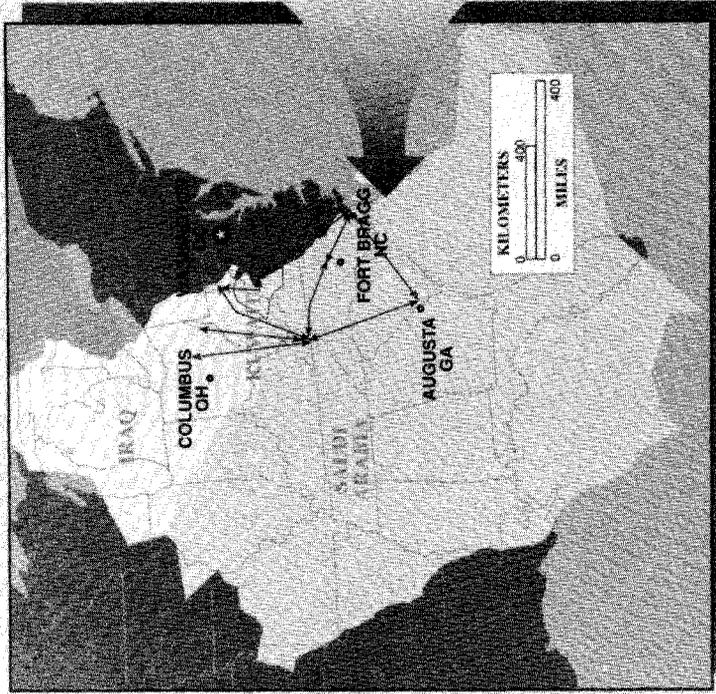
By its very nature, XVIII Airborne Corps was well prepared to meet the demands of long-term, out-of-area deployments. Each unit participated in several off-post exercises each year that required a rear detachment chain of command and informal family care system to take care of dependents. Having just experienced Operation Just Cause, many of the 82d Airborne Division troopers and their families were old hands at dealing with problems arising from deployment. Not surprisingly, those most practiced had fewer problems.

### **THE SAUDI ARABIAN THEATER**

Saudi Arabia is a vast, mostly empty country about the size of the United States east of the Mississippi. Roughly 1,300 miles north to south and 1,400 miles east to west, the country is mostly desert except for a thinly populated band along the coastal plain. The population lives in small, widely separated towns and villages in the vicinity of the Persian Gulf oil fields and at sources of water along ancient pilgrimage routes.

Populated areas are connected by a system of two-lane asphalt roads. Hard-surface roads also link Saudi Arabia to Kuwait, Iraq, Jordan, Qatar, the United Arab Emirates, Bahrain, and Yemen. A series of secondary

**KTO: COMPARISON TO EASTERN UNITED STATES**



roads tie the major cities and towns to minor towns and villages, with a series of dirt tracks between the smaller villages. Paralleling the trans-Arabian pipeline just south of the Iraqi border is Tapline Road, a major east-west roadway. The major north-south artery is the 500-kilometer-long coastal highway that runs from Kuwait, through the length of Saudi Arabia, to Qatar.

Rail facilities are limited, with only one active, standard-gauge, single-track line that runs from the port of ad-Dammam to Riyadh. Seaports are more extensive with seven major ports capable of handling more than 10,000 metric tons of materiel per day. Five secondary ports can handle 5,000 to 10,000 metric tons, and seven others, up to 5,000 metric tons per day. Four serve as outlets to the Persian Gulf and another three are located in the west along the Red Sea coast. Most military supplies and equipment would come into the ports of ad-Dammam and al-Jubayl. These two modern, high-capacity ports, when operated by ARCENT, would provide a reception and transshipment capacity equaled only by ports in Europe, Japan, and North America.

Airfields in Saudi Arabia are modern and well-equipped. Two of the largest, Dhahran and Riyadh, are fully capable of accommodating, day and night in all weather, 149 C-141 cargo aircraft and 3,600 short tons of cargo per day. Additional small but well-equipped airfields are scattered throughout the country.<sup>6</sup>

### **YEOSOCK'S THREE HATS**

In analyzing the upcoming campaign, Yeosock viewed his command in terms of three functions, each serving a distinct and essential purpose. First, as commander of a numbered field army, he was responsible for dividing scarce resources among war-fighting units in accordance with the CINC's campaign plan. Because no combat commander ever receives all the firepower, supplies, and transport he thinks necessary, Yeosock personally assumed the apportionment task—one made even more difficult because the corps commanders were peers. Second, as CENTCOM's Army commander, Yeosock was expected to coordinate with the other US Services and allied ground forces. ARCENT headquarters planned for ground operations and operated the theater communications zone (COMMZ), which coordinated joint, combined, and Coalition operations, including host-nation support. Yeosock was responsible for providing all common supplies and services, such as food, fuel, ammunition, and transportation, to all Services within the theater. Third, as a Service intermediary between Schwarzkopf and various other Army four-star commands that provided soldiers, equipment, and Army-specific training and doctrinal guidance, Yeosock took his unique position very seriously. From his study of past wars, Yeosock recognized that all too often the attentions of combat commanders were needlessly diverted,

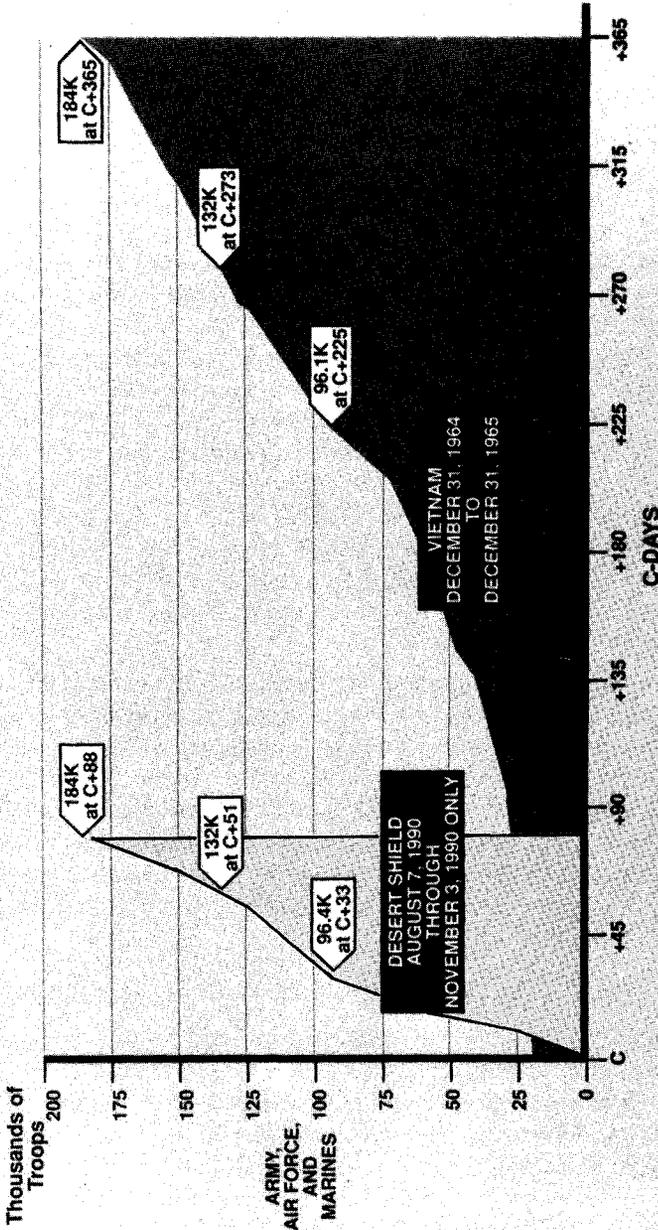
even in the heat of combat, to noncombat tasks. Therefore, in his theater army commander role, he was determined to unburden the corps commanders from housekeeping and diplomatic chores by assuming them himself.

Yeosock would have to build the field army in Saudi Arabia incrementally. The building process required a sense of balance and timing and a finely honed instinct to judge and manage risk. Balance was important to ensure that while priority in deployment went to combat soldiers, enough logistics support and command overhead—just enough—followed along to sustain and control combat units in the field. Nevertheless, every seat on an airplane that went to a typist or a cook meant one less for a combat soldier.<sup>7</sup> Realizing that he might impede the efficiency of the later buildup by having so few support troops and activities in place to meet the combat units and move them forward, Schwarzkopf nevertheless put fighting soldiers at the head of the deployment line. His commitment to maintain a small logistical overhead was derived both from the practical necessity to get a viable fighting presence into theater as quickly as possible and the more emotional imperative inherited from his experience in Vietnam. Both Schwarzkopf and Yeosock were determined to avoid another massive, inefficient logistical depot like Long Binh or Qui Nhon where the Army had created enormous permanent bases at great expense.

Yeosock knew that he had to set a personal example by building his own Army headquarters and support organization on a shoestring. Yet he had to supply American forces with all the goods and services that they could not provide for themselves. This support ran the gamut from housekeeping functions such as transportation, administration, and security, to more combat-oriented functions such as air defense, intelligence gathering, and ammunition resupply. Schwarzkopf gave Yeosock the difficult mission of building a very austere theater support structure while keeping peace among the combat commanders of all Services. Thus Yeosock became both the traffic cop and the chief judge of Desert Shield.

Yeosock set to work building his support team using INTERNAL LOOK 90 and the troop list that had been drafted for that exercise as his game plan. According to procedures little changed since World War II, the theater should have developed progressively following detailed, computerized Time-Phased Force Deployment Data. Unfortunately, the shift in mission and region from Iran to Iraq forced CENTCOM to generate this data manually. Planners had to put in place large command and control structures to handle transportation, construction, administration, medical requirements, supply, maintenance, and military police, among others. These logistics units would bring their own headquarters staff and the additional supplies, housing, and administration to support themselves as well as the combat soldiers. Based on INTERNAL LOOK figures, the ARCENT logistics overhead eventually should have grown to 120,000,

# FORCE GENERATION DESERT SHIELD VERSUS VIETNAM



C = COMMENCEMENT OF DEPLOYMENT, AUGUST 7, 1990

Historical comparison of troop buildup in Vietnam and the Persian Gulf region over time.

including at least 15 generals. Most of the structure would come from activated Army National Guard and Army Reserve units. Two years were required to create such an enormous infrastructure during World War II, six months in Korea, and one year in Vietnam. Needless to say, Yeosock would not have that much time in Southwest Asia.

Schwarzkopf's demand for a buildup of unprecedented speed and austerity compelled Yeosock to devise an incremental method for building the theater in which he would call forward only enough support to do a job and only at the moment the job needed to be done. He allowed ARCENT headquarters to grow from about 300 soldiers during the buildup to about 1,000 during Desert Storm. His total support structure at echelons above corps remained below 38,000, a mere third of the projected requirement for this campaign. Such a high "tooth-to-tail" proportion was unprecedented for a fighting force so large and so far from home. In developing his headquarters, Yeosock combined the functional support organization with his own staff. Pagonis would serve as commander of 22d Support Command as well as Yeosock's ARCENT deputy commanding general for logistics. Yeosock formed subordinate command headquarters only when the functional requirements grew to the point that the appropriate ARCENT section could not handle them. For example, he called forward the Army Reserve's 416th Engineer Command under Major General Terrence Mulcahy only when the construction program became so complex that his own staff could no longer deal with it.

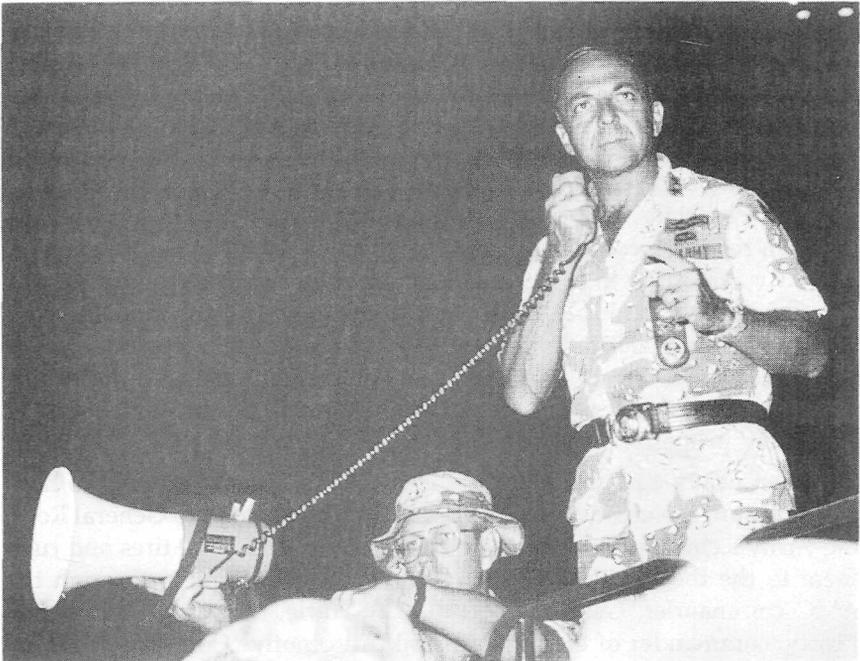
This building-block approach to theater support was not without risk or controversy. Most of the support above corps level is located in the National Guard and Army Reserve. Taking only what was needed most affected the Reserve component structure. To keep overhead down, Schwarzkopf was willing to accept political criticism for not accepting some Reserve units. By not introducing additional commands and organizations into the theater, the Army did not activate many well-trained, well-prepared units that could have provided substantial logistical support.

## **AD HOC LOGISTICS AND WORLDWIDE SUPPORT**

In his own unique style, Pagonis adapted and refined logistics doctrine as he went about building a theater of war. He arrived in Saudi Arabia with 21 officers in trail and set about creating the structure necessary to support a modern contingency force. A firm believer in leading from the front, Pagonis spent much of his time traveling from one problem area to another in his Toyota 4x4, usually using a cellular telephone to pass requests over commercial satellite lines directly to logistics centers and staff sections in the United States.

Pagonis relied heavily on trusted agents—soldiers whom he personally knew and in whom he had total confidence. He used his team as an extension of himself. Although they were not necessarily high-ranking—many were sergeants—each was skilled in a particular logistical function and was empowered to act alone in order to cut through red tape and fix a problem on the spot. One of the earliest members of Pagonis' team, Lieutenant Colonel Mike Velten, formed an ad hoc transportation organization to move troops using Saudi contract buses. This infant organization, consisting of a captain from the 7th Transportation Group and about a dozen soldiers, set up shop in a tent, contracted for buses and materials-handling equipment, and began moving soldiers and their baggage through the airport at Dhahran.

Pagonis centralized all logistics functions in a huge tent about one-fourth the size of a football field. By congregating all functional experts in one place, he could immediately detect a problem from their chatter and, if necessary, track it from port to foxhole. At times the tent resembled the New York Stock Exchange on a heavy trading day. In the age of computers and satellite communications, however, Pagonis still relied on the old, proven 3x5 card to ensure that he kept his hand on the pulse of his command. Any soldier at any level could originate a card detailing a



General Pagonis addressed 22d Support Command soldiers on the eve of the war.

problem, with full authority to send it, by any means available, directly to the boss.

That the size and speed of the buildup in Saudi Arabia would overwhelm the small logistics operations center, requiring a more structured support command of some sort, became apparent early in August. During the first month of Desert Shield, CENTCOM planners worried about whether the President would allow the call-up of enough Reservists to permit full staffing of a theater army area command (TAACOM). First priority for Reserve activations necessarily went to units providing essential services not readily available in the Active force, such as stevedores, communications specialists, and medical technicians. Thus by default, Pagonis' select team became essentially an ad hoc TAACOM staff, completely assuming the function of troop movement and support. On August 19 Yeosock appointed Pagonis commander of the 22d Provisional Support Command. By August 22 when President Bush authorized the limited activation of the Reserves, an improvised 22d Support Command was already in operation and functioning well.<sup>8</sup>

The urgency to build the theater quickly resulted in a streamlined system for getting the necessary supplies to the region. Both Yeosock and Pagonis used the telephone extensively to pass requirements directly back to the United States and often energized support organizations for a quick response. Help came directly from the Army Chief and Vice Chief of Staff, assisted by the entire ARSTAF as well as the Army Materiel Command (AMC) and the Defense Logistics Agency. Often the Chief or the Vice took the most urgent requests directly from Army leaders in the theater and passed them to the required source for action. CINCs from other theaters provided soldiers and equipment. In the United States, major commanders and school commandants responded to calls for specially skilled technicians and soldiers by sending their best on a moment's notice, a response completely contrary to traditional peacetime practice. Similarly, American industry and business went to extraordinary lengths to provide products immediately and to put aside, for the moment, concerns about contracts and payment. A generation of senior soldiers, all of whom had lived through the long years of Vietnam, pledged that whatever the cost to their own particular establishment, this conflict would be supported properly.

When heavy equipment transporters (HETs), used primarily to haul heavy armor, ran critically short of tires, Yeosock turned to General Ross, the Army's chief logistician in the Pentagon, to find 3,000 tires and rush them to the theater. Ross in turn relayed the requirement through the AMC commander, General William G.T. Tuttle, to Major General Leo Pigaty, commander of the Army's Tank-Automotive Command in Warren, Michigan. Pigaty's contracting officer could locate only 800 tires worldwide, and just one manufacturer, Firestone Tire and Rubber in Des



Tanks loaded on heavy equipment transporters in Saudi Arabia.

Moines, Iowa, was producing them at a glacial rate of 40 per month. Pigaty discovered, however, that General Tire and Rubber Company produced a civilian version of the tire for logging, construction, and oil-drilling vehicles. Pigaty personally called General Tire and Rubber's CEO, who offered to direct his retailers and distributors across the country to ship whatever they had in stock from the nearest airport. Ken Oliver, the local General Tire dealer in Waco, Texas, had 74 tires. Immediately after receiving the call for help, he rented a cargo trailer at his own expense, hooked it to his pickup truck, loaded the tires, and made an overnight trip with his precious 1,400-pound load to Tinker Air Force Base, Oklahoma. When the energetic Oliver returned to Waco, he called Pigaty's office in Warren saying that he figured the troops needed those tires as quickly as possible and did not want to wait for commercial transportation.<sup>9</sup>

### **HOST-NATION SUPPORT**

With the arrival of additional personnel in late August, Pagonis expanded the functions of the 22d Support Command's host-nation support operation. After many decades of importing technology and labor to build up their own infrastructure, the Saudis were comfortable dealing with foreign contractors for support. Therefore, when a military unit needed supplies or equipment, a contracting officer would simply pay cash on the spot and send the bill to the Saudis. In the early days of the buildup, the Support Command had to go to extraordinary lengths to purchase goods and services fast enough to keep up with the accelerating arrival of troops. In one case Lieutenant Colonel Jim Ireland, desperate for additional soldier living space, heard of a vacant civilian apartment



Host-nation support at work. Above, Saudi heavy-equipment transporters carried newly arrived self-propelled artillery to tactical assembly areas. Below, both military and commercial fuel trucks used fuel supply point distribution centers.



complex in Dhahran. He looked over the site, decided the price was right, and paid the landlord with cash. In another case, Velten, the transportation officer, had several hundred newly arrived XVIII Airborne Corps troops stranded at the airport. Looking for transportation for these troops, Velten cruised the streets of Dhahran in his pickup truck. Whenever he saw a truck or a bus parked on the street, he pulled over to the side of the road and, in proper Middle Eastern form, negotiated a deal with the usually nonplussed driver. The vehicles arrived as promised. That kind of initiative and ability to perform under enormous pressure with little supervision kept soldiers moving forward through the ports during those early days at a rate of nearly 4,000 per day.<sup>10</sup>

While the Saudis provided support during the first two months without any formal agreement with the United States, a buildup of the dimensions expected soon made some written agreement necessary. Verbal agreements were codified by the Department of Defense negotiating team dispatched on October 17, 1990, with the Saudi government agreeing to pay the costs of all contracts with American forces.<sup>11</sup> In time, ARCENT would contract for food, fuel, long-haul trucks and drivers, water, and other key items necessary for comfort and sustainment. In addition to port facilities and telecommunications, the Saudi government provided 4,800 tents, 1,073,500 gallons of packaged petroleum products, 333 HETs, 20 million meals, and 20.5 million gallons of fuel per day, as well as bottled water for the entire theater and supplies for Iraqi prisoners of war. Saudi contributions substantially shortened the time needed to prepare for combat and undoubtedly shortened the length of the conflict once hostilities commenced.<sup>12</sup> Nonetheless, the pressure of building and organizing the host-nation support effort was tremendous as combat units poured into Saudi Arabia at a pace that even Pagonis and his team found difficult to manage.

### SADDAM PAUSES

The Iraqis' rapid seizure of Kuwait raised fears among regional states that it might be just the first step in a broader program of expansion. Those fears were heightened as the Republican Guard's logistical tail closed on al-Jahra west of Kuwait City, and units deployed along the Saudi border showed no sign of downloading their supplies and digging in to defend. American military intelligence analysts concluded that the Iraqi units in Kuwait and southeastern Iraq—soon dubbed the Kuwaiti theater of operations (KTO)—were capable of continuing the attack into Saudi Arabia. Moreover, within days of the Kuwaiti operation, the Iraqi 3d Corps, garrisoned in Basrah, moved its armored units into assembly areas along the Iraqi border. Their presence there suggested that they might form a second echelon should the Guard move into Saudi Arabia.

Sometime between August 3 and 15, Saddam paused to analyze the situation. At the time, American intelligence believed the Iraqi leader was surprised by the international reaction to the Kuwaiti operation and that he had three options. He could withdraw in the face of international pressure, perhaps under the terms of an Arab-engineered compromise. He could simply hunker down and attempt to deter the United States and its growing Coalition by establishing a "fortress Kuwait." Not only had his willingness to stand up to the West already won him great acclaim in the Arab world, but his control of Kuwait upset regional balance and constituted a constant danger to the Saudis. Or he could preempt the West by taking the Saudi oil fields and perhaps several thousand Westerners in Saudi Arabia.

An Iraqi push into Saudi Arabia would have been the most significant offensive operation ever undertaken by Saddam's military. His commanders offered two options: a full-scale offensive against the key cities of al-Jubayl, Dhahran, and perhaps Riyadh, or a limited attack on a local objective such as Hafar al-Batin or King Khalid Military City (KKMC), 80 kilometers inside Saudi Arabia. The full-scale offensive option, requiring some eight to nine heavy divisions, would have involved deep operations to destroy forward Arab forces, inflict heavy Coalition casualties, and secure northeastern Saudi Arabia. American analysts believed that once all of the Iraqi 3d Corps was deployed into the KTO, the Iraqis would be postured for such an offensive. If Saddam used the 3d Corps as the lead echelon, he could employ the Republican Guard as his follow-on force to secure Dhahran. Such an offensive might have threatened Riyadh and the stability of the Saudi monarchy. An operation of this magnitude, however, would have faced significant difficulties. The Iraqi military's deepest operation to date had been the Kuwaiti invasion, and already indications were surfacing that the Iraqi logistical system was feeling the strain. A deep operation into Saudi Arabia would have entailed an advance in excess of 300 kilometers, twice the distance covered in conquering Kuwait. In any case, preparations for such an offensive would have required a minimum of two days, allowing the allies at least 12 to 24 hours' warning.

The second option, a limited attack, was much more likely. With a requirement for only two or three heavy divisions, the Iraqis could mount an attack at almost any time with perhaps only six to eight hours' warning. A limited attack offered a particularly attractive goal: if successful, it might divide the Coalition's Arab forces and destroy their will to fight. Like a full-blown invasion, it would also threaten the stability of the Saudi regime, which had invited Western forces to protect the kingdom from just such an event. American commanders knew that the sooner Coalition forces arrived in theater, the less likely further Iraqi offensive actions would become.<sup>13</sup>

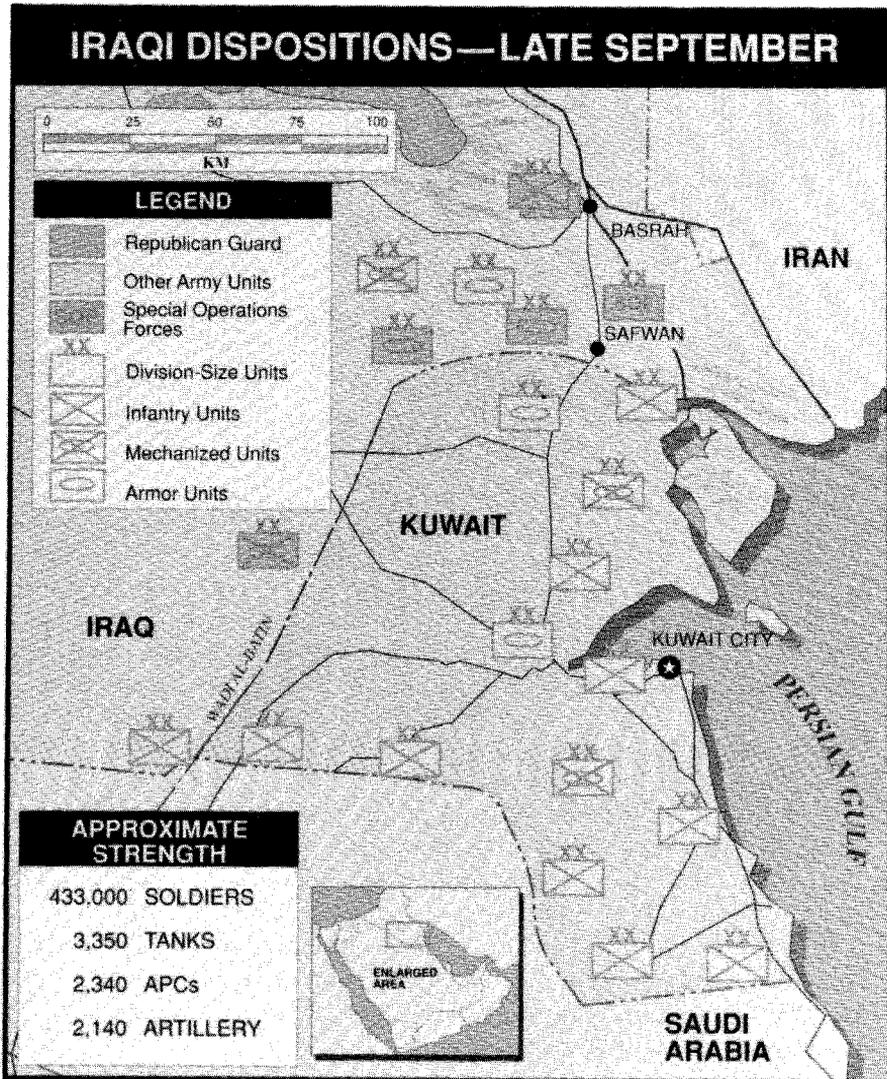
The rapid and unequivocal commitment of Coalition ground forces on August 8 probably caused Saddam to back away from escalation. On the diplomatic front, he opened negotiations with his old nemesis, Iran, generously offering to recognize the 1975 Iran-Iraq border, to withdraw Iraqi troops from Iranian territory, and to release Iranian prisoners of war. His offer was tantamount to a surrender of all gains made in the eight-year war with Tehran. Ominously, the deal also allowed him to withdraw his forces along the Iranian border and send them to Kuwait. Saddam also announced the recall of 14 reserve divisions deactivated since the end of that war. Meanwhile in Kuwait, Iraqi 3d Corps regular divisions began the relief of the Republican Guard along the border with Saudi Arabia. As the Guard units returned to preinvasion laager areas in southeastern Iraq, the first Iraqi regular infantry divisions deployed along the Saudi border to begin building Saddam's "fortress Kuwait."

In transitioning to the defense, Iraqi dispositions reflected Saddam's emerging strategy of deterrence. His forces soon established an echeloned defense of Kuwait and a strategic defense of Iraq, both designed to make an attacker pay dearly. By late September, the Iraqi defenses in the KTO had 22 divisions—13 light and 9 heavy. Fourteen were in the forward defenses. Ten infantry divisions defended the Saudi border and the coast-line, backed by four heavy divisions immediately available as corps reserve. In addition, the Iraqis retained six Guard and two regular army divisions in the theater reserve, of which five were heavy divisions. Evidence of mobilization and training throughout Iraq suggested that more military forces would be dispatched to the KTO as soon as they were nominally ready.

Central to this defense was an increasingly elaborate obstacle system among the forward infantry divisions. The 16th Infantry Division was typical. Within 15 kilometers of the Saudi border astride a key line of communication, the division defended a frontage of almost 45 kilometers with two brigades forward and a third brigade 15 kilometers to the rear. Like most infantry divisions in Kuwait, the unit had an attached armor-heavy brigade. The armored brigade was split with a mechanized battalion forward on the division's western flank along the main road into Kuwait and the balance on the forward eastern flank wrapped around and behind the infantry. This key brigade thus anchored both flanks while providing a strong tactical counterattack force. Supporting forward was a formidable fire-support system consisting of six full battalions of artillery capable of ranging the entire division sector.

To further strengthen its defenses, the division established an integrated system of obstacles and fortifications that could be supported directly by fire and maneuver. Elaborate artillery fire plans supported by large ammunition stocks created multiple kill zones throughout the depth

of the defense. Dug-in wire communications ensured that command and control would remain intact. A double line of earthen berms marked the forward line of defense. Forward armored units used the earthworks to screen movement and to provide cover from direct fire. Antitank ditches protected the flanks of these forward armored units and channeled the enemy into killing zones. Next was the main line of defense, a system of concertina wire and antitank ditches in front of the infantry. Forward infantry positions, laid out in the classic two-up/one-back pattern, covered the complex with direct fire. As more engineering equipment became available, the division would add fire trenches and minefields to this impressive defensive array.



Behind these forward static defenses, the Iraqis maintained a heavy division in operational reserve as a counterattack or blocking force. Hunkered down far to the north, the Republican Guard and several regular heavy divisions waited to conduct a multidivision counterattack. Iraqi forces west of Kuwait, acting in an economy-of-force role, screened the theater's western flank far into the featureless desert.

As Fortress Kuwait took shape in aerial photographs, Army planners became increasingly convinced that Saddam had shifted to a strategy of defensive deterrence based on the threat of attrition warfare. Although such a strategy made an Iraqi offensive increasingly unlikely, it also suggested that Saddam would not evacuate Kuwait without a fight. Nevertheless, the threat of an Iraqi invasion of Saudi Arabia continued to haunt analysts and commanders well into October.

### SPACE AGE IMPROVISATION AND BRUTE-FORCE LOGISTICS

On August 22, 1990, the first Army pre-positioned ship, the *USS Green Harbor*, completed its 2,700-mile trip from Diego Garcia to discharge its cargo at ad-Dammam. During the mid-eighties, the Army had stocked the *Green Harbor* and three similar vessels with enough tentage, food, ammunition, and water purification and refrigeration equipment to provide a logistical jump-start to any Gulf operation until seaborne transport arrived from the United States. After the *Green Harbor* arrived, the logistics race was well under way and the theater in Saudi Arabia continued to build at an extraordinary rate. As Pagonis continued to develop the initial support network for the theater, he also established the basic systems that would sustain the rapidly expanding theater for many months to come. By August 29, the 22d Support Command headquarters had 58 soldiers in country. More than 300 of the 7th Transportation Group's 400 soldiers and civilians were employed as long-haul truck drivers and stevedores who were fully occupied with off-loading supplies from the pre-positioned ships and receiving 18,215 troops and more than 2,000 vehicles through both airports and seaports of debarkation.

The limited time available and the CINC's stringent limitations on rear-area manpower forced Pagonis to create a logistics infrastructure to sustain forces in a distant theater by relying primarily on bases of supply in the United States. Pagonis would rely heavily on host-nation support to reduce the need for supplies and equipment from the States. Technology and the management skills of General Pagonis and his Support Command logisticians made the system work, but often just barely. Thanks to lessening tensions in Europe and other regions of the world, supplies, parts, and equipment were available. Commodity managers throughout the world were poised to provide practically anything CENTCOM needed on a moment's notice. The major breakdown in the

system occurred in the communications link between the requesting forward unit in the theater and the requisite source of supply. The 22d Support Command improvised techniques to improve communications between the theater and the United States. Pagonis worked the system most effectively with his ever-present cellular telephone. His staff relied on a direct, single-channel tactical satellite linkage to Fort McPherson, Georgia.

Colonel Chuck Suttin's 11th Signal Brigade, ARCENT's organization responsible for communications support, was a sort of phone company for the developing theater. Like the Support Command, the Signal Brigade's ability to provide essential services was impeded substantially by severe restrictions imposed on the number of soldiers and the amount of signal equipment allowed into theater during the early days of the buildup. Suttin's problem was made particularly difficult because the CINC's deployment restrictions meant that other essential functions such as supply, maintenance, and administration remained split between major Stateside facilities and forward deployed detachments in theater. Just to survive in such an awkward environment required far more intertheater telephone hookups than any signal planner could ever have foreseen. Suttin initially had only two tactical satellite task forces consisting of 139 soldiers who operated mainly tactical satellite multichannel radios, a virtual godsend. The radios allowed Suttin to keep telephone communications open between ARCENT headquarters in Riyadh and the 22d Support Command at Dhahran Air Base, as well as to other more forward bases as they began to develop. As the theater expanded, the 11th Signal Brigade received more of their organic tactical communications equipment, and by September Suttin had established a continuous telephone network between ARCENT, 22d Support Command, and XVIII Airborne Corps. By the time the ground war started, Suttin had built the largest and most complex communications network ever installed in an active overseas theater. Until this system was mature, however, satellite communications filled the void and allowed Suttin to keep information flowing.<sup>14</sup>

The difficulties forward units faced in transmitting logistics requests electronically to other units inside Saudi Arabia exacerbated communications problems. Most of the Army's automated internal logistics reporting and supply-requisitioning procedures worked well in peacetime as long as units and supporting logisticians were linked by commercial telephone. However, the lack of telephone linkages was not the only problem in the KTO. Desert Shield occurred right in the midst of an enormously complex changeover within the Army to a more modern automated requisition system. Units not yet converted were still obliged to fill out punch cards manually and to deliver them by hand. Some units had computer terminals down to company level that permitted them to trans-

mit requests electronically. These terminals queried and interacted with every level of supply within the theater in attempting to locate and fill a requisition. Yet occasional differences in equipment and software among fully automated units prevented even the best equipped from exchanging data. In one very serious case, the entire 1st COSCOM, XVIII Airborne Corps' main logistics unit, was in the process of converting to a more modern version of an automated supply system when alerted for deployment. 1st COSCOM and the 82d Airborne Division were on the new system while the rest of the corps had yet to convert. The 1st COSCOM managed to resolve the problem only by operating both systems throughout the campaign.<sup>15</sup>

Adaptability, innovation, and ingenuity worked to fill holes in the logistics system. When one logistics node broke contact with another, soldiers resorted to the so-called "sneaker net" in which soldiers transported floppy disks and computer tapes from one node to the next by any means available. The logisticians forced the system to work, and had well-stocked depots been present in theater, it might have worked as designed. But with depots nearly half a world away, just a few days' delay imposed by an occasional requirement to carry supply transactions over long distances by hand caused very serious interruptions in service.<sup>16</sup>

## AMERICAN INDUSTRY RESPONDS

For the most part, the American industrial base was not well prepared to surge or begin accelerated production of many urgently required items at the onset of Desert Shield. Of greatest concern were critical "war stoppers" such as Hellfire and Patriot missiles. First fielded in 1983 as a counterair system, the Patriot missile represented an evolutionary leap forward. The heart—and brain—of the missile was its computer software, allowing it to serve in other roles by modifying its programming. With the proliferation of tactical ballistic missiles like Saddam Hussein's modified Scuds, engineers converted the Patriot to an antitactical missile system. They programmed it to look higher on the horizon for incoming missiles than it did for aircraft and to calculate the higher velocities achieved by such weapons. The resultant PAC-1 radar and software changes went to the field in 1988, followed by the PAC-2 warhead and fuse changes in 1990. When Desert Shield began, only three PAC-2 missiles were available, all three marked "experimental."

Patriot missile production in August 1990 was geared to deliver about 80 of the PAC-1 model each month. However, production of the PAC-2 version had barely started. On his own initiative, Colonel Bruce Garnett, the US Army project manager for the Patriot, began to explore acceleration of the PAC-2 program as early as August. He found a ready ally in General Sullivan, who intervened personally to step up the process.

Even if speeded up, the warhead assembly line in the United States would not be fully operational until the end of December. Fortunately, Raytheon Corporation was already producing the new warhead in Germany on contract with the Deutsch Aerospace division of Messerschmitt-Boelkow-Blohm (MBB), a German industrial giant. Garnett knew that warheads were one of the most critical and time-consuming components of the missile to produce, but getting the warheads to the assembly line in Orlando, Florida, from Germany was not easy. With most military airlift committed to Desert Shield, Raytheon had to lease airplanes to fly them from Europe to Dover, Delaware, and then on to Camden, Arkansas, where the final explosive material was poured and X-rayed. Getting the warheads to Orlando for final assembly presented a similar dilemma, which Raytheon solved by contracting with air carriers who were certified to fly hazardous materials.

In Orlando, the Martin-Marietta Company completed the assembly and began to ship the missiles from Patrick Air Force Base near Cape Canaveral, Florida. This circuitous process would eventually increase the production rate of the new missile from 9 in August to 86 in September, 95 in October, and 117 in November and December when MBB began to produce the missile in Germany. By January 1991 Raytheon reached a peak of 146 missiles, effectively doubling their output to meet the Army's demand for 600 missiles before Desert Storm.<sup>17</sup>

While the contractors deserve great credit for their extraordinary efforts, which included producing on a 24-hour, three-shift-per-day, seven-day-a-week schedule, the collective effort involved hundreds of vendors, the transportation industry, and Garnett's office staff. Every weapons manufacturer responded to the Desert Storm crisis, with everyone competing for the same scarce resources.

Mr. Dick Slaughter, the senior engineer for missile production, along with the 185-person staff in the program manager's office, coordinated with the Army, other government offices, and Raytheon to meet this accelerated procurement schedule. Slaughter faced innumerable challenges. By November, for example, the ARC Company in Camden, Arkansas, which performed the warhead X-ray inspections, was inundated with Patriots and other types of warheads stacking up for inspection. Slaughter found an excess X-ray machine at the Lonestar Plant near Texarkana, Texas, which he was able to procure and send to Camden to break the logjam. When US production of the new warhead finally came on line in late December, obtaining warheads from Germany was no longer necessary. By then, MBB was building complete missiles in their plant in Trobenhausen and sending them directly to Saudi Arabia.

Slaughter credits the fact that the production line was at least luke-warm in August 1990 with meeting the eventual demand. According to

him, six months earlier no amount of heroics could have gotten the PAC-2 in the hands of the soldiers on time.<sup>18</sup>

Though less important, desert uniforms provide another example of industry's response. Enough desert battle dress uniforms (DBDUs) were available in war reserve stocks to outfit an entire corps with two uniforms per soldier. In September, Yeosock directed that all soldiers be outfitted with four sets of DBDUs, exceeding the supply 10 times. In November the VII Corps deployment would add another 145,000 soldiers to the list. Only enough desert camouflage material existed in war reserve stocks to produce an additional 200,000 uniforms. While new material was manufactured, the Defense Personnel Support Center (DPSC) used existing stocks to begin production in their Philadelphia factory. Meanwhile, the Defense Logistics Agency negotiated contracts with Wrangler Jeans Company, American Apparel, and 13 other contractors throughout the United States. By February contractors were producing 300,000 DBDUs a month. Despite such laudable efforts, the industry simply could not catch up and most VII Corps soldiers would go into battle clad in dark green BDUs.

The problem of ration supply was another example of the difficulties inherent in supporting an active theater of war from a near-cold industrial start. In January 1991 the Army, the DOD executive agent for food and water, had to provide 39.2 million meals per month to feed 435,000 troops from all Services in theater. Additionally, the CINC directed the Army to keep a 60-day supply of rations—78.4 million meals above the daily requirement—as a contingency reserve. In August 1990 industry was providing 3.9 million rations per month to the Army and could, if necessary, surge to 45.1 million by January. With the requirement for the additional 60-day supply, the theater food service manager, Chief Warrant Officer Wesley Wolf, would not be able to achieve his 60-day reserve before May 1992. To fix the problem, DPSC simply went on a nationwide shopping expedition. Thanks to the microwave, commercial food preservation technology had come a long way in the decade preceding the war. Individually packaged food items such as "Lunch Bucket" and "Dinty Moore" were tasty, were already popular with younger soldiers, and could remain on the shelf for a relatively long period without spoiling. Commercial products, at least initially, added variety to mealtimes and were preferred by many to the MRE. Before the war ended, the Army purchased almost 24 million individual commercial meals and managed to get theater stockages up to the required 60 days by the end of January.<sup>19</sup>

### **BUILDUP CLOGS PORTS AND ROADS**

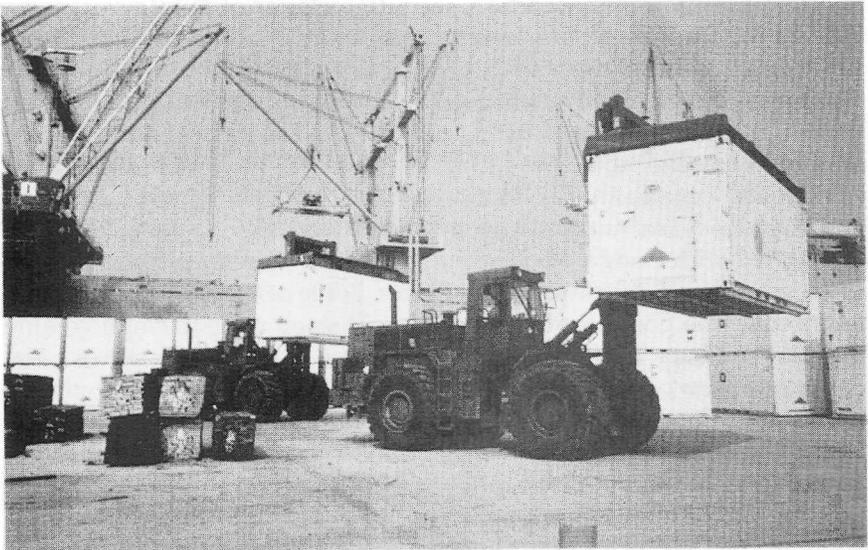
Once the sea lines of communications were opened in late September, the seaborne materiel pipeline began dropping millions of repair parts, equipment, and other supplies on the docks of ad-Dammam and



Port operations at ad-Dammam, Saudi Arabia.

al-Jubayl. By September stevedores had discharged 17,540 tracked and wheeled vehicles, 450 aircraft, and 1,521 sea-land containers, each stuffed with ammunition, repair parts, or other supplies. Practically every loose item shipped to Saudi Arabia was packaged in commercial shipping containers. Unfortunately, the thin forward logistics structure in theater soon fell behind in its effort to track and account for the materiel and move it off the docks to soldiers in the desert.<sup>20</sup>

Faced with increased requirements and time pressures, shippers often provided only the minimum documentation that transportation regulations allowed. Consequently, the contents of most containers could not be accurately determined until they were unloaded. Because the personnel needed to document the receipt of materiel were not among the early arriving units, stacks of containers sat in ports unprocessed, their exact contents unknown. Locating a specific high-priority item that may have been in any one of several hundred containers became almost impossible. The problem was not one of availability—the success soldiers had in scrounging almost anything they needed attests to that—but simply one of asset visibility and in-theater distribution. The problem could only be fixed by opening each container, sorting out the contents, and repackaging them for shipment forward.<sup>21</sup> This process wasted both time and manpower. The problem with containers arriving by aircraft was mitigated somewhat since shipments were usually high-priority, critically needed items that could be tracked by aircraft tail number. Still, shipments by air got lost. At intermediate stops in Spain or Germany, Air



Containers were off-loaded at the Port of ad-Dammam, Saudi Arabia.

Force ground crews frequently unloaded containers with high-priority designations and replaced them with even higher-priority materiel.

Soldiers and leaders' individual initiative and determination to get the job done made the logistical system work. Often logisticians up and down the chain, from combat battalions through division to corps support commands, established direct-request networks with supply centers in the States rather than rely on "the system." While this often solved immediate problems for individual units, multiple requests for the same item created further confusion and delays. Space age scrounging by satellite became a common high-tech method for tracing missing items or for finding new sources for items in short supply. XVIII Airborne Corps used its own organic tactical satellite communication system to establish a callback network between the 1st COSCOM in an-Nuayriyah and supply points at Fort Bragg.

According to doctrine, at least two transportation networks should have been in Saudi Arabia, one to receive and transload ship and airborne materiel at the airports and seaports and another to move materiel by road to forward units. But neither the time nor the soldiers were available to build a traditional transportation structure. Therefore, Pagonis appointed another trusted subordinate, Colonel David Whaley, as his transportation tsar and gave him responsibility for establishing an efficient system to move materiel from port to deployed units. Whaley began humbly enough with contract buses and eventually expanded to a theaterwide transportation fleet of 3,500 vehicles moving across a road network of 2,746 miles.

Main supply routes, or MSRs, were the arteries of Whaley's system. Among the two major northern arteries, MSR Audi was a very good multi-lane road that ran from Dhahran along the coast to just north of al-Jubayl. Tapline Road, named MSR Dodge, ran generally northwest from MSR Audi to Hafar al-Batin and then onward through Rafha across the rest of Saudi Arabia. The two southern routes were MSR Toyota and MSR Nash. Toyota, an excellent multi-lane road, ran between Dhahran and Riyadh. Nash ran north from Riyadh to Hafar al-Batin, where it intersected with Dodge. Nash was a multi-lane road for about one-third its length where it narrowed to two lanes. Some of these roads were well surfaced and in good repair, but none could stand up to the high volume of heavy military traffic about to be inflicted on them. Distances were enormous from ports and airfields to forward logistics bases and combat units within the theater. Troops and materiel moving from Dhahran to the logistics base at King Khalid Military City had to travel 334 miles along the northern MSRs. Because roadways were relatively straight and generally flat, traffic could move quickly, and vehicle operators easily bypassed accidents and obstacles by driving on the shoulders. When large traffic jams occurred, the sight of heavily laden trucks striking out on the flanks

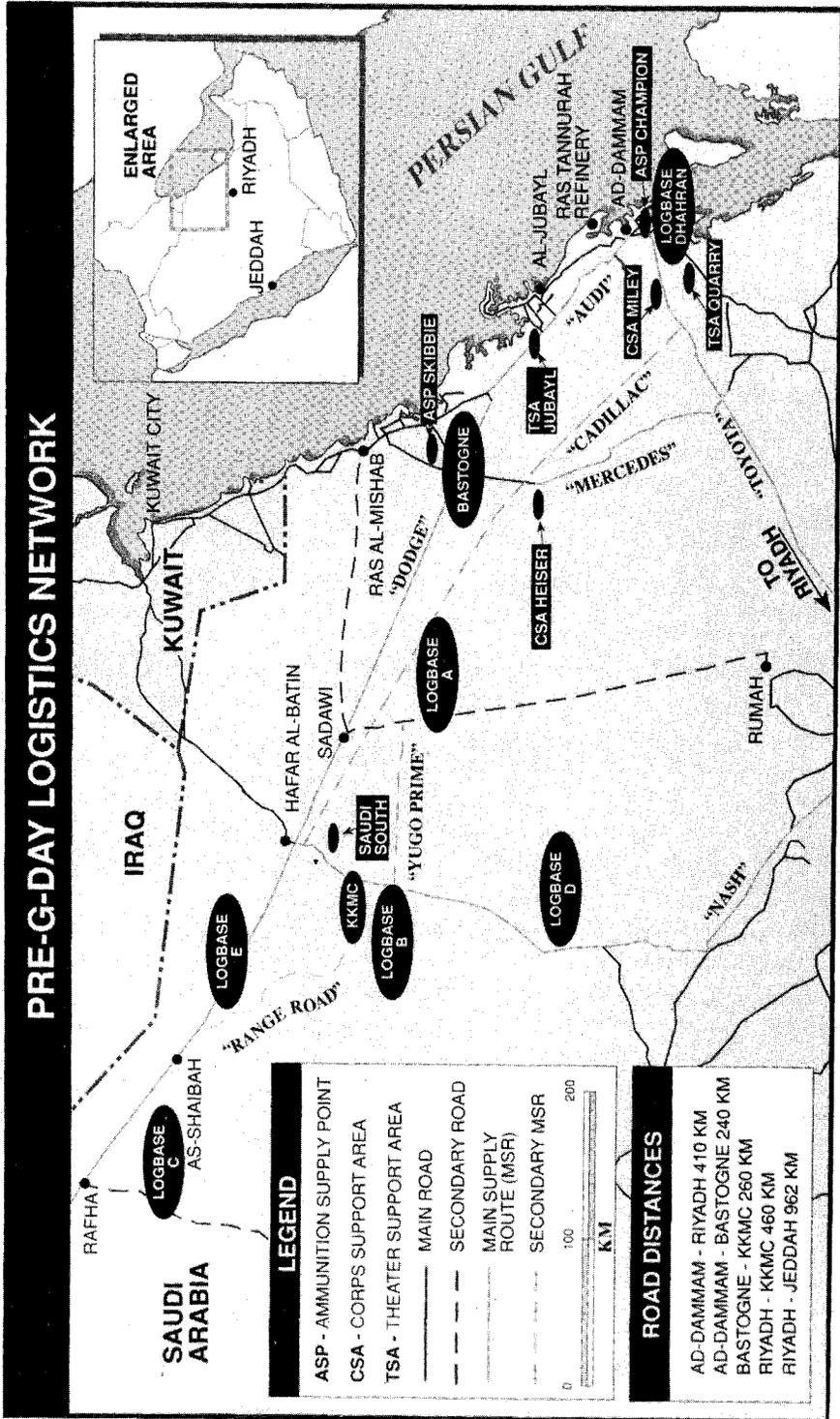


MSRs were constantly jammed, often with several convoys abreast.

to carve out five or six additional lanes of traffic in the open desert was not uncommon.

Whaley established a series of convoy support centers to increase road network efficiency. These centers resembled huge truck stops in the desert, and like all truck stops, operated 24 hours a day, providing fuel, latrines, food, sleeping tents, and limited vehicle repair facilities. The convoy support centers quickly became welcome oases for overworked and exhausted long-haul drivers.

While the MSR arteries allowed supplies to flow efficiently from port to major stockage areas, the capillaries of the system were practically nonexistent. Engineer construction units like the 212th cut roads off the MSRs. Most travel from corps and division depots forward was done off-road across rock-strewn or sandy desert terrain that destroyed precious tires at a frightfully high rate. Forward units were equipped with commercial utility cargo vehicles (CUCVs) and 2½-ton and 5-ton trucks with trailers, many of which were older than their drivers. With such relentless and rugged use, trucks continually broke down en route to forward areas. The only practical solution was to exchange older trucks for the newer heavy expanded mobility tactical truck (HEMTT). The HEMTT was a state-of-the-art cross-country vehicle designed by the Oshkosh Company of Wisconsin—a company long respected for producing rugged, reliable off-road machinery. While Abrams, Bradleys, and Apaches might capture the limelight during the war, the superbly reliable



HEMTT would keep its more glamorous cousins in fuel, ammunition, and repair parts. To help HEMTT drivers get around in the desert, the corps and division support staffs scoured United States depots to find extra radios, global positioning systems, night vision goggles, and recovery vehicles to act as escorts for trucks traveling off-road. By February, forward units had replaced more than 400 older tactical trucks with 926 HEMTTs, and some units had turned in the less reliable CUCVs for high-mobility, multipurpose wheeled vehicles (HMMWVs).<sup>22</sup> Despite the millions of miles driven, military drivers compiled remarkable safety records in the desert and on such thoroughfares as Tapline Road, known as "suicide alley."

### MODERNIZING ON THE RUN

General Vuono was determined to give the force the best possible combat edge. He focused his effort on fielding the M1A1 with its 120mm gun and on-board chemical defense systems to ensure an overmatch against the Iraqi T-72M1 tank. A secondary effort was to upgrade the Bradley to the A2 model, which included a Kevlar spall liner that significantly improved crew protection. Vuono called on US Army Europe to contribute 783 M1A1s from its war stocks to replace the older M1s of the XVIII Airborne Corps and, later, elements of VII Corps. In early estimates, the M1A1 nearly doubled the combat power of the M1s to meet the Iraqi armored threat. The concept of in-theater modernization was not received with unanimous enthusiasm. Both the ARSTAF and Schwarzkopf were concerned that tank crews might be called on to fight while transitioning to an unfamiliar tank. However, the transition to an improved Abrams was much simpler than the change from the M-60 Patton-series tank to the Abrams. The same held true for the upgraded Bradleys, which were functionally identical to the older "vanilla" Bradleys they replaced. Rather than work the issue through the maze of supporting to supported CINCs—the tanks and Bradleys in question would come from European war stocks—Vuono talked the tank modernization plan through with Schwarzkopf. Vuono carefully matched it to the campaign plan to guarantee that the effects of tank modernization on the readiness of the CINC's forces would be minimal. Schwarzkopf agreed to the plan and the program began. From November 6, 1990, through January 15, 1991, AMC successfully accomplished what came to be known as the M1A1 rollover program in the theater. AMC received the M1A1s from Europe, applied several upgrades, and returned them to fully operational standards for issue to units in theater. The rollover was made possible by 84 tons of tools and equipment shipped from Anniston Army Depot and by more than 300 civilians deployed from six different depots with augmentation from contractors. The tanks were handed off under the Total Package Fielding concept to the Abrams tank project manager and issued to deployed units

in record time, allowing the units in theater time to train on the new tanks before the ground war started. Morale and confidence soared. Soldiers received these tanks and other new equipment with great enthusiasm and appreciation for the edge their Army was giving them.

Throughout Desert Shield and Desert Storm, AMC upgraded a total of 1,032 Abrams tanks. The most significant improvement ensured that nearly every armor battalion went into the ground war equipped with the far more powerful 120mm gun. AMC also applied reactive armor plates to the older Marine M60-series tanks in an effort to reduce their vulnerability. AMC issued the armored combat earthmover (ACE) vehicle and new mineplows to engineer units in combat divisions. To meet the CINC's demand for any means to haul tanks over great distances, AMC gathered 1,059 heavy-equipment transporters from war reserve stocks, nondeploying Active Army units, and training centers. Pagonis' staff contracted for an additional 333 through host-nation support. In an ironic epilogue to the end of the Cold War, AMC managed to locate and lease more than 270 HETs from former Warsaw Pact countries, including Czechoslovakia, the former East Germany, and Poland. Vehicles intended originally to carry Soviet tanks into combat against Americans would now transport American tanks into battle against Soviet-equipped Iraqis.<sup>23</sup> The German army also provided key support. When Saddam's chemical threat caught the Army short of adequate chemical defense equipment, the German army donated its excellent "Fuchs" armored chemical-detection vehicles. These vehicles would allow soldiers under mobile cover to sniff out and warn unprotected soldiers of a chemical attack.

### **SEEKING BALANCE IN LOGISTICS SUPPORT**

Anticipated high casualties and the pervasive fear of Saddam's chemical weapons led planners to bring what would turn out to be too much medical infrastructure into the theater. By February, four hospitals with more than 13,530 beds and 24,000 medical soldiers comprised almost 5 percent of the total deployed force. Not only did medical facilities have very few patients during Desert Shield, but such a huge organization was not needed to handle combat casualties. Better-quality, better-disciplined soldiers tend to be in better shape, have fewer health problems, and take better care of themselves, even under such harsh climatic conditions. In one of the hottest climates on earth, not one soldier died of heat stroke, and the rate of heat injury was substantially less than in any Stateside Army post in the south.<sup>24</sup> Gastrointestinal diseases such as dysentery never became the factor they were in earlier wars, largely due to bottled water and the healthy—albeit unpopular—MRE. As a result, theater non-battle hospital admission rates in Desert Shield were one-sixth those of World War II and about one-third those of Vietnam for similar periods of time. Nevertheless, the medical mobilization caused a significant reduc-

tion in support to military families in the United States and drained a number of trained medical specialists in American civilian hospitals as well. To fill the gap, the Surgeon General implemented a plan to backfill vacancies in United States civilian and military hospitals with selected Army Reserve medical professionals.<sup>25</sup> Fortunately, the medical system was not stressed fully during the war in large measure because Saddam chose not to employ weapons of mass destruction. Had such weapons been used, a greater proportion of the medical infrastructure in theater would have been necessary.

Having too much ammunition can be as much a vice as a virtue, particularly in a contingency operation where shipping space is always constrained. During Desert Shield, more than 350,000 tons of ammunition were shipped into theater. Faced with the prospect of the Army's first large-scale tank-on-tank fight since World War II, ARCENT planners turned in part to combat experience in that earlier conflict to estimate ammunition consumption rates. However, those rates did not take into account the enormously greater lethality of modern precision munitions with the result that daily expenditure rates were far less than anticipated. Unlike first battles in earlier wars, the superior fire discipline of combat soldiers and highly accurate weapons in Desert Storm greatly reduced the number of rounds fired in direct combat engagements. While available figures are inexact, estimates indicate that the Abrams main gun required less than 1.2 rounds for each enemy tank destroyed, contrasted with World War II tank engagements where each main gun averaged 17 rounds per kill.

Nevertheless, perceived shortages were alarming at the time. Armor-piercing 25mm ammunition for the M2 Bradley fighting vehicle caused particular concern. AMC conducted an intensive worldwide search for tungsten rounds and managed to locate and ship more than 3 million before the war began, representing almost 80 percent of the estimated requirement. When Desert Shield began, a newer, more lethal depleted uranium penetrator was in the process of replacing the older tungsten penetrator round. Tactical commanders went to great pains to ensure that Bradley crews would use the precious penetrator rounds only against armored targets. Yet a check of total expenditures after the war indicated that Bradley crews had used far fewer penetrator rounds than expected, averaging only six 25mm rounds for each Iraqi armored carrier destroyed. Superior firing discipline again made the difference. One 1st Armored Division company commander instructed his Bradley crews to engage light armor by firing a single ranging round and then to follow with no more than three rounds for killing effect. Later, during a night engagement, he recalled with great satisfaction being surrounded by the distinctive "crack, pause, crack-crack-crack" sound of his unseen Bradley crewmen firing exactly as they were told.

In spite of some unforeseen problems and occasional delays, the American Army had succeeded in establishing a logistics infrastructure capable of supporting half a million troops from all Services, the same number sustained in Vietnam at the peak of deployment. By November, just 90 days into the campaign, ships were unloaded smoothly and the trucking network extended the sinews of the coming war efficiently toward the tent cities and camps already sprouting in the desert. The logistics system strained to the breaking point to keep up, but bad as it was in November, Yeosock, Pagonis, and the Support Command had come a long way from that lonesome morning back in August. When the two generals stood alone on the sweltering tarmac at the Dhahran airport to greet the first paratroopers from the 82d Airborne, they had nothing more in hand than some Bedouin tents, a colorful caravan of Saudi buses, and a pocketful of unanswered questions.

### DESERT DRAGON I

After arriving in Saudi Arabia, the three infantry battalions of the 82d Airborne's 2d Brigade formed the nucleus of Desert Dragon I. An Apache battalion, a Sheridan light tank company, a battalion of 105mm howitzers, and a platoon of MLRS supported the lightly armed paratroopers.<sup>26</sup> The brigade's first mission was to form an enclave to secure Dhahran air base and the port of ad-Dammam far enough outside the city to keep the port and air base beyond Iraqi artillery range. From inside this secure perimeter, American forces would gradually expand, first up the coastline and later into the interior. Although the 82d can deploy quickly, it is a very lean force that can only reasonably be expected to sustain itself and delay an enemy advance for 72 hours. General Scholes, the senior XVIII Airborne Corps officer on the ground with the lead elements, expected an attack by six heavy Iraqi divisions, some of them Republican Guard, preceded by commando air assaults and supported by air and missile strikes with chemical weapons. He had a limited armor capability in the division's Sheridan armored reconnaissance vehicle—a very light "tank" in the mind of its most ardent supporters, the crews of the 3-73d Armor. Although its main armament, the Shillelagh missile, was an effective tank killer out to 3,000 meters, the Sheridan is not designed to fight head-to-head against tanks. Like the M113 troop carrier, the Sheridan is an aluminum vehicle, vulnerable to heavy machine-gun fire and a certain kill for even the most obsolete Iraqi tank. To thicken the antiarmor defenses, Scholes would rely on TOW missiles. The brigade's TOW antitank missile systems also outranged Iraqi armor by more than 2,000 meters, and both Sheridans and TOWs had full night capability.

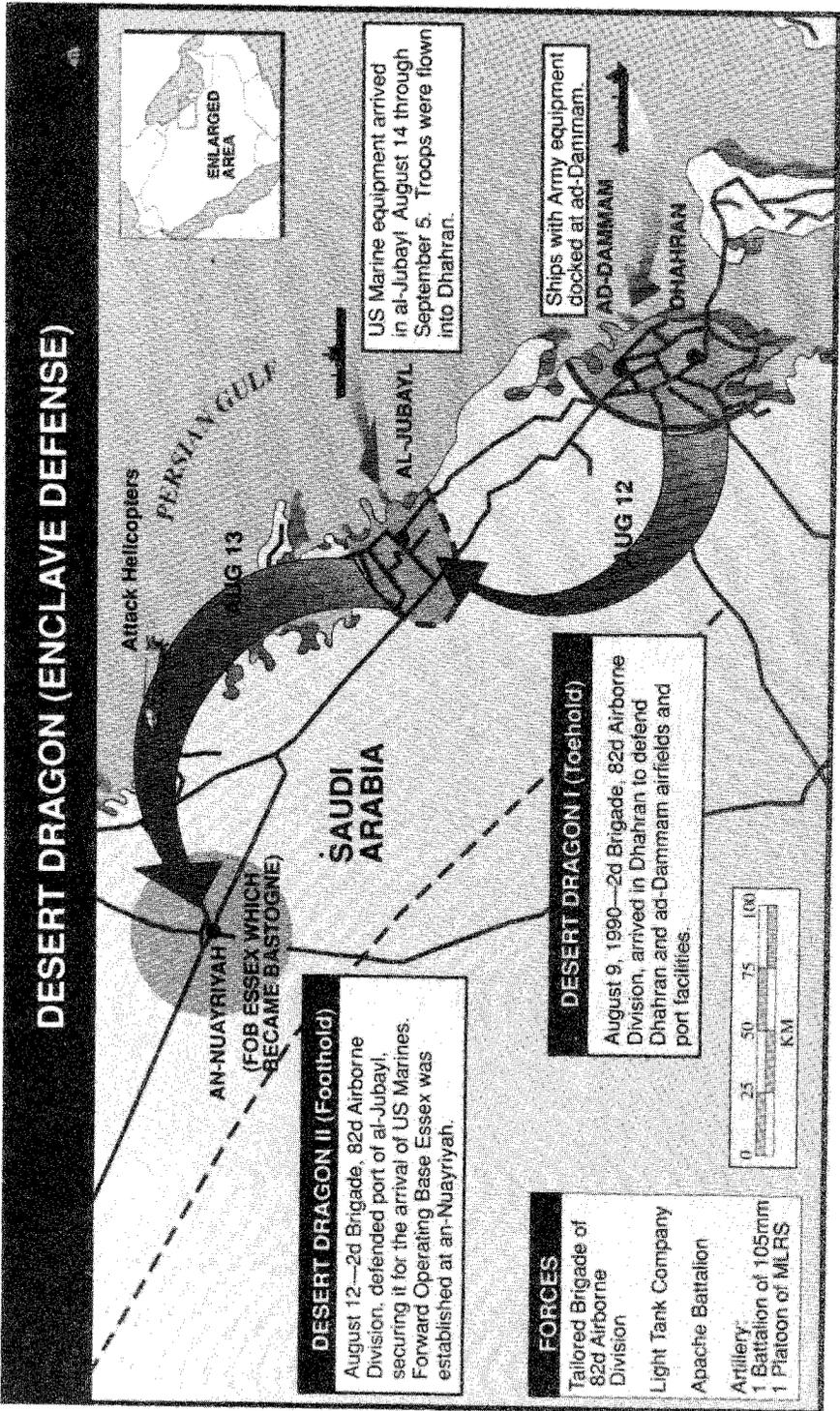
The conditions necessary for dismounted "light" soldiers to defend against mobile armored formations have not changed appreciably since



M551 Sheridan light tanks of 3-73d Armor, 82d Airborne Division, flown into Dhahran in early August, provided the only armored fighting vehicle for first-arriving American forces.



82d Airborne troopers, mounted in TOW-equipped HMMWVs, occupied deploying positions along coastal sabkhas.



the Hundred Years War. Whether longbowmen of Henry V at Agincourt or the paratroopers of the 101st at Bastogne, the light infantry defender must accomplish three essential tasks to withstand an armored attack. First, he must break the charge of the heavier force. Henry V took advantage of a plowed hillside knee-deep in mud. The 82d sought to engage the Iraqis at points along the coast road closely bordered by sabkhas, or coastal salt flats, which could easily be traversed by the 82d's light vehicles but would bog down much heavier Iraqi tanks. Second, the light force must be able to engage at long range before the heavy force can use its superior weight to slam into and bowl over the defender. Henry V's technological edge rested with the longbow and cloth yard arrow, which could dismount an armored knight at 300 yards. The 82d planned to cover the sabkhas at ten times that distance with the concentrated fires of TOWs, Sheridans, and artillery, and at a hundred times that distance with attack helicopters and Air Force close air support. Third, the light force must develop enough confidence in their weapons and leaders that they will not be intimidated by the psychological shock of advancing armor. Henry V had his yeomen; General Luck had paratroopers who had spent nearly two decades concentrating principally on the task of equipping and training to defend against a mechanized enemy.

In accordance with doctrine, the 82d fights jointly. By the end of August, the United States Air Force had in place a substantial force of more than 200 ground attack aircraft, including the A-10.<sup>27</sup> The corps air liaison officer, Lieutenant Colonel Terry Buettner, planned to direct close air support using rectangular "kill boxes" drawn around the existing Saudi air defense and control grid. Once cleared by the Saudi forces, an open kill box would permit unhindered air attack without further control from the ground.<sup>28</sup>

Although the tactical situation was tenuous in the extreme, the forces of Desert Dragon I had already accomplished two critical missions. First, the line drawn in the sand by the paratroopers deterred an Iraqi incursion into Saudi Arabia. Although Saddam and his military council must have known that the paratroopers could not defeat a sustained effort to take Dhahran, they also knew that the force blocking their path was no mere speed bump. With open terrain and clear weather, American air superiority would have badly mauled any armored force, particularly if it were tied to the main coastal road. More important was what the thin line of paratroopers represented. Should he harm them, Saddam would find himself embroiled in a larger war against forces en route, a war he had no hope of winning. Second, the presence of the paratroopers eased the panic and mass exodus that ensued after the invasion. Soon after Kuwait fell, rumors spread among Saudis, foreign workers, and American civilians alike that the Iraqis were headed south, intent on treating them as horribly as they had treated the Kuwaitis. Civilians fled from the Iraqis in panic,

jamming the roads. Cities and refineries emptied as frightened citizens and foreigners sought refuge.<sup>29</sup> Most serious, however, was the potential damage to the Saudi defenses. Virtually all of the country's air defenses and maintenance operations for its high-tech F-15 and Tornado fighters were in the hands of foreign technicians. If the technicians fled, Saudi Arabian skies would be open to Saddam's air force. Already, families of Saudi air force officers had fled to the west coast, fearing Iraqi chemical air strikes. After the Americans arrived, confidence returned, panic abated, and the oil market stabilized.

## DESERT DRAGON II

On August 12 Desert Dragon II expanded the defensive enclave to accommodate the arrival of an additional brigade. The 4-325th Airborne Infantry moved north 110 miles to occupy the port of al-Jubayl in order to protect the arrival of the 7th Marine Expeditionary Brigade, which began to download its equipment at Dhahran on August 14. Additional forces allowed General Scholes to create a forward operating base at an-Nuayriyah, which he named FOB Essex. Five roads converged on Essex, including the main coast road. If held long enough, FOB Essex would back Iraqi armored columns well into Kuwait. Moreover, the move to Essex allowed attack helicopters to engage the enemy earlier and provided additional space and time for maneuver. On the negative side, the exposed position of Essex astride Tapline Road risked bypass and encirclement. Even if Essex or al-Jubayl were surrounded, the 82d would retain absolute air and sea control and could use either medium to evacuate the bases if necessary.

Ten days into the deployment, 4,185 troops of the 82d were on the ground. With 15 Apaches and 23 other helicopters, the division was able to establish a strong defensive screen on the northern approaches. It also had on the ground 19 of 51 M551 Sheridans, 56 of 180 TOW systems, 20 Stinger teams, 3 Vulcans, 20 105mm howitzers, and 3 MLRS launchers with 10 missile pods.<sup>30</sup> Its August 24 situation report declared that ARCENT had a "potent combat force" with almost a full airborne division and two battalions of attack helicopters, and it concluded: "As of today, we are confident in our ability to detect and punish a major armored attack."<sup>31</sup> Even with that optimistic note and in spite of large numbers of combat aircraft arriving in the theater daily, available bombs and other aerial munitions were inadequate to exploit the air power. The airlift had put enough combat power on the ground in Saudi Arabia to make the Iraqis hesitate at the line in the sand, but if they had attacked, the expected air power advantage would have been seriously diminished by the lack of antitank munitions. Fortunately, fast sealift ships were about to arrive, carrying with them the heavy forces necessary to build a credible defense.

When asked in postwar testimony before the House Armed Services Committee whether he could have stopped an immediate invasion by Saddam, General Schwarzkopf replied, "I think we would have had to rely on tactical fighter squadrons to interdict his supply lines as he came across. It would not have been easy. I think we would have found ourselves in an enclave type of defense, the very toughest thing.... But I think we could have stopped him."<sup>32</sup>

### THE 24TH INFANTRY DIVISION (MECH) DEPLOYS

At the same time that the 82d received its order to load out on August 6, FORSCOM instructed the 24th Infantry Division to move one armored brigade to the port at Savannah within 18 hours. The threat was so severe that General Luck likewise ordered the division to be prepared to fight immediately on arrival at Dhahran.<sup>33</sup> For almost a decade, the Southwest Asia mission had formed a centerpiece for planning and training within the 24th. Whether the regional enemy would be Soviet, Iranian, or Iraqi did not particularly matter; all threatening regional states possessed a respectable array of heavy armor. The "Victory" Division would perform the classic mission of linkup with an airhead that airborne forces had previously established. The airborne troops would seize a preemptory lodgement and hold it against a superior enemy until the heavy armor of the 24th arrived to make the lodgement secure. In an era of global strategic warfare, however, the 24th would be expected to reinforce from more than 8,000 miles of ocean rather than from a 100-mile stretch of European highway. Luck was convinced that the period of greatest danger in the campaign would end with the closure of the 24th into Dhahran. The challenge, therefore, was to get the division loaded and across the ocean before Saddam reached the vulnerable airhead. The division's sense of urgency was palpable. Just as the first of the 82d's aircraft took off for Saudi Arabia, the vehicles of the 2d Brigade of the 24th arrived fully stocked with fuel and ammunition ready to load aboard Navy fast sealift ships.<sup>34</sup>

The sealift of the 24th proceeded rapidly, with the first of 10 ships departing on August 13. But the load-out was not without problems. Essentially, the 24th had the same difficulty with ships that the 82d had with aircraft. Because of difficulties activating reserve shipping, planners were unable at any one time to predict which ships would be available to load. Ships closed on the port between August 11 and 19. On August 12, without knowing specific ships or arrival times, the 2d Brigade moved by rail and highway to Savannah, 40 miles away. On that day, the first fast sealift ship, the *Capella*, began loading. The Navy was troubled by the Army's insistence on combat-loading its vehicles with ammunition and fuel. Not since World War II had they outloaded a heavy Army division



24th Infantry Division vehicles were loaded aboard fast sealift ships at Savannah, Georgia.

configured for immediate combat. Despite the Navy's objection, the Defense Department waived its peacetime prohibition on combat loading. The division placed 100 additional chemical, medical, fire support, and communications specialists aboard each ship. The air defenders placed Vulcan anti-aircraft guns and Stinger missiles on the decks of every ship to protect the ships from a preemptive Iraqi aerial attack during the vulnerable unloading operations at ad-Dammam.

The requirement to close on the airhead as quickly as possible convinced the Navy to dispatch one of the fast sealift ships, the *Antares*, before scheduled boiler repairs were completed. It was a calculated risk and, carrying elements of both the 24th Division's aviation brigade and division support command, the *Antares* broke down and drifted disabled for two days in the mid-Atlantic. Brigadier General Joe Frazar, the assistant division commander for support of the 24th, headed a 50-soldier detail sent back from Saudi Arabia to Rota, Spain, to assist in transloading the equipment to another ship, the *Altair*, which finally arrived in Saudi Arabia on September 23. For three weeks the division was obliged to defend without benefit of its maintenance and supply system and without the protection of its own organic aviation brigade. Gradually, the 24th's tail caught up with its teeth. Eventually the 24th Division deployed 1,600 armored and 3,500 wheeled vehicles and 90 helicopters on 10 ships. Most of the division's soldiers flew on 57 military and chartered civilian aircraft. Thirty-one days into the operation, two heavy brigades were in field assembly areas en route to their defensive sectors.<sup>35</sup> The division's third

brigade, the 197th Infantry (Mech) from Fort Benning, Georgia, was also inbound and would complete the move into the desert on September 14.

### **THE 101ST AIRBORNE DIVISION (AIR ASSAULT) DEPLOYS**

Helicopters were essential to the combat power necessary to sustain airborne forces in the Dammam-Jubayl airhead. To strengthen the aerial covering force, Luck ordered Major General Peay, commander of the 101st Airborne Division (Air Assault), to send his aviation brigade and 2d Brigade by Air Force C-5 and C-141 aircraft beginning on August 17.<sup>36</sup> During the next 13 days, in one of the largest global combat deployments by air, the 101st filled 56 C-141s and 49 C-5s to move 117 helicopters, 487 vehicles, 123 equipment pallets, and 2,742 troops to the theater. The equipment from the other two brigades of the 101st went by sea from Jacksonville, Florida. Problems with shipping continued to plague the operation. The 101st had to load aboard old ready-reserve fleet ships that had been pulled hastily out of fleet storage and rushed to Jacksonville. The 10 ships dedicated to the division were in poor repair and required an average of 23 days to make the voyage to ad-Dammam.<sup>37</sup> Ironically, some



Lieutenant General Gary Luck, commander, XVIII Airborne Corps, and Major General J. H. Binford Peay III, commander, 101st Airborne Division, just before Desert Storm began, February 1991.



More than 350,000 tons of ammunition were delivered to Southwest Asia. Highly lethal MLRS rockets, shown here, reduced the tonnages necessary to support a campaign.

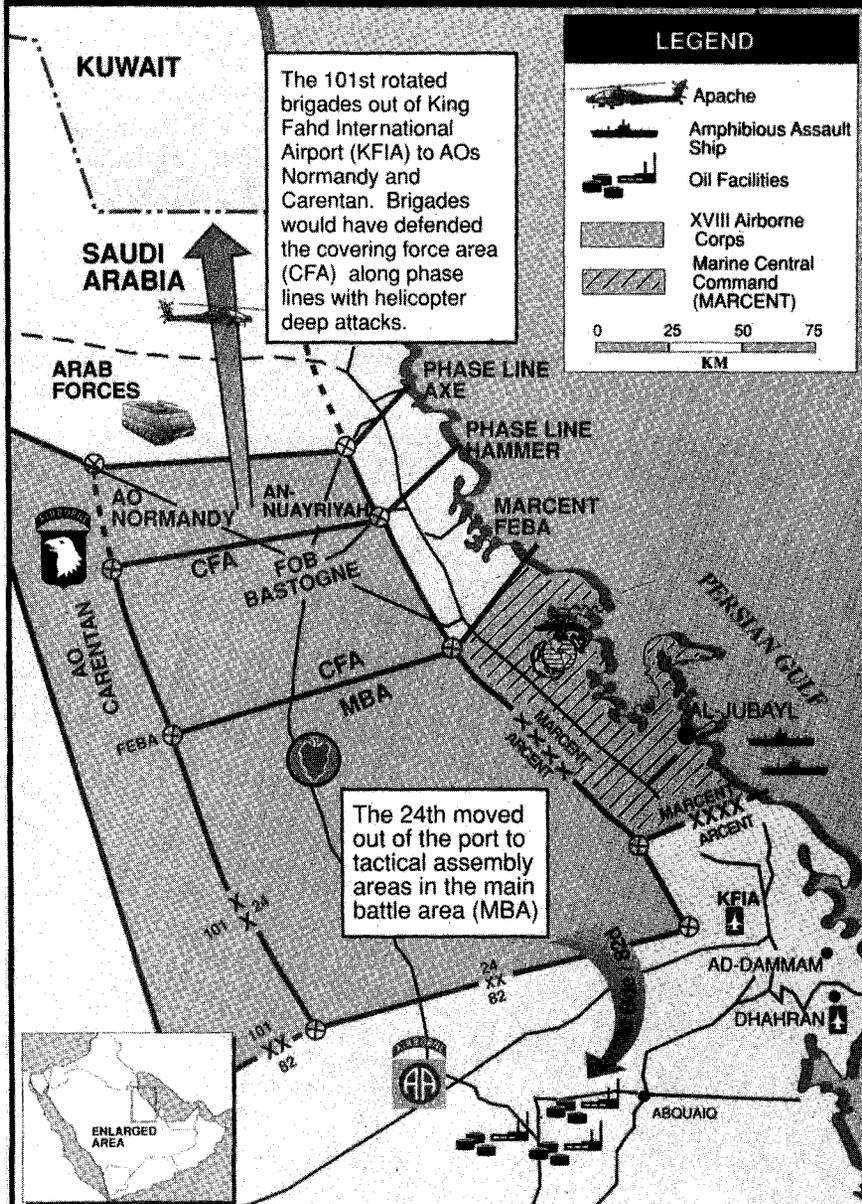
of these ships were the same ones that had taken the division to Vietnam. Fear of an imminent Iraqi attack against the airhead led the 101st, like the 24th, to deploy its initial brigade with its full basic load of ammunition. The 24th and the 82d had depleted the corps' ammunition reserve to such an extent that the last two brigades of the 101st arrived in theater without adequate stocks of Dragon, TOW, Hellfire, and Stinger missiles and other critical ammunition.

Even with the 101st en route, Luck did not have enough combat helicopters to screen the vast expanses of desert between his vulnerable airhead and the Iraqis. The 2-229th Attack Helicopter Battalion from Fort Rucker, Alabama, and the 12th Aviation Brigade from Wiesbaden, Germany, both equipped with Apaches, were soon deployed. Collectively, Luck would be able to put into the air more than 1,000 helicopters to cover a sector 215 by 130 miles, an area roughly the size of South Carolina.

### DESERT DRAGON III

The door on Saddam's offensive option closed a little more on August 27 when the first fast sealift ship carrying armor from the 24th Infantry docked at ad-Dammam. Instead of only air power and long-range defensive fires, the Coalition now had the tanks and Bradleys of the 24th, enabling them to maneuver against the Iraqi armored formations on better terms. The presence of an armored force also freed attack helicopters to range farther north in order to begin killing the enemy earlier.

# DESERT DRAGON III—SEPTEMBER 3, 1990 CENTCOM DEFENDS IN SECTOR



Arrival of 101st and 24th Divisions allowed XVIII Airborne Corps to defend as shown. The Marines took over the al-Jubayl sector in September, freeing 2d Brigade, 82d Airborne Division, to move south to defend the critical oil facilities of Abqaiq.

On September 1 the corps ordered the 101st Airborne Division to relieve the 82d at FOB Essex. Besides serving as an important forward attack helicopter base, Essex had become the key site for the corps' signal intelligence systems. Eventually it would grow into a major logistical base. Soldiers of the 101st noted an interesting comparison between the position of Essex in Saudi Arabia and the Belgium city of Bastogne during the Battle of the Bulge. Both sat astride five key intersecting roads leading to the heart of the allied defenses. The analogy was too striking to ignore. When the 101st took over Essex, they renamed it FOB Bastogne.

Desert Dragon III called for the 101st to establish AO Normandy north of FOB Bastogne to allow five battalions of Cobras and Apaches to operate at will. In the battle zone or covering force area, the 101st could mass fires from 93 attack helicopters, 180 TOW antitank systems, 10 artillery battalions, and Air Force close air support to delay, disrupt, and wear down the Iraqi armor. The plan called for the division's long-range aerial killers to



Major General James Johnson discussed artillery fire planning for Desert Dragon III, October 1990.

blind the enemy by knocking out his lightly armored reconnaissance vehicles and then stripping away equally thin-skinned air defense and artillery vehicles on the road. Should the enemy persist in its advance, the 101st would continue to engage at maximum range, withdraw slowly to preserve most of its force, and eventually hand off the battle to the 24th.

As the enemy reached the main battle area, the 24th would destroy it. Massed fires on engagement areas and counterattacks by Abrams tanks would halt and contain the enemy penetration and set up conditions for further corps counterattacks. Subsequent attacks by armor and Bradleys supported by close air and attack helicopters would break up the enemy's following divisions. The 82d would defend the critical facilities of Dhahran, ad-Dammam, and Abqaiq and eliminate commando raids on rear areas.

### COALITION OPERATIONS

Although Army forces provided the vast preponderance of combat power for the Desert Dragon plans, the Iraqi threat was so great that General Luck needed every available ounce of combat power he could conjure. A provisional Arab mechanized division, designated the Eastern Area Command under Saudi Major General Saleh Bin Ali Almohayya, was positioned closest to the border and would be the first to fight. This force was well-equipped with 267 M60A3 and AMX-10 tanks,



Camp Eagle II, base camp for 101st Airborne Division (Air Assault). Tents were provided by the Saudi government and erected by members of the 101st near King Fahd International Airport in November 1990.

accompanied by 800 fighting vehicles and 140 pieces of artillery. The problems Scholes, and later Luck, faced in integrating the Arabs into the XVIII Airborne Corps scheme of defense were essentially cultural and organizational. Neither the Saudis nor the Americans had any formal cooperative agreements for combined warfare, nor had they much experience working together during exercises. The Saudis had great potential, however, because they were absolutely committed to defending their homeland and were willing to accept the advice of their more experienced partners on the battlefield. Many of their officers spoke English and had been trained in the US and other Western military schools. On the other hand, the Saudis had never operated formations larger than a battalion and had no provisions for a division headquarters. Nor had they much experience with integrating the wealth of artillery, helicopter, and fighter-bomber firepower the Americans were about to provide to them. Scholes began the Army's frontline relationship with the Saudis by assigning a trusted agent, Major John Turner, as liaison officer to General Saleh.

The Saudi fighting concept called for a static position defense. The American officers began to persuade and train them to execute a mobile covering force battle in which they would engage the Iraqis at long range and fall back behind American forces before becoming decisively engaged. A mobile defense is very difficult to execute even by an experienced force, and language and cultural differences, not to mention the Coalition's radically dissimilar equipment that could easily be mistaken for Iraqi, heightened problems significantly. To lessen these difficulties, in September CENTCOM formed the Joint Liaison Organization headed by corps plans officer Colonel John Marcello. The JLO's charter was to devise methods for recognizing forces and for controlling fires among this increasingly polyglot assortment of armies and nationalities. The JLO was the first to standardize the use of orange recognition panels on the rear decks of armored vehicles to assist in spotting Coalition forces from the air.

Aircraft recognition presented a similar challenge. By September more than 1,000 helicopters crowded into a coastal enclave that had rarely seen more than a few dozen. These aircraft included French Gazelle and Puma helicopters identical to the French-supplied Iraqi versions of the same aircraft. Scholes dispatched another liaison team to the Saudi air base at Dhahran, which controlled all airspace in the eastern provinces. The Eastern Sector Control Center was a state-of-the-art facility equipped with air traffic control radars, computers, and a down-link station for the Airborne Warning and Control System (AWACS). Working with the Saudis, Major Robert Brown developed low-level flight routes and procedures. The Saudis returned the favor by turning over a large network of unused desert landing strips, controlled by ARAMCO, for use by Army



helicopter units. As new Services or allies arrived, they joined the system by sending liaison representatives to the Eastern Sector Control Center.

Once the Marines established their own enclave at al-Jubayl, Schwarzkopf charged XVIII Airborne Corps with securing their left flank. Luck regarded his boundary with the Marines as critical since it paralleled the key coastal highways. The combination of a high-speed avenue of approach with a boundary between two Services made this region the most vulnerable point in CENTCOM's defenses. A skillful enemy would most certainly choose to attack along a boundary because fire support, surveillance, and movement are always much more difficult to execute near the confluence of two dissimilar units. In fact, during INTERNAL LOOK, "enemy" controllers chose to attack along precisely the same boundary and, on paper at least, nearly reached al-Jubayl before being stopped.

Luck was also concerned about essential differences in doctrine between the two forward forces. The Marines preferred to keep ground forces farther back and nearer to the coasts than Army forces and to control the vacated ground using fires from their Harrier ground support aircraft and naval gunfire. The Marines did not have the armored staying power necessary to fight well forward. They had only 123 tanks—all older M60s—that were overmatched by the Iraqi T-72s. With only two other battalions of extremely thin-skinned and vulnerable light-armor vehicles, the Marines were capable of limited maneuvering against the Iraqis outside their narrow coastal enclave. Luck insisted on keeping as much ground force forward as possible, so he assigned Colonel Doug Starr's 3d Armored Cavalry Regiment to bolster the covering force. The regiment had just recently arrived from Fort Bliss, Texas, and was equipped with 123 of the latest 120mm version of the Abrams tank. To bolster the coastal forces, Schwarzkopf attached the British 7th Armoured Brigade to the Marines, and for Desert Storm he replaced the British "Desert Rats" with the Army's "Tiger" Brigade, also equipped with the latest Abrams tanks.

The XVIII Airborne Corps gained the combat power necessary to take the battle to the Iraqis with the arrival of Brigadier General John Tilelli's 1st Cavalry Division from Fort Hood, Texas. The "Cav" would be the last major maneuver unit to join Desert Shield before the arrival of VII Corps from Germany in January 1991. Luck placed the 1st Cav in Tactical Assembly Area Horse located in the southwestern portion of his area of operation, 150 kilometers from the proposed site of the covering force battles. It would be the corps' counterattack force, the key "defeat mechanism" to destroy the Republican Guard in a massive armored clash once the Guard became stalled in front of the 24th.

## DESERT SHIELD COMBAT POWER XVIII AIRBORNE CORPS SUMMARY, NOVEMBER 5 (C+90)

• Tanks .....	763
• Artillery	
-Howitzers .....	444
-MLRS .....	63
-ATACMS Launchers .....	18
• Armored Fighting Vehicles .....	1,494
• Air Defense	
-Patriot Launchers .....	24
-Hawk Launchers .....	24
-Vulcans .....	117
-Stinger Teams .....	320
• Attack Helicopters .....	227
• Support Helicopters .....	741
• Infantry Battalions .....	18
• TOW Vehicles .....	368

Just three months after its call-out order on a thundering night in August, the corps had in place almost 800 tanks, 525 artillery pieces, and 227 attack helicopters, manned, maintained, and supported by 107,300 soldiers. Most of this force had reached the theater aboard 600 C-141s, 375 C-5s, and 300 commercial aircraft.<sup>38</sup>

### THE SUPPORT STRUCTURE MATURES

As equipment began to pour off the docks in ad-Dammam, the enormous tent that housed the logistics operations center began to fill with logistical support agencies to keep up with the constant demand for service. One such operation was AMC's United States Army Support Group (USASG). To project the wholesale logistics system into the theater, the USASG was established almost exclusively with civilian volunteers from Depot Systems Command. Another was AMC-Southwest Asia, which included the logistics assistance representatives (LARs)—civilians who served directly in the field with troop units, providing technical advice and a means of contact with AMC.

The USASG officially began operations at Dhahran on November 17, 1990, but had civilians on the ground conducting special maintenance missions as early as August. Its purpose was to reduce the amount of materiel in the supply pipeline, shorten the time required to move it, and manage the movement of defective items back to the United States.<sup>39</sup> It was also charged with providing the highest level of maintenance practical in the forward areas. The goal was an in-theater return rate of 70 percent, which would reduce the turnaround time for repair and minimize the evacuation of critical materiel from the theater to repair facilities in the United States. The support group's primary maintenance mission was "component repair." The thrust was to provide a flexible, rapid turnaround capability to enhance readiness, ease pressures on the supply pipeline, and cover the entire spectrum of combat and tactical vehicles, ground support and troop support equipment, weapons systems, and missile electronic and communications equipment.<sup>40</sup>

Defense pundits, long critical of the Army's overreliance on high-tech weaponry and equipment, predicted that long supply lines and the brutal desert climate would impede the Army's ability to keep an effective force in the field. Yet Herculean efforts by maintenance logisticians, including the USASG and LARs, achieved readiness rates unprecedented in Desert Shield or any other modern military campaign. Fleet readiness averages for the M1A1 tank, the Bradley, and the HMMWV exceeded 90 percent. The most complex war machine the Army had ever fielded, the Apache helicopter, maintained an 86 percent readiness rate in spite of the fact that soldiers maintained most of their aircraft in the open desert without benefit of hangars or machine shops.<sup>41</sup>

While the forces in theater continued their preparations and training, the whole of United States Army Europe transitioned to a new and unprecedented mission, a REFORGER in reverse. This transition was not accomplished in a vacuum. Units in Germany had followed the buildup during Desert Shield with considerable interest and effort. No one knew precisely which units would be tapped to reinforce those in Southwest Asia, but everyone clearly recognized that German-based combat units were candidates to strengthen the shield.

Early in August, United States Army Europe ordered the 421st Medical Evacuation Battalion to fly 12 UH-60 helicopters from their base in Wiesbaden, Germany, to Dhahran. Simultaneously, units from the 11th and 12th Aviation Brigades were alerted for deployment. Staffs in these units began intensive planning to deploy by any means necessary, including flying the distance with their own twin-engine aircraft. The V Corps' entire 12th Aviation Brigade deployed to ports in Livorno, Italy, for upload on ships. The brigade reinforced XVIII Airborne Corps with two attack helicopter battalions, a command aviation battalion, and a task force of 16 CH-47D Chinooks and 12 UH-60 Blackhawks.

CENTCOM was particularly keen to receive the additional medical helicopters. Should the Iraqis attack XVIII Airborne Corps with chemical weapons, ARCENT expected high casualties, and the ability to move them to hospital ships or to other evacuation points as quickly as possible was critical. The 421st began its long transit from Germany on August 22 with a flight of six MEDEVAC Blackhawks. Helicopters from an 11th Aviation Brigade special detachment based on Cyprus met them in Italy and escorted them across the Mediterranean. At the end of August, six more helicopters completed the transit and proceeded to Saudi Arabia.

By the time the President dispatched VII Corps from Germany to reinforce XVIII Corps already in Saudi Arabia, the logistics infrastructure was already firmly in place. Problems would arise, of course, particularly once VII Corps ships began to close on Saudi ports at the end of the year. But by then a complete, if somewhat fragile, supply, communications, and transportation network awaited the inevitable stresses and strains that further theater expansion would bring.

### **NEW LOGISTICS CONCEPT EMERGES**

From the experience of Desert Shield and later Desert Storm, a new method emerged for projecting and sustaining a large military force far from home. The concept was forced out of the traditional logistical structure by the imperative to move forces at unprecedented speed with the narrowest margin of tail to tooth. The new concept demanded a constriction of logistics bureaucracies in favor of functional building blocks assembled and transported to the theater to provide just enough support and management oversight to get the job done—and no more. The combination of rapid movement and thin overhead could only have been possible because of the efforts of quality soldiers who harnessed modern data processing, rapid transcontinental mobility, and global communications to meet constantly changing demands.

Any system created ad hoc in the crucible of battle will be imperfect. At times, only the initiative and flexibility of leaders at all levels kept the engine driving Desert Shield from running out of gas. Perfection is not the standard, and obvious imperfections diminish neither the remarkable managerial skill of those who modified the system to make it work nor the value of the system as a model for how a future contingency force should be projected and sustained.

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### **Notes**

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5. Interview with General (Retired) Carl E. Vuono, June 1, 1992.
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7. Lieutenant General John J. Yeosock, "H+100 An Army Comes of Age in the Persian Gulf," *AUSA Green Book* (Glendale, MD: Holliday, Tyler Corporation, October 1991), pp. 44-58.
8. Frank N. Schubert and Theresa L. Kraus, eds., *The Whirlwind War: The United States Army in Operations Desert Shield and Desert Storm* (Draft) (Washington, DC: US Army Center of Military History, January 1992), p. 102.
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10. Interview with Lieutenant Colonel Michael Velten, February 13, 1992.
11. Schubert and Kraus, p. 109.
12. Yeosock, p. 50.
13. Assessment derived from numerous information papers produced from August to October 1990 by Dr. Norman Cigar, HQDA, DAMI-FI, on "Iraqi Likely Courses of Action."
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17. Interview with Mr. Dick Manning, Raytheon Corporation production manager for the Patriot missile, September 24, 1992.
18. Interview with Mr. Dick Slaughter, senior engineer for Patriot missile production, Patriot Project Manager's Office, September 23, 1992.
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21. *Ibid.* p. 59.
22. *Ibid.* p. 79.
23. *Ibid.* pp. 78-81.
24. Office of the Surgeon General, Department of the Army, briefing slides entitled "Non-Battle Injury Rates from Desert Shield and Desert Storm, September 1, 1990 to June 3, 1991."
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26. 82d Airborne Division Command Report Narrative, "Operation Desert Shield and Desert Storm," p. B-1, and interview with Lieutenant Colonel William Harrison, XVIII Airborne Corps FSE, May 19, 1992.

27. Lieutenant Colonel Terry Buettner, XVIII Airborne Corps ALO, March 25, 1992.

28. *Ibid.*

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33. CINCFOR message and XVIII Airborne Corps message dated 070900Z August 1990, "Deployment."

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35. 24th Infantry Division (Mech), "A History of the 24th Infantry Division (Mech) Combat Team During Operation Desert Storm: The Attack to Free Kuwait (January-March 1991)," p. 1, hereafter cited as *24th Infantry Division History*.

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37. *Ibid.* p. 5.

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