STUDY PROJECT

A PRIMER ON FIRE SUPPORT FOR JOINT SPECIAL OPERATIONS

BY

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A PRIMER ON FIRE SUPPORT FOR JOINT SPECIAL OPERATIONS

AN INDIVIDUAL STUDY PROJECT

by

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ABSTRACT

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The term "special operations" immediately brings to mind the image of an unruly band of misfits creating havoc in some small corner of the world. Nothing could be farther from the truth for today's "quiet professionals." Their operations will be conducted in support of national policies with carefully developed objectives. Targeting restraints will be the rule rather than the exception, to protect the population from collateral damage. Accordingly, fire support officers will play an increasingly important role planning, coordinating and controlling joint special operations. This study examines the historical relationship between the fire support community and special operations forces, the current arsenal of fire support systems, and the role of the fire support officer in special operations. It is an attempt to understand some of the opportunities and limitations of fighting with fires in the special operations environment.

INTRODUCTION

> . . . raiding is as old as history itself; indeed, it might be argued that this was how warfare began.[1]

Given a contingency-based military strategy of power projection, it is very likely that our nation's special operations forces will be employed in their direct action role - the raid. During these operations short of war, interservice and interagency participation will be the norm. The key to early success in these situations will be the ability to keep the enemy forces at risk and to minimize the probability of decisive combat for the special operations forces. Winning will be determined by projecting force, not just forces. The joint special operations task force commander will have to fight with fires to accomplish his mission and protect his force. Fire support provides him the capability to hold enemy centers of gravity hostage while protecting his own forces. Fires give small, lighter strike forces the edge for quick victory.

The joint fire support community is made up of persons in traditional arms or branches of service who can support special operations forces. They understand that the measure of merit for fire support effectiveness does not depend upon the number of missions fired, but how well the missions met the commander's intent for fires. All fire support in the special operations environment, therefore, will demand detailed planning, coordination and control.

As a primer, this paper will review the historical relationships between fire support systems and special operations forces in direct action. It will provide a comprehensive list of ordnance and delivery systems currently being used by the four services. Finally, it will examine the role of the fire support officer in planning, coordinating, and controlling fires during joint special operations.

HISTORICAL BACKGROUND

Historically, the United States has always lauded its free-spirited, independent fighting units for their unorthodox successes on the battlefield. The daring raids conducted by men like Roger's Rangers in the French and Indian War, by Francis Marion, the "Swamp Fox," in the Revolutionary War, and by Mosby's Partisan Rangers in the Civil War have inspired military men for ages. Their exploits epitomized the indomitable spirit of the American frontiersman. In times of crisis, these rugged patriots came together as small bands of fighting men united by a deep-seated commitment to freedom and they defeated a common enemy. Their feats became legendary, and in every war since, Americans have come to expect these sorts of victories from its citizen-soldiers. Those who fought in special operations forces were seen as a breed apart. As one historian described them,

> [d]uring the 18th century, a new breed of soldier was born in North America. Known as "Rangers," these men belonged to levies that ranged the forests to protect settlers against the depredations of the Indians. They were

> not products of the drill sergeant's art, but farmers and hunters - men who were crack shots and had an instinctive understanding of how to use the ground to the best advantage. Lightly armed, and not burdened by the heavy trappings of an elegant, though not very practical uniform, they could travel much more quickly than conventional troops.[2]

The French and Indian War

Rogers' Rangers. Robert Rogers formed one of the first successful irregular units in North America, during the French and Indian War. Fighting for the British, he ultimately raised four companies of Rangers - about 600 men - and trained them in Indian warfare. He impressed on them the value of "hitting the enemy forces with small bands of elite, highly trained soldiers where they [were] the most vulnerable...."[3] Rogers understood that to be successful in this type of warfare, his men had to keep a sharp focus on the objective and to display an extraordinary degree of determination in the face of seemingly overwhelming odds. So from the beginning, he taught them to exploit the virtues of speed, surprise, and security. By taking the initiative and fighting on terrain where the French least expected it, Rogers taught his men to win.

In his way, Rogers laid the foundation for our special operations doctrine of today. What he could not influence, however, was the nature of fire support in the raids of his day. The ponderous siege guns, of the time, were used exclusively in the static warfare of feudal battles. Moreover, the more mobile field guns were still cumbersome and required large crews of men

and horses to move them about the battlefield. They were not instruments of stealth. Cannons simply had no place in the hit and run tactics of Rogers' Rangers on their French opponents.

The Revolutionary War

Marion's Partisans. Unlike Rogers' Rangers who were foot soldiers, Francis Marion's troops were mounted infantrymen. The conditions in which they fought were much different then those that Rogers' men had to contend with. First of all, they were fighting a much more mobile British foe. Second, the terrain could not have been more different. Rogers had fought in the forests and mountains of northern New York and southern Canada, while Marion's battles were fought on the flat, treeless grasslands of the Carolinas. Still, the tactics of the two special operations leaders were surprisingly similar. Both relied on speed and surprise to win the day. To Marion, mobility equated to survival. Consequently, he trained his irregulars to strike from ambush positions and leave the field before the unsuspecting British could react. As mounted riflemen, his partisans rode to concealed positions where they dismounted to attack the British on foot. Then they rode like hell to seek shelter from their pursuers in the inhospitable swamps of South Carolina. Even though Marion's fighters were greatly outnumbered, their guerrilla tactics were very successful. Ultimately, their attacks forced Lord Cornwallis to abandon his campaign in the Carolinas and Virginia, and to withdraw to the

safety of his garrison in Charleston, South Carolina.

The issue of artillery support was as unrealistic for Marion as it had been for Rogers. Even the best field guns of the day were still too unwieldy for a force of this type. Instead of depending on firepower, Marion relied on being able to out-ride and out-fight his opponent from hidden positions along the British routes of march. Speed and surprise remained the hallmarks of a successful raid.

The Civil War

Mosby's Rangers. Reportedly, the legendary exploits of Marion's mounted riflemen served as a source of inspiration for Colonel John S. Mosby, unquestionably the most successful raider on either side of the Civil War.[4] Mosby's 300 Partisan Rangers wreaked havoc on the Union forces attempting to operate in the northern Shenandoah Valley. In fact, his raiders were so successful that the three-county area north of the Rappahannock become known as Mosby's Confederacy.[5] Almost at will, his cavalrymen wrecked railroads, captured wagon trains, raided headquarters, and disrupted communications. By the end of the war, his lightening fast raids effectively tied down five Union divisions.

> Before the war's end, the Confederacy had denounced, disbanded, or incorporated into the regular army all rangers except those under Mosby's command. According to Gen. Robert E. Lee and Maj. Gen. J.E.B. Stuart, Mosby's ranger unit was the only one that ever accomplished its intended mission. Indeed, Mosby's operations serve as a model of the

> three functions of partisan warfare: weakening the enemy's front line, weakening the enemy's infrastructure and winning the support of the people.[6]

Mosby was as successful as he was because he improvised and because he improved upon the tactical examples of his predecessors, Rogers and Marion. As a cavalryman, Mosby capitalized on lightening speed and offensive mindedness, but he also stressed the importance of firepower in achieving victory over a stubborn enemy.

> At that time, the standard cavalry weapon was the sabre, but repeating firepower made more sense to Mosby, who felt the sword belonged more to medieval combat than to 19th century warfare. He urged his men to carry at least two pistols.[7]

The standard ranger uniform, therefore, included two .44 caliber Colt army revolvers. Of course, just as important as the weapon is the way it is used.

> Since the Union soldiers kept them well supplied with ammo, Mosby's rangers practiced often and were all good shots. In combat it was not unheard of for a ranger to fire six shots and empty five saddles.[8]

Beside stressing the importance of marksmanship training, Mosby imbued his men with an offensive spirit that kept the enemy off balance. His attacks were fast and furious, especially in cavalry on cavalry situations. He knew what happened in the first few seconds of the battle, when the enemy either reacted or failed to react, would determine success or failure.

> Mosby's usual command was "Go through them!" The theory was that the less time spent in contact, the less the danger. With reins free and a pistol in each hand, the rangers would

> put spurs to their horses and charge. With skill, superiority of weapons and determined confidence, Mosby's men seldom met defeat.[9]

By 1861, America's war industry had made tremendous advances with its artillery pieces. Lighter field guns now could fire much more lethal ammunition out to much greater ranges than at any time before. These modern improvements were not lost on Mosby. The shock value of surprise field artillery fires fit his philosophy perfectly. He had taught his men "never to stand and receive an attack, but to be always on the offensive."[10] Now, his howitzers gave him the psychological edge he was looking for.

Mosby's forces had four 12-pound mountain howitzers[11]that they hid in the forests of Big Cobbler Mountain, a spur of the Blue Ridge near Salem, Virginia[12]. Moving only at night, the rangers would set up their artillery in ambush sites before dawn. Then they would wait to attack the unsuspecting supply-laden trains of the Manassas Gap Railroad[13],the Union lifeline into the Shenandoah Valley. Mosby "used solid shot with [these weapons] for locomotives and for distance shots against large bodies of troops."[14] Besides the trains themselves, Mosby's artillerymen frequently attacked the railroad repair crews, around Rectortown and Salem, with canister rounds.[15]

These persistent attacks forced General Sheridan to use a sizeable percentage of his force for simple guard duty. One of the Federal officers who had to perform this guard duty was Colonel Henry Gansevoort, Commander of the 13th New York Cavalry. From his point of view "... artillery has been the secret of

Mosby's success. In the valley and in the county, it has been dreaded."[16]

Mosby's tactics and his successes caused a great deal of bitterness amongst the Union forces operating in the Shenandoah Valley. Federal casualties were inordinately high compared to those of Mosby. In part this was due to Mosby's habit of striking with great speed and violence, then after the raid, scattering the rangers in all directions. "Their escapes were aided by the enemy's extreme fear of being ambushed during pursuit."[17] The Union soldiers knew from first-hand experience that to chase the fleeing rebels often meant running right into an artillery ambush. For their part, Mosby's artillerymen fired grapeshot or canister point blank into the hard-riding Union Cavalry trying to overtake the fleeing rangers. It was a favorite tactic that caused a great number of casualties and gave substance to the myth of the rangers' irvincibility.

> The military value of a partisan's work is not the number of men killed or captured, but the number he keeps watching. Every soldier withdrawn from the front to guard the rear of an army is so much taken from its fighting strength. The largest force Mosby ever employed was 350 men. Yet some historians estimate he neutralized 50,000 enemy soldiers. By anyone's criteria, John Singleton Mosby was an outstanding partisan warrior.[18]

The Civil War was the first American conflict in which partisan, or special operations forces, learned to mix the firepower of the handgun with that of the artillery piece. Mosby's rangers capitalized on the unique capabilities of each weapon. The rangers early successes and subsequent advances in

weapons technology after the Civil War set the stage for future developments in the relationship between raiders and fire supporters.

World War I

By the time the Americans joined the First World War, the war in the trenches had been dragging on for three devastating years. When General Pershing's forces disembarked in France, the front lines were essentially stagnant. Tactical surprise had long since given way to artillery preparations which sometimes lasted for days. Both sides hoped to gain some kind of advantage, no matter how small, by pounding their opponent into oblivion with hundreds of thousands of artillery projectiles.

To be sure, by 1914, new technologies had dramatically improved the capabilities of the field artillery. The cannons Mosby's troops used had to be dragged to within a range of 300 yards, and fired point blank into the enemy to be effective. This assault artillery tactic was considered safe as long as the opposing infantrymen were only armed with the musket, accurate to about 50 yards. However, as the war progressed, marksmen with rifles were able to hit artillery crewmen at 1000 yards. This forced artillerymen to develop new tactics and better weapons.

The artillery pieces that supported the armies of the Western Front were vastly improved over those of the Civil War. They were lighter, more mobile, breech loaders. Their barrels were rifled, making them capable of achieving ranges out to

12,000 yards. The shells they fired were tremendously more lethal. And most importantly, modern instruments made indirect aiming an exact science. They were considered so accurate that artillerymen referred to them as instruments of war rather than weapons of war. Unfortunately, these advances in the science of war were not matched by advances in the tactics of war. The evolution of the howitzer created, not quick victory, but long-term stalemate on the battlefield. Both sides suffered enormous losses in seesaw battles that failed to produce decisive victory. At best, trench warfare represented a loss of tactical mobility on the battlefield. Along with the loss of tactical mobility, was the loss of innovation, speed, and surprise so closely associated with special operations. For the Americans fighting in Europe 1917, there would be no elite formations of troops conducting raids deep in the enemy's rear. Any thought of these short, swift, violent missions was mired in the mud and misery of the trenches.

While innovation may have been lost to those fighting the ground war, it was the key ingredient for those who took to the air to fight. "When World War I broke out in 1914, aviation was in its infancy. Only a dozen years before the Wrights had achieved mankind's first powered flight."[19] Very quickly airplanes armed with machine guns flew the skies over the muddy trenches. This rapid development of the combat aircraft epitomized the use of modern technology in warfare. Tens of thousands of airplanes were built during the course of the war,

and they evolved into very effective fighting machines. They proved they had the potential to bring enormous amounts of firepower to bear on the enemy. "As the bitter war years passed, the planes got better and faster and the casualty lists grew longer."[20]

Fire support was coming of age. The two weapons, the modern field artillery piece and the attack aircraft, were proving themselves to be destructive machines of war. For the generals concerned about attrition warfare, bombing and shelling from great distances was the most efficient and cost effective means of delivering explosive power while avoiding direct, bloody contact with the enemy.

World War II

"In wartime, necessity provides the goad to new ideas, and special, elite units tend to flourish."[21] What is astonishing is the number of these special military units that came into being during World War II. It is even more astonishing considering that they all appear to have their roots in the same dark events of 1940.

> By July 1940 Hitler and his armies were masters of the whole of Europe from northern Norway to southern France. His ally Mussolini controlled Italy. Within the next year the German armies had overrun Romania, Bulgaria, Yugoslavia, Greece and Crete. Furthermore, there were German troops in North Africa to assist the Italians against the British. Europe, in fact, was lost. Soon the Far East would be lost too....[22]

Obviously, it was going to take the allies a long time to

build an invasion force large enough to retake the European continent. Therefore, Winston Churchill, knowing his country needed to take some action immediately, appointed Lord Louis Mountbatten as his Chief of Combined Operations to "conduct a program of raids in ever-increasing intensity on the European coast."[23] These he hoped would bolster British morale and forestall a German invasion of England proper. His recommendation led to the establishment of the Commandos, a unit specifically designed to conduct amphibious assaults against Axis-held territory.

By the time the United States entered the war in 1941, Britain and the other allies already had extensive fighting experience. The Americans, on the other hand, had vast resources and unlimited enthusiasm, but no battlefield experience. To correct this deficiency, General George C. Marshall, Chief of Staff of the Army, searched for the most experienced and successful British units to serve as models for similar American units.

World War II: European Theater

Darby's Rangers. Inspired by the exploits of the British Commandos, General Marshall ordered General Truscott to form a "commando-like organization." Accordingly, 1st Ranger Battalion was activated on June 19, 1942 from volunteers from the 1st Armored Division and the 34th Infantry Division, the first American combat divisions to land in Great Britain.[24]

> Unlike a regular infantry battalion, the Ranger battalion had small companies

> consisting of three officers and 64 enlisted men. The six line companies - A through F - had only two (instead of four) platoons. Each platoon consisted of two assault sections composed of twelve men and a mortar section with five men. The Commandos had found that short decisive encounters, such as night raids or establishing beachheads, smaller units were more effective.[25]

Interestingly, the man selected to command this first-of-its-kind unit was Major William O. Darby, an artilleryman. His unique background in fire support would greatly influence the way in which he planned the battalion's night attacks.

Following months of rigorous training at the British Commando Center, the Rangers' were ready for their first full-scale combat assault, as part of Operation TORCH. Their mission was to spearhead the invasion of North Africa by conducting a pre-dawn amphibious assault on the town of Arzew, 30 miles east of Oran in French Algeria. Specifically, the Rangers were to knock out the coastal artillery batteries defending the harbor at Arzew and to occupy the heights above the town before the 1st Infantry Division came ashore.[26] The coastal guns controlled the sea for miles in all directions and could easily sink any ship trying to approach the harbor entrance. Although this was a complex raid requiring simultaneous attacks on two primary gun locations, the Rangers accomplished their mission with remarkably few casualties.

Before leaving England, Colonel Darby had decided that the 60-mm mortars provided insufficient firepower for a raid against concrete and stone fortifications. He wanted something with more

punch. Therefore, he temporarily replaced the 60-mm mortars with 81-mm mortars. This was the first of several efforts to outfit the battalion with its own "portable artillery."[27] In this case, the decision was a sound one. As it turned out, the French fortifications were more substantial than originally thought and Colonel Darby was forced to adjust a mortar barrage, himself, against the French troops in Batterie du Nord. The attack was so successful that "hundreds of prisoners were taken who were still in their bedclothes...most of whom were still dazed by the shocking mortar barrage...."[28]

In general, Colonel Darby was pleased with the performance of his Rangers on their first raid. They had achieved local surprise and seized their objectives in just three hours. However, as a former artilleryman, Colonel Darby was dissatisfied with the killing power of both the 60-mm and 81-mm mortars. Instinctively, he knew he would need more fire support if he were going to continue spearheading large-scale conventional assaults.

Over the next eight months in North Africa, the Rangers conducted several very successful raids against the German Africa Corps. Also during that time, Colonel Darby expanded his forces significantly. First, he activated two more Ranger Battalions, the 3d and 4th.[29] Then, he secured the virtually permanent attachment of the 83d Chemical Warfare Battalion, a 4.2-inch mortar outfit, to his newly created Ranger Force.[30]

> The evolution, which had begun before Arzew when Darby temporarily replaced his 60-mm mortars with 81-mm tubes continued, gradually transforming the Rangers from a light,

> commando-like strike force into a heavily and conventionally armed unit.[31]

Now, as Colonel Darby trained the Ranger Force for the upcoming invasion of Sicily, each of his rifle companies also learned how to call for naval gunfire. Every section chief practiced calling for support from the destroyers and cruisers that took part in the numerous amphibious landing exercises off the coast of North Africa.

As fate would have it, the Rangers needed all of these weapons and more during their fight for the city of Gela. For two days, the Rangers, along with infantrymen from the Big Red One, fought off every enemy counterattack, destroying 40 enemy tanks in the process. It was noted that "[for] all the courage of the individual Rangers, naval gunfire support proved decisive in holding the town."[32] The superb coordination of the Army and Navy had saved the day.

The Rangers' next major combat operation was another amphibious assault, their third. This time the objective was on mainland Italy. Their mission was:

> ...to stage a surprise landing at the small town of Maiori, situated on the mountainous coast several miles north of Salerno, and to push inland for six miles to seize a series of commanding ridges overlooking the Plain of Naples. The capture of these heights would then enable the Rangers to cut or render useless the enemy's main line of communications traversing the plain from Naples to Salerno. This action would also secure the left flank of the main Fifth Army forces landing on the beaches between Salerno and Paestum, forming a hinge for the main attack to be delivered against Naples from the south....The entire success of the Ranger

> operation depended upon the surprise of the initial landing and the speed in which the heights were seized.[33]

Once again, Colonel Darby displayed his "fetish for firepower."[34]

> The major lesson Darby drew from the Gela counterattack was that the light weapons of the Rangers made them much too vulnerable to enemy armor. He responded as a former artilleryman might, by creating a Ranger cannon company armed with four 75-mm guns mounted on half-tracks. The new company was formed at Corleone at the end of the fighting in Sicily and was ready for use in Italy. As with the attachment of the chemical mortar battalion, however, the Rangers' additional firepower made it more likely that they would be used as conventional infantry in the future.[35]

The 75-mm pack howitzer fired a 13.9 pound shell out to a maximum range of 9650 yards.[36] Darby was thoroughly familiar with its capabilities. As a captain, he had been "a battery commander with the 99th Field Artillery (Pack) at Fort Hoyle, Maryland."[37] The addition of the provisional cannon company to the Force demonstrated how difficult he expected the Maiori landing would be. Accordingly, he put his best company commander, Captain Charles Shundstorm,[38] in charge and selected the cannon crews and drivers from the former artillery and armor men in the line companies of the three Ranger Battalions.[39] The Ranger Force was prepared to strike hard at the German coastal defenses.

After achieving complete surprise at Maiori, the Rangers met stiff resistance in the mountains. The Germans counterattacked in force and trapped Fifth Army on the beach at Salerno. The

Rangers, therefore, were forced to defend their positions in the critical Chiunzi Pass for more than two weeks.

> Lacking enough troops to hold a continuous line, the Rangers adopted a system of mutually supporting strongpoints and relied on the terrain and naval gunfire, which they directed to harass the routes from Naples until Clark's force broke through to them on 30 September.[40]

The cannon company and mortar battalion also played a crucial role in the defense of the pass. By coordinating their fires with those of the Navy, they helped to beat back a series of determined German counterattacks. The newly formed cannon company was especially impressive.

> Darting from one firing site to another, the self-propelled cannons blasted at enemy troop concentrations in the small towns and olive groves on the plain below. Moving out to the mouth of the Pass, the half-tracks would hurl hundreds of shells at direct fire range and would then withdraw to the narrow confines of the Pass, just as enemy shells retaliated. Several enemy motor pools were destroyed by the elusive cannon. Though many shells landed close to these fast moving guns, at the end of the beachhead battle they were still in good shape.[41]

During the period of September 10-22, the Germans launched as many as seven major counterattacks against the Rangers holding Chiunzi Pass. Each was beaten back, but as might be expected, the price was very high. The Ranger Force which was neither organized nor equipped to conduct conventional defensive operations, "lost 28 killed, 9 missing, and about 66 wounded ... about 20 percent of their authorized strength."[42] However, after 18 days of fierce give-and-take fighting as conventional infantry, the Rangers entered Naples against waning enemy

resistance.

The next joint operation for Darby's Rangers took place at Anzio on 22 January 1944. Once again, the Rangers were used to spearhead a major amphibious assault at night. This time their mission was to capture and clear the port city of Anzio.[43] Building on the lessons they had learned at Arzew, Sicily, and Salerno, the Rangers arranged for naval gunfire ships and Allied rocket boats to cover their beach assault. Not wanting to be outgunned or pushed off the beach, Colonel Darby ensured his own 4.2-inch mortars, two of the half-track mounted 75-mm howitzers, and three attached 57-mm antitank guns were in the initial assault force.

After numerous live-fire rehearsals near Naples, the Rangers landed at Anzio in their smoothest amphibious operation to date. The landing was a total success. Unfortunately, the Commanding General of VI Corps, went on the defense and used the Rangers as conventional infantrymen. Their special talents as raiders were wasted defending the beachhead. Casualties mounted and morale slumped. Then on 29 January 1944, in an effort to regain the initiative and expand the beachhead, General Lucas ordered the Rangers to seize the city of Cisterna and to cut the two main highways from Rome to Cassino. However, his intelligence failed to notice a large German buildup opposite the American lines. As a result, 1st and 3d Ranger Battalions, expecting only minor resistance around Cisterna, were trapped by the Germans in a deliberate armor ambush. With no fire support other than that of

their own 60-mm mortars, the two battalions were locked in a life-or-death struggle that lasted over ten hours. Tanks from the Hermann Goering Panzer Division and paratroopers from the 2d Parachute Lehr Battalion annihilated the two lightly armed battalions. Colonel Darby, leading the 4th Ranger Battalion and directing the fires of the Cannon Company, tried desperately to rescue his isolated units, but he was badly outnumbered and no match for the German armor forces. He was beaten back and the Ranger Force he had trained so well literally ceased to exist. "Only six of the 767 men who infiltrated to Cisterna made their way back to friendly lines. All the others had been killed or captured."[44]

> The VI Corps attack was ended on 1 February. The next day Alexander and Clark informed Lucas that he was to prepare for the German counterattack believed to be imminent. None of the Allied commanders knew at the time that the attack had caused fifty-five hundred German casualties and had forced the Germans to commit all their reserves. In fact, the Allied attack came very close to success for it had upset the German plans to counterattack, delaying them two days.[45]

The Ranger Force was inactivated rather than reconstituted. There was not enough time to properly train the number of replacements needed to keep the three battalions up to fighting strength. Thus, the Rangers who had opened the North African campaign in 1942, had fought against overwhelming odds in Tunisia and Sicily, and had swiftly captured the beaches at Maiori and Anzio, ended their fighting history in the Mediterranean on the Anzio beachhead. However, the lessons they learned did not die

at Anzio. Some former members of Darby's Rangers served as instructors in training centers in both Europe and the United States. Some were transferred to the First Special Service Force. Still others were assigned to the newly formed 2d and 5th Ranger Battalions, preparing for the cross-channel invasion of Fortress Europe. Wherever they went, the surviving Rangers were always looked upon as pioneers in night operations, raids, and coordinated fire support.

First Special Service Force (FSSF). About the time Colonel Darby was forming the 1st Ranger Battalion, another artilleryman was recruiting soldiers for yet another commando-like unit, the First Special Service Force. The man responsible for putting the Force together and getting it ready for combat was Lieutenant Colonel Robert T. Frederick, a staff officer working in the War Department for General George C. Marshall.[46] Frederick's mission was to prepare a combined force of U.S. and Canadian soldiers to "demolish hydro-electric plants in Norway (on which Germany depended for its production of iron ore), and to carry out raids on enemy garrisons.[47] Each of his soldiers would have to master an unusually large number of special skills. In addition to knowing all infantry small arms weapons inside out, each Forceman had to be able to drive and repair the Weasel, be a qualified skier, parachutist, and demolitions expert.[48] Like the 1st Ranger Battalion, the FSSF was designed as a very light strike force. In all, there were 1800 men in the Force. And in the beginning, like the Rangers, they lacked the heavy mortars of a

standard infantry unit. Each platoon had just two 60-mm mortars.

When Operation PLOUGH (the Norway operation) was canceled, Colonel Frederick's men were sent to Italy where they fought alongside the Rangers at Salerno and Anzio. They quickly found out, as the Rangers had, that their 60-mm mortars did not provide enough firepower for the types of raids they were being directed to conduct. Therefore when the FSSF entered the lines at Salerno, the 463d Parachute Artillery Battalion was attached in what developed into an almost permanent relationship with the Force.[49] Then at Anzio, the 463d was joined by the 456th Parachute Artillery Battalion, as well as an assortment of light tanks and armored cars from the 81st Reconnaissance Battalion.[50] Finally, following the ambush of 1st and 3d Ranger Battalions at Cisterna, the Ranger Cannon Company was transferred to the Force and it stayed with them throughout the rest of the war.[51]

After the fall of Rome, the Colonel Frederick's raiders reorganized and prepared for the invasion of Southern France. Their mission in Operation DRAGOON was to seize the German coastal batteries on two islands in the Hyeres chain, Port Cros and Levant Islands, which flanked the main invasion beaches.[52] The German guns on both of the islands could easily threatened the airborne and seaborne assaults on the mainland. The Forcemen planned to conduct a night amphibious assault against the German garrisons. Their intention was to use speed and stealth to surprise and overcome the German defenders.

Since this plan called for the raiders to use rubber boats,

the assault sections relied on their 60-mm mortars for immediate, direct support and on naval gunfire ships for general support. The naval support consisted of one French battleship, five light cruisers, three destroyers, and 16 PT boats.

> At Port Cros, the Germans held out for forty-eight hours. The last enemy strongpoint, sheltered in an old thick-walled fort, surrendered when twelve 15-inch shells from a supporting battleship passed from one side of the fort through the other.[53]

After their raid on the Hyeres Islands, the First Special Service Force spent four months patrolling the mountains along the Franco-Italian border. Then in December, they were inactivated. As with Colonel Darby, Colonel Frederick found that he needed significant amounts of fire support to accomplish some of the missions given to the Force. At times, the Force had so much firepower that it took on a combined arms structure. Frederick and his troops showed exceptional skill in handling these assets.

> In fact, it was probably Frederick's performance as a combined arms commander during the advance from Anzio to Rome that earned him his promotion to Major General and identified him as a likely division commander.[54]

2d and 5th Ranger Battalions. Following the tragedy at Cisterna, many of the surviving members of Darby's Ranger Force were transferred to the newly formed 2d and 5th Ranger Battalions. Both were in England, at the time, preparing for the Normandy invasion. And, not surprisingly, both were experiencing the problems of insufficient firepower for their invasion roles.

As the invasion date neared, the Rangers trained feverishly with naval gunfire ships to perfect their skills as naval gunfire spotters. That would be the extent of their fire support until the beachhead was pushed inland and artillery could be brought ashore.

In perhaps the most celebrated of Ranger missions of World War II, three companies from Lieutenant Colonel Rudder's 2d Ranger Battalion were ordered to scale the cliffs of Pointe de Hoc and destroy the German 155-mm guns overlooking both the Omaha and Utah invasion beaches.[55] The remaining 2d Battalion companies were attached to 5th Ranger Battalion, commanded by Lieutenant Colonel Max Schneider (one of Darby's original Rangers). Their mission was to spearhead the amphibious assault onto Utah beach and to seize the causeways leading inland for the 4th Infantry Division. Both battalions had 30 minutes in which to accomplish their missions before the second wave of boats would hit the beaches. To support them, they had one battleship, the USS Texas, and two destroyers, the USS Satterlee and the HMS Talybont.[56]

Naked firepower is seldom enough to defeat an enemy once the attacker has lost the element of surprise. That certainly was the case for both of these battalions. Whereas Darby made his assaults at night and with local surprise, on Normandy the invasion took place at dawn in the face of an alert opponent. Both battalions made good use of their naval gunfire support, but both also suffered higher than average casualties. In fact, 135

of Colonel Rudder's assault force of 225 men died trying to scale Pointe de Hoc and destroy the German guns.[57] Still the timely and effective use of fire support was characteristic of the lessons learned and passed on by Darby's Rangers.

World War II: Pacific Theater

6th Ranger Battalion. Perhaps the least well known of the Ranger Battalions is the 6th Battalion. It was the only one to fight in the Pacific Theater. Interestingly, not only was the battalion commander, Lieutenant Colonel Henry A Mucci, an artilleryman, the entire battalion was composed of former artillerymen. Lieutenant General Walter Krueger, commanding general of Sixth Army, created the 6th Ranger Battalion from the 98th Field Artillery Battalion.[58]

The 6th Battalion fought in the Philippines and is credited with one of the most successful raids of the war, "the rescue of 511 American and Allied prisoners from a Japanese POW compound near Cabanatuan" on Luzon.[59] Actually, this raid involved three special operations units, the Rangers, two teams of Alamo Scouts, and approximately 250 Filipino guerrillas. The Rangers were to conduct the assault on the compound based on a thorough reconnaissance performed by the Alamo Scouts. The Filipino guerrillas and their American advisors did what they could to flank security for Colonel Mucci's column during the march and all-around security at the POW compound. The guerrillas also assembled enough native carts to carry 200 liberated POWs.

With no artillery and no mortars, the Rangers had to rely strictly on close air support for their fires. However, even that was extremely limited since this was to be a night attack. The 547th Night Fighter Squadron provided just one P-61 Black Widow for their support at the compound (other P-61s did attack outlying Japanese units to distract and harass them).[60] Even so, Mucci's force of 128 Rangers achieved complete surprise and totally overwhelmed the 73 guards and 150 other Japanese headquarters personnel in the compound. They freed the prisoners and began their withdrawal a half hour into the raid. Later one of the P-61s strafed and destroyed a Japanese convoy heading toward the compound with reinforcements. "At a cost of two Rangers killed, [Mucci's raiders] liberated 511 POWs and killed or wounded an estimated 523 Japanese."[61]

Again, the success of this raid is characteristic of the reconnaissance, planning, and violent execution expected of special operations forces. Unfortunately, the 6th Ranger Battalion did not take part in any major combat operations after Cabanatuan.

Merrill's Marauders. Officially designated the 5307th Composite Unit (Provisional) or the Galahad Force, the unit was organized as a long-range penetration force to operate deep behind enemy lines.[62] The mission of these 3000 Americans was to conduct a series of envelopments around the right flank of the Japanese 18th Infantry Division, and ultimately, to conduct a surprise attack on the airfield at Myitkyina.[63] Their tactics

were unique for an American unit. Because they were such a light unit, General Stilwell had heavy weapons flown in or airdropped to them whenever they established a roadblock or strongpoint.[64]

The Marauders' organic fire support consisted of 60-mm and 81-mm mortars carried over the mountains of Burma by mules. Transports from the 2d Troop Carrier Command flew in 75-mm pack howitzers in gliders whenever Merrill's men could cut a clearing in the jungle. Otherwise, they airdropped the guns to the troops.[65] The No. 1 Air Commando, commanded by Colonel Philip Cochran (of Terry and the Pirates fame), provided air support to Galahad with 30 P-51 Mustangs and 12 B-25 Mitchell bombers.[66] More often than not though, because of the jungle conditions, the P-51s provided the only "direct support artillery" fire that the Marauders got.

Fortunately, the Marauders' tactics were successful. They caught the Japanese at Myitkyina completely off guard and captured the airfield in a quick daylight attack.[67] The cost in disease and exhaustion was staggering, but the victory was theirs.

Unlike any of the other units looked at to this point, Merrill's Marauders demonstrated that special operations forces can operate successfully at the operational level (their tactical objectives contributed directly to the attainment of strategic goals). Their actions in the Japanese rear areas worked because they avoided major engagements with enemy main force units. However, all of their successes were dependent on air

superiority. Everything from food to ammunition to artillery weapons themselves had to be delivered by air. If the Allies had not controlled the skies, supply by air would have been difficult, if not impossible, to achieve. Without a doubt, air superiority enabled the Marauders "to operate deeper, with more secrecy, and over a longer period of time than would have been possible otherwise."[68]

Marine Raider Battalions. During the war in the Pacific, the Marine Corps formed four Raider Battalions as independent amphibious commandos. They were hit-and-run guerrilla organizations, designed by Marine Lieutenant Colonel Evans Carlson, who himself commanded 2d Raider Battalion.[69]

The Raiders contributed to the island hopping campaign by attacking the Japanese where they least expected it. They launched their attacks from transport ships, landing craft, submarines, and rubber boats. They used whatever was available. The same principle was true for their fire support. They employed naval gunfire, if they could get it. Otherwise, they relied on close air support or their own handheld 60-mm mortars.

Carlson's Raiders fought fierce small-unit actions on Makin Island and Guadalcanal, but their operations never amounted to more than supporting attacks, at best. As the war progressed, they fought fewer independent battles and conducted more amphibious landings as a spearhead force. In general, their misuse came about because the admirals and generals could not find any legitimate special missions for them to accomplish.

Korean War

World War II clearly demonstrated that joint and combined operations had become a war imperative. Unfortunately, World War II also,

> introduced the era of the "big bang," the nuclear age. The United States had a nuclear monopoly right after the war which would keep the world safe for a time, or at least scared into peace. Army strength was minuscule compared to the eleven-million-man Army of World War II....There were simply no spaces for elite units, such as the once proud Ranger battalions.[70]

Instead of battalions, a number of airborne-qualified Ranger companies were formed; however, they were attached directly to specific maneuver divisions. As a result, they were used on the tactical level as shock troops or clean up forces. The corps commanders never exploited the operational potential of these highly trained volunteers. Their talents were squandered in conventional infantry operations. As the casualty figures mounted and the pool of qualified replacements dwindled, several of the companies were inactivated - well before the end of the war.[71]

Justas special operations innovation and doctrine was stalled in the Korean War, so too was the advancement of fire support technology. For the most part, our troops fought the war with World War II weapons and ammunition. The only bright spot was in the air. Helicopters were coming into their own as a means of rapid deployment on the battlefield. They also showed

promise as an aerial artillery platform. Too, the Air Force introduced the F-84F Thunderjet to the skies over Korea as a close air support and interdiction aircraft. Regrettably, these small steps forward did not advance the role of special forces.

Vietnam War

Son Tay Raiders. "The Son Tay rescue [was] the first major military operation in American history conducted under direct control of the Office, Chairman, Joint Chiefs of Staff."[72] It was also the first truly joint special operations raid, involving men and equipment from the Army, Navy, Air Force, and other government agencies.

The man selected to lead this raid, Colonel Arthur D. "Bull" Simons, was a legend in Special Forces circles. As a captain in World War II, he had commanded B Company, 6th Ranger Battalion and led them on a successful raid in the Philippines to destroy a Japanese radar station just three days before the invasion of Leyte.[73] Now 26 years later, he was to lead another raid; this time to rescue approximately 70 prisoners of war from a camp in North Vietnam called Son Tay.

Colonel Simons interviewed 500 volunteers before he finally selected 15 officers and 88 enlisted men, all Special Forces and all but three with previous combat experience in Vietnam.[74] Together they trained for over three months to perfect their skills. To succeed, the raid would have to be timed perfectly and for every person and every system there would have to be a

back-up.

Because the raiders were going into North Vietnam as a lightly armed strike force, they did not have any organic fire support. The largest weapon they carried was the M-79 40-mm grenade launcher. For that reason, the six Air Force HH-53 Super Jolly Green Giant helicopters dedicated to the raid were each armed with a pair of 7.62-mm miniguns.[75] To back them up, a flight of propeller-driven A-1 Skyraider fighter-bombers provided Rockeye bombs and rockets for close air support.[76]

Two MC-130 Combat Talons were selected to guide the helicopters and A-1s to the compound and back to safety. They, in turn, were protected by five F-105 Wild Weasels, to jam North Vietnamese radars, and ten F-4 Phantoms, to fly combat air patrol (CAP) against enemy MIGs.[77] Finally, ten Navy A-6 Intruders and 27 A-7 Corsairs, from the carriers Ranger, Oriskany, and Hancock in the Tonkin Gulf, staged a diversion -

> a mock attack on Haiphong - to draw the attention of North Vietnam's air defenses away from Son Tay. Because a halt in the bombing was in effect, the feint would have to rely on parachute flares and the noise from the aircraft.[78]

The rescue went exactly according to plan - except there were no prisoners at Son Tay. They had been moved to another prison four months earlier. However, in just 26 minutes from landing to takeoff, Colonel Simons and his men proved that United States special operations forces had the expertise to plan and execute a complex operation - including joint fire support. They demonstrated how to synchronize offensive and defensive measures

in a total package.

Operation Rice Bowl

Disaster at Desert One. Ten years later, in April 1980, our military forces attempted another rescue mission. And, again they were unsuccessful. The assault force, led by Colonel Charlie Beckwith, the Delta Force commander, was stymied in the middle of the desert. The Navy's RH-53 Sea Stallion helicopters were just not reliable enough to fly extended ranges at night, at low levels, in severe sand storms. Of the helicopters that did make it to the refueling point, code named Desert One, some were unable to continue due to mechanical problems. According to everyone's calculations, that meant the mission had to be called off. Colonel Beckwith had to have six fully operational helicopters for the mission to continue; he could not go on with only five. As the ground force commander, he decided to abort the mission and he ordered everyone to prepare for the return flight home. Suddenly disaster struck. One of pilots became disoriented when he tried to reposition his helicopter and he collided with one of the parked C-130s. Immediately, both aircraft burst into flames killing eight Air Force and Marine crewmen. Operation Rice Bowl was over.

This was, arguably, the most difficult rescue attempt in military history. Yet had the force made it to Tehran, their only fire support would have come from three AC-130 gunships. The requirement to maintain surprise prevented fighter-bombers

from being used, as did the requirement to minimize civilian casualties.

During the Congressional Hearings that followed, Senator Nunn asked Colonel Beckwith what lessons he had learned from the mission. He answered,

> In Iran we had an ad hoc affair. We went out, found bits and pieces, people and equipment, brought them together occasionally and then asked them to perform a highly complex mission. The parts performed, but they didn't necessarily perform as a team. Nor did they have the same motivation.
>
> My recommendation is to put together an organization that contains everything it will ever need, an organization that would include Delta, the Rangers, the Navy SEALs, Air Force pilots, its own staff, its own support people, its own aircraft and helicopters. Make this organization a permanent military unit. Give it a place to call home. Allocate sufficient funds to run it. And give it sufficient time to recruit, assess, and train its people.[79]

The Joint Chiefs' Special Operations Review Group, chaired by Admiral James Holloway, came to roughly the same conclusion as Colonel Beckwith. Shortly thereafter, a Special Operations Command was formed that would operate independently of the individual military services and would report directly to the Joint Chiefs.

Operation Urgent Fury

The Grenada Campaign. Within three years, the newly formed special operations headquarters was in combat on the tiny Caribbean island of Grenada. And, they had with them an impressive special operations strike force. There were elements

of Delta Force, a Navy SEAL team, portions of 1st and 2d Ranger Battalions, numerous special operations helicopters from Task Force 160, and AC-130 gunships from the Air Forces' 1st Special Operations Wing (SOW). All premier SOF units.

Despite having some of the best trained forces available, difficulties arose. Admiral Metcalf, Commander of Joint Task Force 120 (JTF-120), decided - in the interest of speed and surprise - to conduct certain special and conventional operations over the same terrain at the same time. This created potentially very dangerous situations because the two forces were not aware of each other's fire support plans nor did they have compatible radios and frequency listings with which to clear fires. Rangers could not talk to the Navy A-7s flying close air support. No one could talk to the naval gunfire ships and they were eventually moved off station without having fired a shot. Troopers from the 82d Airborne Division could not talk to the special operations helicopters and shot at them thinking they were Cuban.

In the end, fire support assets went unused because of a lack of understanding and common communications. Special warfare units had made significant advances in their command and control structure, joint planning, and doctrine since the Holloway Report; however, their ability to integrate fires on the SOF-conventional battlefield still needed improvement.

Operation Just Cause

The Panama Campaign. Most of the special operations units

that fought in Grenada also fought in Panama - Delta Force, the Rangers, the SEALs, Task Force 160, and 1st SOW. The big difference in Panama was that the lessons of Grenada had been well learned. Communications worked well and fire support coordinators with both SOF and conventional units synchronized lethal and nonlethal fire support assets to produce effective fires.

Historically, field artillery fires have been used for their ability to produce mass destruction over an area with little regard for collateral damage. The situation in Panama City, however, called for restraint. Massive collateral damage was not in the best interest of either the military or political objective. Therefore, the joint special operations task force (JSOTF) commander ordered that weapon systems effects be scrutinized to avoid unnecessary collateral damage. The emphasis clearly was on the use of precision weapon systems. Accordingly, the AC-130 gunship was the weapon of choice. Starting with H-hour fires directed against the Comandancia (Noriega's headquarters), the AC-130H provided the majority of fire support throughout the special operations phase of the campaign.

The coordination between SOF and conventional units in Panama was the best it has ever been. Fire support officers at every level worked to synchronize fires, deconflict targets, limit collateral damage, and avoid fratricide. "The imaginative and responsive role that fire support played in Operation Just Cause may well be the traditional role of the future."[80]

JOINT FIRE SUPPORT SYSTEMS

Today's special operations will truly be joint. We have evolved from fighting two integrated battles (ground and air) to one extended battle with an increasing role for precision fires and joint synchronization. Advanced technologies enable us to deploy SOF forces under the protective umbrella of precise, lethal firepower. In building our force packages, we will need continuous firepower, day or night, and in all weather conditions - something no single service can provide by itself. Joint fire support will take the form of tactical air (TACAIR), electronic warfare, naval gunfire and missile fires, as well as Army attack air, field artillery, and mortar fires.

Army Systems

M224, 60-mm Mortar. This 60-mm mortar was designed to replace the 81-mm mortar in the non-mechanized infantry company. The bursting radius of the new 60-mm high-explosive ammunition equals that of the older 81-mm round. The new ammunition also comes with a multi-option fuze that allows proximity, near-surface, point detonating, and delay options by rotating the fuze head. Since the M224 can be used in all types of terrain, it is especially suited for SOF operations. It can be fired from a conventional baseplate or, using a built-in trigger system, from a hand-held position by one man. The maximum range of the M224

is 3,500 meters.[81] There are two 60-mm mortars in every Ranger company[82]and six 60-mm mortars at the Special Forces Group-, Battalion-, and Company-level, for use in special situations. The M224 is also fielded in the Marine Corps.[83]

M252, 81-mm Mortar. The M252 is specifically designed for light infantry units. It is light enough to be carried and operated by a three-man team. With the new family of 81-mm ammunition, the M252 can achieve a maximum range of 5,650 meters. The Marine Corps has also bought this weapon.[84]

M30, 4.2-inch Mortar. The "four deuce" is a medium range mortar. It fires a family of munitions - high-explosive, illuminating, gas, and smoke - out to ranges between 770 and 6,840 meters. The M30 is presently fielded at the battalion level in heavy divisions, but is scheduled to be replaced by the new 120-mm system.[85]

BMS-120, 120-mm Mortar. The 120-mm mortar was acquired as a non-developmental system from Israel. The light units will be equipped, during the fourth quarter of FY93, with the towed version of this new mortar. The mortar will be transported on a trailer and a HMMWV will serve as the prime mover for the system. With its smooth bore and a new family of fin-stabilized ammunition, the BMS-120 will provide increased range, lethality, illumination and smoke-screening capability over the M30 4.2-inch mortar. The range for this system is between 300 and 7,240 meters. As technology becomes available, improved munitions could include an improved multi-spectral screening round to

defeat infrared sensors, a FASCAM (family of scatterable mines) round, a DP/ICM (dual purpose-improved conventional munition) round, and an antipersonnel flechette round.[86]

M119, 105-mm Towed Howitzer. The M119 is the newest 105-mm direct support howitzer for the light, airborne, and air assault divisions. It is light enough to be dropped by parachute or transported by the UH-60 Black Hawk helicopter. With the new family of ammunition, the M119's range will be 14,300 meters. That range is expected to increase to 19,500 meters with the improved rocket-assisted projectile (RAP) round now under development.[87]

M109, 155-mm Self-Propelled Howitzer. The M109 is the direct support howitzer for heavy divisions. Its maximum range is 14,600 meters for zone seven charges, 18,000 meters for zone eight, and 23,500 meters for zone eight with rocket assisted projectiles (RAP). The Army is presently fielding the latest version of this howitzer, the M109A6 Paladin. It features a new cannon with a maximum range of 30 kilometers. Other improvements include an on-board fire control system, a navigation system, additional ballistic protection for the crew, a driver's night-vision device, and secure communications. The Paladin can deliver and sustain rapid firepower on a target, operate reliably day or night and shoot farther than today's systems.[88]

M198, 155-mm Towed Howitzer. In general, the M198 is found in field artillery brigades which reinforce light, airborne, or air assault divisions. At 15,750 pounds, it is towed by the

M925A1 5-ton truck, yet it is still light enough to be lifted by the CH-47D helicopter. The M198 is the standard 155-mm howitzer for the Marine Corps.[89]

Multiple Launch Rocket System (MLRS). The MLRS is a free-flight, area fire, artillery rocket system which supplements cannon artillery fires by delivering large volumes of firepower in a short time against critical, time-sensitive targets. Its primary missions are counterfire, suppression of enemy air defenses, and neutralization of light material and personnel targets. It has a planning range of eight to 30 kilometers against large targets - not to exceed 2000 meters by 1000 meters for rectangular targets, 1000 meters by 1000 meters for square targets or a 500 meter radius for circular targets. Each M270 launcher carries two launch pods containing six rockets apiece, for a total of 12 rockets. Launchers can shoot within three to five minutes of receiving a fire mission. Each warhead contains 644 M77 dual-purpose/improved conventional munitions (DP/ICM).[90]

Army Tactical Missile System (ATACMS). The ATACMS Block I is a long-range missile system designed to attack tactical surface-to-surface missile sites, air defense systems, logistics elements, and command, control, and communication (C3) complexes. As the replacement for the Lance missile system, it delivers a larger warhead to substantially longer ranges than the Lance missile, with dramatically improved accuracies and vastly superior firing rates. Each missile warhead contains 950 M74

anti-personnel and anti-material submunitions. The ATACMS Block II missile is designed to attack second echelon maneuver targets in the corps area of influence. The Block II system will carry a smart anti-armor submunition capable of attacking hard or armored targets. By providing operational fires to the corps and echelons above the corps (EAC), the ATACMS Block II can potentially free-up tactical air assets to fulfill other missions.[91]

High-Mobility Artillery Rocket System (HIMARS). The HIMARS (still in development) is a wheeled multiple launch rocket system (MLRS) that will fire the entire family of MLRS munitions. More importantly for SOF, it will be light enough to deploy, fully combat loaded, in a C-130 to areas with short or unimproved airfields and, therefore, will be an excellent asset for maximum firepower early on during a contingency operation. Each launcher will carry one launch pod container with six MLRS rockets or one ATACMS missile. Current projections call for XVIII Airborne Corps Artillery to have two HIMARS battalions. (The US Army Missile Command has already conducted successful tests of the HIMARS concept. In April and September 1991, they fired both MLRS rockets and ATACMS missiles from an old Honest John launcher at White Sands Missile Range, New Mexico.)[92]

AH-1 Cobra Attack Helicopter. The Cobra's primary missions are anti-armor, armed escort,and reconnaissance. Armed with both point and improved area weapons systems, it is an excellent fire support platform. It can be armed with an assortment of weapons up to 10,000 pounds; it can carry a mix of eight TOW missiles,

750 rounds for the 20-mm cannon, and 76 2.75-inch rockets.[93]

AH-64A Apache Attack Helicopter. The Apache is the Army's primary anti-armor attack helicopter. It can find, engage, and destroy targets during day, night, and bad weather. During Operation Desert Storm, the Apache proved to be a vital member of the combined arms team. It complemented other weapons systems on the battlefield with its high survivability, mobility, and lethal firepower. Because the Apache is self-deployable, it may be one of the first fire support systems available to SOF or other early deploying forces. Among the exceptional features of this attack helicopter, are the target acquisition/designation sight (TADS) and the pilot night vision sensor (PNVS). Together, they enable the pilot to fly and engage enemy armor at night and in adverse weather. The Apache is armed with the 30-mm chain gun and can carry a mix of Hellfire laser guided missiles and 2.75-inch Hydra 70 rockets. Plans call for the integration of the Longbow fire control radar system and the fire-and-forget seeker for the Hellfire missile. The mast mounted Longbow radar will supplement the existing nose-mounted optical/infrared targeting system.[94]

OH-58D Kiowa Warrior. The OH-58D is the Army's first true scout helicopter. The armed version is currently the only practical armed reconnaissance aircraft in the inventory. Its primary missions are armed reconnaissance, light attack, security, command and control, and target acquisition/designation during day, night, or adverse weather operations. The mast-mounted sight (MMS) houses a thermal imaging system, a low-light

television, and a laser rangefinder/designator. The MMS is located above the rotor blades to allow the helicopter to hover closer to the ground or behind hills or berms, thereby reducing its vulnerability. The highly accurate inertial navigation system ensures precise target location information can be passed digitally to other attack aircraft or to artillery units via the airborne target handover system. During the Gulf War, many OH-58Ds were modified with air-to-air and air-to-ground weapons. Designated as Prime Chance aircraft, these Kiowas were equipped with air-to-air Stinger missiles and an air-to-ground weapons package, consisting of Hellfire missiles, 2.75-inch Hydra 70 rockets, and a .50-caliber machine gun. As an armed helicopter, the OH-58D is an especially lethal member of the combined arms team, able to both detect and defeat enemy threats.[95]

AH-6. The AH-6 is a modified Hughes 500 helicopter, flown exclusively by the 160th Special Operations Aviation Regiment (SOAR). Like all special operations helicopters it is designed to fly at very low altitudes at night and in bad weather. The AH-6 can easily be transported internally by all standard Air Force airlift aircraft. Thus, the AH-6 can be rapidly deployed to a forward operating base. It is an armed helicopter and normally carries 2.75-inch rockets and a mini-gun.[96]

MH-60K. The MH-60K is the mainstay of the 160th SOAR. It is a modified Black Hawk helicopter which routinely supports special operations at low levels at night and in bad weather, over extended ranges using precision navigation systems. Because

of its improved engines, extended-range fuel systems, and in-flight refueling capability, the MH-60K is capable of rapid deployment to contingency sites. The MH-60K can be armed with a variety of weapons (mini-guns, 2.75-inch rockets, Hellfire and Stinger missiles) for defensive purposes.[97]

Air Force Systems

A-10A Thunderbolt II. Designed specifically for the close air support (CAS) mission, the A-10A's ability to combine large ordnance load, long loiter, and wide combat radius proved a vital asset to Operation Desert Storm. A-10s flew 8,100 sorties and launched ninety percent of the Maverick missiles used during the war. In a typical anti-armor CAS mission, the A-10 can fly 150 miles and remain on station for one hour. The 30-mm GAU-8/A gun can fire 2,100 or 4,200 rounds per minute to defeat armor targets. A key to the A-10's success is the Pave Penny laser target identification pod. Pave Penny picks up the reflected laser energy from SOF/ground forces laser target designators to pinpoint targets, day or night. In addition to the 30-mm cannon, the A-10 can carry up to 16,000 lb of mixed ordnance, including various types of free-fall or guided bombs, combined effects munitions dispensers, gun pods, six AGM-65 Maverick missiles, or four AIM-9 Sidewinder air-to-air missiles.[98]

AC-130H Spectre. The AC-130 gunship is the most celebrated of the special operations aircraft. It is capable of providing precise surgical firepower in addition to performing other

special operations and conventional missions, including escort, surveillance, armed reconnaissance/interdiction, close air support, and air base defense. The AC-130H is equipped with a digital fire-control computer, two fixed 20-mm Vulcan cannons, one trainable 40-mm cannon, and one trainable 105-mm howitzer. Spectre uses electro-optical sensors and target acquisition systems, including FLIR (forward looking radar) and low-light-level TV to acquire its targets at night. The H model is capable of in-flight refueling, thereby, considerably extending its loiter time in the target area. The H model is currently undergoing a series of modernizations to its fire-control computer, navigation, communication, and sensor suites. The nine remaining active duty AC-130Hs will soon be replaced by the new AC-130U. It will combine increased firepower, reliability, and superior accuracy with the latest methods of target location. The AC-130U will have the same 40-mm and 105-mm guns as the H model, but replaces the two 20-mm cannons with one trainable 25-mm cannon. As the AC-130U is delivered to the 16th Special Operations Squadron, Hurlburt Field, Florida, the AC-130Hs will transfer to the Reserve.[99]

MC-130H Combat Talon II. The Combat Talon II is the latest model in the versatile low-level deep-penetration MC-130 program. The H model will feature improved, night/adverse weather, terrain following and terrain avoidance radar. In addition, it will come with a dual inertial navigation system for improved accuracy and reliability, and a GPS receiver. The H model will also boast a

much improved defensive avionics package. While the MC-130H is normally considered a special operations aircraft, it is a capable air delivery platform, particularly when called upon to deliver the largest conventional weapon in the US arsenal, the 15,000 BLU-82.[100]

B-1B Lancer. Advanced aerodynamic technology and improved engine performance permit the B-1B to carry a considerably greater weapons load than the larger B-52, which it partners in the USAF strategic bomber force. The Air Force currently has 97 B-1Bs. Each has three internal weapons bays. The bulkhead of the forward weapons bay is moveable permitting the aircraft to carry a wide range of weapons of different sizes. The maximum payload in its nonnuclear role is up to 84 MK 82 (500 lb) bombs or MK 36 (500 lb) mines. The bomber's offensive avionics include a forward-looking and fully automatic terrain-following radar, and an extremely accurate inertial navigation system. The bomber also makes extensive use of radar-absorbing materials to reduce the aircraft's radar signature. As a result, the B-1B can penetrate sophisticated enemy air defense systems to accomplish its mission and return safely.[101]

B-2A. The B-2A was conceived as a highly survivable strategic bomber to supplement, and ultimately replace, the B-1B in its penetration role. The B-2s most notable characteristic is its flying wing configuration. It employs sophisticated stealth technologies to avoid detection. The B-2A has two large side-by-side weapons bays that can carry a total weapons load between

40,000 and 75,000 lb. It can easily accommodate 80 MK 82 (500 lb) bombs or various other conventional weapons, including sea mines.[102]

B-52G/H Stratofortress. The aging but extremely versatile B-52 proved its worth as a conventional bomber again during Operation Desert Storm. This multi-mission intercontinental bomber can fly at high subsonic speeds at altitudes up to 50,000 feet. In the Gulf War, it flew 1624 missions and delivered 25,700 tons of bombs against both tactical and strategic targets. Now used exclusively in the nonnuclear role, the B-52's mission profile includes precision strikes, defense suppression, maritime interdiction, and show of force. Their long range has also made them the aircraft of choice for other important collateral missions, such as sea surveillance, aerial minelaying, and anti-surface warfare operations in cooperation with the US Navy and other NATO allies. The B-52 can carry 20 cruise missiles internally in a rotary launcher or 12 AGM-129A Advanced Cruise Missiles (ACM) in underwing pylons or 12 Harpoon missiles also in underwing clusters. When carrying gravity bombs, the B-52's weapons bay can carry bombs up to the 2000 lb cluster bombs. A total of 180 B-52G/Hs remain operational in the active duty fleet.[103]

F-4G Wild Weasel. The F-4G is an electronic countermeasures (ECM) aircraft. Its mission is to destroy, neutralize, or degrade enemy radar-directed surface-to-air threats. The Wild Weasel can carry the high-speed anti-radiation missile (HARM), as

well as the Shrike and Maverick missiles, Rockeye cluster bombs, and air-to-air missiles. The HARM is the preferred munition for suppression of enemy air defenses (SEAD). The Air Force has plans to replace the F-4G with an ECM version of the F-16.[104]

F-15E Eagle. The F-15 is the USAF's primary air-superiority fighter. It is a two-seat, dual-role, totally integrated fighter for all-weather air-to-air and deep interdiction missions. Capable of automatic terrain following and exceptional navigational accuracy, it is the perfect aircraft for low-altitude, high-speed penetration and precision attacks on tactical targets at night and adverse weather. Night attacks are possible because the F-15E is equipped with LANTIRN (Low-Altitude Navigation and Targeting Infrared for Night) pods, with wide-field FLIR. This is of particular importance is SOF since the FLIR is compatible with the handheld IR designators (foreign technology) used during Operation Desert Storm during SCUD hunting reconnaissance missions.[105] The F-15E is armed with one internally mounted M61A1 20-mm six-barrel cannon, four AIM-9L/M Sidewinder and four AIM-7F/M Sparrow air-to-air missiles, or eight AMRAAMs. It is also capable of carrying up to 24,500 lb of ordnance. There are 744 F-15s in the active duty fleet.[106]

F-16 Fighting Falcon. More sorties were flown by the USAF F-16 multi-mission fighters than any other type during Operation Desert Storm. In 13,500 missions, the 249 F-16s were used to attack airfields, military production facilities, SCUD missile sites, and a variety of other targets. The F-16 was developed to

replace the F-4 in the active-duty force and to modernize the air reserve forces. F/A-16s will replace A-10s as CAS/BAI aircraft in the mid-1990s. Current proposals call for 300-450 of these F-16s to be modified to carry the centerline GPU-5/A 30-mm gun pod. The standard F-16 will still be armed with one M61A1 20-mm multi-barrel cannon, with 500 rounds, wingtip-mounted infrared missiles, as well as seven other external stations for air-to-air and air-to-surface munitions.[107]

F-111 Aardvark. Described as the "workhorse" of the Gulf War, the F-111 flew 4,000 sorties against armored formations, bridges, C3I sites, aircraft shelters, and weapons production facilities. The F-111 is an around-the-clock long-range, interdiction aircraft. The F-111F carries the Pave Tack system in its weapons bay to acquire, track, and designate ground targets for laser, infrared, or electro-optically guided weapons, day or night. Its wing pylons can carry a total external load of up to 25,000 lb of bombs, rockets or missiles. As an addition to its conventional bombing capability, the F-111 can carry up to 12 French Durandal parachute-retarded, rocket-boosted, runway attack bombs for low-altitude high-speed delivery, and GATOR, USAF's first air-delivered mine system.[108]

F-117A Nighthawk. The F-117 stealth fighter combined precision targeting and stealth technology to provide outstanding results in the Gulf War. The USAF's total force of 56 F-117A's flew 1,270 missions, undetected and unmolested, against top-priority targets. Their success is attributed to its minimal

radar signature. The skin panels of the arrowhead-shaped airframe are divided into many small, perfectly flat surfaces, which reflect all probing signals from enemy ground or airborne radars at a variety of angles. In addition, much of the aircraft's external surface is made of composite radar-absorbing materials and has a dull black finish that reflects little light. The engine air intake and exhaust nozzles are above the wings and rear fuselage to shield them from infrared seekers. Besides the high-precision inertial navigation system, a key feature of the F-117A is the FLIR and DLIR (downward looking radar) mounted in a retractable, steerable turret built into the underside of the aircraft, with a boresight laser designator and autotracker, to ensure precision attack. The combat payload of the F-117A is not available, however, it can carry a wide variety of tactical weapons up to and including laser-guided 2,000 b munitions.[109]

EC-130E Airborne Command and Control Center (ABCCC). The ABCCC is one of a series of special duty variants of the basic C-130 which have been produced for specialized missions. The EC-130 series does not actually provide fire support, but it does facilitate or complement the fire support capabilities of other USAF aircraft. There are eight of these aircraft, all of which are based at Keesler Air Force Base, Mississippi. During SOF operations, the Joint Special Operations Task Force Commander, the Air Component Commander, and the TF Fire Support Officer are all usually co-located in the ABCCC.[110]

EC-130E Volant Solo II. The Volant Solo aircraft are used

to conduct psychological operations (PSYOP) broadcasts by transmitting messages and information on the standard AM/FM radio, television, short wave, and military communications bands. There are four of these special duty aircraft located at the 193d Special Operations Group ANG, Harrisburg, Pennsylvania.[111]

EC-130H Compass Call. The EC-130H is another of the special duty C-130s. This one is a communications jammer. It played an important role in disrupting Iraqi communications during the Gulf War. There are 14 Compass Call aircraft operated by the 41st Electronic Combat Squadron at Davis-Monthan AFB, Arizona.[112]

EF-111A Raven. The EF-111A Raven is a conversion of a basic F-111 airframe to accomplish air defense suppression/jamming missions in support of tactical strike forces worldwide. Missions for this aircraft include barrier standoff jamming, degradation of acquisition radars during CAS operations, and close-in jamming and direct support for deep strikes. EF-111s were crucial to the success of the Libyan Raid in 1986 and the Gulf War in 1990.[113]

E-3B/C Airborne Warning and Control System (AWACS). The AWACS provides highly mobile, survivable, jam-resistant surveillance and command and control (C2) functions for tactical and air defense forces. With look-down radar, it is capable of all-weather, long-range, high- or low-level surveillance of all air vehicles, manned or unmanned, above all kinds of terrain. The AWACS missions are to detect enemy aircraft, control defensive friendly fighters, control strike aircraft, and provide

a long-range air picture to theater commanders.[114]

E-8 Joint Surveillance and Target Attack Radar System (JSTARS). JSTARS is a joint Army/Air Force program designed to provide near real time wide-area surveillance and deep targeting capability to ground and air commanders. This radar, with a reported range in excess of 155 miles, can detect and locate stationary objects, such as parked tanks, as easily as it can locate and track slow-moving targets. The JSTARS system then directs the attacks on the targets, in real time, via data link or radio.[115]

MH-60J Pave Low III. The Pave Low is the primary special operations helicopter in the Air Force. It is fitted with an inertial navigation system coupled to the global positioning system (GPS), as well as FLIR and terrain-following and terrain-avoidance radars. These systems give the Pave Low the ability to fly very complex missions at night and in adverse weather. They frequently fly as pathfinder aircraft for larger helicopter formations where low level flight is absolutely necessary for mission success. The Pave Low itself can carry up to 40 troops or three jeeps. It can be armed with either 7.62-mm miniguns or .50 caliber machine guns. These weapons are for self-protection. The Pave Low is not considered an attack or even offensive helicopter.[116]

AGM-86C Air Launched Cruise Missile (ALCM). The AGM-86C is a small, unmanned, winged air vehicle capable of sustained subsonic flight following its launch from a carrier-based

aircraft. It is programmed for precision attack of surface targets and is armed with a 1,000 lb high-explosive blast fragmentation warhead. When launched in large numbers, each of the missiles would have to be countered, making defense against them costly and complicated. Additionally, by diluting defenses, AGM-86Cs improve the chances of manned aircraft to penetrate to major targets. During the Persian Gulf War, seven B-52Gs successfully launched 35 missiles against eight high-priority Iraqi targets from standoff ranges.[117]

AGM-129A Advanced Cruise Missile (ACM). The AGM-129A is also an air-launched cruise missile. It was designed to arm the B-52H and has improved range, accuracy, survivability, and targeting flexibility compared with that of the AGM-86.[118]

AGM-65 Maverick. The basic Maverick is a launch-and-leave, TV-guided, air-to-surface missile. It enables the pilot to seek other targets or to leave the area once it has been launched, but can only be used in daylight, clear weather conditions. The D and F variants have an imaging infrared seeker to overcome the daylight only limitation. The E variant users a laser seeker to guide against designated targets such as protected command bunkers and armored vehicles. Beside the different seekers, the Maverick has two different warheads to choose from. The shaped charge, jet and blast warhead contains 125 lb of explosive and is used against enemy armor. The blast fragmentation warhead contains 300 lb of high explosive for use against hardened targets. A-10s fired more than 4,800 of the more than 5,100

Mavericks used during Operation Desert Storm. The range of the Maverick is 14 miles.[119]

AGM-88 High-Speed Anti-Radiation Missile (HARM). The HARM is the missile used by the F-4G Wild Weasel against enemy radar. The seeker head homes in on enemy radar emissions and destroys the site before the enemy can detect the approach of the missile and cease operations. The missile travels at supersonic speeds and covers a wide range of frequencies. The range of the HARM is more than 10 miles.[120]

Navy Systems

Aircraft Carriers. Even as the Navy shifts away from open-ocean warfighting on the sea toward joint operations conducted from the sea, the aircraft carrier remains the centerpiece of the restructured Naval Expeditionary Forces. Their mission is to support and operate aircraft that engage in attacks on airborne, afloat and ashore targets which threaten our use of the sea; and engage in sustained operations in support of other forces. Aircraft carriers are deployed worldwide in support of U.S. national interests and commitments. The aircraft carrier's contribution to fire support is its embarked air wings and full complement of guided and gravity ordnance. Carrier wings routinely train to conduct close air support and interdiction strikes in conjunction with amphibious operations and land campaigns. They also train to conduct deep strikes against enemy infrastructure and strategic targets.[121]

Cruisers. Guided missile cruisers are classified as multi-mission surface combatants. They are capable of supporting carrier battle groups and amphibious task forces, or of operating independently and as flagships of surface action groups. The cruiser's contribution to fire support is the Tomahawk Land Attack Missile (TLAM) and its two MK 45 5-inch/54 caliber guns. The TLAM C model has a 1,000 lb blast fragmentation warhead and the D model contains 166 combined effects bomblets which provide armor-piercing, fragmentation, and incendiary effects.[122]

Destroyers. Modern destroyers and guided missile destroyers perform primarily in a battle force combatant (BFC) role. As such, these ships operate in support of carrier battle groups, surface action groups, amphibious groups, and replenishment groups. Destroyers primarily perform an anti-submarine mission while guided missile destroyers can perform multiple missions (anti-submarine, anti-air, and anti-surface warfare). The destroyer's contribution to fire support is the Tomahawk Land Attack Missile and the MK-45 5-inch/54 caliber gun.[123]

Frigates. Modern frigates and guided missile frigates perform primarily in a protection of shipping role as anti-submarine warfare combatants for amphibious expeditionary forces, underway replenishment groups, and merchant convoys. The guided missile frigates are also capable of performing anti-air warfare missions. The frigate's contribution to fire support is its 3-inch/62 caliber MK-75 rapid fire gun.[124]

Unmanned Aerial Vehicle (UAV) Pioneer. UAVs were used

during most of the naval gunfire missions during Operation Desert Storm for surveillance, targeting, spotting, and battle damage assessment. UAVs launched from the battleships USS Missouri (BB63) and USS Wisconsin (BB64) flew 64 sorties for 213 hours and supported 83 naval gunfire missions. Naval gunfire support was unaffected by cloud cover or oil field smoke over the targets because the UAVs were able to operate below these conditions.[125]

A-6E Intruder. The A-6E is an all-weather, day or night, carrier-based attack aircraft. Its mission is to destroy both fixed and moving targets at sea or ashore. To accomplish this, it is equipped with an all-weather ground mapping radar, a FLIR, and a self-contained laser designator to ensure the accurate delivery of laser-guided weapons. The A-6 also can provide CAS to ground forces in all weather conditions using a radar beacon to identify friendly positions and accept target reference data. Typically the Intruder carries a combination of gravity and laser-guided bombs, Harpoon anti-ship missiles, Maverick, HARM, and stand-off land attack missiles (SLAM). During Operation Desert Storm, 95 Navy A-6s flew 4,045 sorties against high value Iraqi targets. The Navy used the A-6 extensively at night because of its all- weather, night-attack capability.[126]

F-14 Tomcat. The F-14 is the Navy's premier all-weather, day-night fleet air defense fighter. It is an air superiority fighter designed to attack and destroy multiple airborne targets simultaneously. Its armament includes the AIM-54 long-range air-to-air missile, the AIM-7 Sparrow medium-range air-to-air

missile, the AIM-9 Sidewinder short-range missile, and the 20-mm M61A1 cannon. During Desert Storm, the F-14 flew fighter sweep, CAP, and escort missions to protect coalition forces on interdiction and CAS operations.[127]

F/A-18A/C Hornet. The F/A-18 strike-fighter is designed to perform both fighter and attack roles. When used as a fighter, the F/A-18 provides cover for tactical air projection over land or sea and complements Fleet air defense. When used as an attack aircraft, the F/A-18 conducts interdiction, CAS, air defense suppression, and strikes against land/seaborne targets. The Hornet carries an assortment of air-to-air missiles (AIM-7 and AIM-9) and air-to-ground weapons (Harpoon, HARM, Maverick, as well as general purpose and laser-guided bombs).[128]

EA-6B Prowler. The EA-6B is an all-weather, four seat, carrier-based tactical electronic warfare aircraft. It is designed to protect fleet battle groups or strike aircraft by denying or delaying enemy radar, data links, and communications. The crew of the Prowler consists of one pilot and three electronic countermeasures officers to operate the complex ALQ-99 Tactical Jamming System and ASQ-99 Communications Jamming System. In addition to the jamming pods, the EA-6B carries up to four HARM missiles to destroy enemy early warning or air defense radars.[129]

Stand-off Land Attack Missile (SLAM). The SLAM is an air-to-ground tactical missile, launched from both A-6E and F/A-18 aircraft. It has a stand-off range of more than 50 miles. This

puts it in the intermediate category between long-range cruise missiles and short-range freefall munitions. Its warhead consists of 500 lb of high explosive with instantaneous and delayed detonation fuze options.[130]

Tomahawk Cruise Missile. The Tomahawk is a ship/submarine launched, deep strike missile. Its range is in excess of 500 miles compared to 50 for the SLAM. It is used to attack high value targets in heavily defended areas where there is a high probability of the loss of manned aircraft. The Tomahawk features an inertial navigation and terrain-matching contour guidance system with a radar altimeter to ensure precision strikes. This system uses a stored map reference to compare with the actual terrain and, if necessary, make mid-flight course corrections while enroute to the target. During Operation Desert Storm, two variants of the Tomahawk were used, the BGM-109C and the -109D. The C model is armed with a 1,000 lb high explosive warhead for use against hardened targets, command and control bunkers, airfields, and air defense facilities. The D model can attack multiple targets by dispersing its 166 combined effects munitions in partial loads. Therefore, it is used against area targets, such as parked aircraft or air defense artillery sites. The combined effects bomblets provide armor-piercing, fragmentation, and incendiary effects. During Operation Desert Storm, 288 Tomahawks were launched from 16 surface ships and two submarines. Of those, 282 successfully achieved cruise flight for a 98 percent success rate. The Tomahawk was the only weapon

used during daylight against Baghdad during the entire campaign.[131]

AGM-88 High-Speed Anti-Radiation Missile (HARM). The Navy uses the same HARM missile as the Air Force. It is the air-to-surface missile used to destroy or suppress enemy electronic emitters, especially those associated with radar sites used to direct anti-aircraft guns and surface-to-air missiles. It is launched from the EA-6B Prowler.[132]

AGM-65F IR Maverick. The Navy's IR Maverick missile is the same as the Air Force's AGM-65F, although slightly modified to optimize ship tracking. It has a 300 lb blast fragmentation warhead and is launched from the A-6E Intruder, AV-8B Harrier, and F/A-18 Hornet.[133]

MK-45 5-Inch/54-Caliber Gun. The MK-45 is the gun used by surface combatants to provide accurate naval gunfire against both fixed and moving targets ashore during amphibious assaults. It is very accurate, fully automatic, and very rapid. It fires at 16 to 20 rounds per minute. Naval gunfire support missions are considered very reliable against vertical targets. They are essentially all-weather capable since the ships can be adjusted by spotters ashore or by UAVs flying under the weather.[134]

Marine Corps Systems

M224 60-mm Mortar. The Marine Corps uses the same weapon system as the Army. It is organic to the infantry company, and therefore, available to the Marine Expeditionary Unit (Special

Operations Capable) or MEU (SOC).

M252 81-mm Mortar. The Marine Corps uses the same weapon system as the Army. They are organic to the infantry battalion. There are eight 81-mm mortars available to support MEU (SOC) operations, upon request.[135]

M101A1 105-mm Towed Howitzer. Although the Army is transitioning to a new 105-mm, the M119 howitzer, the Marine Corps has decided to keep the older M101A1 in service. There are 48 M101A1s within each Marine Expeditionary Force (MEF) as contingency weapons. Ordinarily, there is one battery of six howitzers afloat with each Marine Expeditionary Brigade (MEB). At any one time, at least four of these M101A1s are available to provide fire support to MEU (SOC) operations. The maximum range of the M101A1 is 11,500 meters.[136]

M198 155-mm Towed Howitzer. The Marine Corps uses the same weapon system as the Army. The M198 provides direct support fires to the MEB. Each Marine artillery battalion consists of four firing batteries with six M198s howitzers (4x6 configuration) each. Normally, at least one of these batteries is available to support MEU (SOC) operations.[137]

M109 155-mm Self-Propelled Howitzer. The Marine Corps phased-out all M109s from both the active and reserve forces following Operation Desert Storm. They were replaced by the M198 155-mm towed howitzer in the 4x6 configuration.

M110A2 8-inch Self-Propelled Howitzer. The Marine Corps phased out all M110s from both the active and reserve forces

following Operation Desert Storm. In the future, the Army will deploy MLRS battalion(s), as required, to provide general support and general support-reinforcing fires to MEF operations.

AH-1W Super Cobra. The Marine Corps Super Cobra is powered by two engines as opposed to the Army version which has only one. Its primary mission is to provide close-in fire support and fire support coordination to amphibious assaults and subsequent operations ashore, under day, night, and adverse weather conditions. Additional missions include armed escort for assault transport helicopters, anti-armor operations, and reconnaissance. The AH-1W is armed with a 20-mm nose gun and may carry a mix of 2.75-inch rockets, 5-inch rockets, TOW, Hellfire, Sidewinder, and Sidearm missiles. The AH-1Ws versatility proved invaluable during Operation Desert Storm. They destroyed tanks, armored personnel carriers, light-skinned vehicles, bunkers, and anti-aircraft artillery sites with their guns rockets, and missiles. To increase their flexibility, the Marine Corps is updating its Super Cobras with the introduction of the Cobra Night Targeting System, a FLIR and an on-board laser designator.[138]

A-6E Intruder. The Marines fly the same model A-6E as the Navy. During Operations Desert Storm, 20 Marine Corps A-6Es flew 854 sorties from land bases to attack strategic and interdiction targets, almost all of them at night. The Intruder can carry up to 18,000 pounds of armament on its five external stations.[139]

AV-8B Harrier. The Harrier is a vertical/short takeoff and landing aircraft. It is designed as an attack aircraft to

conduct deep strikes, CAS, armed reconnaissance, air defense, and helicopter escort missions. Because of its unique takeoff and landing characteristics, it can operate from amphibious ships, expeditionary airfields, and remote tactical landing sites. That gives it the ability to respond quickly to the ground commander's need for timely CAS. The Harrier is armed with a 25-mm Gatling gun and can carry a mix of weaponry - 2.75-inch and 5-inch rockets, MK-80 series bombs, MK-20 Rockeye cluster bombs, mines, AGM-65E Maverick missiles, laser guided bombs (GBUs), CBU-72 fuel air explosive, and AIM-9 Sidewinders.[140]

F/A-18A/C Hornet. The Marines fly the same F/A-18A/C models as the Navy. These are the single seat versions of the F/A-18. During Operation Desert Storm, the Marines deployed 72 F/A-18A/Cs to land-based airfields in Southwest Asia. They were used in strategic air strikes, suppression of enemy air defense, interdiction (especially of the Republican Guards), battlefield preparation, and air support during ground operations.[141]

F/A-18D. The two-seat F/A-18D is unique to the Marine Corps. Its mission is to attack and destroy surface (versus sea) targets, conduct multi-sensor reconnaissance, fire support coordination, and air interception. The Marines deployed twelve F/A-18Ds to Operation Desert Storm in a tactical air coordinator and forward air control roles. They routinely flew ahead of the coalition strike aircraft to locate and identify high value targets.[142]

Unmanned Aerial Vehicle (UAV) Pioneer. The Marine Corps

uses the same UAVs as the Army and Navy. During Operation Desert Storm, the Marines deployed three Remotely Piloted Vehicle Companies to Southwest Asia. Operating from field locations in Saudi Arabia, the Marine UAVs flew 138 missions (318 hours) during Desert Shield and 185 missions (662 hours) during Desert Storm. They were primarily used to conduct reconnaissance, surveillance, and target acquisition. The information from these missions was successfully used to detect dummy from actual targets, and to engage the real targets with artillery, naval gunfire, and CAS. Following the fire missions, subsequent Pioneer sorties determined whether additional attacks were required. The Pioneer with its infrared sensor and exceptional video quality is an excellent information gatherer for special operations.[143]

ROLE OF THE FIRE SUPPORT OFFICER

During a recent interview, Major General Fred F. Marty, Commandant of the Field Artillery School, expressed concern that modernization and technology were proceeding at a faster pace than the development of our joint warfighting doctrine.[144] On the plus side, he noted that these emerging technologies have tremendously increased our ability to destroy enemy forces and to do so at vastly greater ranges than ever before. The maximum range of the ATACMS, for instance, is more than twice that of the Lance missile it replaced. As for lethality, the MLRS can

deliver almost two tons of grenades per launcher in less than one minute, something an entire battalion of 8-inch howitzers could never accomplish in a single volley. On the negative side, however, he went on to say that several staff studies from the combat training centers have indicated, and after action reports from Desert Storm have validated, that our fire support elements (FSEs) from battalion to echelons above corps (EAC) need revamping. The demands of 24-hour and split command post operations require more robust FSEs at all levels. No where is this more true than at the joint special operations task force (JSOTF) headquarters where there presently is no provision for an FSE of any sort.

As the field artillery's warfighting structure is reduced by budget decreases, the firepower available to joint task force (JTF) commanders for fighting with fires is actually increasing. Consequently, the traditional roles of fire support - to protect our force from enemy indirect fires, to defeat the enemy before he can close with our forces, and to support our forces in contact - will remain as valid in the future as it is today. However, the JTF commander's ability to fight with fires and win will depend on his capability to successfully deploy tailored, integrated fire support packages - not "eaches" from individual services. In the future, winning decisively will depend on projecting force, not just forces. And then as now, synchronization will remain the linchpin to fighting with fires in joint operations.

The only logical conclusion to this chain of thought, as General Marty sees it, is that the JTF commander must have a dedicated fire support coordinator - a joint force fires coordinator (JFFC) - and a fires coordination element (FCE) to plan, apportion, and execute fires throughout the theater. The FCE would be a multi-service agency and would provide the JTF the means to implement the commander's concept and intent for fires. Accordingly, the Field Artillery School recently proposed a 31-man FCE at EAC for the 3d, 7th, and 8th Armies.

The impact of these initiatives on the JSOTF commander will be profound. As one Special Forces officer who has studied this issue extensively pointed out,

> Historically, little interface or coordination was necessary between SOF and the FSO because doctrinally their operational areas did not overlap - they weren't even contiguous. This is no longer the case. The post-Cold War era focus on regional operations, technological advances that bring most of the contingency theater within the range of FA systems, coalition warfare and the potential for fratricide call for close coordination between SOF and the FSO. To increase effectiveness, FA and joint SOF need to become more closely associated and continue to work on tactics, techniques and procedures (TTP) for targeting, sensor and shooter cuing, target handoff and deconfliction.[145]

Several special operations organizations have already taken steps in the direction of closer coordination. The Joint Special Operations Command (JSOC), whose mission it is "to study special operations requirements, techniques and tactics of all services to ensure standardization," has established a multi-service liaison element to coordinate training and operational

requirements for selected units.[146] As it is presently manned, the liaison element consists of three joint specialty officers, all majors - an Army fire support officer, a Marine fire support officer, and an Air Force air liaison officer.[147]

The Ranger Regiment has a far more robust and traditional FSE. It is supervised by an experienced brigade fire support officer and is fully staffed with fire support sergeants and fire support specialists. Furthermore, the Regimental FSE is augmented by a permanently attached Air Force tactical air control party (TACP) and a Marine Corps supporting arms control officer from the 2d Air and Naval Gunfire Liaison Company (ANGLICO). Each of the three Ranger battalions also has a full complement of fire supporters, giving the Rangers the only truly multi-service FSEs in the Army today.

Even the shadowy Delta Force created an FSE as a lesson learned following combat in Operation Urgent Fury. Operational miscues and faulty communications between the shooters and supporters convinced Delta's leadership there was an urgent requirement for a fire support coordinator on the planning staff. As a result, a brigade-level fire support officer and a senior fire support sergeant were added to the operations section.[148] There they serve two functions. First, they plan and coordinate fire support in accordance with their commander's intent. Second, they act as a liaison cell to the higher headquarters involved in the operation to analyze target information and to ensure that Delta Force activities are factored into the overall

fire support operation. The success of this deconfliction process depends on constant two-way communication with the higher headquarters to prevent any operational or fire support misunderstandings.

Apart from these organizations, the rest of the special operations community lacks any dedicated fire support coordinators. For the time being, deployed SOF must rely heavily on theater-level special operations commands (SOCs) and corps-level special operations coordination elements (SOCOORDs). Currently, they are the only institutions capable of coordinating the JSOTF commander's requirements and control measures with the battlefield coordination element (BCE), collocated with the Air control center (ACC) and the corps FSE. Future concept studies should examine the practicality of creating an FCE on the United States Special Operations Command (USSOCOM) planning staff and FSEs on the Army Special Operations Command (USASOC) and Special Forces Command (SFC) staffs. These organizations would create the habitual working relationships which are so important as our forces shift from deployments to the combat training centers to deployments to combat zones.

A SPECIAL OPERATIONS SCENARIO

Recent history has demonstrated that subtlety and diplomacy do not always work. Consider the situation in the former Yugoslavia. The Vance-Owen peace plan appears to have failed.

The Serbians, who refused to sign the tri-party peace accord, are pressing the full weight of their numerical and military superiority upon the faltering resistance of the Bosnian Muslims. Against this violent and increasingly bloody backdrop, there exists the very real possibility that the United States and its allies may be compelled to deploy armed forces to reestablish peace and regional stability.

In fact, the worst case situation became reality as the relentless Serbian assault consumed more and more of Bosnia and Herzegovina. While the Serb gunners pounded the retreating Muslims, the Bosnian government pleaded with the UN Security Council to authorize the deployment of NATO combat forces to prevent the fall of their capital city, Sarajevo. That did not happen. Before the Security Council could reach consensus and pass a resolution calling for military action, the Serbs overran the city center. When the Council finally met in emergency session, all it could do was authorize NATO to evacuate its remaining outnumbered peacekeepers from the international airport. Unfortunately, this too was too little too late. Although most of the troops got out, a vanguard of Serbian fighters captured the airport and with it Philippe Morillon, Commanding General of the UN Peacekeeping Mission, and 21 members of his staff. The latest information obtained from the International Red Cross, indicated that all of the hostages were being held in a warehouse complex on a former Bosnian military base 18 miles from the airport.

Acknowledging that little can be done without the use of force, Secretary-General Boutros Boutros-Ghali urges the United States to lead a UN coalition of nations on a mission to rescue General Morillon and his staff and to reestablish peace and regional stability in the former Yugoslavia.

The National Command Authority (NCA) designates the Commander-in-Chief of the European Command (CINCEUR) as the supported commander for this operation. In their warning order, the Joint Chiefs of Staff (JCS) identify the Commander-in-Chief of the U.S. Special Operations Command (CINCSOC) as one of the supporting commanders and direct him to provide the forces for the hostage rescue phase of the overall campaign.

Obviously, a raid into Sarajevo to rescue the UN personnel will be a high risk adventure. There are large concentrations of well armed and mobile Serbian forces in the mountains surrounding the city. Historically, special operations forces have lacked the lethality, survivability, and sustainability to attack heavy forces like these one-on-one. However in this scenario, there is the probability of close combat. Therefore, this raid must rely heavily on the use of joint fire support assets to support the surgical ground operations of the hostage rescue forces.

In all likelihood, CINCSOC would task the Commander of the Joint Special Operations Command (COMJSOC) to form a Joint Special Operations Task Force (JSOTF) for this mission. COMJSOC, in turn, would report to the CINCEUR for operational control. Planning staffs from selected Army and Air Force special

operations units would report to forward operating bases (FOBs) in the Mediterranean basin to begin their work. The combat, combat support, and combat service support units would soon deploy to the FOBs, as well.

The mission of the JSOTF is to rescue the captive UN peacekeepers. The commander's intent is to exploit speed, surprise and fires to accomplish the mission as quickly as possible and to ensure friendly and non-combatant casualties are kept to a minimum. The concept of operations calls for the JSOTF to conduct a multi-phased operation. First, assault troops are to seize the Sarajevo airport as an airhead from which to launch the rescue mission. Next, Air Force special operations low-level (SOLL II) aircraft will land with the hostage rescue unit (HRU) and their air and ground support equipment at Sarajevo. Once formed, the HRU will conduct a coordinated air and ground assault against the compound to defeat the Serbian defenders and free the hostages. Finally, the extraction of friendly forces would take place from the Sarajevo airport. The HRU and freed captives would depart first, while the assault forces were collapsing the airhead perimeter in a controlled manner. In all, JSOTF forces should be on the ground for no more than four hours.

The commander's intent for fires for this operation calls for a totally coordinated, proactive counterfire program using artillery, Air Force and Navy fighter-bombers and attack helicopters to neutralize the Serbian artillery overlooking the Sarajevo airport, as quickly as possible. The security of the

airfield will ultimately determine the success or failure of the rescue attempt. Fires will also be used to protect and defend the airfield seizure and hostage rescue forces.

Naked firepower, even when applied at massive levels, is not the best way to support a special operation, such as this one. Firepower is only effective when it becomes an integral part of the overall operation. Special operations, in particular, require timely and measured use of appropriate levels of force rather than the massive sledgehammer blows associated with ground gaining operations in general war. The JSOTF commander must be able to apply joint firepower - tactical air, electronic warfare, naval gunfire and missile fires, as well as Army attack air, field artillery, and mortar fires.

For this operation, the three fire support planners on the JSOC staff have an enormous amount of fire support available. During the deployment phase (from FOBs to the Sarajevo airport) of this raid, the emphasis must be on achieving surprise. To do this, the JSOTF must blind the enemy's air defenses to protect the task force while it is airborne. From the list of joint fire support assets, the best platforms for air defense suppression and jamming are the Air Force EF-111A and the Navy EA-6B. By flying stand-off and close-in orbits, they will be able to jam early warning, acquisition, and ground controlled interception (GCI) radars. If it becomes necessary to actually destroy the enemy radars, the Air Force F-4G Wild Weasel and Navy EA-6B will go after them armed with the HARM, the preferred anti-radiation

missile.

The ground assault forces will be airlifted from their FOB to the Sarajevo airport on board a variety of transport flown by SOLL II crews. These Air Force aircrews have extensive training in night vision goggle flight. They are accustomed to flying in formation at night without the benefit of hazard lights and to landing on airfields without any visible landing/control lights. Typically, this air convoy would be led by MC-130H Combat Talons and consist of a number of C-130s, C-141s, and C-5s. Since none of them are armed, Air Force F-15s and/or Navy F-14s would fly combat air patrol (CAP) to maintain air superiority and to ensure none of the transports were molested by enemy air, either enroute or on the ground at the objective airfield.

The mission of ground interdiction - at an operational radius from the hostage rescue site - would go to the Air Force F-16s and Navy F/A-18s. Their mission would be to attack enemy motorized or mechanized formations from the surrounding countryside which might try to reinforce Serbian forces in Sarajevo. The E-8 JSTARS can provide a real-time picture of the entire special operations battlefield. Its worth to the JSOTF commander is its ability to detect moving targets or to display discriminate objects, such as stationary vehicles, buildings, and aircraft. Therefore, it will be used to detect and locate enemy threats to our ground operations and to direct attack aircraft against the threats.

The missions of tactical interdiction and close air support

would go to the armed special operations helicopters, the AH-6 and MH-60K. They would be transported to the Sarajevo airport in the SOLL II C-141s and C-5s. At least two AC-130s would also perform these missions. Spectre's 40-mm gun and 105-mm howitzer, in the direct fire mode, are extremely accurate and can be used in close proximity to friendly troops (once positive identification has been achieved).

The joint force air component commander (JFACC) would control these various combat aircraft through the AWACS, from his station with the JSOTF commander aboard the ABCCC. Since the fire support officer is also on board the ABCCC, the JFACC can immediately resolve all air-ground deconfliction issues.

The big problem, that of the Serbian artillery in the hills surrounding the airport, would be countered using the MLRS. One SOLL II C-5 can carry two MLRS launchers, one ammunition truck (the heavy expanded-mobility tactical truck (HEMTT), and one Q-36 Firefinder radar system. An artillery raid in this configuration is a powerful weapon. Because the Q-36 counterfire radar is data linked to the launcher's fire control system, the Q-36-MLRS team can both detect and attack the enemy firing units while their first adjusting round is still in the air. Each MLRS rocket warhead contains 644 dual-purpose/improved conventional munitions (DP/ICM). The "rain of steel" created by this many grenades not only destroys equipment, it also has a devastating effect on enemy troop morale. With grenades striking the ground just a few feet apart, whole firing positions will be destroyed or

neutralized by a single rocket fired in the night.

The Rangers will provide indirect fire support at the airfield with their 60-mm mortars, while the AH-6 attack helicopters and AC-130 gunships provide close air support. The Ranger FSO would clear all fires inside the fire support coordination line (FSCL).

Other AH-6s, MH-60Ks, and AC-130s will support the HRU on its raid to rescue the hostages from their Serb captors. Since the rescue will, no doubt, be a close combat affair, the best vantage point for the HRU FSO might be on board the AC-130. With the AC-130's advanced night- and low-light sensors, he will have the best available overall view of the objective. He will also have better line-of-sight communications to the airfield than the rest of the JSOTF.

The HRU FSO also has a crucial role to play in getting the rescue force back into friendly lines without mishap. Since he can literally see both the outposts of the airfield seizure force and the converging column of rescue forces, he can control fires to prevent any friendly fire incidents.

Once the JSOTF has accounted for all its personnel and equipment, the force would depart Sarajevo airport under the protection of the AC-130s and, above them, a fighter CAP of F-14s and F-16s. One of the last players to leave the scene would be the EC-130E Volant Solo. From the beginning, it would have played a vital role in minimizing non-combatant casualties by broadcasting instructions and psychological messages to the

city's residents on AM/FM radio frequencies and television bands.

Finally, if this rescue operation had needed deep strikes to destroy Serbian airfields or air forces, to isolate and incapacitate the Serbian political or military leadership, and to silence their telecommunications and command, control, and communication nodes, the mission would have gone to the Air Force's F-111s and F-117s, along with the Navy's A-6s and Tomahawk missiles.

Air superiority is absolutely essential for a forced entry raid like this to take place at all. Accordingly, the JFACC's first mission must be to win the air superiority battle. With today's precision guided munitions, the Air Force and the Navy have the ability to create an environment for success for the special operations aviation and ground components.

CONCLUSION

The role of fire support in joint special operations - to protect our forces from enemy indirect fire, defeat the enemy before he can close and support SOF in contact - remains valid for the future. That is a theme that Lieutenant General Wayne A. Downing, Commanding General of the U.S. Army Special Operations Command, emphasized during a recent interview,

> The issue is not field artillery, it's fire support - the full integration of SOF with fires....Special operations planners and operators need to improve the integration and synchronization of joint fires to produce maximum relative combat power at the decisive

> point and time....In the wake of our success, I say don't fix something that's not broken. But, improve some part of our successful operations that is faulty. Potential adversaries around the world watched and learned from our recent victories. Our warfighting edge is only relative to a specific enemy at a specific time. Each war is situational and unique. It would be foolhardy to extrapolate from our past successes to future conflicts.[149]

With the advanced state of our fire support ordnance and delivery systems, the area which needs more attention is that of interservice doctrine and training. Special operations commanders, down to the lowest levels, need dedicated fire support officers. And, those officers need to concentrate on the integration of fire support assets into joint special operations.

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