combination of two major factors slowed the final determination and disposition of 3d MAW's forces. The first was the I MEF's late decision to go with a course of action that required two breaches in the Iraqi defenses, one of which was further west than either aviation or logistics were currently in position to support. The second was that the aluminum and airborne tanker bridges were backlogged with forces flowing to theater.*

Desert Storm: The Air Campaign

The Eve of the Storm

As the two Marine divisions and the direct support command positioned themselves around Kibrit in early January, General Moore and his staff settled into the new wing headquarters area at NAF Jubayl. The 15 January deadline imposed by the United Nations Security Council for Iraq to leave Kuwait rapidly approached. Although many important details needed to be finalized in the short time remaining, overall 3d MAW was prepared to begin its portion of the air campaign. Its fixed-wing aircraft groups and the MACCS were fully operational and rehearsed in both the deep air and push-close air support. Two major issues of long-term consequence remained unresolved, sustaining 3d MAW's aviation ordnance stocks and relocating the rotary-wing force.

The wing possessed an estimated 15 days worth of ammunition stored in its dumps ashore for a sustained sortie rate.** Faced with the possibility of a longer air campaign, General Moore sought to build up sufficient stocks to carry him through General Schwarzkopf's mandated 60 days. More ordnance was available afloat in the region and on ships enroute from the U.S., but to General Moore's disappointment Vice Admiral Stanley R. Arthur, USN, who as the senior naval officer was responsible for all naval ordnance in the theater, chose to retain this large reserve ordnance stock afloat for use by both NavCent and MarCent. General Moore expressed repeated concern to General Boomer about the efficacy of this plan.[136] He was concerned that Arthur would decide to husband these assets rather than release them to the 3d MAW when needed.

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* In August, strategic airlift missions totaled 1,668, while in January and February they totaled 3,272 and 3,052 respectively. The C-5s and C-141s along with the CRAF aircraft were flying what would become known as the "aluminum bridge." (James K. Matthews and Cora J. Holt, *So Many, So Much, So Far, So Fast: United States Transportation Command and Strategic Deployment for Operation Desert Shield/Desert Storm.* (Washington, D.C.: Office of the Chairman of the Joint Chiefs of Staff and United States Transport Command, 1996), p. 39.

** On 16 January, 3d MAW had on hand 13,056 MK-20s, 4,623 MK-82s, and 2,812 MK-83s which was a 22-day, 12-day, and 8-day supply of those level-of-effort weapons, respectively. (John D. Parsons, Benjamin T. Regala, and Orman H. Paananen. *Marine Corps Desert Storm Reconstruction Report: Third Marine Aircraft Wing Operations.* (Alexandria, Virginia: Center for Naval Analyses, Feb92), pp. 95-107, and 3d MAW daily ordnance reports).

The helicopter-basing situation also remained uncertain. The development of the Mishab base proceeded, and it looked probable that MAG-26 could move there starting at the end of January. The Saudis, however, continued to delay the opening of Tanajib to MAG-16. If the delay continued much longer, assault and close-in fire support for the divisions would be in jeopardy. With the start of the air campaign only days away, General Moore also was anxious to clear out Jubayl so that MAG-11's Hornets could use it as a FARP site and divert base. He planned to do the same for MAG-13's Harriers at Tanajib. Moore also wanted to make room at Jubayl for the KC-130s destined to operate the airborne DASC and the Senior Warrior signals intelligence package.

3d MAW continued to expand daily, which was a tremendous administrative, as well as logistical burden. The 3d MAW OPLAN for Desert Storm, dated 15 January 1991, described a stop-loss plan for personnel assigned to Marine units. It contained an authorized "suspension of provisions of law and Navy/USMC policy relating to the retirement and separation of personnel engaged in the conduct of operations in and around the Arabian Peninsula, or engaged in direct support of the . . . operations."[137] This effectively stabilized personnel in the deployed force.

Heliborne Assault Training

With the 1st Marine Division now out of the Jubayl area and largely based between Manifa and Mishab to the north, General Myatt and his staff turned their full attention to preparations for offensive operations. Myatt put into motion a plan to reorganize the division in order to form two mechanized regimental combat teams built around Colonel Carlton W. Fulford, Jr.'s 7th Marines and the inbound 1st Marines under Colonel Richard W. Hodory. Task Force Ripper, as Fulford's command was designated, consisted of the 3d Tank Battalion; the 1st Battalion, 7th Marines; and the 1st Battalion, 5th Marines. Hodory's task force, to be designated Papa Bear, included the 1st Tank Battalion; the 1st Battalion, 1st Marines; and the 3d Battalion, 9th Marines.[138]

A third RCT was in the process of being built around the headquarters of the 4th Marines, which had nearly finished turning over its four-month rear-area security mission to the recently arrived 24th Marines. Commanded by Colonel James A. Fulks and designated Task Force Grizzly, RCT-4, by late January, included the 2d Battalion, 7th Marines, and the 3d Battalion, 7th Marines. General Myatt envisioned using Task Force Grizzly as a dismounted infiltration force to secure the flanks of the planned division breach.

Even as the first combat service support units moved northward into Mishab, the division's now-truncated Task Force Taro (RCT-3) prepared courses of action for heliborne operations as directed by the 1st Marine Division. On 7 January, Taro practiced a regimental heliborne raid supported by MAG-16 in the vicinity of Kibrit. Involving two dozen transport helicopters, eight AH-1s, two UH-1s, and a section each of Harriers and Broncos, this was Taro's first opportunity to exercise a heliborne operation of this size. The exercise scenario featured an Iraqi corps headquarters as the objective of the raid, with a battalion-sized

blocking force built around the 3d Battalion, 3d Marines, used to isolate the objective while the assault force—the 1st Battalion, 3d Marines—destroyed the corps' command, control, and communication facility. The raid was set up on a two-and-one-half-hour time line from landing zone departure to withdrawal.

Despite the large number of helicopters involved, only a reduced weapons company was actually lifted into the zone during daylight hours. In the course of the lift, a HMMWV mounted with a MK-19 40mm automatic grenade launcher was dropped by an aircraft and severely damaged. This underscored for Taro the difficulties faced when relying upon the external helilift of vehicles. The task force therefore planned for the use of modified M151 jeeps and small commercial pickup trucks instead of the larger and heavier HMMWVs in future heliborne operations as the smaller vehicles could be loaded in the cargo bay of the helicopters.

Task Force Taro conducted an extensive series of debriefs with MAG-16 and other supporting elements in the wake of the exercise. With the arrival of MAG-26, Colonel Admire looked forward to some relief from the limited helicopter availability for training that had constrained his force for several months. As the task force prepared for its next heliborne exercise slated for 14-15 January, it welcomed its 2d Battalion to the Arabian Desert as it deployed from Okinawa.

The Evolving I MEF Offensive Plan

After several weeks of considering the "Southern Option" plan that he reluctantly approved in late December, General Boomer in early January decided to alter the route of I MEF's assault into Kuwait. Instead of attacking just to the east of the Al Wafra Oilfield, he switched the 1st Marine Division's breach point inland another 20 kilometers to an area in the southwestern corner of lower Kuwait. The revised plan was labeled as the Southwest Option. After several more weeks of detailed planning, Boomer formally approved the Southwest Option on 22 January.

The heliborne assault maintained its viability as an option in the new plan. Although not without risk, it appeared to be the only recourse to relieve some of the burden of the assault regiments attacking into the teeth of the Iraqi defense. With MAG-26 now on deck at Jubayl, General Moore had a force of nearly 200 transport, attack, and utility helicopters from which to support a heliborne assault. If the basing issue could be resolved quickly, all of the aircraft would be positioned at Mishab and Tanajib by early February. The wing, however, was still constrained by the 22,000-pound restriction on the CH-46, which made realistic training and rehearsals impossible.*

On 12 January, General Moore proposed to I MEF that the peacetime lift

* Colonel Garret would later emphasise, "This was a fairly significant detractor from helo support to the GCE and FSSG up to this time. Lots of our frag activity was moving people and it doesn't take a calculator to figure out the effect of flying aircraft around for months at half or less of their passenger capacity." (BGen Larry T. Garret, comments on draft ms, 27Jun99)

Marines relax in the shade of a CH-46 Sea Knight, as maintenance crews check the rotors prior to takeoff during Operation Desert Storm.

restrictions on the CH-46E and the 18-passenger restriction for the CH-53 be lifted because of the pending hostilities.[139] Concurrence came and both MAG-16 and MAG-26 were authorized to operate their transports at prescribed combat loads.

Unfortunately, with Task Force Taro's mid-January displacement to its assigned TAOR between Mishab and Kibrit, there was little possibility of taking advantage of this new capacity to train for large heliborne operations. Further complicating the situation, the shift of the 1st Marine Division to the west left both northern helicopter bases well off to the flank of the projected assault. General Moore planned to overcome this handicap by relying more heavily on the FARP site at Kibrit as a staging area for helicopters supporting the assault. This increased the burden on the 1st FSSG by requiring even greater stocks of fuel to be transported and stored at Kibrit.

With the Southwest Option now on the table, the 1st Marine Division published its Operations Order 1-91 on 16 January which detailed General Myatt's planned offensive scheme of maneuver for the upcoming battle. Myatt directed his two mechanized RCTs—Task Force Papa Bear and Task Force Ripper—to breach Iraqi forward defensive positions while Task Force Grizzly conducted a night infiltration of the defenses on the flanks of the mechanized breaches. Task Force Taro would, on order, conduct a heliborne assault on Al Jaber Airfield "in order to secure the airfield and to provide mutual support to the [1st Marine] Division advance by blocking or delaying, as directed, an enemy counterattack."[140]

The plan further directed that when the breaching of the two defensive

belts had been accomplished, the 2d Marine Division, reinforced with the Army's 1st Brigade (Tiger Brigade), 2d Armor Division, would pass through the 1st Marine Division and continue the attack up through the key terrain west of Kuwait City at Al Jahra.

JFACC Apportionment Issues

In accordance with General Moore's August 1990 agreement with General Horner on the apportionment of Marine sorties to the joint air effort, Marine planners in Riyadh worked carefully to ensure that Marine air was integrated fully into the upcoming air campaign without being held hostage to it. To accomplish this fine balancing act, the Marines on the wing and MarCent (Rear) staffs attempted to match 3d MAW sorties with targets of Marine interest where possible. Fortunately, they were able to do this often because many targets of primary interest to MarCent in the Kuwait theater of operation were also targets of interest to AFCent.

Major General Norman E. Ehlert became deputy commander, U.S. Marine Forces Central Command, on 18 January, replacing Major General Pearson. Ehlert and Colonel Robben worked closely with the AFCent targeting group to identify appropriate targets and strike packages. Although relatively slow and less maneuverable by the standard of the day, the two A-6 Intruder squadrons out of MAG-11 featured prominently in these packages because of their true all-weather attack capabilities and their large ordnance capacity. The A-6Es were employed almost exclusively at night, and had the sole fixed-wing capability in 3d MAW to self-designate targets by laser. Faced with a sophisticated enemy integrated air defense system (IADS), the planners considered VMAQ-2's 12 EA-6Bs to be a vital part of every strike package. General Moore informed AFCent that he would not push Marine strike packages north without their jammers. He was adamant that if sufficient numbers of EA-6Bs were not available, then Marine strikes would not go.

With the A-6E nearing the end of its useful life and vulnerable to air-to-air weapons, Moore also considered strong fighter support essential to Marine strike packages. He expected that the Iraqi Air Force would not be able to contest control of the skies over Kuwait and Iraq for long, but during the first few days they could do significant damage if given the opportunity. Thus, Marine Hornets would provide close escort to the Intruders. More important, the Hornets of MAG-11 would perform the vital function of suppressing enemy air defenses (SEAD) using radar-killing AGM-88 HARM missiles. Although the EA-6B Prowler could carry several HARMs under its wings, Moore wanted to employ them initially in a standoff mode wherever possible to lessen the risk to these valuable platforms.

On 15 January, after reviewing the growing list of targets desired to be hit by I MEF during the first phase of the upcoming air campaign, General Moore reversed his earlier decision and authorized the use of Harriers from the opening day of the campaign. He determined, however, to use the Harrier in a very con-

servative manner until the early returns from the theater-wide strikes against the Iraqi IADS could be assessed. The concern of I MEF was to target artillery and missiles that could range the Marine divisions that had moved closer to the border. What would hold the Harriers back from the first day's planned strikes would be the lack of electronic jamming escort assets. MAG-13 (Forward) retained its responsibility to surge close air support sorties on short notice if the call came in from the Marine divisions. Colonel John R. Bioty, Jr., therefore prepared to keep 12 of his Harriers on strip alert: four aircraft at 15 minutes, four at 30 minutes, and four at 60 minutes.[141]

JFACC Targeting, Control, and 'Kill Boxes'

While the integration of Marine aviation into the master attack plan and the D-Day air tasking order (ATO) of the strategic air campaign proceeded smoothly, a variety of joint air control issues remained thorny as mid-January approached. Although reasonably assured that the requisite number of Marine sorties would be retained by I MEF, both the types of enemy targets to be hit and their location on the battlefield were a source of disagreement among the Air Force, the Army, and the Marines on the other.

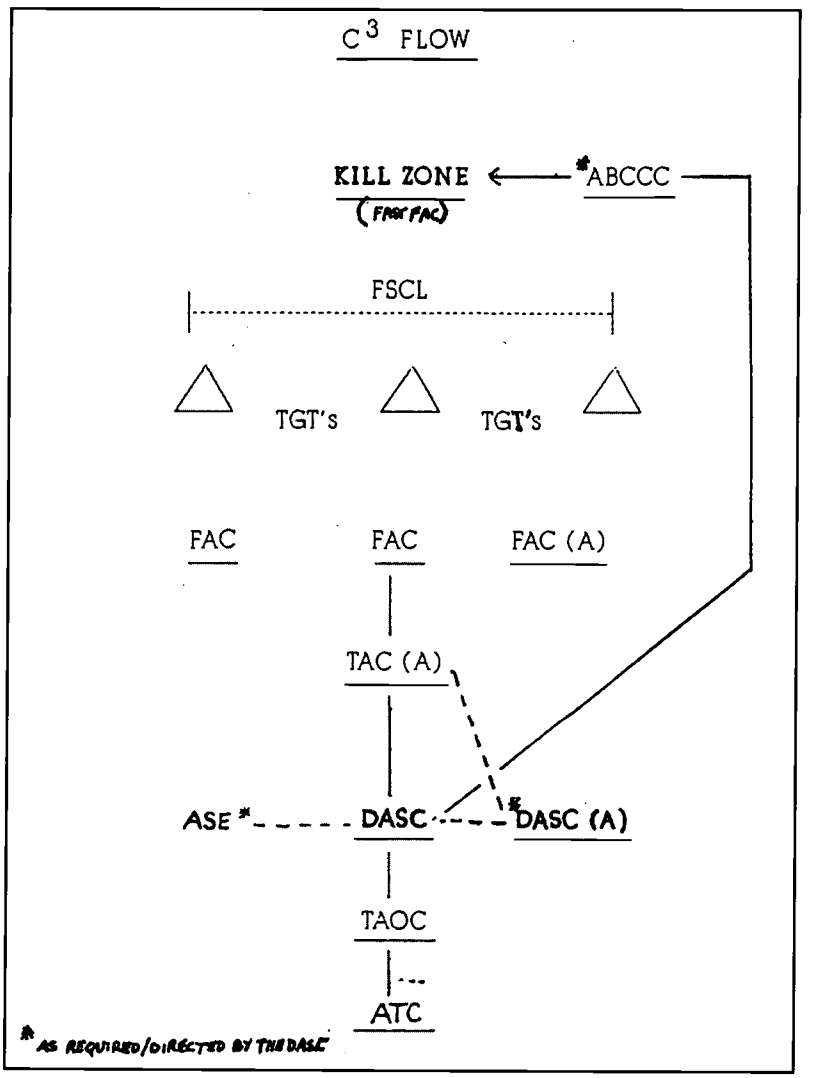
The senior Army leadership, led by Lieutenant General John Yeosock USA, the ArCent/Third U.S. Army commander, expressed their strong dissatisfaction at AFCent's priorities on the initial CentCom target list. General Schwarzkopf in earlier planning sessions had ordered attacks from the outset against the *Republican Guard* formations sitting astride the Kuwait-Iraqi border.[142] He saw the *Guard* as an essential element not only of Iraqi ground strength but also as a vehicle for Saddam's control of the Iraqi State. The *Guard* was to be the primary target of the VII Corps after it cleared the Iraqi border defenses west of Kuwait. Yeosock and his subordinates assumed that Schwarzkopf's specific guidance would translate into early and repeated attacks against the *Republican Guard.* Thus, they were surprised that the planned first days of the air campaign virtually ignored this target in favor of what the AFCent targeting cell determined were true "strategic" targets.

The Marines also nominated what they considered to be key targets in the I MEF area of interest in southern Kuwait to the Joint Force Air Component Commander, only to see them fail to make the final cut for the D-Day air tasking order, and several days thereafter. Although frustrating to Generals Boomer and Moore, this action was not unexpected, and so they planned to strike them with Marine aircraft as soon as possible. Colonel Bioty would add: "People thought that you were on the ATO, so therefore you were a JFACC type sortie. That is not the case. The ATO was a coordinating, facilitating type document."[143] Long range bombing missions were clearly a JFACC function and were considered JFACC sorties. The air tasking order had to cover all fixed-wing aircraft. The MEF commander had all his Harriers, half of his F/A-18s, his OV-10s, and his assault support aircraft to influence his area of operations/influence. Boomer nominated targets to the joint force air commander and 3d Marine Aircraft Wing to attack targets in the MEFs area of operations. That area was beyond the fire support coor-

dination line, but generally before the strategic target area.

The joint air structure, however, conspired to make this a difficult action to undertake. Under the operating rules laid down by the joint air component commander, targets beyond the joint fire support coordination line had to be both nominated and approved through JFACC, and struck through the joint air command and control system. Marine aircraft taking off would coordinate through the MACCS (the ATC, TACC, TAOC, and DASC), and then the Air Force airborne command and control. This would be true for all but the large strike packages, which usually departed under reduced radio communications (minimize emissions control, MinCon). Air Force assets, primarily A-10s, would also attack the MEF's targets nominated to the joint air component commander and provide close air support when needed.

Table: C^3 Flow of Aircraft to Target*



* Enclosure 2 to Tab A to Appendix 4 to 3d MAW OPLAN Desert Storm (u).

The facility that AFCent established to control deep air strikes was a high-orbiting Air Force C-130 Hercules transport modified to serve as an airborne battlefield command, control, and communications (ABCCC) post. Several ABCCCs, orbiting along key sectors of the Saudi border, were linked by radio to the Air Force TACC in Riyadh. In conjunction with the TACC, the ABCCCs coordinated deep air strikes as directed on the air tasking order. To further facilitate control, AFCent divided the airspace over Kuwait and southern Iraq into "kill boxes," originally "fighter engagement boxes," corresponding roughly to latitude and longitude that measured 30 miles by 30 miles. Later in the war, these would be further subdivided into four 15-mile-square boxes. Aircraft required a specific target assignment, and would be directed by the ABCCC to a kill box for aircraft separation and ease of control, where the aircraft could attack its target.

General Moore could thus control Marine aircraft providing close air support to I MEF ground units in need, but he could not directly attack targets beyond the FSCL. These deep strikes had to be coordinated with the Air Force TACC and run through the sector ABCCC. Judging that this system was simply not responsive enough for Marine needs, Moore took several actions designed to improve coordination within the established system and to provide a viable alternative. In August 1990, he had established a group of Marines based in Sharjah, United Arab Emirates, to operate as permanent liaison officers on board the ABCCCs of the 7th Airborne Command and Control Squadron. This small cell labored throughout the fall to ensure the closest coordination between the ABCCC crew and the 3d MAW TACC watchstanders. They engaged in numerous exercises, briefings, and meetings with the MarCent (Rear) staff, I MEF, and 3d MAW in preparation for Desert Storm. Starting out with just one Marine major, by late January the Marine liaison staff to the ABCCC had grown to five members.[144]

As an alternate plan, General Moore ordered that several Marine KC-130s carrying the AN/UYQ-3, a van module that had 13 communications stations, be used as a modified direct air support center airborne (DASC [A]). This would be the near equivalent of the ABCCC for I MEF. Initially manned by Marines of MASS-3 and mislabeled as the Airborne DASC, Moore intended the platform to serve not purely as an airborne extension of the DASC or as a separate agency, but as a link between the divisions, the DASC, and the Marine tactical air command center. Besides MASS-3 personnel, it often carried aloft representatives from the 1st Marine Division and the 3d MAW. Relying on the ground DASC to service the divisions' close air support needs, Moore wanted the DASC (A) to coordinate the deep air battle.

As early as 21 December, Colonel Joseph W. Robben, Jr., the Marine liaison at AFCent, reported to General Boomer on the issues of airspace control for offensive operations. His view was that if the Marines had sector control, or the lesser control of HIDACZs, it would provide a more flexible and effective system to react to the enemy within the MEF commander's area of interest. However, proactive liaison officers on board the ABCCC and at AFCent could work within the current Air Force system to ensure full support of the MAGTF. The addition of "untargeted" air interdiction (AI) could add flexibility to work within the sys-

tem. Colonel Robben further added that: "Personal discussions between Lieutenant General Horner and Marine LNOs, reflect a strong opposition to Marine air sector."[145] This would set in motion a series of work-arounds to the air tasking order and JFACC control.

Using General Moore's push-CAS system, attack aircraft arriving on station up north, if not needed for a close air support mission, would be handed off to the a two seat F/A-18D (Fast FAC) above Kuwait.* The fast FAC would in turn either direct the aircraft onto a specific target it had identified, or send it further to a "kill box" in which it could strike a suspected target. As of 15 January the 3d MAW OPLAN would read: "In the absence of an assigned target a forward air controller (airborne) will be required for locating and marking targets beyond the FSCL."[146] The Fast FAC thus would not serve a single function, but instead would be employed in a flexible manner, as the situation demanded. The airborne DASC would support this process through communications rely and coordination between the two divisions, the DASC, and the TACC.[147] These extra measures could be integrated within the planned joint air command and control system to allow 3d MAW to do its job more effectively. Moore thus had in place an alternative to press on General Horner.

The 3d MAW Battle Plan

As slowly spelled out through the past two months of activity, AFCent's offensive air plan boiled down to an extensively planned three-day air tasking order followed by the more generic four-phase air campaign. The broad outline of the JFACC's planned four-phase air war suited General Moore, but he fought up to the last minute to keep the 3d MAW's independence to act in the best interest of the MEF.[148] Planning to follow his apportionment agreement with General Horner to the letter, he nevertheless designed a conservative sustained sortie rate through the first three phases in order to husband 3d MAW strength for Phase IV, "Air Support for the Ground Offensive." Many officers on the AFCent staff, and particularly Colonel Warden's former Checkmate airmen, believed that the planned strategic air offensive would utterly smash the Iraqi leadership's will to remain in control of Kuwait, thus obviating the need for a ground assault. General Moore took the opposite approach, and strove to ensure that the wing was at peak strength on G-Day when the Marines of I MEF would need air support the most.[149]

To execute this strategy, General Moore directed that Marine air first concentrate its non-JFACC sorties on targets in southern Kuwait near the Saudi border area. The 3d MAW would then progressively shift its aim further north, hitting Iraqi corps facilities, logistics areas, and communications routes in the I MEF area of interest. As G-Day drew closer, Moore planned to shift his attacks back down to the Iraqi frontline divisions to soften them up to the greatest extent possible. The wing's effort would peak just before G-Day, when Moore would put

* The two seat F/A-18D was referred to as a fast forward air controller and was more survivable than other airborne forward air controllers such as the OV-10.

the maximum number of attack aircraft in the air to support the ground offensive. They would be force-fed to the DASC day and night, thereby ensuring that close air support would be available when needed.

With only a handful of 3d MAW pilots having faced combat action before, General Moore was forced to rely on the leadership abilities of his squadron commanders, whose skills had been built up over many years of peacetime training exercises. Some of those exercises, most notably the Navy's "Top Gun" and "Strike University" schools, the Marine Corps' Weapons and Tactics Instructors (WTI) course at MCAS Yuma, Arizona, and the Red Flag series run by the Air Force at Nellis Air Force Base, Nevada, approached the level of intensity experienced in combat. Still, they at best only approximated the conditions of combat, and none really prepared aircrews for the day-in, day-out pressures of sustained operations in the face of enemy fire.

Confirmation of two decades' worth of Marine air combat training methods would come shortly. While the world seemed to hold its breath, the last minutes of the United Nations Security Council's 15 January deadline ticked by, without the expected coalition onslaught against Iraq. Not wanting to appear to rush things, the Bush Administration chose to delay slightly the start of the air campaign against Iraq. A few days prior to commencement of the air campaign, Moore called his group commanders together in a room at his new headquarters at Jubayl. With a guard at each door, he told them that at 0300 on the morning on the 17th an Air Force stealth F-117 was going to drop a 2,000 pound bomb on the telecommunications building in downtown Baghdad and the air campaign would begin. At 0900 on the 16th, General Moore called his key staff, his group commanders, and his squadron commanders to Jubayl for a final briefing, telling them that "now they would have to earn their flight pay."[150] As the western news media speculated endlessly over the causes and tactics of the apparent delay, General Moore proceeded to inform his subordinates that unless otherwise directed, they were to prepare to execute their first-day strikes early the next morning.

The pilots would have to face a significant variety of surface-to-air missile threats that included SA-2,-3,-6,-7,-8,-9,-13,-14, and-16; Roland; and possibly U.S. HAWK missiles left behind by the Kuwaitis. The primary antiaircraft artillery (AAA) threats were the 23mm, 37mm, 57mm, 85mm, and 100mm. The AAA would be barraged-fired with the main exception being the ZSU-23-4, a self-propelled, 23mm, four-barreled radar or optically guided weapon. Tactics against all radar-guided threats would include the employment of the EA-6B for jamming and HARM escort for targets of opportunity after the first day of the campaign.

With NavCent's aircraft carriers moving into positions in the central Persian Gulf, General Moore coordinated the Navy's relief of the northern Gulf combat air patrol manned since early August by MAG-11's Hornets. With combat actions imminent, General Moore could no longer afford the diversion of Marine aircraft in support of this mission. The thousands of combat air patrol sorties flown by the wing's F/A-18s in that time undoubtedly contributed greatly to their heightened state of combat readiness as war approached, but the time was now at hand for those pilots to push their aircraft across the border into Kuwait

and Iraq. The last MAG-11 Northern CAP mission was flow at 2400 on January 16th. After a long respite from this mission, the Navy would have to use its carrier-based F-14s and F/A-18s for the defensive combat air patrol over the fleet.

The Storm Begins

The First Hours

Aircrews of the 3d MAW did not have long to wait after General Moore's brief to their commanders. Around 1600 most of the squadrons would be briefed that the scheduled Day One, Wave One rehearsal would be real and not a rehearsal. Major David F. Goold, the executive officer of VMFA-451 who flew in the first wave noted that: "there was actually some disbelief [among the pilots] that we were actually going to kick this thing off, but once we crossed the border there was no doubt in anyone's mind."[151] By 0230 on 17 January, the first wave of 46 MAG-11 aircraft were airborne off of Shaikh Isa to join a massive armada of coalition aircraft heading for strikes on key Iraqi command and control facilities across Iraq and Kuwait. The JFACC tasked targets included Shaibah, Tallil, Qurnah, and Al Rumaylah airfields, as well as Al Amarah and targets around Basra. Lieutenant Colonel Waldo B. Cummings, Jr., commanding officer of VMA (AW)-533, leading a division of four A-6s to destroy SCUD missile maintenance buildings at the Qurnah Airfield 30 miles north of Basra described that first night's missions:

> As we penetrated Iraqi airspace, I looked down and saw the biggest light show I had ever seen. Continuous lines of red and orange tracers covered the black void below us. It seemed that every Iraqi who could put his finger on a trigger had pressed down and wouldn't let go. Most of the airbursts were below us, but some were going off near us as well. We soon lost count of the numbers of small white dots of fast moving light that continually arched over our canopies. They were surface-to-air missiles fired blindly in the hope that one would hit something. We could also see the small blue flames that our escorts' high-speed anti-radiation missiles let out as they went streaming by us to seek out the enemy radars. Several miles from the target, I pushed the nose of my aircraft down into a 30-degree dive as 'Condor,' my bombadier/navigator, picked out his aim point on the radar. Passing 13,000 feet I started our recovery to make time on target 0409 and banked hard left as I felt the aircraft suddenly get 6,000 pounds lighter when all three of our bombs were released . . . . I saw two bright blue flames, which highlighted one of our escort fighters as he lit afterburners and began to climb away. The target below was engulfed in flames and secondary explosions.[152]

These first missions would be complex, minimum to no communications flights with night tanking and rendezvous at various altitudes for separation. The

fighter escorts, high-speed antiradiation missiles (HARM) shooters, tanking, and jamming all had to be precisely timed on each target and with the various coalition forces all choreographed through the JFACC ATO process. Some of the very few Distinguished Flying Crosses earned would go to the overall strike leaders of these large complex strike packages in the first few days of "The Storm."

As the aircraft returned unscathed to Shaikh Isa, elated aircrew greeted each other with a mixture of pride and relief. The reality struck home to the flight line crews as they saw the planes come back without their ordnance and just the fusing wires dangling.

The Iraqi guided missile system had clearly been overwhelmed by the jamming and suppression actions of the escorts. One hundred HARM missiles were fired during the first day of the air campaign which accounted for nearly half of the 233 HARMs that would be fired by Marines during Desert Storm.[153] The Iraqi's ground-based antiaircraft artillery, although often firing without its radar direction, nevertheless put up what appeared to be a wall of shell fire through which Marine aircraft had to fly. With weather far from ideal over the target area, battle damage assessment was sketchy, and the Marine Corps had no dedicated photo reconnaissance assets. The Air Force RF-4s stationed at Shaikh Isa were controlled by CentCom and seldom had duplicates of photos, even if they by chance covered a Marine-struck target. A system was put into place to duplicate as many of the photos from the Air Force RF-4s as possible by attaching Marines to the Air Force processing lab.[154]

At Shaikh Isa the SCUD alert sounded and the remaining troops had to break open the plastic, sealed bags that contained the nuclear, chemical, and bio-

LtCol Leif R. Larsen, the maintenance officer for VMA(AW)-533, explained that they painted on a small bomb for each mission an aircraft flew, and at the end of the war painted the total number of missions flown inside the larger bomb outline. These VMA (AW)-533 aircraft are parked on the flightline at Shaikh Isa.

logical gear. They donned the charcoal-impregnated green two-piece suits, put on the rubber boots, gloves, and gas masks and went outside. There were no over-all plans to get into any shelters, which were still not built. They would eventually get the all clear, but few would take the "chemical suiting" portion of the SCUD alerts very seriously after that night. Colonel Rietsch worried about the many spurious SCUD alerts for two reasons. First there was only one chemical protection suit per Marine, and once it was opened it had a short lifespan. The second reason was that the loudspeakers and sheer number of alerts in the middle of the night were robbing his aircrew of their desperately needed sleep. "I finally ordered the loud speakers to be disconnected in the sleeping areas."[155]

The squadron operations duty officers did not have base radios for the aircraft to check back in on, but did have a telephone and communications wired line down to the aircraft maintenance tents.* As the aircraft pulled into the tactical hot refuel pits, they were greeted by the sign "A.M./P.M. You Kill'em, We Fill'em."[156]

MAG-13 Harriers were originally scheduled to strike more than 60 targets in the MEF area of operations (mainly long-range artillery, FROG rockets and anything that could range the 1st and 2d Marine Divisions), but due to lack of EA-6B jamming assets to knock out the AAA and SAM radars the missions were cancelled. As Colonel "Hunter" Bioty recalled: "General Moore called about 0730 . . . and said what's your status . . . . We have an OV-10 reporting Iraqi shelling in the Khafji area . . . . He said go ahead and launch the ready Harriers."[157] It was Major Richard C. Branch, VMA-311's executive officer who would lead that first section of Harriers at about 0740 carrying four 1,000-pound bombs each. "From then on we were very much involved in the war."[158] The mission was controlled by an OV-10 airborne FAC that was off the coast. Colonel Bioty described the OV-10's heads-up display (HUD) camera film as showing spectacular results of artillery pieces being thrown around with secondary explosions.

The Early Days of the Air Campaign

After dawn on the 17th, 3d MAW aircraft shifted their attention to targets in northern Kuwait and Iraq. Despite poor weather across the KTO, Harriers hit artillery positions near Khafji. The ABCCC ran USAF A-10s on interdiction targets in the MarCent area of operations from the very first day. In one incident on the first day, an A-10 dropped one MK-83 in close proximity to a reconnaissance team that was controlling it, but caused no casualties.[159] The assault support helicopters were also busy starting on the 17th with an aerial resupply of ordnance to Mishab where they were directed to build up a three-day supply. This would prove to be a valuable foresight. The 3d MAW support troops continued building at all the airfields. In addition MWSS-174 started a security fence around King Abdul Aziz Naval Base to augment the line of empty storage containers lined up to block

* After five months, communications had not reached the minimal peacetime standards that the Marine Corps has at each Marine Corps air station.

direct line of sight from the highway of the crowded AV-8s parked along the airfield's ramp.

The tactical air command center at Jubayl was where 3d MAW's overall strategy was determined, as well as day-to-day adjustments in accomplishing that strategy. General Moore would have a daily breakfast meeting with four key individuals who stood the watch in the TACC: Assistant Wing Commander General Amos had the 0600 to noon; Chief of Staff Colonel William A. Forney, the noon to 1800; Colonel William D. Carr, Jr., the 1800 to midnight; and Colonel Melvin W. DeMars, Jr., was on duty from midnight to 0600. The morning meeting covered the current day's ATO. General Amos recalled the process: "We would meet every morning at seven to kind of go through the day's evolution. Then, at 1300 we would meet with the plans side of G-3 to look at the next 12-,24-,48-,72-hour plan, and that is where General Moore made his input into changing . . . the frag process."[160] The 1300 staff meeting would last about an hour, and it was where decisions were made for tweaking the ATO process after adjusting for the input from the two fixed-wing groups, divisions, and MEF.

Some difficulty was encountered with the direct air support center that was co-located with the Marine expeditionary force headquarters at Safaniya. In the first two weeks of the air campaign, various staff members of the MEF would make diversions of airborne aircraft to new targets. On several occasions this caused aircraft to hold for 15 or more minutes trying to get the new target briefed. They would then have to return to base without dropping any bombs. General Amos would find this one of the most frustrating problems of the war, as he later noted: "the MEF would run into the DASC and divert airplanes willy-nilly . . . . They were trying to do the TACC's job . . . . Some officers thought it was their asset and not the tactical air commander's asset . . . . Once you beat those crazies out of the DASC, things moved smoothly."[161] This is not to say that there was no flexibility built into the process. The airborne DASC became the controller of the deep air, or as more appropriately described by Air Force terminology, the battlefield air interdiction (BAI). These targets were to become predominantly MEF targets as the targeting process smoothed out and as F/A-18Ds became proficient in the Fast FAC role.* (Only six F/A-18Ds were in theater at this time, and they had arrived the day before the start of the air campaign).

Colonel Rietsch, MAG 11's commanding officer, was also concerned with the functioning of the direct air support center co-located with the MEF, and later stated:

> The DASC wasn't used in its doctrinal role . . . the MEF absorbed the DASC and it became almost a competition between the TACC and the DASC as to who was going to control airplanes and the flow of airplanes . . . . They [the DASC] attempted to control airplanes where their job was really coordination, not control, and a couple of times they actually put some airplanes into some situations that they should-

* "Fast FAC" was the term used for the F/A-18D when it coordinated interdiction missions as the Forward Air Controller. This differentiated it from the FAC (A) which could be an OV-10 or other assault support aircraft.

> n't have been. Telling them to go after some ridiculous target in a dangerous situation. It didn't work the way it was intended. Again, the way I see the DASC, he's a bean counter who services the ground side—not to try and control the battlefield beyond the FSCL [Fire Support Coordination Line]—and that's what we tried to do with the DASC.[162]

The initial fire support coordination line was the border between Saudi Arabia and Kuwait. Areas inside the FSCL were clearly over-the-head of Marines on the ground, and required coordination with the Marine command and control system. During the early stages, the Air Force would keep control of all air space beyond the FSCL, as a restrictive measure where all aircraft ordnance dropped required Air Force coordination and approval. The Marines viewed the FSCL as a permissive control measure beyond which weapons could be used to influence the MEF commander's area of operations. That view would slowly become the prominent view as the ground war approached. The driving factor in this change in viewpoint would be the short-comings of the targeting and battle damage assessment (BDA) process.

As the first day of a fully scripted ATO air campaign closed, the infamous fog of war began to show in many diverse areas. General Moore would comment that "BDA is beginning to come in, although the picture is largely incomplete."[163] The next day he would be pressing to get more of the unmanned aerial vehicle time to be able to plan air operations. Even at this early stage concern existed that if too many Phase III (battlefield preparation) targets were destroyed, the Iraqis would replace the material and additional strikes would be required. Literally into the fog, helicopter pilots bemoaned the fact that Loran-C, the navigation system available in many helicopters, was unreliable in the northern sectors. MAG-26 yelped the loudest as they had none of the new global positioning systems (GPS) installed in their aircraft. The struggle for ordnance was ongoing with the first of a daily munitions report coming out. MAG-16's use of Tanajib was far from complete because of lack of ramp space usage in the agreement. The helicopters could operate directly from the desert, but as General Moore stated, "I am holding that movement until the latest time to preserve engines and blades." [164]

On the morning of the 18th, the second scripted and rehearsed day of the ATO would begin to unravel due to weather. Only three JFACC-tasked missions made it out to their targets: the Tallil Airfield; the *Medinah Division*; and a *Republican Guard* armor battalion. Even with the weather-aborted missions MAG-11 flew a total of 99 sorties: 6 airborne forward air control; 36 interdiction; 8 Escort; 10 suppression of enemy air defense (SEAD); 14 on-call support, 10 electronic warfare (EW); 3 airborne direct air support center; 2 training; and 9 refueling missions. MAG-13 flew 66 sorties with the AV-8s flying interdiction and the OV-10s flying reconnaissance and close air support.*

Four AH-1Ws from HMLA-369 operating out of Mishab reported

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* Sortie numbers are those reported in 3d MAW daily SitRep messages and differ from those reported in the Gulf War Air Power Survey.

destroying two 120mm mortar tubes, ammunition trucks, and two buildings using 14 TOW missiles, 19 rockets, and 20mm guns. Of note, the AH-1W Cobras were launched from alert when the reconnaissance teams in the Khafji region received artillery fire from some heavily defended positions. Captain Steven G. Springer and First Lieutenant Gregory D. Anderson would receive Distinguished Flying Crosses for that night's work with Hellfire and TOW missiles against an enemy observation post and antiaircraft sites while under intense antiaircraft and artillery fires. They displayed leadership by taking control of the flight when the original lead aircraft lost its radios[165]

This action was just a part of several observation posts that were destroyed by aircrews working with a command and control UH-1N Huey, flown by Lieutenant Colonel Kurth. They worked closely with both "Sea Lion," a Navy SEAL team, and an OV-10 aircraft. Each flight as they rotated through took small arms, artillery, and even tank fire. The enemy observation posts controlled artillery that at times were placing dangerously close rounds on the Marine reconnaissance and surveillance teams around Khafji. The Cobras stood the alert at Mishab and would return to Mishab for fuel and stop at Safaniya to rearm.[166]

At 0910, the wing suffered its first aircraft combat loss when an OV-10 of VMO-2 piloted by the squadron commander Lieutenant Colonel Clifford M. Acree, with Chief Warrant Officer-4 Guy L. Hunter in the observer's seat, was shot down by an Iraqi infra red surface-to-air missile (IR SAM). The loss, 14 miles northeast of Mishab over Kuwait, was not observed by friendly aircraft. Both officers were presumed dead.* The aircraft, call sign "Hostage 75," was flying at about 8,000 feet. The pilot later recalled sensing something coming up at him and looking over his shoulder as the right engine exploded and the wing folded. The OV-10s were not allowed to go north of the border due to their vulnerability, with the exception that the DASC or TACC could wave the restriction for an emergency mission. Colonel Bioty said of the incident: "We did not know that they were alive until we saw them on TV. . . . I never saw Cliff until after the war to ask him if that was an emergency type mission, and obviously the answer was yes it was . . . . [The aircraft going down] was really a shocker and that squadron took a real significant hard swallow, . . . because there was a lot of leadership and experience in that airplane and here it got hit on the second day of the war."[167] Major Steven J. Antosh took command of the squadron, and MAG-13 asked for some MAWTS assistance.

Also, on the 18th, the Air Force airborne battlefield command and control (ABCCC) ran an A-10 flight against a fire control radar dish located in Southern Kuwait. Marine liaison officers with the ABCCC also ran a flight of A-10s against artillery batteries in southern Kuwait.[168] Marine FA/18s and A-6Es would not begin to join these interdiction missions which supported primarily the MEF objectives until the 19th.

On 19 January, two large JFACC packages of 28 and 26 aircraft each attacked the Basra area bridges and *Republican Guard* units. Now that the pre-

* A message two days later from USAFCENT/JRCC to COMUSARCENT reported that the crew had been captured (*Gulf War Air Power Survey*. Vol IV, part II, p. 162).

scripted ATO was complete, the F/A-18s and A-6Es would begin to fly about half of their sorties against MEF objective targets. VMO-1 initiated combat operations after being in theater only 48 hours. The AV-8s continued to attack targets primarily south of the 28 degree 45 minute line, an east-west line south of Al Jaber Airfield in Kuwait. Six division-size (four aircraft) AV-8 packages had good effect on a variety of targets and worked closely and effectively with EA-6B jammers. Weather was still a factor in getting to some of the targets, such as the OV-10 FAC (A) mission with A-6s on a multiple rocket launcher just north of the border which resulted in no ordnance being dropped, or the canceling of three other AV-8 divisions. The ABCCC worked 30 A-10 sorties against I MEF targets through the DASC.[169]

Other 3d MAW personnel and assets were still arriving in theater. First Lieutenant Michael J. Bergerud was sitting in his home at Cherry Point watching, along with most Americans, the kick-off of the air campaign on the Cable News Network. He thought, to his chagrin, that he had missed this war, because the larger portion of MASS-1 was afloat in the Gulf with MAG-40. The next day, he was ordered to pack his bags and catch a flight, as a portion of MASS-1 (Forward) was going to join 3d MAW.

General Moore met on the 19th with the commanding officer of MACG-38 along with MEF representatives, operations officers, and other squadron commanders to discuss targeting, tactics, and control. General Moore described the meeting as "a spirited discussion to examine the most effective way to get bombs on Iraqis."[170] MASS-1 (Forward) would be a part of the solution. Led by

Table: 3d MAW Personnel

Date	Total 3d MAW Personnel In-Theater
15 January 1991	14,480
20 January 1991	14,776
25 January 1991	14,848
30 January 1991	15,016
5 February 1991	15,239
10 February 1991	15,223
20 February 1991	15, 399
25 February 1991	15,594
28 February 1991	15,655

Lieutenant Colonel Robert D. Hughes, the remainder of the squadron would provide the necessary crews to man the DASC (A) on a 24-hour basis and flesh out the main DASC. The MASS-1 Marines replaced some of the Reserve MASS-6 detachment which moved forward to work with the newly formed DASC at Safaniya.

The memory that would stick in Lieutenant Bergerud's mind upon landing at Jubayl was that the war effort must be totally dependent on the non-stop forklifts moving gear all over the field. If Saddam Hussein could somehow stop the forklifts, he could win this war. Bergerud would later add copy machines to that list of overworked "show-stopper" ingredients of the war.[171]

The newly created air support elements (ASEs) with each division consisted of four AN/MRC-138s (HF) and two AN/MRC-110s (UHF and VHF), which are communications packages mounted on high mobility multi-purpose wheeled vehicles (HUMMWV). Communications exercises (CommEx) were ongoing, however, the CommEx on 19 and 20 January forewarned of problems with the air request and air tasking order system. Comments on the CommEx revealed that in the 1st Division, battalion air officers were using AN/PRC-104s (a low-powered, high-frequency radio) on the tactical air request (TAR) net while their MRC-138s had to be taken for use on other circuits. The ASE had communication with nine of 14 battalions and on the second day with only six of 14 battalions. Communications with the DASC was worse. In the 2d Division, the battalions had their MRC-138s and the ASE and DASC could receive all the stations at one time or another, but not consistently, as would be required in an immediate air request. A significant glitch was found in relying on the DASC (A) to take the function of the DASC, should it become a casualty, due to the fact that both its HF radios would be required to monitor the two divisions TAR nets, which left no long-distance capability to stay in contact with the tactical air command center.

A view of part of the ordnance load carried by an F/A-18C Hornet from the VMFA-235 "Death Angels" during Operation Desert Storm.

The overall clear concerns from the CommEx were the distances and net saturation controlling the large number of aircraft expected in the Kuwait theater during the ground portion of the war.[172]

"Bomb art" became rampant with almost 50 percent of the bombs being delivered having some marking on it. The markings were usually in chalk or white paint. It seemed nearly everyone had an uncle, aunt, grandparent, mother, or wife who wanted a personal bomb dedicated to "Saddam."

On 20 and 21 January, bad weather forced cancellation of sorties both airborne and before launch, rather than just in the target area. On the morning of the 21st, Shaikh Isa was totally fogged in. The A-6s got out at night and focused their bombs primarily against Iraqi multiple rocket launchers (MRLs) that were sending harassing fires toward Mishab. The aircraft saw some secondary explosions but BDA was difficult with the cloud coverage. Infrared surface-to-air missiles seemed to be more active. This was precisely the environment that the attacking pilots feared most, coming down through the clouds for attacks where they could not see the launching of inbound missiles. (IR missiles give no radar warning receiver [RWR] indications).[173] Package bombing criteria were slowly developed. Primarily the mission commanders made the abort weather call. During this period for missions using high-altitude ingress and egress to the target, 15,000 feet of clear airspace above the overcast to react to surface-to-air missiles was the norm. For medium-altitude ingress and egress the pilot had to see the ground.[174]

Based on Joint Surveillance Target Attack Radar System (JSTARS) information, on the 21st the ABCCC ran 16 F-16s into southern Kuwait on a 100-vehicle convoy travelling with suspected "free rocket over ground" (FROG) systems.[175] The same day, Al Kibrit opened with five vertical/short takeoff and landing (VSTOL) pads, a tactical airfield fuel dispensing system (TAFDS) with six refueling sites, and available crash fire rescue support.[176] MWSS-271 received some of its equipment that was being offloaded at the piers. There was a redistribution of ambulances so that MWHS-3 could better provide medical services. Some ordnance arrived in country and the shuffle among the various ammunition storage points (ASP) was a full-time mission for the wing ordnance section. Liaison over the Air Force ordnance continued with attempts to obtain laser-guided bomb (LGB) components and an additional 200 high-speed antiradiation missiles.

At Shaikh Isa the population breakdown, according to the 11 January water supply data report, was: 4,500 MarCent; 1,500 AFCent; 300 Civilian/USN; and an estimated 200 Bahrain defense force, for a total of 6,900.* The Air Force had better living accommodations than the Marines, with their air conditioned and heated tents, as well as separate, but unequal recreation facilities. Being first in country, the Air Force had managed to get one revetment to use as a headquarters/maintenance facility. Within four weeks of their arrival the Air Force had

* The MarCent water data report went on to state that the base had 800,000 gallons of water storage capacity with 500,000 gallons on hand for 3.6 days of supply. Similar statistics are available for several of the bases and can be found in the author's notes or at Marine Corps Research Center, Quantico, Virginia.

built additional taxiways at the south end of the field and constructed steel/sand revetments simular to those used in Vietnam for their old F-4 Wild Weasels, while the Marine Corps' highly valued EA-6Bs remained on open flight lines. It was not, however, until the Air Force erected modern environmentally controlled restroom facilities, that underlying camp warfare broke out on the base. In front of the new restroom facilities were signs: "No Marines!" Marines continued to use fifty-five gallon drums that were sawed in half with plywood seats mounted over them. Sabotage of the new Air Force facilities became common. The Air Force initially responded with barbed wire around the facilities, and then double barbed wire, and finally guards, but various ingenious attacks continued. In the end, the Air Force won the latrine war when Marines were assigned the duty to guard the Air Force's beautiful restroom complex.[177]

On 22 January, MAG-13 reported 100 percent weather cancellations either before launch or in flight. The ABCCC ran 16 A-10 sorties against Marine targets. It would also be a source of intelligence to the DASC concerning surface-to-air missiles, enemy troop and vehicle movements, and Iraqi fire support units. Marine observation post six was involved in a "friendly fire" incident when a USAF A-10 fired rounds long while attacking an SA-2 site during egress after striking his primary target. No Marines were injured.[178]

Finally, on the 22d, the first of MAG-26's aircraft began arriving at Al Mishab. The site was far from complete. A portion of the water there was made potable by using reverse osmosis water purification units (ROWPU). Other amenities would be considerably less than those that were built up at Jubayl.

On the 23d, 3d MAW non-JFACC targets continued to be Iraqi *III Corps* surface-to-air missile sites to develop a larger area for the wing to be able to work on MEF target priorities. Weather finally allowed free access to targets over the Kuwait theater, but a new weather system was bringing lower ceilings and rain over Iraq. Battle damage assessment began to improve as limited use of national-level assets "looked at" some Marine targets. And General Moore openly fretted in his situation report that MK-83s and other high-use ordnance levels needed resupply. He would not be at ease until they were on the ground instead of at sea.

In Riyadh, the senior Marine on the joint targeting board was a lieutenant colonel. The board proved to have limited input into the targeting that was taking place in the "Black Hole." General Boomer was briefed that the JFACC was trying to "apportion 'x' number of sorties to each of the components," and do away with the joint targeting process. The MEF's firm response was to try to maintain the joint targeting process.[179]

On 23 January, the ABCCC diverted eight A-10 missions to the DASC for work against Marine targets.[180] Major Maurice B. Hutchinson, the executive officer of MASS-3, and one of three senior experienced watch officers in the DASC, would recall: "We would sometimes get a call from the TACC that we were going to get, . . . say 10 A-10s to work . . . a good half of the time they were not on the ATO for us, and we'd call over to the MEF-do you guys have targets?" Lieutenant Colonel Dennis C. Sorrell, the commanding officer of MASS-3, would add: "It was almost as if jointness was being pushed on us, us being the Marine Corps."[181]

Targeting information from Joint Surveillance Target Attack System (JSTARS), an Air Force prototype (Boeing EC-18C) airborne system flying mainly at night, was feeding the MEF good intelligence on moving targets by this time. This information was being shared with 3d MAW. It showed a considerable amount of the movement and resupply going on at night. Marine A-6s had been brought to bear on the backed-up road intersections in the Kuwait theater of operations the previous two nights, but clouds restricted battle damage assessment of the bombing. General Boomer would state at his evening briefing on the 23d that "Senior Warrior[Marine electronic warfare equipped C-130] seems to be—I contrast it with J STARS. It came up and is working. I don't get the same impression with Senior Warrior."[182] The new terminal at MEF to receive the feed from Senior Warrior was still down. As an indication that the build up for war was continuing, the intelligence staffs throughout the MEF would receive 82 out of a requested 152 intelligence personnel from continental United States on this day.

The air tasking order was still creating a backlog in the message traffic system. It was more than 400 pages at the beginning of the air campaign. As of 23 January, there was no way to break out just the Marine portion from the entire ATO. The message centers at both divisions complained to the MEF about this process.[183] In an effort to reduce the number of communications centers that were receiving the ATO, I MEF Rear at Jubayl put the ATO on the local area network (LAN). General Moore commented that the ATO was difficult to keep on a timeline: "The input is received late much of the time and often conflicts with plans my staff has put together to service MEF targets."[184] The ATO indicated JFACC strikes as lettered (A,B,C), while MEF strike packages were numbered. A typical helicopter ATO for this period contained the following missions:

Table: Representative ATO from 17 January to 23 February[185]

Mission	Aircraft
CIFS (standby)	10 AH-1J/ W
MEDEVAC/ TRAP standby	6 AH-1J/ W, 6 CH-46E
Tactical Recon, VIP standby	7 UH-1N, 2 CH-46E
Range sweep	1 CH-46E
Troop lift (standby)	4 CH-46E, 4 CH-53D/ E
Courier	1 CH-46E
Supply (standby)	1 CH-46E, 10 CH-53D/ E

Maintenance crews take a break as their A-6 squadron was tasked to fly all night.

In addition, on the 23d, one of the first artillery raids took place with the support of 17 aircraft. It had several planning kinks that were smoothed out as more missions were conducted. Another worrisome event had Marine F/A-18s in the same kill box with F-111s escorting a B-52 strike.[186] The proverbial "big sky, little bombs" helped provide the touch of luck that kept this from being a tragedy. Additionally, a downed RPV was located and recovered by a Huey from HMLA-369, as was a CH-46 from HMM-161 about six miles south of the Kuwait border.

Safety was an issue throughout Desert Shield and Desert Storm. Most squadrons indicated that they concentrated on the basics and tried to fly the same in the desert as they flew in peacetime. Lieutenant Colonel Stuart would add: "Maintenance and ordnance personnel did an excellent job of turning the aircraft around in an rapid safe manner. It was encouraging to note that safety procedures practiced during peacetime were not abandoned now that the squadron was engaged in combat."[187] There were, however, some things that were different, such as loading ordnance on the flight lines, then arming just prior to takeoff, or having dearmed ordnance still on the aircraft while in the fuel pits. These procedures never occurred in peacetime, but allowed for a more rapid turn-around of the aircraft, and provided more sorties from the crowded single runway airfields. Because of the large expenditure of ordnance and lack of storage space near the flight line at Shaikh Isa, the sides of the parallel taxiway became the ordnance storage area for the next 24 hours of operation.[188] No problems or incidents were recorded with these "wartime" procedures. A terrorist might wreak havoc with such munitions in close proximity to so many aircraft, but the risk was weighed and security was kept as tight as possible.

On 24 January, the ABCCC reported a second friendly fire incident when a Marine observation post (OP) received fire from coalition aircraft. There were no casualties.[189] A new FSCL was established about 10 kilometers beyond the

Kuwait border to help avoid friendly fire incidents. The MEF fire support coordination center logbook entry stated: "The precipitate cause of change was another A-10 strafing short of the FSCL."[190] A clear understanding of the ground units maneuver and positions were needed. General Moore and select members of his staff went to a MEF wargaming exercise, which proved beneficial in integrating air into the ground scheme of maneuver.

Three large strike packages made it out on the 24th to hit the Shaibah Airfield, while MEF target packages continued to strike primarily the Iraqi *III Corps* SAM sites. Two Iraqi F-1s were "locked up" by HAWK batteries as they were heading south down the seam of the coastline. They were intercepted by Saudi F-15s and both shot down. Marine Aircraft Group 13 had an excellent day in the interdiction mode striking surface-to-air missile sites. At night, A-6s on their battlefield interdiction missions struck two artillery positions, barracks, and vehicles on the move, while ABCCC worked an Air Force AC-130 on Marine targets in an arc near the first obstacle belt.

On ordnance, the Air Force 35th Tactical Fighter Wing delivered 200 HARM missiles to 3d MAW. The entire world's supply of 1,700 five-inch white phosphorus rockets were reported inbound to 3d MAW. These WP rockets (nicknamed "Willie Pete") were used by the airborne forward air controllers for marking targets. The five-inch WP was no longer produced and was programmed to be replaced by an advanced rocket system, which had not yet gone to production.[191] During this period there were constant remarks made on the ordnance situation, such as: "slipping arrival dates for inbound ships, type and amount of ordnance," and "the fact that aircraft are now going out with the available ordnance vs. the best required for the target."[192] MK-20 Rockeye were dropped because they were available in the large numbers instead of the preferred weapon of the F/A-18, the MK-83. The F/A-18, using the tactics of medium- to high-altitude steep dive-bombing was extremely accurate with the MK-83. Rockeye, developed for dropping from lower altitudes, was not very effective from these initial high to medium altitudes. Pilots were briefed repeatedly not to drop ordnance if they were unable to have good effect on target, but rather to bring it home.[193]

Bombing weather was mixed from the 23d through the 27th, but occasionally allowed for some good results and accurate battle damage assessment. One ammunition dump hit on the 25th caused a smoke cloud to rise to 30,000 feet. One of the Iraqi *III Corps* headquarters re-strike packages was held on the deck as their mission was changed to strike an oil refinery pumping station that the Iraqis were using to pump oil into the Gulf.* For the pilots the war was beginning to take on a routine and sortie counting among aircrew became common. No one wanted to miss their share of missions.

While intelligence and imagery was excellent for the air packages for the first three days of combat, once less advanced planned targeting started the pilots were now finding that intelligence briefings depicted threats that were not there. This caused many missions to unnecessarily "one pass haul ass" as Major David

* An act of bio-terrorism only matched by the Iraqis setting on fire virtually all of Kuwait's oil wells a short time later.

H. Peeler, the executive officer of VMFA-212, put it. "We finally adjusted tactics to the actual threat by relying heavily on the Fast FAC." The tactics evolved around the basic sanctuary above 10,000 feet, which was beyond the range of most antiaircraft artillery, and most hand-held infrared surface-to-air missiles. In an attack, the first aircraft over the target would not see any air defense activity, but "dash six, eight, etc., would see unaimed optical stuff. What we would do is run away from the wind so that the guys on the ground couldn't hear us until we were running away. Even at 8 [to] 10,000 feet we had great success with point targets."[194]

During this time 3d MAW was tasked to test the effectiveness of a 1,000-pound laser guided bomb against the large sand-berm that marked the Saudi/Kuwait border. It showed that bombing would have little effect in assisting the breaching of this obstacle. Additionally bombing was determined to be ineffective against mine fields.[195] On the positive side, ordnance was finally authorized to cross over the causeway connecting Bahrain to Saudi Arabia on the 27th, easing the transfer of ordnance among the Marine aircraft groups.

By 28 January, the TAFDS at Tanajib was operational, and soon allowed the Harriers a forward area arming and refueling point to increase the number of sorties MAG-13 could produce. General Moore requested that at least one of the seven in-country special operation capable forces deliver 15,000 pound bombs be reserved for disorientation of the enemy during ground phase breaching operations. And, the last of VMO-1's OV-10s arrived from Cairo bringing the squadron total to 12 aircraft.

At about 1000 local time on the 28th, the second 3d MAW aircraft was lost. An AV-8B, call sign "CAT 36," was shot down. Captain Michael C. Berryman of VMA-311 was leading a section to attack a preplanned target. The section was unable to find the original target and while circling back to a FROG missile target of opportunity, the lead aircraft with Captain Berryman was shot down by an infrared surface-to-air missile. He would become a prisoner of war, but his fate would be left as missing in action as the Iraqis never showed him on TV, or acknowledged his capture.

Four lettered JFACC packages and two numbered MEF strike packages went out on 29 January with varied results, as the BDA other than from pilots was limited. The two MEF packages hit huge corps-size logistics areas with numerous vehicles. The JFACC packages struck the Latafiya solid propellant plant, the *Republican Guard*, SA-2 site, and the Rumauylan storage bunkers.

On the 29th the remaining six F/A-18D's were enroute to 3d MAW when an in-flight fueling incident started an engine fire and stopped the trans-Atlantic movement at Naval Air Station, Brunswick, Maine. General Moore adjusted the ATO to reflect shorter alert times to have better effectiveness on the enemy with the OV-10 and F/A-18Ds targeting. Moore's ordnance concerns were ever at the forefront when he stated: "At this point a balance must be struck between the ability to generate sorties and the amount of ordnance available."[196]

The Impact of SCUDs

In January, Iraq launched the first of several modified Soviet surface-to-surface missile (SCUD) attacks against targets in Israel and Saudi Arabia. Although General Schwarzkopf initially dismissed the SCUDs as a nuisance weapon of little military value, the uproar in Israel, and to a lesser extent in Saudi Arabia, soon forced him to direct an extensive air effort in an attempt to suppress the fixed and mobile SCUD firing batteries in western Iraq. The AFCent staff fought to limit the diversion of aircraft for this (from their viewpoint) secondary purpose, but their efforts were to no avail.

At Jubayl, General Moore and his staff watched this evolution with concern. They too recognized the limited military utility of the SCUD missile, but a brief glance at the headlines drove home the point that its political impact was undeniable. Of more immediate concern to the wing was the down-stream result of the continued diversion of Air Force strike aircraft in the seemingly fruitless attempt at SCUD suppression. While sympathetic to AFCent's difficult tasking, the wing did not want to divert its aircraft toward this effort.* After the initial days of the air campaign, 3d MAW stuck close to the established priorities for Marine air. General Amos noted the initial exception, "when on day four or five we went, basically, went SCUD crazy."[197] In fact, with the first phase of the air campaign succeeding well beyond the coalition's most optimistic hopes, Moore looked forward to being able to pull back some of the 3d MAW aircraft committed to JFACC sorties. The cumulative effect of the now-widened "strategic" campaign prevented this action, and General Horner continued to call for his full share of 3d MAW sorties through the end of the month.[198]

ATO Issues

'Opting Out' of the ATO

With the Iraqi integrated air defense system (IADS) suppressed and the Air Force's F-117s operating virtually at will in the night sky over Baghdad, General Moore decided to try to work around the wing's heavy JFACC commitment in order to begin attacking some of I MEF's high-priority Phase II targets. At the top of General Boomer's list was the suspected headquarters of the Iraqi *III Corps*. The 3d MAW had attempted earlier to get this site targeted as part of Phase I, but it did not pass the Air Force acid test as a "strategic" target. As early as 27 January, General Moore openly stated "JFACC is absorbing the full 72 plus F/A-18 sorties each day, as well as A-6, EA-6B and KC-130 sorties. That will make a large contribution to the MEF target list if turned in that direction, and we can't really put our heart in Phase III until relieved of the Phase I load."[199]

Colonel Rietsch, MAG-11's commanding officer, would be the most vocal on the subject of the ATO from a standpoint of the unit that had to carryout the taskings. As he pointed out:

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* Major General Terrance R. Dake noted that the SCUD hunt seemed "like packing sand down a rat hole." (MajGen Terrance R. Dake intvw, 21Feb96).

> We were able to do our job in spite of the ATO process and that's really true. From the Air—Force point of view this thing will probably come out as a big success-the ATO—because they are going to say 'yes it worked.' Well, my answer: it worked—we did our job in spite of it. It was not flexible, [and] most days we got the ATO after the ATO day had already started. I mean we were launching airplanes before we got the ATO.[200]

He felt no pressure to carry out each and every flight assigned by the ATO. The more important thing was to be ready to fly the "line number" and have that "ticket" to get into the JFACC controlled air space. Rietsch continued:

> The things that we did to make it work for us—we put extra line numbers into the ATO so that we would have some flexibility. That bothered the Air Force because they wanted to see—be able to match up—line number for sortie flown. Well, we would have a lot of line numbers that never flew because we had to build some flexibility into the system in order to make it work for us.[201]

A very valuable part of the ATO process from 3d MAW's perspective was the assignment of an Air Force officer to the 3d MAW tactical air command center. Major Robert Sands, an A-10 pilot, whose father had been a Marine was that knowledgeable Air Force liaison officer assigned the mission to help 3d MAW work out its ATO issues. General Moore would say "Major Robert Sands did a superb job for us. He knew the process and how to do what we needed to do to influence the process, and it worked."[202]

The central JFACC mission planners did not have a complete view of the battlefield, nor did the flyers who flew over the battlefield daily noting numerous lucrative targets. Instead, they flew on to their assigned targets, where there may or may not have been anything to strike. The JFACC assigned missions did not often come with the necessary imagery to effectively plan and engage the target. There was a need for mission and intent orders so that the air assets could focus on the desired effect. Colonel Rietsch and his commanders were frustrated by what seemed to them a ponderous and slow reacting targeting process. It soon became obvious to them that in the KTO the Iraqis hunkered down during the day and preferred the apparent safety of the night to carry out activity and movement. By week three of the air campaign, VMFA(AW)-121 was carrying out three to four nightly reconnaissance sorties using night vision goggles and on-board targeting and navigation FLIR systems. These were good enough to actually detect individual Iraqi soldiers smoking in their trenches as well as more important targets such as artillery and armor. Thanks to a new type of laser-ring gyro on the F/A-18D, they were able to note the locations of these targets to within 100 meters. Rietsch would then arrange with the senior watch officer in the Marine TACC to launch excess sorties using ATO blank mission lines to strike targets while they were still hot. This informal but highly effective system eased the frustration. As Rietsch commented:

> But we were being sent on, as I mentioned, targets of questionable value and that we were in fact not able to concentrate on the area that affected our Marines. As we drew close [to the ground campaign] one of our frustrations also was [that] there were certain areas where there was a lot of enemy activity that appeared to be untouched by the JFACC central planning—and I'm primarily talking about areas of northern Kuwait—that never seemed to be hit where you had reinforcements and resupply activities that we could see and could not get targeted for.[203]

As the end of January approached the 3d MAW's portion of the air campaign began to focus more heavily on I MEF's area of operation. The Iraqi forces would be targeted with as many aircraft as 3d MAW could sustain. Additionally, General Moore made every effort to obtain more JFACC aircraft to attack I MEF targets. The recent good weather and the new emphasis on Iraqi forces in the Kuwait theater of operations helped stimulate a reaction by Iraq.

The Battle for Khafji and Its Fallout

Air Support for Artillery Raids

The commencement of the air campaign did not adversely affect I MEF's ground combat preparations throughout northeastern Saudi Arabia. Both the 1st and 2d Marine Divisions planned and executed a series of artillery raids against Iraqi concentrations in Kuwait along the southern border region. Both division commanders hoped to provoke a response from the Iraqis, thus revealing their positions. Iraqi counterbattery fire, once detected, was immediately pounced upon by 3d MAW aircraft. The result was a deep reluctance on the part of Iraqi artillerymen to employ their guns against Marines for fear of a quick and deadly reprisal.

A typical raid package would consist of four aviation elements: an OV-10 reconnaissance aircraft to spot any counterbattery fire; a package consisting of an F/A-18D to mark the target for two A-6Es to bomb; a suppression of enemy air defense (SEAD) package of an F/A-18D and two F/A-18s to suppress any anti-aircraft artillery (AAA); and an EA-6B with an F/A-18 escort to jam radar near the raiding parties. A ground FAC would coordinate these raids and the artillery. The wing supported eight such raids between January 23d and February 23d.

As the artillery raids continued, Marine ANGLICO teams assigned to the Joint Forces Command East north of Mishab worked closely with the 3d MAW to arrange offensive air support for its drive into Kuwait.* Toward this end, General Moore expected to provide close air support to the Arab force, JFC-E. Although important from a political perspective, he did not want to over-commit Marine air

*Joint Forces Command East was the joint command for the Arab coalition forces operating along the coast on I MEF's eastern boundary. ANGLICO was the Marine Air and Naval Gun Fire Liaison Company.

to the diverse Saudi coalition force. With no tradition of close air-ground cooperation to speak of, these forces were not fully capable of exploiting the synergy of such a relationship.

In accordance with Marine procedures, attached ANGLICO teams were to contact the 3d MAW DASC operating near the I MEF main headquarters at Safaniya. This process would be more difficult after the first week of February, when the I MEF (Main) and the DASC were slated to move 50 kilometers to the west to the developing combat service support area (CSSA) at Kibrit. Both divisions had already started to move their forces into the area south and west of Kibrit. Task Force Taro, however, remained in the Mishab area to back stop JFC-E and protect I MEF's lines of communications out to Kibrit.

Marine Air in the Battle of Khafji

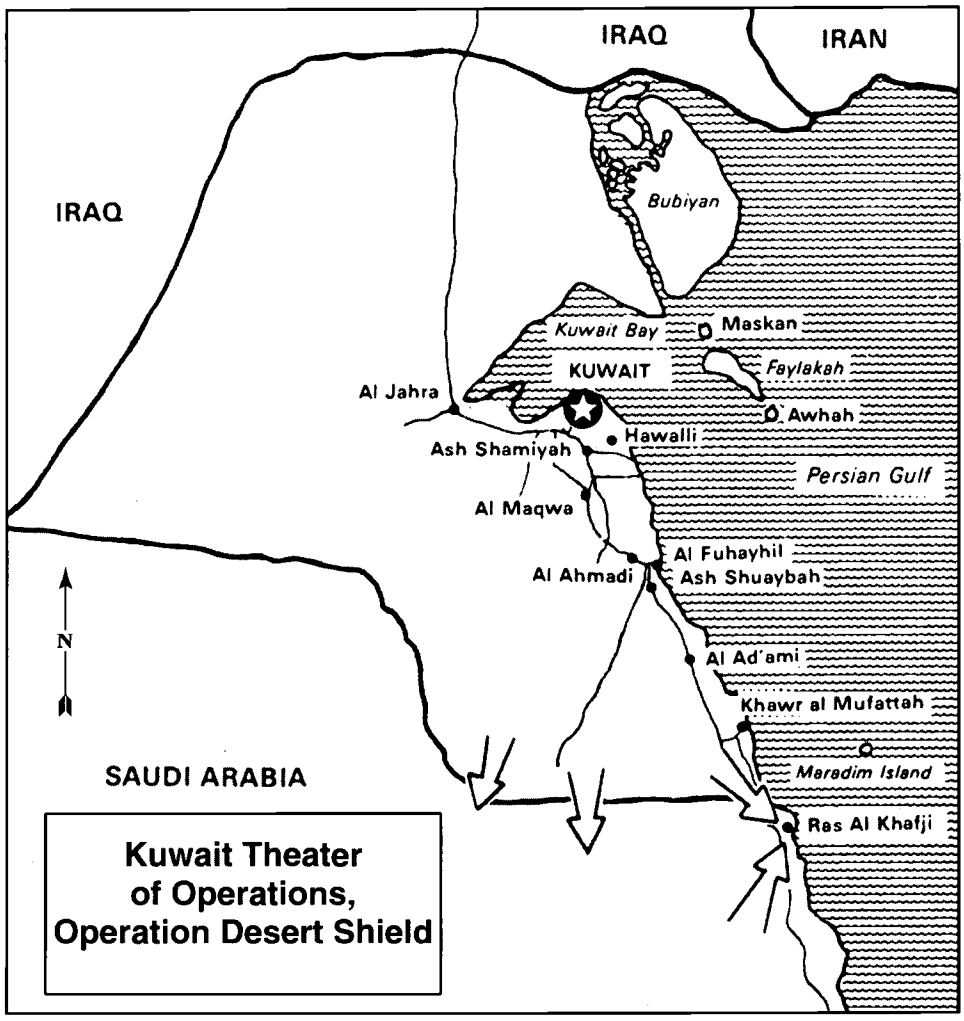
As the end of January approached, the Marine build-up around Kibrit in northeastern Saudi Arabia proceeded as planned. Other than occasional rocket and artillery fire, the soldiers of Iraq's *III Corps* seemed content to bide their time in their fighting positions and thereby to force the Marines to uproot them in an all-out assault. Task Force Taro, in order to familiarize itself with the area north of Mishab, conducted a reconnaissance in force on 25-26 January, up to the recently-evacuated coastal town of Khafji, located a mere 10 kilometers from the Kuwaiti border. Coalition forces manned outposts in and around the town, as did teams from a force reconnaissance company. The mission to Khafji proved useful but uneventful and Taro withdrew to its positions around Mishab. Its battalions quickly started to move west to the Kibrit area to join up with the rest of the division, leaving behind a company-sized element for security wielding HMMWV-mounted TOW missiles and .50-caliber machine guns.

General Moore noted on the 28th, in his situation report, that it appeared the Iraqis were on the move. Even during the significant events on 29 January, the report indicated a "business as usual" approach, with the only notes: "A-6 BAI reacted to Iraqi mech/armor night attack."[204]

The quiet on the ground front was broken in a dramatic fashion on 29 January when elements of an Iraqi brigade from the *III Corps* caught the coalition forces unaware and seized Khafji. This night attack was part of a complex drive across the *III Corps* front and included a commando assault from the sea in high-speed boats from *IV Corps*. Three prongs of the attack would succeed in crossing the Saudi border. The commando assault was stopped off the coast by British and American naval forces and helicopters. Two of the prongs hit the central and western border areas in the I MEF area within a few hours. The Arab forces quickly evacuated Khafji in the face of the onslaught. The dozen Marines in the town stayed in place, and keeping a low profile, managed to avoid discovery while calling in air and artillery strikes against the invaders. Task Force Taro positioned its TOW missile equipped combined antiarmor teams (CAATs) north of Mishab to back up the Arabs and coordinated artillery strikes in support of the Arab counterattack. Colonel John H. Admire would state:

> For me the Battle of Khafji involved one of the most difficult decisions I've ever had to make . . . . It was truly the opportunity of a lifetime for a Marine. I believed in our Marines, and I was confident in their capabilities. But it was also an opportunity for us as Americans to demonstrate our belief, our trust, our confidence in the Arab Coalition Forces . . . . We encouraged them to be the main attack and we accepted the secondary role as the supporting force . . . Khafji was truly an Arab victory.[205]

Marine air, called in by the reconnaissance Marines and the ANGLICO units, responded swiftly. Major Michael W. Quinlan's division of four Cobras standing the alert was launched at 2138 on 29 January. Arriving on scene, he swung his division of AH-1W Cobras around the east side of the city and attacked Iraqi armor on the road running north of the town toward the border. The aircrews reported the deadly accuracy of their weapons as they destroyed tanks and APCs. Major Michael L. Steele would lead a division of Cobras launched at 0045 on the



30th. Lieutenant Colonel Kurth would again direct Cobras using an experimental forward looking infrared system from the Huey. Steele's division engaged six BMPs (Russian-made tracked personnel carrier Boevaya Machina Pekhota) on the hardsurfaced road north of Khafji with 2.75-inch rockets and 20mm guns, while receiving 73mm fire from the BMPs.[206] That night the available Harriers attacked more targets along the road, ranging across the border to strike concentrations attempting to reinforce the Iraqi battalion-sized force in town. This force was later identified as the remnant of what started out as three battalions. [207]

The first night, AC-130H gunships with numerous coalition aircraft "shut down" the coastal road while a large number of aircraft were assigned to work the AG-4 and AG-5 kill box areas of southern Kuwait to hit moving targets of opportunity. These attacks continued throughout the 29th and 30th paving the way for the Saudi Arabian National Guard (SANG) forces, reinforced with Qatari tanks and supported with coalition air power, to reclaim the town on the 31st. Seven on-scene Cobras remained until the town was recaptured, shuttling as required for more fuel and ordnance. Five of HMLA-367's "Scarface" Cobras worked closely with the ANGLICO Marines and the Saudis to destroy several tanks with TOW missiles in close-in city fighting. The fire support coordination line for fixed-wing remained well north of Khafji. Just at nightfall on the 30th there was a lull in retaking the town due to an abort call by a ground FAC team, and the reorganization of Saudi forces. About nine sections of F/A-18 stacked up as the ground units were sorting themselves out.

The Marine OV-10 going off station would climb to altitude and make a fast dive over the border then break 'feet wet' to take a peek about 10 kilometers into Kuwait to report what they saw to ANGLICO. The OV-10 "Bronco" was the most effective eyes out in front of the Khafji ANGLICO units, with the forward looking infrared particularly effective at night for the ground troops equipped with only night vision goggles.[208] In this sprint for a peek , the Bronco saw a tank column that was heading south and forwarded the GPS grid coordinates to ANGLICO, which promptly released the F/A-18s to go after them. The lead and rear tanks of the column were hit and the Iraqis bailed out for the desert. The forward looking infrared tapes documented a portion of the tank columns' subsequent destruction. As Major James R. Braden of ANGLICO stated:

> We had a pretty good comfort level that air was there if we needed it . . . . The next day we had Cobras at our side all day and ran about five fixed-wing CAS missions into the city . . . those were AV-8s and one A-10 . . . . The [Saudi's] learning curve was pretty steep . . . . They got to the point where they got very confident that they could fight a ground fight against the Iraqis. Mainly because if anything went wrong they always felt air was there to help them.[209]

On the battle, Colonel Bioty would later state:

> I think Khafji sort of happened. We didn't really know how significant it was until after it was all said and done. And then after the war as we

started to look into it, it became a larger evolution than I could have imagined.[210]

Fratricide Issues and Preventative Measures

On 29 January, the battles further to the west, coming under the cover of darkness in a largely featureless landscape, proved more difficult to resolve. At the Saudi police post at Al Zabr, know as OP-4, was Company D, 1st Light Armored Infantry Battalion with seven LAV-AT (antitank versions of the light armored vehicles) attached from Weapons Company. Company C was at OP-6 and had their own engagement. OP-4 bore the brunt of the attack from the Iraqi T-62 tanks. At 2000, they first detected the column of 30-35 tanks and APCs approaching from the north towards OP-4. The attack began with jamming of the tactical radio nets, but the company nevertheless held its own in a seesaw battle ranging across the border area. Reconnaissance forces actually in the border outpost, began the engagement by having the FAC (A), an OV-10, direct two Marine A-6s to drop Rockeye onto the approaching Iraqi advance. The Rockeyes had little effect. The outpost was left to engage the Iraqis with hand-held direct fire weapons as they approached within small arms range. The LAVs fired TOW missiles, but the advance continued, and the reconnaissance platoon signaled their withdrawal. The Iraqis briefly manned OP-4 with two tanks and BMPs and again were engaged by the OV-10 with another section of A-6s dropping Rockeye to little effect.

At about 2045, the Airborne DASC, responding to a call for air support from Company D, directed in a pair of Air Force A-10 "Thunderbolt II" attack aircraft to help. The company's executive officer had the OV-10 mark the friendly position in front of the LAVs with a rocket. The rocket landed directly in front of the friendly LAVs. Handed off to the FAC with Company D, the lead A-10 aircraft fired his 30mm gun with good effect causing secondary explosions on the tanks at OP-4. The second A-10, confusing the rocket mark for the enemy during the chaotic encounter, launched a Maverick missile that locked on to the LAV-25 nearest the mark, destroying the vehicle and killing seven Marines inside. Only the driver survived. Not long before the A-10 mishap, an LAV-AT was involved in a similar mishap, when it launched a TOW missile at another LAV-AT, taking the life of four others. The attack at OP-4 was beaten back by daybreak with the help of A-10s and Cobras cleaning up the Iraqi tanks left to hold the observation post. The second alert division of Cobras from HMLA-369, led by Major Sidney E. Mills, Jr., launched at 2314 the evening before and was routed to work with 1st Light Armored Infantry Battalion.

Sergeant Greg J. Michaels of Company A, 1st LAI, summed up the fratricide picture well:

> The man at the controls of the aircraft will ultimately decide whether the speck on the ground below him is friend or foe. To me that is a huge burden of responsibility. The shifting lines on the map that represent

> boundaries for friendly units are not good enough to ensure the survival of ground combatants. What is needed in the here and now is a technological advance in IFF [identification of friend and foe] to aid the pilot in making the decision about the speck on the ground below him. For the rest of the Storm I didn't worry so much about the enemy, I worried about the friendlies. I worried about buzzing aircraft intending to drop their bombs, and I worried about itchy fingers on triggers, combatants eager to be involved in the shoot-out. After the battle at OP-4 . . . . We were professionals as before, but now we had experienced the harsh realities of armored combat, we knew the penalties enforced by confused execution.[211]

The aftermath of the two fratricide incidents left difficult questions to answer about the level of positive identification of friend and foe necessary on the modern battlefield. At I MEF, General Boomer appointed a "Tiger Team" of Marines headed by Colonels Jerry G. Henderson and Charles J. Quilter, to find the causes of the five separate incidences of friendly aircraft attacking I MEF forces from 17 January to 2 February. The most severe of these was the Marine controlled USAF A-10 which killed seven Marines when it fired a Maverick missile at a light armored vehicle (LAV-25) on the night of 29 January near the Saudi border police post (OP-4). Four nights later a Marine A-6E dropped a Rockeye on the 5th Battalion, 11th Marines, causing the death of one Marine. Working under a severe time constraint, as the expected beginning of the ground offensive approached, the Tiger Team presented its findings to General Boomer on 10 February.

The team noted that the air-to-ground friendly fire incident was due to a combination of the lack of situational awareness at several levels, a poor identification of friend or foe (IFF) system, and a lack of a visually defined battlefield at night. Colonel Quilter recommended that the quickest and most effective gains could be made in situational awareness and marking the night battlefield. The IFF systems, he noted, would be of marginal value, but worth the effort.[212]

> The report listed the capabilities for navigation accuracy:
> (1) Inertial navigation systems for all jets were good to about 1,000 meters.
> (2) LORAN-C on OV-10s and some helicopters was good to about 200-400 meters with variances even greater in the northern Saudi region.
> (3) Global Positioning System(GPS) on some helicopters was good to 10-20 meters, but was clumsy to use due to temporary, stopgap installation.
> (4) Mapping radar in the A-6E and F/A-18s was good to 100-200 meters around radar significant features. There were no radars on AV-8 or OV-10s.
> (5) FLIR, although not a navigation, system could effectively identify

> in clear weather most targets at lower altitudes than the threat currently permitted. The A-6s, some OV-10s, and about 25 percent of the F/A-18s had FLIR capability.
> (6) On the ground, map reading in the desert was good from 100-5,000 meters depending upon the terrain features and training.
> (7) Position Locating and Reporting System (PLARS) for ground use was good to 10-20 meters.

The recommendations of the team were detailed and numerous with an emphasis on being simple, practical, and timely. The key recommendations were: orient the PLARS use toward fratricide prevention; focus efforts to continuously update the friendly positions; immediately implement High Density Airspace Control Zone 8; encourage location reporting in both grid and latitude/longitude; place a TACAN close to the southwest corner of the Saudi-Kuwait border; and make some limited marking of friendly positions and vehicles.[213] Colonel Rietsch later noted that none of the F/A-18s were involved with fratricide incidents and attributed this to the improved situational awareness provided by the Hornets' moving map display.[214]

Al Jaber Mission Planning

As I MEF Marines settled down in the wake of the Battle of Khafji, Task Force Taro again turned its attention to planning for a heliborne assault in support of the upcoming ground campaign. Based on guidance from 1st Division, Taro on 4 February prepared Fragmentary Order (FragO) 6-91, which detailed the heliborne assault mission:

> [On order] TF Taro conducts a helicopterborne assault to seize Al Jaber Airfield (Grid QT7204) in order to secure the airfield and provide mutual support to the Division advance by blocking or delaying, as directed, any enemy counterattack. Be prepared to conduct linkup operations with advancing friendly forces.

Al Jaber Airfield, designated as MEF Objective A, was located in south central Kuwait, nearly 30 kilometers due north of the planned 1st Marine Division breach. General Boomer viewed the airfield as an essential position from which to support I MEF's rapid exploitation northward to isolate the capital and cut off the Iraqi *III Corps*.

In his planned attack, Colonel Admire intended to "use surprise and firepower to overwhelm the Iraqi airfield defense." He envisioned that Task Force Taro would "use our vertical envelopment [helicopter assault] to attack [the] Iraqi forces from inside his own perimeter and utilize night to consolidate our forces and prepare the defense of the airfield."

Taro was faced with a daunting mission. The task force intelligence staff painted a disturbing portrait of the objective: "The enemy possesses the capability to defend Al Jaber Airfield in-place with one mechanized battalion, elements of

one armored battalion (-), and AAA units of unknown size and number." Additionally in the immediate vicinity of Al Jaber intelligence estimated that the Iraqi army could reinforce the airfield with elements of the *1st* and *5th Mechanized*, and *3d Armor Divisions* within 2-3 hours. The mechanized and armor units within the airfield remained in well-bermed positions as was the anti-aircraft and expected hand-held surface-to-air missiles. The most worrying problem was that Iraqi *III Corps* could mass fires from its considerable artillery in the area.

To accomplish its mission, Task Force Taro planned a three-phased operation. In phase one, for the main attack, a reinforced infantry battalion would conduct a heliborne assault directly onto the airfield in a single wave. It would then seize the airfield and clear it of enemy forces. The task force command group planned to accompany the first battalion into the airfield. Meanwhile, the aircraft from the first wave would return to friendly territory, pick up a second battalion, and helilift it onto the objective where it would join the initial battalion and assist in consolidating control of the airfield.

In phase two, once the airfield was secured, Taro would establish a hasty perimeter defense. Taro's third infantry battalion, designated as the task force reserve, would if possible, be transported to the airfield in an additional helilift to assist in the defense. Otherwise, the reserve battalion would move north to the airfield by vehicles. During phase three, Taro would link up with friendly forces approaching the airfield from the south. The task force would then prepare to conduct follow-on offensive operations in support of the I MEF assault. In the fragmentary order, Taro designated the 3d Battalion, 3d Marines, as the main attack, the 1st Battalion, 3d Marines, as the follow-on wave, and the 2d Battalion, 3d Marines, as the task force reserve.

MAG-16, one of the two groups that would be providing the helicopter support for Taro, was still gathering squadrons together at Tanagib from Jubayl and Ras Al Ghar. Colonel Garrett and his staff carefully examined the assault helicopter proposal. Taro anticipated the first wave would require 45 CH-46Es, 24 CH-53Ds, and 17 CH-53Es. Together, the two helicopter groups could muster, on a perfect maintenance day, 60 CH-46Es, 34 CH/RH-53Ds, and 23 CH-53Es. When taking maintenance aircraft into account, the first wave of Taro would require essentially all of I MEF's likely available transport helicopters. Given probable casualties suffered on the first wave, even fewer would be available for subsequent waves and other assault support tasks.

Early February, Phase II of the Air Campaign

The Breach is Shifted Again/Al Jaber is Scratched

On 6 February, after discussions with his subordinate commanders, General Boomer abandoned the plan for a single-division breach in the southwestern corner of Kuwait in favor of a two-division breach of Iraqi lines further north on either side of the Umm Gudair Oilfield. Boomer designated General Keys' 2d Marine Division, conducting the more northerly of the two breaches, as

the I MEF main attack force. Freed from the constraints imposed on a single-division breach by the acquisition of additional combat engineering equipment and the planned relocation of his main combat service support base northwest from Kibrit, Boomer reexamined all aspects of offensive planning to date.

Already of doubtful utility to General Schwarzkopf, Boomer ruled out a large amphibious assault on the coast south of Kuwait City except as a response to an unforeseen emergency. Marine forces afloat would now be used primarily in tying down as many Iraqi units as possible into the shoreline defense of Kuwait as a deception. While Al Jaber retained its importance as I MEF's forward logistics and helicopter base, its immediate seizure by heliborne assault appeared much less necessary for the success of the ground assault than a month before.

From General Boomer's perspective, the planned assault on Al Jaber suffered several major shortcomings. First, its execution would require the use of virtually all the force's available helicopters on G-Day. This would leave too few for logistics support, medical evacuation duty, close-in fire support, and command and control. Second, the antiaircraft threat presented by the Iraqi forces in the area made the planned assault a risky proposition for those called upon to fly the mission. Thus, for the same reason that an amphibious assault onto a well-defended beachfront looked prohibitive in terms of cost versus benefit, so too did a large heliborne assault into a well-defended objective area.

Task Force Taro presented its concept of operations brief on 9 February to the MEF staff. Because of his concern over aircraft vulnerability and high casualties, General Boomer rejected the plan. The heliborne assault option, however, was not dismissed completely. General Myatt quickly assigned Task Force Taro the mission of infiltrating the obstacle belt on the right flank of the 1st Division breach area, leaving Task Force Grizzly to perform the same mission on the left flank with two battalions. Myatt ordered one of Taro's battalions—the 1st Battalion, 3d Marines—to detach on 15 February and to constitute the heart of an independent task force under the division's direct control. Myatt assigned the task force, designated X-Ray, the single mission of: "O/O, [on order] conduct heliborne assault to occupy BP (battle position) X-Ray and guard division right flank north of 2d obstacle."[215]

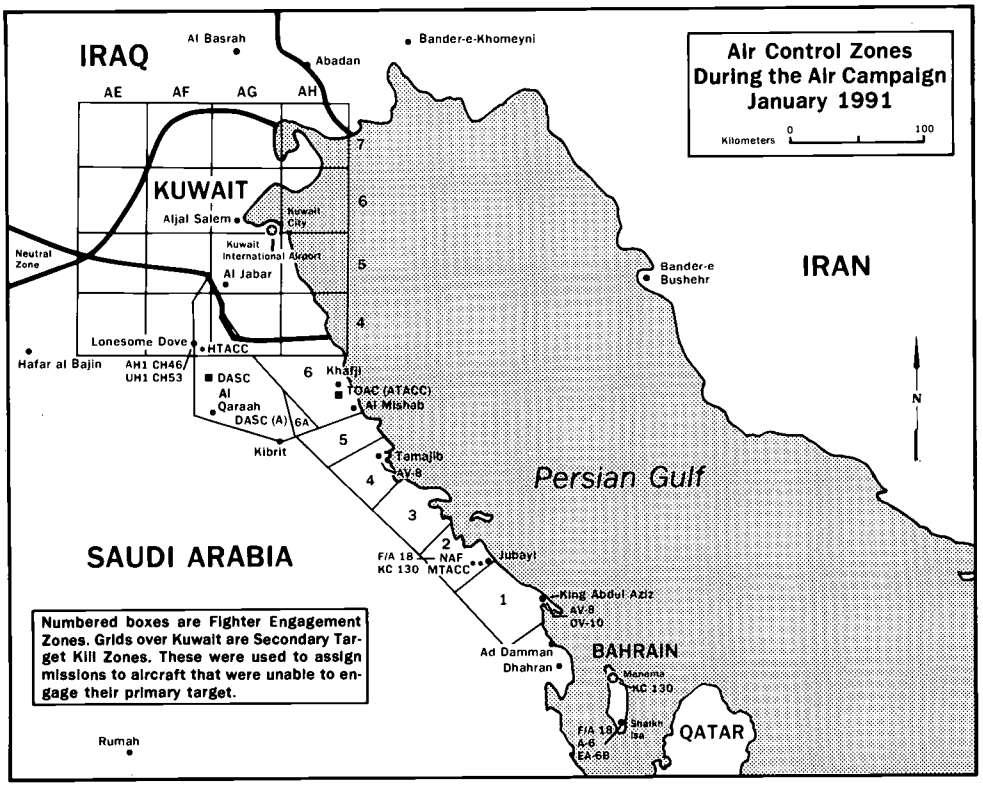
Targeting and Intelligence Issues

General Moore discussed insufficient imagery hampering mission planning and targeting with anyone he could get to listen. In his situation report of 28 January, Moore stated the corollary that would go hand-in-hand with lack of imagery, and that was the last minute changes to the JFACC package missions: "Targeting continues to take a great amount of attention. I have made it a policy that only the AWC or I approve JFACC targets. I want to reduce the number of changes and turmoil that they create." MAG-11's commanding officer, Colonel Rietsch, was likewise critical:

> Old imagery, poor quality—we were lucky to get even that. Getting up to date imagery or something of good quality was the exception—I

> mean the big exception—because it only happened a few times. We were asked to go attack targets where all we had was a LAT/LONG—pull something off a map. The way the system should work-all that stuff should be fed to you. It didn't work that way. One of two things happened. Either the higher headquarters [had] up-to-date imagery which identified the location of a valuable target and we didn't receive the same imageries, so therefore we couldn't tell what the target was, or else they based a mission on outdated imagery and so when we went to that place the thing that had been there and was the designated target was no longer there. Consequently, we ended up [flying] many, many sorties where we went where we couldn't identify a target that they thought might have been there or the target had moved and the people who made the decision to send us to the inset target were based on that two week old, three week old, two month old imagery of a tank battalion, for example, that very well might have clanked away and gone somewhere else.[216]

VMFA-451 and VMFA-314 pilots would mention that when a team was formed for briefing a package that one officer would be assigned the job to hunt down and find any imagery that was available. This would take nearly all his time for that day. On the plus side of planning, the Tactical Aircraft Mission Planning System (TAMPS) was universally praised for providing navigation planning, fuel planning, and updated threat planning. TAMPS' updates came from the EA-6Bs,



Ordnance was stored on the open flight line at Shaikh Isa Air Base, Bahrain.

the USAF F-4 "Wild Weasels," aircrew debriefs, and national assets, and were input into TAMPS in near real time.[217]

In late January, the MEF set target precedence by category: Category One targets were nuclear, biological, and chemical; Category Two were indirect fire weapons; Category Three were command posts; and Category Four were the maneuver units of armor, mechanized infantry, and infantry. This gave some guidance to a flight leader who had arrived at his assigned target only to find nothing but sand at that grid coordinate. He then became an armed reconnaissance in a large kill box. This was a dramatic shift from the 3d MAW OPLAN requirement not to drop ordnance except on "assigned targets" or FAC (A) "marked targets beyond the FSCL."[218] Targets were now being bombed in the larger alpha numeric kill boxes, with relationship to the MEFs prioritized unit target list, however, MEF needed to hit specific units to shape the battlefield for the upcoming ground campaign.

The Aviation Ordnance Shortage

After more than two weeks of the sustained air bombardment of targets in Kuwait and southern Iraq, General Moore began to grow increasingly concerned at the drawdown of his aviation ordnance stocks. While the allied coalition suffered remarkably low losses when compared to prewar estimates, their leaders felt no rush to attack on the ground into Kuwait. The airmen enjoyed relative immunity from damage yet seemed to score continued successes against a host of vital Iraqi targets with their precision guided munitions (PGMs). This perception was reinforced by CentCom's and AFCent's selective release of high-quality videotapes of Air Force aircraft scoring impressive hits on buildings, bridges, and vehicles with their so-called "smart" bombs. These "best hits" videos did not represent the reality of allied attack aviation in theater, which still relied heavily on traditional "dumb" bombs guided to their targets only by the

skillful flying of the aircraft pilot. This was particularly true of naval aviation, which relied overwhelmingly on hitting targets with single and multiple drops of 1,000- and 2,000-pound unguided iron bombs.

General Boomer placed artillery concentrations near the top of his list of targets to be attacked. With an estimated 1,242 artillery pieces in the Iraqi *III Corps* area alone, the 3d MAW was not without targets as January turned to February.[219] Although "smart" bombs proved extremely effective against point targets so far in the war, the typical dispersion of Iraqi artillery batteries in southern Kuwait (almost all of which were towed) meant that they were not the optimum weapon for the mission. Unlike self-propelled artillery pieces, towed artillery was almost impossible to destroy. Essentially a narrow tube of hardened steel, they offered an indistinct aim point for PGMs to hit, and near misses often did little more than flatten tires or strip off peripheral equipment. While the damage caused by such a strike may have been beyond repair, post-strike aerial photography generally could not confirm whether the pieces were put out of action.

3d MAW's attack on artillery therefore concentrated on attacking artillery positions with the intent to kill or injure some crewmen, damage the pieces, and set off ammunition stored near the battery. Weaponeering dictated that a mix of "old-fashioned" 1,000-pound bombs and MK-20 Rockeyes were the best ordnance for this purpose. By 24 January, 3d MAW reported that stocks of MK-83s were extremely low. Facing a shortfall in a few weeks just as the divisions would go on the attack, General Moore requested that NavCent release the stocks of MK-83s and Rockeyes to his command. After some delay, on 7 February, Admiral Arthur concurred, and beginning on the 9th, 3d MAW took delivery of sizeable quantities of the two essential bombs.

Also on 9 February, 3d MAW lost an AV-8B and a damaged F/A-18 had to make a recovery at Shaikh Isa. The Harrier from VMA-231 flown by Captain Russell A. C. Sanborn, was "Dash-Two" in a section, call sign "Jump 51." The section was controlled by a Fast FAC at about 1630. After making a couple of runs on a marked target, the F/A-18D marked a new target, a revetment, about two miles away from the original target. The "Dash-Two" made a run in to drop its remaining ordnance. Captain Sanborn made the drop and was struck by an infrared surface-to-air missile on pullout. His parachute was sighted by his lead, Colonel Bioty, and Captain Sanborn became 3d MAW's fourth POW.

The first combat damage to a Marine F/A-18 occurred on the morning of the 9th. The F/A-18 was in the lead position on a four-aircraft division attack on a SA-2 site. The aircraft from VMFA-451, call sign "Clover 21," was struck in the right fuselage-mounted AIM-7 Sparrow missile as it was pulling off target. The rocket motor of the missile caught fire and scorched the aft fuselage and engine bay door. Once "feet wet" over the more friendly waters of the Gulf, the pilot jettisoned the sparrow and made an uneventful landing at Shaikh Isa. Probable cause was an SA-16 infrared surface-to-air missile.[220] The aircraft was repaired and on the following day's schedule. [221]

"Fast" FACs and Isolating the KTO

Fast FAC was a mission flown exclusively by the two-seat F/A-18Ds. During the first three weeks of the war the Fast FAC as well as the strikers were learning their trade and becoming accustomed to the threat level. Aircraft would use the high sanctuary, entering and egressing the area at 20-30,000 feet. A typical Fast FAC mission would include 30 minutes over the kill box area, refueling by airborne tanker, and then return to the box for a second 30 minutes on station. The Fast FAC would stay high and attempt to find the targets from the MEF's target list for the area with the back-seater using high-powered binoculars, or night vision goggles. Colonel Rietsch commented on the beginning of the Fast FAC mission:

> We did not deal really with the traditional FAC of the helicopter war and the OV-10 since neither one was survivable—or appeared to be survivable—during the majority of the campaign . . . . We got into the Fast FACs somewhat by accident. There were very few people who were trained in the Fast FAC role and there was a learning curve for us. What the Fast FAC did for us (A)[it] got us through the bureaucracy of the command and control system, and (B) I think we became a hell of a lot more efficient as far as putting ordnance on target instead of putting ordnance into sand, because the Fast FAC—especially during the earlier part of the campaign—was able to stay in a relatively safe altitude, and have the guy in the back seat check out targets, whether they were in fact valid targets or whether that was something that had to be taken out.[222]

There were seldom any photos of the enemy positions, and the MEF targeting list was several hundred items long. A hot targeting board was made up by VMFA (AW)-121's operations section, which listed high-threat areas and lucrative target areas. The Fast FAC would always be escorted by a single seat F/A-18, to keep situational awareness of the air-to-air threat as well as to carry HARM

A two-seat F/A-18D from VMFA (AW)-121, the "Green Knights," flying by the burning oil wells of Kuwait. The "Green Knights" flew primarily the Fast FAC mission in Desert Storm.

missiles to suppress radar-guided SAMs. These escorts would often get their ordnance crews to load at least one bomb to break the escort tedium and to "get some" in any lull in the flow of aircraft to the Fast FAC. In the first weeks, only two to three sections could be controlled in the 30-minute on-station time. The DASC had difficulty in smoothly flowing aircraft to the Fast FACs. Ordnance drops were often inaccurate from the higher altitudes.[223] Some of the inaccuracy can be attributed to the lack of peacetime bombing training at these altitudes due to a perceived lack of survivability in a high SAM threat. The second reason for inaccuracy was the lack of software support and delivery tables in both the AV-8 and F/A-18 aircraft for the higher altitude drops of the MK-20 Rockeye. Most aircraft would pull out by 12,000 feet in the early weeks.

Six more F/A-18Ds arrived on 31 January, bringing the total to 12 aircraft. Only four of these new aircraft would be equipped with a targeting FLIR. Forward looking infrared was practically mandatory to be effective at night. Searching for targets with the FLIR at high altitude would not give enough definition to identify the target, and could be likened to searching the battlefield through a soda straw. Smoke and high humidity also made the search for targets more difficult. The use of night vision goggles improved the ability to control aircraft and detect targets, but as with the FLIR, few crews had been fully trained on either system. With 12 F/A-18Ds now in country there were still only four sets of AN/NVS-6 "Cats Eye" night vision goggles.[224] Night attacks presented more problems when it came to marking the target for non-FLIR-equipped F/A-18s. The 5-inch white phosphorous marking rocket was extremely difficult to see at night even with the FLIR. Many F/A-18 wingmen were forced to drop their ordnance on their leader's hits, or adjust from the leader's hits, because they could not actually acquire the target themselves. Night attacks were still a difficult proposition, and near to impossible without illumination, forward-looking infrared, or night vision goggles.

As General Moore intended, the majority of the Fast FAC controlled targeting was in the southern KTO during the first two weeks. The third week brought the targeting toward the central KTO region and Al Jaber Airfield. Fast FACs showed exceptional success in striking armored personnel carriers and trucks in staging areas around Al Wafra on 29 January. Over the KTO the heaviest antiaircraft artillery and surface-to-air missile activity were around Al Jaber, along the coastal roads, and in urban built-up areas. By the fourth week, air command and control smoothed out with the use of the airborne DASC playing a major role. Pilots were more comfortable in the area, especially when controlled by the Fast FACs. The bottom attack altitudes were dropped to about 8-10,000 feet, and accuracy in bombing improved dramatically. If the weather was good, and the threat cooperated, Fast FACs could now run as many as 10 sections of aircraft onto targets in an hour by stacking the follow-on sections overhead to see the targets being bombed. Intelligence and battle damage assessment remained a problem, but the hot-target board was now run at the group level. Familiarity with the KTO led to the naming of various kill boxes. For example, the "Ice Tray" was an area north of Al Jaber on a main east west supply route where numerous artillery batteries were attacked.

During the first through third weeks of February, aircrews became more comfortable in the KTO area. Artillery and armor formations, when found, were attacked until destroyed. Major James S. Robertson later recalled that by this time in the air campaign, "Enemy vehicles were never allowed to use the main supply routes without being attacked."[225] The threat now boiled down to the Iraqis illuminating aircraft with their tracking radar to make the crews flinch and optically guiding surface-to-air missiles and antiaircraft artillery in areas they felt were key to their defenses. Threats in the KTO were more sporadic but seemed to have a greater intensity during the hours of darkness.[226] The occasional skillful use of the hand-held infrared surface-to-air missile would prove to be the most effective antiair weapon the Iraqis possessed.

Early morning JFCCC and MEF strike packages were moved later by an hour, to avoid the difficulty in target acquisition in the low sun angle shadows and haze. On 17 February, the Iraqis began destroying oil well heads and lighting them off. The resulting smoke over succeeding days severely affected the ease of target prosecution that the Fast FAC teams had developed.

By the fifth week of the air war and the week before the ground campaign, the shift in focus of the bombing campaign moved west and onto trench and artillery positions. Large numbers of artillery and entrenched armor were attacked near the Ali Salem Airfield.

I MEF Swings West Again

In November, before thoughts of a western option, and before the switch to a two-division breach that required moving combat service support further west to Al Khanjar, the movement of supplies and sustainment rested mainly on the backs of trucks and forklifts. One day of supply was in excess of 7,000 short tons of material, and that was required to be moved distances of more than 150 miles. The Army was unable to-fully support Marine line haul, and as a result MarCent leased in November, some 450 high-bed trailer trucks, 110 heavy equipment trucks, 50 five thousand gallon water trucks, 50 five-thousand-gallon fuel trucks, and 63 fork lifts of various sizes. The Marines requested at least 100 more forklifts (material handling equipment-MHE) be shipped with the MEF sustainment being loaded out of Blount Island. A message released by General Boomer's headquarters stated: "It is imperative that sufficient MHE be available to ensure the timely turn around on transportation assets at each transfer point."[227] Now, with the shift west, there was little time to find more line haul assets to get I MEF in position to begin the ground offensive.

The KC-130s helped with moving fuel and some supplies as far as Kibrit, while CH-53s moved passengers, mail, and high value, quick response cargo. Within this environment, where anything that could move west was carrying something for the divisions or the combat service support element, 3d MAW was asked to build a base further west. The base had to be far enough out west to have the helicopters support both divisions' breaches and their further attacks into Kuwait.

3d MAW's OPLAN required each site to have five days of supply (DOS)

of fuel storage in USMARCENT tactical storage or USMARCENT owned stocks in plant account systems based on wartime usage rates.[228] MWSG-37 was required to install and operate fuel and water equipment and report for both. In addition, they supported forward arming and refueling point (FARP) operations.*

Table: 3d MAW Fuel Requirements

Location	Use Rate (Per Day)	Capability Required
Shaikh Isa	672,117	4,000,000
King Abdul Aziz Naval Air Strip	253,680	1,768,400
Jubayl Naval Air Facility	365,142	1,825,710
Tanajib/Alternate Forward Airfield	91,176	1,000,000
Al Mishab Airfield	266,355	1,331,775
Ras Al Ghar	39,416	197,080
Abraq Al Kibrit	441,790	2,208,950

Table: 3d MAW Water Storage Capabilities*

Location	ROWPU	20K TANK	50K TANK
Shaikh Isa, Bahrain	8	0	2
King Abdul Aziz Naval Air Strip	5	2	0
Jubayl Naval Air Facility	7	2	0
Manifa Bay	12	6	4
Al Mishab	20	2	10
In reserve	93	30	30
Totals:	145	48	54

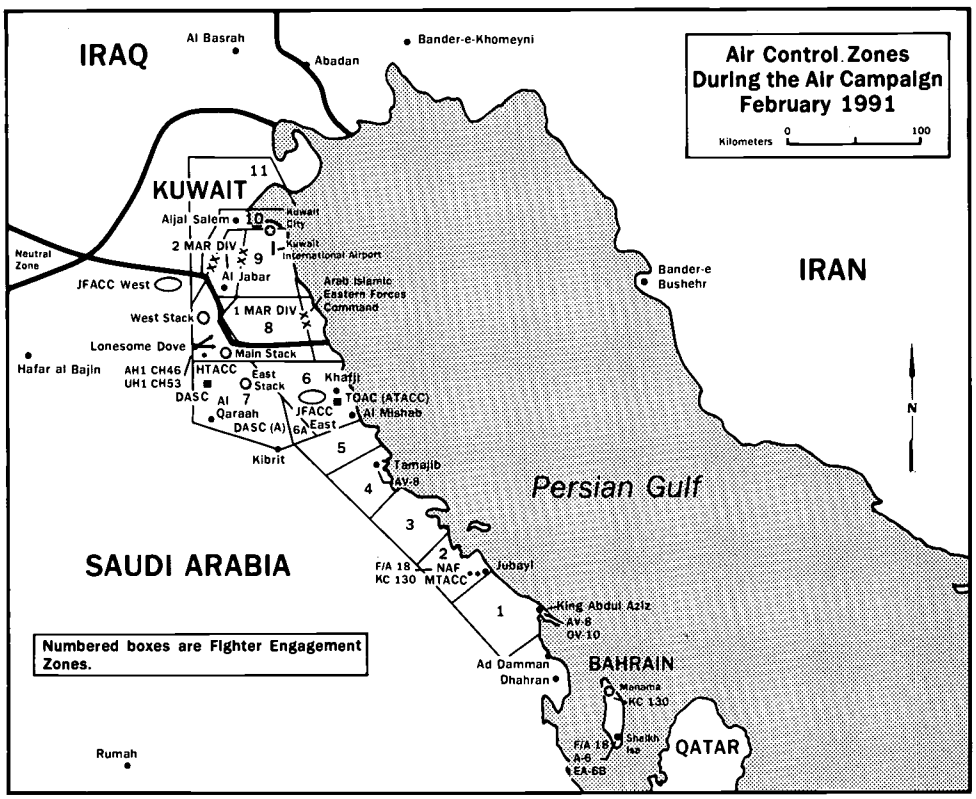
*The planned storage and water reserve capability was also designated by area.

Middle February, Phase III of the Air Campaign

Preparing the Battlefield

Preparation of the battlefield actually began the first day of the air campaign, as well as during the Phase II suppression of enemy air defenses. The num-

* Both fuel and water storage capacity for a Lonesome Dove Air Base near Al Khanjar would be added after this 3d MAW OPLAN was signed on 15 January 1991.



ber of sorties that 3d MAW dedicated to battlefield preparation increased as the air campaign progressed. Those sorties had not always been effectively coordinated into the MEF's desire to shape the battlefield. The frustration of not being able to degrade specific enemy units due to lack of timely targeting intelligence, resulted on 10 February in a COMUSMARCENT message that established new "kill boxes" based on a maneuver box (M-box) and fire-support box (A-box) concept. Up to that point in the air campaign, intelligence had difficulty in maintaining up-to-date target locations because of enemy movement and camouflage. (M-boxes and A-boxes were relatively small areas associated with Iraqi units.)

The MEF would continue to focus its intelligence and collection efforts on units to be struck the next day. When those efforts did not produce targetable information, 3d MAW could attack units that the MEF desired results on by attacking targets in specific M-boxes and A-boxes associated with those units. MarCent's intent as laid out in its 10 February message on target nominations, was to destroy the enemy with emphasis on those forces that could threaten "our assembly areas, line of departure, and breaching areas. Target priorities will then shift outward from the breaching area, and then collapse back to the breaching area by G-Day." This was something General Moore had keyed on from the beginning of the air war.

The 10 February MarCent message laid out prioritization by type of target that was similar to the original precedence list:

a. Attack known chemical delivery weapons systems and associated ordnance as identified.
b. Attack high threat/high value weapon systems that pose a threat to MarCent forces (SCUDS/FROGS, MRLs, long range artillery, BM-21s).
c. Destroy/neutralize fire support assets that pose a threat to the accomplishment of the MarCent mission.
d. Destroy command, control, and communications capabilities of KTO forces by attacking all known headquarters in a top to bottom priority.
e. Destroy/neutralize maneuver units that pose a threat to the mission.
f. Eliminate the capability of Iraqi forces to sustain or reinforce committed units by attacking major logistics sites and lines of communications.[229]

This was quite an order for aviation to attempt to meet, but the new maneuver boxes and fire-support boxes would refine the effort. For example, on 12 February MarCent executed its sequenced targeting strategy by striking targeting areas (TAs) M-6,-7,-8,-9, and -19 corresponding to the enemy units in these areas:

a. *80th Independent Armored Brigade*
b. *54th Armored Brigade, 3d Armored Division*
c. *12th Armored Brigade, 3d Armored Division*
d. *7th Infrantry Division*
e. *29th Infrantry Division*
f. *8th Mechanized Brigade, 3d Armored Division*[230]

Until 20 February, the assigning of targets, and then the fall back of searching the maneuver and fire-support boxes, was used by 3d MAW. By the 20th it was obvious to even the JFACC that targeting was unable to keep up, and so General Horner finally allowed missions on the ATO with a maneuver or attack box as the designated target.[231] In other words, armed reconnaissance was now JFACC approved. It was now designated as untargeted air interdiction. The way now officially existed for prepping the battlefield with as many sorties as could safely be run into the KTO. Intent and motivation would be provided shortly as 3d MAW began to increase the number of daily sorties.

General Boomer gave 3d MAW its mission and intent orders. In the few days prior to the ground offensive (G-Day) General Boomer and a team came to brief the two fixed-wing groups on the ground scheme of maneuver, expected FSCLs, targets, and objectives, if everything went according to plan. Colonel Bioty related General Boomer's final words at the required gathering of all MAG-13's pilots:

General Boomer lead it off by saying, I want to tell you a story which is not really a story, because it is true, but in the form of a story. I woke

> up at two or three o'clock in the morning . . . shaking soaking wet . . . from a terrible bad dream where two divisions on line attempting to go through two breaches . . . being bogged down in the mine fields and extensive obstacle belts . . . and in the middle of all that somewhere between 11 hundred and 14 hundred artillery tubes were raining a fiery death and destruction." Then he said, "My Marines are dying." He put his hands behind his back . . . walked back and forth on the stage in silence, which seemed to be eternity, and he turns around and says, "Go get the artillery!" It was about 8:30, 9:00 at night. I had guys who wanted to go man airplanes and go get artillery![232]

Planning for Task Force X-Ray

Task Force X-Ray would be plagued with changes from its conversion from Task Force Taro on the 15th through its final execution. Aircraft availability for planning purposes would be guaranteed at only about 35 aircraft, so a two-wave, 500-troop, and 40-vehicle screening force insert was initially planned. A full rehearsal was out of the question due to heavy tasking of assault support aircraft before G-Day. On G-2 the force mix was changed to 130 troops and 40 vehicles making up combined antiarmor teams (CAAT). As early as 25 January, General Boomer mentioned to his staff his uneasiness about attaining the necessary close working relationship among the CH-46 pilots, squadron commanders, and the 3d Marines if "they are going to be able to pull off a successful entry in the territory."[233] Aircrews and aircraft from nearly every squadron of both helicopter groups were assigned the day before the lift to arrive at LZ Sandy, just a spot in the desert, by the morning of G-1 to load up and brief for the X-Ray mission.

Final MACCS Adjustments-Establishment of the HTACC-Airborne DASC

3d MAW established the HTACC by a flash message sent on 19 February to the MEF and all 3d MAW units, which delineated the scope and mission of the HTACC:

> The intent of the HTACC is to provide a rapid flexible system to command and coordinate 3d MAW helicopter operations in support of I MEF scheme of maneuver for Phase IV, ground assault phase, for Operation Desert Storm. The HTACC is not intended to replace the MTACC [main TACC] and is subordinate to it.[234]

The HTACC, call sign "Bullpen," published the helicopter ATO and distributed it over the local area network system, as well as by helicopter courier. All requests for helicopter support were to come directly to the HTACC located at Lonesome Dove Air Base near Al Khanjar.

MACG-38 units would have a command, control, and communications challenge unlike any other faced by a similar Marine unit. They were spread from Shaikh Isa in Bahrain through three countries with widely separated units of the

Table: MACG Units at the Beginning of the Ground War

Unit	Function	Location(s)
HHS-38	TACC	Jubayl
DET HHS-38	A-TACC	Jubayl Lonesome Dove
MACS-2	TAOC	Mishab
DET MACS-6	EW/ C	KAANB Lonesome Dove
MASS-1	DASC(A)	Jubayl
MASS-3	DASC	Safaniya Khanjar
DET MASS-6	DASC	Safaniya Khanjar
2D LAAM	4 HAWK fire platoons	Jubayl Mishab Lonesome Dove
3D LAAM	4 HAWK fire platoons	King Abdul Aziz Shaikh Isa Lonesome Dove
2D LAAD	65 Stinger teams	10 teams, 2d MarDiv 5 teams, 6th Marines 5 teams, 8th Marines 5 teams, 10th Marines 5 teams, Direct Support Group 5 teams, 2d LAI 30 teams, I MEF (General Support)
3D LAAD	51 Stinger teams	3 teams, TF Shepherd 8 teams, TF Papa Bear 8 teams, TF Ripper 3 teams, TF Taro 9 teams, 11th Marines 3 teams, TF Grizzly 8 teams, Jubayl NAF 6 teams, Jubayl Port 3 teams, King Abdul Aziz

MEF, and also continued to support a "super-sized" 3d MAW. Displacement of several of these units without losing support and communications during combat was a difficult feat. The helicopters would find it especially difficult to remain in contact with any portion of the control system.

Planned Attack Helicopter Employment/AV-8B FARP

An interesting experimental FLIR system would get the attack helicopter community into the action again. On 13 February a NITE/EAGLE FLIR (forward-looking infrared) laser designator installed on a MAG-16 UN-1N flew the first of several border reconnaissance missions. It was used as the designator for several Kuwaiti Gazelles firing missiles that destroyed some T-62 tanks. This designation package would be effective in working with Cobras to take on targets in smoke and bad weather conditions.

On 17 February, MAG-13 received a detailed brief by the MEF on the ground scheme of maneuver, which included the 3d MAW plan for close air support and battlefield air interdiction. Though often maligned, the ATO was stretched to provide the flexibility that Marine Corps aviation needed to deliver support to the MEF. The flexibility in the ATO was not only in the "over booking," but the strip alerts, and the fact that if the mission required it, an aircraft could "hot turn around" and generate two or even three sorties on one ATO mission number.* As was proved at Khafji, when Marines or coalition forces were directly in the enemy's sights they could count on Marine aviation to set aside the pull-out altitude restrictions and deliver every last bit of ordnance as accurately on the enemy as possible.** This included strafing runs on active artillery units where pull-out altitudes would break 500 feet.[235]

3d MAW Gains Control of HIDACZ 8 and 9

Control of air space over the heads of Marines was a constant and daily struggle for Colonel Dake, G-3 operations of 3d MAW. As much flexibility as could be was wrung from the ATO. The concern was the request process (delays and or permission) to get into the kill boxes with the right amount of aircraft at a critical time when Marines may be heavily engaged as the ground war started. An additional concern was the use of JFACC aircraft in close proximity to Marines, as the MEF was far more comfortable with Marines delivering close air support. The ABCCC was already showing signs of saturation with the amount of aircraft reporting in. The volume would only increase with the ground campaign. High-

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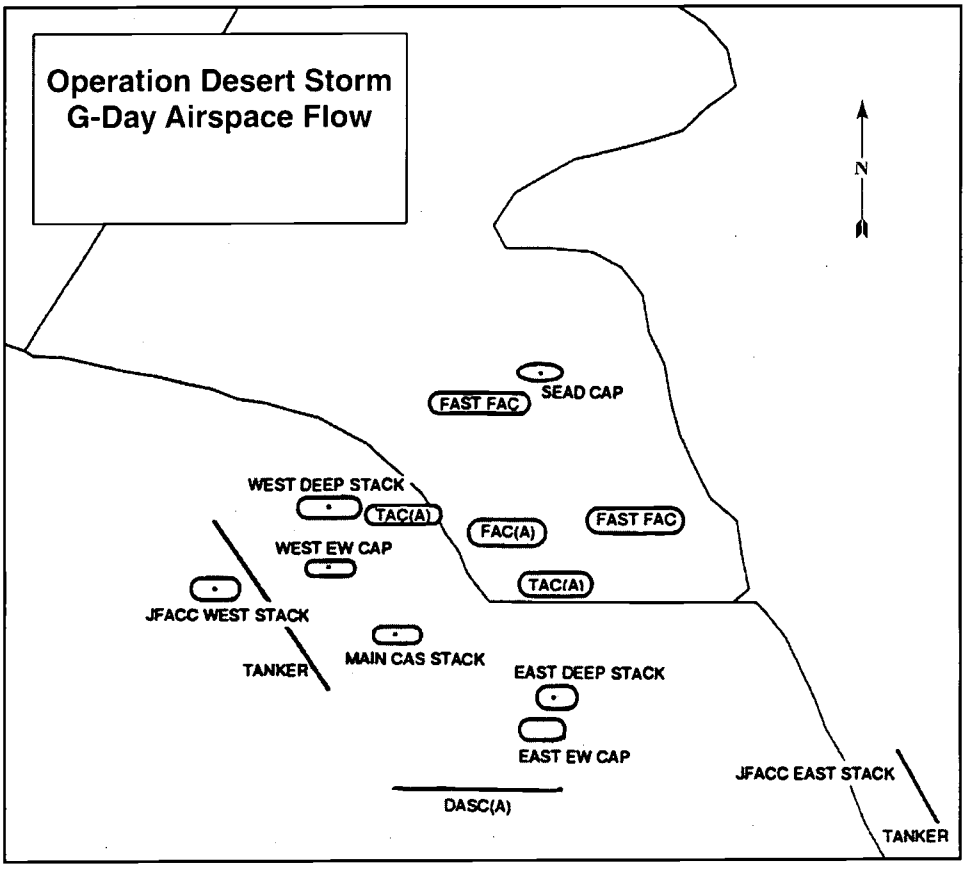
* The Harriers would take off from King Abdul Aziz, fly the mission, and, if required on a hot target, returned to the closer Tanajib Airfield where they would take on fuel and rearm. Hornets would do the same at Jubayl, while Cobras often used Mishab or Safaniya.

** Lieutenant Colonel Richard M. Barry was the executive officer of 1st SRIG in Khafji and relates a story of Harriers suppressing artillery in direct fire on his position at 0930 on 17 January, the first day of the air campaign. LtCol Richard M. Barry, USMC, "In Praise of Close Air Support" (*Marine Corps Gazette*, May 92, p. 56).



density air control zones (HIDACZ) had already been approved in concept at the JFACC level, but the space was rarely activated and handed over for Marine control. Additionally it was withdrawn without notice during the few times when the HIDACZ had been tested. On 18 February, the Marines gained the control of HIDACZ 8 and 9. They would fight daily to keep this control through the close of the ground campaign.[236]

Prior to the ground campaign the typical flow for Marine aircraft required them to check into Marine Tactical Air Command Center (MTACC) for any changes to missions assigned on the ATO. The MTACC would then pass off the aircraft to the Tactical Air Operations Center (TAOC) for flight following and deconfliction information on both friendly and enemy aircraft within the area.* The TAOC would then pass the aircraft to the Direct Air Support Center (DASC) or the DASC (A) airborne. The aircraft upon reporting into the DASC or DASC (A) would receive final mission information. The DASC would contact the

* The TAOC was where the "eyes," or radar picture was primarily generated and "fused" together from other radar to provide positive control of the aircraft. The fixed-wing squadrons almost unanimously criticized the radio hand-off to the TAOC as being a waste of time, because their situational awareness was so far behind. They believed there was no value added by the radio call to the TAOC (VMFA-314,-232,-231,-212, and VMFA(AW)-121 Battlefield Assessment Tapes).

Photo Courtesy of Sgt Charles G. Grow

Gen Royal N. Moore, Jr., addresses ground commanders at a large sand-table exercise in Saudi Arabia shortly before commencement of the ground offensive.

ABCCC to inform and get approval for the Marine aircraft to proceed to a kill box, which normally had its own frequency for deconfliction. At the kill box the aircraft would do one of three things: contact the Fast FAC if flying in that box; proceed to the target assigned; or hit targets of opportunity. Immediate close air support was always a possibility and the priority mission.

General Moore fully briefed all forces on the changes to the system, sometimes referred to as "push CAS" that would occur at the onset of the ground offensive. Marine aircraft would check into the MTACC and then the TAOC before being passed to the DASC. The close air support and battlefield interdiction stacks were established when the HIDACZs were active. The kill boxes were disestablished and five stacks were used when the HIDACZs were established shortly before the ground offensive: Main, East, West, JFACC East (USN), and JFACC West (USAF). Marine aircraft after checking in with the DASC were placed in the Main stack to fill requests for CAS. Those aircraft not running a mission under DASC direction were handed off to the DASC (A) for either the East or West stack where they worked with a Fast FAC conducting battlefield interdiction beyond the Fire Support Coordination Line (FSCL). Joint or combined aircraft would check in with the TAOC and be forwarded to one of the JFACC stacks. The joint aircraft were primarily used beyond the FSCL. The intention of the procedures was to maintain control without stacking up aircraft awaiting deconfliction of missions.

There was one last ominous note before the ground campaign began. At 1945 on 23 February, the evening before the start of the ground offensive, an AV-8B from VMA-542 piloted by Captain James N. Wilbourn II was lost on a night bombing mission in central Kuwait. His was the lead aircraft in a section of AV-

8Bs, call sign "Pride 16." He was in a bombing run marked by a bomb from a departing Fast FAC's escort, and listed as killed in action. He was the first 3d MAW aviator to be killed in action.

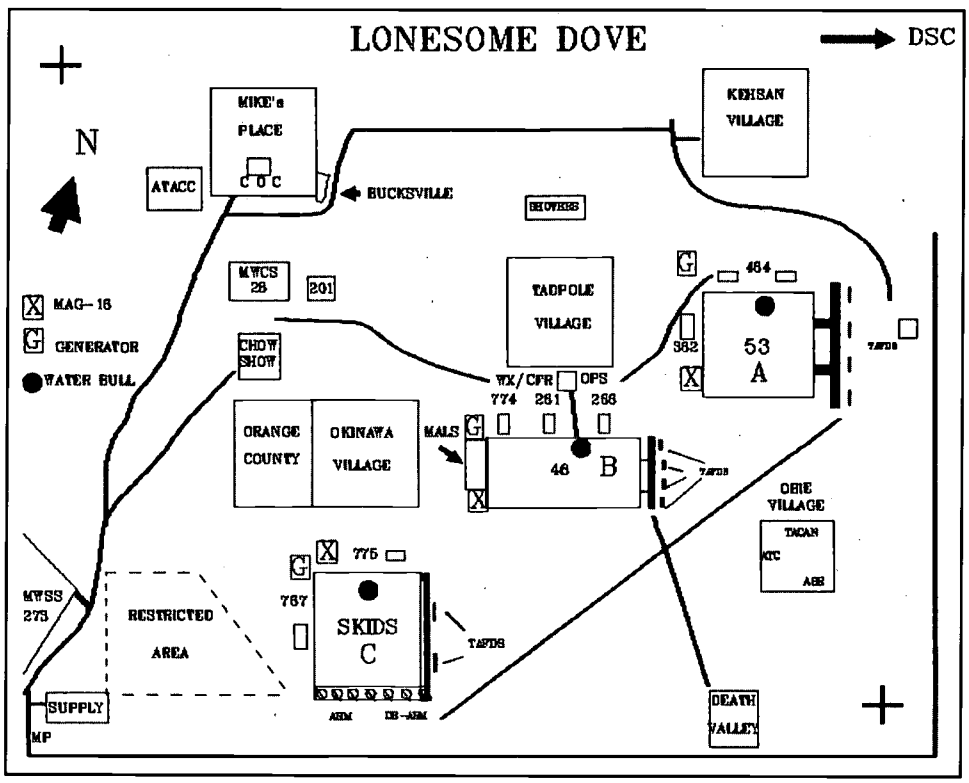
Air Support for the Ground Campaign

Last-Minute Aviation Issues

MAG-26's movement to an area near Al Khanjar named Lonesome Dove proceeded with the squadrons arriving between 16 and 20 February. Lonesome Dove became a functioning air base built up from what was a bare stretch of desert. The helicopter tactical air command center (HTACC) was operational for communications purposes by the 19th. AM-2 matting (an aluminum material used in expeditionary airfield construction) went down quickly because very little soil preparation was required, but the transportation of the material was a MEF-wide project requiring all available motor transport assets. Matting was even pulled up at Jubayl to get enough matting out west to keep the helicopters "out of the dirt." Colonel Larry T. Garrett would later state that the MAG-26 building of and deployment to Lonesome Dove was "an absolutely splendid piece of expeditionary work . . . that built an airfield from absolutely nothing . . . in double quick time . . . and a substantial amount of assault support during the ground war was flown from it."[237] Moore made the decision to start moving helicopters to the site, but guarded closely their workload. The reasons were maintenance driven. It required the precious commodity of water to wash the engines to maintain aircraft availability for the ground war.* On 20 February the first MAG-26 medical evacuation from Lonesome Dove started. At the same time near the new combat service center a simple graded airstrip about 6,000 feet long nicknamed "Al Khanjar International" was operational. Marine KC-130s and USAF C-130s shuttled last minute crucial gear for the upcoming ground assault.

On the fixed-wing side, General Moore directed his planners to draft a 72-hour G-Day ATO. There was a concerted effort to make the ATO for the ground campaign generic and to get it out several days before G-Day. In essence, the same ATO was published several days in a row so that if anything happened at any echelon of the command element, the squadrons would know what to expect. The ATO was primarily a "push CAS" ATO, where aircraft would show up on station at regular intervals. This plan was built to provide the most flexibility to the ground combat element and avoid confusion. Questions still existed as to whether the MEF or 3d MAW should be the focal point in adding additional non-3d MAW assets to fill in requests for support on the ATO of the ground offensive. The wing felt that they had more consistent and appropriate contact with the

*Even with these precautions and constant vigilance, after the war squadrons returning home found two-thirds or more of their aircraft engines required compressor blades blending or replacement due to the harsh desert environment (HMM-165 Command Chronology 1Feb-30Jun91).



JFACC to coordinate for additional assets to fill the preplanned needs.[238] The MEF continued to coordinate directly with CentCom for joint air assets.

On the ground-side of the wing, HAWK batteries were moved to cover Al Khanjar and the 2d Marine Division staging area, as well as Lonesome Dove. The MEF was busy painting the roofs of all their vehicles with orange paint to help in identification of friend and foe. They were especially concerned with painting non-military Toyotas and jeeps.

Ordnance was a concern to the end. Numerous requests for assistance went out, because the ordnance ships arrival dates were constantly changing. A February situation report stated: "The ordnance aboard these ships is not resupply. They have aboard part of 3d MAW's initial 60-day requirement."[239] The OV-10s particularly needed 5-inch Zuni rockets for adequate standoff range to avoid the threat. The lack of the 5-inch marking rockets was exacerbated because of the difficulty the OV-10s were having with their laser designators.[240] Even with the shortage of MK-80 series bombs, General Moore took 150 of the 1,000 recently delivered MK-82 bombs and gave them to Bahrain, saying: "I believe this transaction will perpetuate the good will established with the Bahrainis. They expend 15-20 bombs a day."[241]

As the ground offensive approached, the F/A-18Ds were also running out of the preferred 5-inch white phosphorous marking rockets. These rockets would be reserved strictly for night marking and a two-pod 2.75-inch rocket mark was being used in the day. The 2.75-inch rocket was not usable at night because it was

not a distinct enough mark. Two 2.75-inch rockets were being shot down range in the daytime to mark targets. This was initially done to overcome a high dud rate. The two plumes of 2.75-inch rocket smoke had the advantage of giving a distance reference on the ground that was used to talk the pilot's eyes onto the target.

Colonel Garrett, the commanding officer of MAG-16, lamented that the two largest problems he still faced were lack of communications and the failure of the direct air support center (DASC) to be able to control his helicopters. These two problems fed each other to create a disconcertingly large "fog of war" or unknown outcome as the ground campaign approached. As Colonel Garret remarked: "I never with any reliability using tactical communications, have any confidence that I could pick up the phone or radio and contact either my subordinate units . . . the guys that I work for . . . or the guys that I support. It was certainly not a problem with the communicators. . . the people in communications, they worked as hard or harder than any of the folks in theater."[242] Even before 17 January, when the helicopters were at static positions for several months, there would be many days when the only way to get a tasking order for the next day's flights was to launch a helicopter from Jubayl to Ras Al Ghar or Manifa. These two sites were only about 20 miles from the MAG-16 headquarters.

As the ground operations were about to start, MAG-16 was spread even further, with no additional communications assets. Communications, which had not worked that well up to this point, were going to have to be maintained or expanded. 3d MAW's command and control system was widely separated. The main tactical air command center (TACC) was at Jubayl, the helicopter tactical air command center (HTACC) at Lonesome Dove, and the direct air support center (DASC) with the MEF headquarters, moved from Safaniya to Al Qaraah West. MAG-16's main headquarters was at Tanajib, with its forward command post with MAG-26 at Lonesome Dove. There were helicopters with both divisions' command posts, with medical evacuation helicopters at the clearing companies, and attack helicopters at forward arming and refueling point (FARP) sites.

As Colonel Garrett remarked: "We spent into the wee hours of the night, every night, just trying to figure out where our helicopters were . . . you could call the DASC . . . when you could talk to it . . . and ask where 'Hotel 101' was, and they would have no idea . . . Now there are two problems—one, communications, and number two is that I know from personal experience that 'Hotel 101' checked in with the DASC and told them where they were and what happened to them . . . at the DASC, I don't know what happened, but that thing did not work!"[243] This was a manifestation of having the direct air support center collocated with the MEF main headquarters, which was too far to the rear. It became a large conduit for information flow to the MEF headquarters rather than its primary mission of being in a place where it could communicate and control aircraft.[244]

Additionally, battle damage assessment (BDA) continued to be a problem. There was a tremendous amount of pressure put on BDA in the days prior to the ground campaign. Lieutenant Colonel Stephen F. Mugg, commanding officer of the F/A-18D squadron VMFA(AW)-121, would recall: "BDA was a particular-

ly difficult problem. We used in the end a very strict conservative evaluation. There was probably more destroyed than we reported because if we didn't see a secondary (explosion), we would give an unknown for the BDA. The reason we could not do a good BDA was because of the same old reasons of airspeed, altitude, and the threat environment . . . you can't simply go down there and park beside a bunker and say, yeah I see 15 of this or that. You had to make your estimates based on where you could get to and how low you could go based on the threat. The lower you went, the faster you went, so the less time you had to look . . . . If you left it burning you know you hit it. And that was the pretty simple standard that we established after about the second week of the war."[245]

The main thrust for intelligence assets at MEF was for target validation rather than pure battle damage assessment. The MEF G-2 appeared satisfied at least at this late date that the major subordinate command's targets were validated by the myriad of collection assets, both national and theater, being used.[246] This level of information was certainly not making it to the squadrons that had to carry out the attacks.

Some other procedural changes were made shortly before the ground offensive to simplify the attack of targets being controlled by the F/A-18D Fast FACs. It was an unnecessary procedural delay to require covered communications once over the target area. General Moore directed that while under the terminal control, communications would be "in the red" or uncovered. This included passing of target locations in the standard nine-line close air support brief. The second simplification was that all targets were passed in latitude/longitude. It became the aviation community standard and avoided many of the early problems with different grids from different map sources. Finally, a two-plane section of attack aircraft over the target area at any particular time proved the most expeditious means of getting ordnance on target. A four-aircraft division was too large. It lengthened and complicated the administrative requirements to keep separation of all the aircraft, and with a dose of weather or smoke, made midair collisions a greater threat than the enemy.

General Moore focused his fixed-wing assets on MEF targets and would later comment: "With General Schwarzkopf's acknowledgement, about 15 days prior to the ground campaign, we were into battlefield preparation. At that time if a target didn't do something for I MEF and battlefield preparation, we weren't going . . . we weaned ourselves out of any deep strike support." There was the "reasonable officer" factor that played into this withdrawal from deep bombing. There were trade-offs back and forth between 3d MAW and the AFCent even during this late battlefield preparation phase. General Moore described a trade-off conversation with General Horner: "General Horner would come to me and say 'Hey, Royal, if you can hit these rail yards or this power line, I will give you 75 A-10 sorties as a trade off. If you can give me one more strike group late in the afternoon or in the morning, I will give you these F-16s or these F15Es."[247] This give and take allowed 3d MAW to engage far more I MEF targets and priorities.

An example of what 3d MAW could accomplish when weather conditions were favorable occurred on 17 February. The wind had shifted from the north to

the south and the smoke from the oil well fires cleared some to reveal several concentrations of enemy forces. The most prominent was about nine miles southeast of Al Jaber airfield in Kuwait. The wing flew 222 sorties and reported a conservative BDA of 3 communication vans, 6 AAA sites, 10 buildings, 17 tanks, 46 artillery pieces, and 57 vehicles.[248] By the 19th, weather would again cancel many sorties.

HMLA-369's Cobras, as late as G-1, the day before the ground campaign commenced, in conjunction with their own forward looking infrared (FLIR) equipped Huey as a designation platform, found that the oil fires made their designation efforts difficult to impossible. Company C, 2d Light Armored Infantry attempted to use the Cobra/Huey package on tanks in the vicinity of the Minagish Oilfields with limited success. Their own ground laser designation capability proved ineffective on this night mission, and the Cobras had to fly within 1,500 meters to get effective tank kills.

MAG-50 Joins the Fight

In accordance with earlier plans, on 15 February, Detachment B, VMA-513, under the command of Major Eddie L. Holcomb, flew off the *Tarawa* (LHA-1) to King Abdul Aziz to join up with MAG-13 (Forward). After a short orientation period with its new command, the detachment found itself in the combat sortie lineup on the 17th.

On the 16th, General Moore met with 5th MEB staff members to discuss the integration of the remainder of MAG-50 into the wing's air effort. All would not go as smoothly as planned.

Events out in the Gulf quickly served to alter the plan. On 17 February, the *Tripoli* (LPH-10) struck a mine only five days after being assigned to support mine countermeasure operations. Although still carrying Marines, the ship had been pressed into service as a mother ship for the Navy's antimine warfare helicopters. Unfortunately, NavCent did not realize that the Iraqis had sown their minefield much farther out to sea, and thus the *Tripoli* and half a dozen other ships were operating inside mine-infested waters rather than on the edge.

Taking on water but out of immediate danger, the *Tripoli* departed. NavCent decided to replace her with the *New Orleans* (LPH-11), which carried the headquarters of MAG-50 along with HMM(C)-268 and BLT 3/1.[249] Thus, short one LPH already due to mine damage and with elements of the 5th MEB slated to go ashore in support of I MEF after G-Day, NavCent and MarCent agreed that the Marines on board the *New Orleans* would be immediately offloaded. With much of MAG-26 already on the way to Lonesome Dove, the 3d MAW ordered MAG-50 to come ashore at Tanajib. They would be tasked like any other helicopter asset in the helicopter ATO being produced from the HTACC at Lonesome Dove.

At this point the several war game simulations from outside of theater anticipated about 10,000 friendly casualties during the ground attack into the teeth of Iraq's prepared defenses in Kuwait. The CH-46 would be primarily reserved for

medical evacuations. Even if the casualty rate was one tenth of the Washington predictions, the CH-46s would be busy, and MAG-50's assets would be welcomed.

On 21 February, a single light antiair defense vehicle (LAAD) HUMMWV with six Stinger missiles was destroyed by enemy mortar fire while in support of 2d Marine Division. No Marines were injured. 3d MAW aircraft would continue to defy the odds as damaged aircraft were making it back to base. Also on 21 February, at about 1545 local time, a F/A-18D was struck by a surface-to-air missile at about 10,000 to 12,000 feet, while pulling off a target. The aircraft had just previously pulled through a 6-G (six times the force of gravity) turn out of a cloud while deploying flares at around 6,000 to 7,000 feet. The aircraft returned to Shaikh Isa with damage to the right engine and stabilizer. At 2110 the same day, an A-6E call sign "Blaze 66" was hit once in the tail section with antiaircraft artillery fire. The pilot was not aware of the damage until after returning to base.

Helicopters did not fare so well during February. On 2 February, at about 1840, HMA-775 suffered a major accident (Class A Mishap), not involving direct enemy action. Major Eugene T. McCarthy and Captain Jonathan R. Edwards flying an AH-1J Cobra crashed in the Saudi Arabian desert during escort of a night emergency MedEvac. Both pilots were killed. On 3 February, HMLA-369 lost a UH-1N Huey with all four crew members in a flight not involving direct enemy action. Captains David R. Herr, Jr., and James K. Thorp, along with Corporals Kurt A. Benz and Albert G. Haddad, Jr., were killed in the mishap. And, on 20 February, HMM-165 lost a CH-46E returning from a priority night mission when it ran into a fog bank. While attempting to land at an unprepared dusty site the aircraft touched down with a sideward drift and rolled over. The internal fuel tank ruptured and caught fire destroying the aircraft. The crew escaped with minor injuries.

Napalm and fuel-air explosives (FAE) ordnance were dropped in the last few days before commencement of the ground campaign. Concentrations were dropped on the first and second obstacle belts where the MEF would have to fight its way through. The focus of these final preparations was on enemy trench lines and nearby artillery. Sortie rates increased daily to attain surge rates by G-1 and continued as required thereafter. A surge rate is easy to shut down, but considerably more difficult to start back up.

General Moore met personally with the helicopter group and squadron commanders on the 22d, to ensure they understood how helicopter assets would be positioned and what was available on the first three days of the ground campaign. However, Moore expressed his uneasiness with the medical evacuation system. He believed operational commanders needed to make the decision on MedEvacs rather than the medical people who made the decisions up to that point. His concern was that they would run out of MedEvac assets with the long flights by helicopters shuttling back to the naval hospital set up at Jubayl.[250]

The wing would also begin staging gear and planning for the take over of Al Jaber Airfield in Kuwait for forward basing. Detachment C, MATCS-38,

would begin pre-staging at Tanajib on 23 February. The Assistant Wing Commander, General Amos, reported helicopter preparations complete and Lonesome Dove ready. General Moore reported good battle damage was accomplished despite the smoke, with more than 450 sorties being flown for the final battlefield preparations supporting the MEF's breaching operations. And finally, on G-1, he sent: "To both divisions and the FSSG as you join the fight, I wish you Godspeed and good hunting."[251]

*G-Day, 24 February**

Command and control configured Hueys flew support for nearly all the commanders in the war, to include General Boomer, down to all the task forces and some battalions. At 0610 on 24 February, the first day of the ground offensive, a HMLA-369 Huey took off from the 1st Marine Division's combat operations center with the 1st Marine Division's commanding general, General Myatt, the division's operations officer, and Task Force Ripper's fire support coordinator on board. The Huey proceeded to the first breach site and observed Task Force Ripper's progress until rain and low visibility forced the aircraft to return to the division's combat operations center. Several hours later, bad weather continued to preclude another launch, and General Myatt joined the ground forces to maintain situational awareness of the battle.[252]

General Myatt described the process and concern for air support during the breaching operations: "We knew that if we got hit by artillery between the obstacle belts, especially chemical rounds, they could really hurt us. We also knew that our artillery was going to be outranged because the first and second belts were 18 kilometers apart. So we had to create lanes in those obstacles to move the artillery through to support the breach of the second obstacle belt. Here's where General Moore instructed his F/A-18Ds on what to do on the 'quickfire' radio channel if we took incoming artillery rounds in the two belts. We had AN/TPQ-36 counter-battery radars, set to locate the Iraqi firing positions, linked directly with the FastFACs, who in turn directed attack aircraft onto the target. Of course our own artillery was also tied into this net . . . . Between 0600 and 1400 on that first day, we had 42 instances of incoming artillery . . . the TPQ-36 picked up the source grid, and we were able to use our artillery to attack 24 of the 42 targets. The remainder were attacked by Marine AV-8B aircraft within a few minutes of the artillery fire being detected. I am very proud of that air-ground coordination."[253]

General Moore was also pleased with the control of aircraft. The system seemed to be handling the large number of fixed-wing aircraft surging into the small Kuwait Theater. Aircraft control and deconfliction requirements would remain the limiting factor in numbers of aircraft that could safely support the ground forces. The "push CAS" worked. Due to light Iraqi resistance the majori-

*G-day, the designation for the commencement of ground operations, was 24 February 1991.

ty of the aircraft would move on to the deep stacks for interdiction, and were usually further controlled by F/A-18Ds.

Every four hours the commanding generals came up on a command net for a conference call. General Moore found the command conference calls held between the MEF and his major subordinate commanders every few hours to be extremely effective. They added considerably to the operational picture. Moore found he had essential information to add to the MEF's overall battlefield picture. The outcome of this was to add an F/A-18D over flight of the battlefield for the sole purpose of gathering information on positions, weather, and enemy concentrations ahead of the ground forces. It was by no means a benign environment.

1st Marine Division would count the breaching operations as going much easier than planned. Task Force Grizzly and Task Force Ripper were both through the first obstacle belt in the morning and rapidly moving toward the second obstacle belt through sporadic direct and indirect fires. They overcame unexpected minefields and a brief period of being engaged by fellow Marines in poor visibility of the early morning. Medical evacuation helicopters moved casualties from as far forward as the weather and visibility allowed. HMM-165 would also carry medical evacuations of four Saudis to the fleet hospital back in Jubayl on this first day. These medical evacuations were nothing new. They flew on nearly a daily basis for the entire period of Desert Shield carrying the injured, and vehicle accident victims. The difference now was that business had picked up and they were more often ordnance-related victims, which included Iraqi prisoners of war.

At about 1010 on the morning of G-Day, infrared guided surface-to-air missiles hit two F/A-18As from VMFA-314 flying together against targets west of Kuwait City. Both aircraft were heading north on egress from a target and putting out flares. One aircraft was hit at 6,000 feet and his wingman hit at 8,000 feet, each sustained damage to the engine or engine bay. The target was overcast with a solid layer of clouds at 10,000 and 25,000 feet. Major Robert M. Knutzen and First Lieutenant Scott M. Quinlan piloted their now single-engined aircraft safely to Shaikh Isa. Both aircraft were repaired and returned to the flight schedule within 36 hours.

Task Force X-Ray

MAG-16 and MAG-26 were given the Task Force X-Ray mission to insert a blocking force to protect the left flank of Task Force Papa Bear after it breached the second obstacle belt. The operation was to be an on-call, emissions controlled (EMCON), day mission starting at sunrise on 24 February.* It could not be executed after 1645 or it would become a night-vision goggle evolution, for which the aircrews were not briefed or in some cases not qualified to carry out. The commanding officer of the "White Knights" of HMM-165, Lieutenant

*EMCON is a condition where the radio emissions of the aircraft involved in a mission are controlled. In the most severe of EMCON conditions to be set at brief time, no radio calls, radar, or radar altimeters can be used. This is done to avoid having the enemy detect the flight prior to or during the mission.

Colonel Marvin D. "Sam" Hall, was assigned the mission commander role for helicopter lift of Task Force X-Ray. Major Raymond E. Schwartz III, the operations officer of the White Knights, was assigned as the airborne helicopter coordinator and would conduct the mission from the back of a command and control configured UH-1N Huey. On board the Huey would be Captain Christopher C. Conlin, the operations officer for the ground element, and Lieutenant Colonel Michael V. Maloney, the commanding officer of 1st Battalion, 3d Marines.

During the initial planning, Lieutenant Colonel Hall had to travel between MAG-16 and 1st Marine Division because of the lack of covered communications between the two sites. Communications difficulties among the Marine air groups necessitated that the helicopters from MAG-26 were not briefed until 1630 on 23 February at Landing Zone Sandy* A one-wave assault was decided only two days before G-day, and required the 52 helicopters that were now arrayed in Landing Zone "Sandy" to lift the 132 troops and 40 vehicles.** This would be the largest Marine combat heliborne operation since Vietnam. It would consist of about four aircraft from every squadron in MAG-26 and MAG-16.

The plan called for five flights of helicopters separated by two minutes each. The lead flight consisted of AH-1W and AH-1J Cobras to escort the helicopters to the insert zone in addition to the command and control Huey. The following four flights consisted of 10 to 12 transport helicopters of either CH-53s or CH-46s. The mission commander, Lieutenant Colonel Hall, was in the lead CH-46 of the first flight. The brief was thorough and included sand tables and an expected update on the route by an unmanned aerial vehicle (UAV) the following day. The UAV, however, did not update the route as expected. The briefed "go/no-go" criteria included: a mission launch before 1645; 60 minutes prior notice to coordinate priority fires from all fire support agencies; insert Task Force on the friendly side of the second breach if the primary landing zone was untenable; and minimum enroute adjustments or delays could be accepted because the CH-46s were at the limit (50 miles) of their combat radius. Additionally, on the evening before the lift, at Landing Zone Sandy there were numerous loading problems requiring ingenious "work-arounds" by the crew chiefs and the X-Ray insert force. What sleep was available was grabbed in, around, and under the aircraft.

Task Force X-Ray was ready and on-call at sunrise on 24 February, though it realistically expected to launch anytime after 1200. The crews and troops were patiently waiting with their chemical suits on, and ready to fly into a chemically contaminated environment.*** Word that there were enemy tanks in

*Lieutenant Colonel John F. Pettine, commanding officer of HMM-266, found out on 23 February that he was to supply four aircraft and crews to Landing Zone Sandy at 1400 for a large trooplift: "Four aircraft from each squadron... with no rehearsal is not the way to go" (Lieutenant Colonel John F. Pettine intvw, 21May96).

**HMM-165 February 1991 Command Chronology states 52 aircraft. Several other sources note 51 aircraft.

***MOPP 4 was a condition of nuclear, biological, and chemical readiness requiring the wearing of a charcoal-impregnated top and pants, rubber gloves, rubber overboots, and gas mask.

the insert-landing zone reached the mission commander by courier in the morning. The mission commander had no radio contact with the helicopter tactical control center at Lonesome Dove Air Base, only 10 miles away. The 1st Battalion, 3d Marines, combat operations center was the focal point for radio contact from Landing Zone Sandy. They had good contact with the 1st Marine Division as the lead element, as Task Force Papa Bear, began breaching the second obstacle belt. At 1400, the 60-minute prior to launch signal was given to the crews by a white star cluster rocket. Marines buckled in and flight crews made their final preparations. Approaching 1500, several pilots started their auxiliary power units, which is the only way to have radio communications with the aircraft without the engines and blades turning. The act of communicating with the aircrew was impossible without meeting face to face. The aircraft were spread over more than a mile in Landing Zone Sandy. Aircraft were aligned in the wind direction from their landing of the afternoon before, and mostly in the order they would take off.

The waiting went on. It was now 1600 and some of the pilots walked toward the lead aircraft and briefing area. Those pilots received the change that the mission was to be with night vision goggles and without gas masks. All aircraft were not represented in the new brief. Mixing of a night vision goggled crew within a flight of non-night vision goggled crew and aircraft was prohibited for safety concerns. Lieutenant Colonel Hall initially declined the new 1730 mission, but was directed by division that it was a go. He then tried to delay the night orders to rebrief the aircrews. He contacted the 3d MAW tactical air command center on relayed radios. A garbled response from 3d MAW command center 10 minutes later indicated the mission was to go. The Marines had a job and they were going to do everything they could to make it work.

From the ground perspective, Task Force X-Ray was needed to protect the 1st Divisions' flank so that Task Force Papa Bear could continue with its attack on Al Jaber Airfield on time. Papa Bear had been intermittently engaged with the enemy in the vicinity of the landing zone since they had breached the second obstacle belt. Night did not pose the ground commander of Task Force X-Ray many problems. However, as Captain Conlin flying in the command and control Huey remarked, from the air perspective having more than 50 helicopters flying unprepared, unrehearsed, low level at night, under clouds, and through a smoke-filled battlefield to a sand covered landing zone, "was a sobering thought."[254]

The wind was almost the reverse of when the aircraft had landed the afternoon before. This would blow the rising cloud of dust in front of the launching aircraft, restricting view for much longer. A tail wind also added to the amount of power required for these heavily laden aircraft to gain speed and altitude to escape the dust cloud. As the aircraft lifted, a CH-46 rolled over in the dust cloud, but all on board escaped with only minor injuries. The formation of aircraft moved on towards the border belying the difficulty individual crews were having with goggles on/goggles off while trying to maintain bearing and location as they progressed in and out of smoke.

Task Force X-Ray's Operations Officer, Captain Conlin, described what happened next: "I established contact with Papa Bear and received landing 'T' lit . . . . I overheard one of the task forces report incoming artillery. Out the open

door of my helicopter I saw a series of flashes to our northwest . . . a call from Cobra escorts that they were over the zone and it looked hot. The Cobras were turning outboard for another pass . . . the LZ below us was invisible because of the glare from hundreds of flaming oil wells to the north. I could see intermittent incoming and outgoing fires on the ground."*[255]

To make matters worse the Cobras had turned into the path of the following transports and aircraft were now making avoidance calls, climbing or diving to avoid each other. The airspace around the landing zone became a jumbled "fur-ball." Major Schwartz, also in the command and control Huey, turned in frustration, knowing that the flight could not be straightened out, and asked the ground mission commander, Lieutenant Colonel Maloney, to make the abort call, which he did.

The return to Lonesome Dove Air Base was not pretty. The CH-46s, which had run their auxiliary power units for long periods during the afternoon, were now critically low on gas. Some landed in the desert to avoid running out of fuel. Some landed at Kibrit. Others landed at Lonesome Dove for the first time. The CH-53s had more fuel and allowed the CH-46 to land at Lonesome Dove first. It was dark, and even this administrative landing claimed a CH-53 that landed hard enough to drive the nose landing gear though the cockpit.

The Marine Corps was lucky on that night not to have lost a Marine. Lieutenant Colonel Aguilar, executive officer of MAG-16 would state: "It appears and I believe it to be true that the launch order came from the ground combat element. The mission was never planned to be run as a night NVG assault. The requirements to execute had not been met. In fact the aircrews were not qualified to do a night NVG assault. Only because of individual aviator skills did we avoid multiple mid-air collisions, and I am not exaggerating that at all. Oh, there were a lot of people that came back with religion [after that mission]."[256]

By the afternoon of the first day, the 2d Marine Division, with the Army's Tiger Brigade attached, had cleared the second obstacle belt and were spread out north of Al Jaber Airfield in Kuwait. Shelling from Iraqi artillery was sporadic and ill directed due to constant pressure on any artillery tube that opened up and a concerted effort to keep observation posts under fire. This first night the divisions stopped just short of Phase Line Red.

The 1st Marine Division had Task Forces Ripper, Shepherd, and Papa Bear through the second obstacle belts. Captured Iraqis became a major problem in getting the forces through the cleared lanes of the obstacle belts. Engagements were generally brief with a confusion of Iraqis surrendering amid defenders stubbornly resisting. The Iraqi tanks seemed to be the preponderance of the resistance. The call to engage was an individual and sometime difficult decision. Reports from prisoners indicated that an attack was to come "out of the flames" of the burning Al Burqan Oilfield. Cobras and Harriers were used under the direction of

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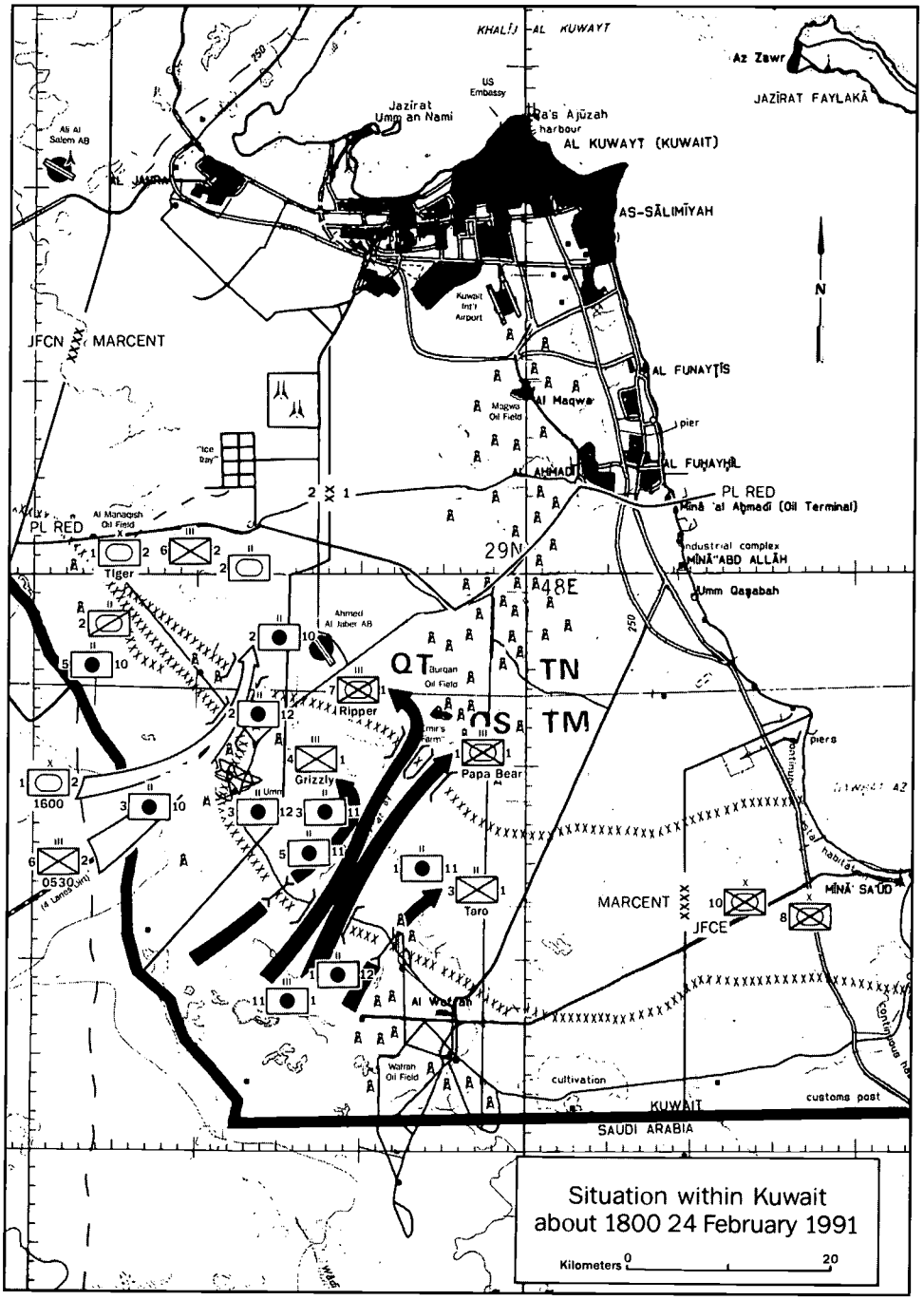
*Landing "T" is a set of lights set up by a landing zone control team with a radio to mark the landing zone and provide spacial orientation to the helicopters while landing. In this case with such a large formation in-bound, it would simply mark the landing zone and the wind direction.



OV-10s to reconnoiter and expand Task Force Papa Bear's breach site north of the second obstacle belt. By the end of this first day, nearly all of both Marine divisions would experience the surreal ominous atmosphere created by the rumbling burning well heads as they spewed clouds of dense, dark smoke across the battlefield. Ground crews, which had night vision devices, used them to see what they could before night fall.

Despite the weather and visibility, one or two divisions of four Cobra air-

craft flew the entire day in support of each attacking Marine division. They remained in constant demand, engaging tanks, armored personnel carriers, multiple rocket launchers, observation posts, and bunkers.

A division of Cobras, lead by Captain Randall W. "Spanky" Hammond flew a unique mission on night vision goggles at about midnight in support of the 1st Marine Division on this first night of the ground offensive. In what would become the standard over the next few days, when the command and control system could not get fixed-wing aircraft down through the cloud layers and smoke to address a threat, the Cobras were brought forward. What was unique on this mission was the distance beyond friendly lines that the Cobras would finally find and engage the threat. The 1st Division's air officer, call sign "Impala," directed Hammond's Cobras north to engage a reported column of T-72 tanks moving towards the division. The T-72's were north of the "Ice Tray" in the vicinity of Ali Al Salem Airfield, which was deep into "Indian Territory." The four Cobras with infrared chemical lights taped to their aircraft went into a close trail formation so that they could penetrate the thick smoke at about 1,500 feet. On night vision goggles the largest signature was the engines of the Cobra directly in front. They punched through and coordinated their position with a section of OV-10s from VMO-1 that had the tanks under observation on their forward-looking infrared. The OV-10s laser-designated the tanks and the four Cobras launched all eight of

The air and ground assault into Kuwait took place under dramatic conditions caused by burning oil wells, turning day into night in some cases. In this instance a Marine Cobra overflies a motorized column.

Hits on target also produced spectacular results, as this Iraqi tank "cooks-off" after being hit by allied fire. For purposes of bomb damage assessment, secondary explosions were a prime indicator of target destruction throughout the conflict

their Hellfire missiles with good secondary explosions on the tanks. The Cobras then divided into two sections with Hammond's section throwing up flares and Captain Steve R. Rudder's section firing TOW missiles, again with the tanks stopping and a couple of spectacular explosions. Captain Hammond realized that he was in a hover over some manned "bermed-in" T-62 enemy tanks and called the Cobras to quickly depart. Captain Rudder's section raked the position with 2.75-inch rockets and 20mm guns as it departed.[257]

The next morning, there was an initial request for Task Force X-Ray to be inserted at first light. A different mix of aircraft was put together to insert Task Force X-Ray in the same landing zone, and free up Task Force Papa Bear. Lieutenant Colonel Hall remained mission commander, but the plan was changed to a two-wave insert with 30 helicopters. Aircraft were pulled out to support numerous other taskings as both divisions pressed on and the combat service support moved in trail. Therefore, a first light launch was impossible, but by 1100 the flight was ready. However, it was held while Task Force Papa Bear again engaged enemy in the landing zone.

A forward arming and refueling point for helicopters had been established on the friendly side of the 1st Marine Division breach site near the border Observation Post 4. This would increase the sortie rate of the Cobras dramatically. Captain "Spanky" Hammond's four-aircraft Cobra division departed Lonesome Dove for work with Task Force Papa Bear at 0745. Again it was a foggy morning and smoke kept the ever-present OV-10 from bringing F/A-18s to

bear on a threat moving from the southeast towards Task Force Papa Bear. This turned out to be the Iraqi *22d Mechanized Brigade* of armored vehicles emerging from the smoke.

The OV-10 talked the Cobras onto the armored targets while Task Force Papa Bear engaged with TOW missiles. "Spanky" Hammond's Cobras needed no encouragement to pick one target after another and fire their 16 TOW missiles in about three minutes. The Cobras were about 3,000 meters ahead of the friendly troops, with every missile leaving a burning vehicle. Within another seven minutes they had fired all 16 of their Hellfire missiles at new targets, and the battlefield was now full of burning, smoking armored vehicles and tanks. Enemy troops were now moving forward from among the vehicles without any sign of white flags. The Cobras then used their remaining 2.75-inch rockets and 20mm guns to delay the enemy's forward movement, and returned to the forward arming and refueling site with no ammunition left. The pilots jumped out of the aircraft to quickly assist reloading the missiles while the ground ordnance troops loaded the more difficult 20mm rounds. The Cobras then returned to the vicinity of Task Force Papa Bear's command post where they observed a T-59 Chinese variant tank roll up with a white flag.

At about 1000, the fog began lifting and a forward air control OV-10 spotted a build-up of enemy armor to the northeast of the two Iraqi brigades counterattacking General Myatt's 1st Marine Division out of the Al Burqan Oilfields. Marine fighter attack aircraft took advantage of the improving visibility to pound the gathering force, which fled into the smoke.

Meanwhile Task Force Shepherd was attacked by a brigade-sized force and countered it with TOW missiles and thermal sights. The 1st Division's command post, which was just outside of one of the only forested areas in Kuwait, referred to as the Emir's Farm, was under attack as well. By 1015, and the second attack on the division's command post, Cobras had been added to handily repel the counterattack.

Task Force Ripper was supported in a similar manner by four Cobras for the entire day as they attacked around the Al Jaber Airfield. The Cobras played a key part in suppressing observation posts, which directly impacted on the enemy's ability to control directed artillery and rocket fires. Laser guided Hellfire missiles would have intermittent success depending upon who was doing the designating, and the range of that designation.

Task Force X-Ray was launched about 1200, but because the intended landing zone was full of prisoners of war and burning equipment, an alternate landing zone between the two obstacle belts was used. X-Ray finally moved the remaining distance on the ground and linked up with Task Force Papa Bear by 1500.

By noon, both divisions had reached Phase Line Red and Iraqi counterattacks seemed to have played out. The 2d Marine Division, to the west, was to attack and seize MEF Objective B, a main supply route intersection near Al Jahra. The 1st Marine Division, on the east, was to attack and seize MEF Objective C, the Kuwait International Airport, located 15 mile, south of Kuwait City, and on

the southern edge of the built-up area. What little sun and burn-off that occurred was now rapidly disappearing under cloud cover.

During the day, Task Force Grizzly had been moved up to take the bypassed Al Jaber Airfield, and its attack began at 1602. At 1722, the preparation fires struck Al Jaber. The Iraqi *449th Artillery Brigade* countered with fires that cost Task Force Grizzly 12 wounded and one killed. Most of the outer buildings of the airfield were taken by 2100. The remainder would wait for first light.

The 2d Division had fought its way to Phase Line Horse, and took advantage of pre-planned air attacks on trenches, bunkers, and dug-in tanks at two prominent terrain features noted as "Ice Cube" and "Ice Tray." Marine attack aircraft were now pressing the altitude restrictions even lower to more effectively attack their assigned targets. Attacks and re-attacks inside kill boxes were now pressed into a shrinking area as the fire support coordination line moved north and the ground forces occupied more of Kuwait.

Most of the scheduled fixed-wing close air support missions continued to be in the kill zones beyond the fire support coordination lines and working with the F/A-18D Fast FACs. The Cobras and Harriers often used the OV-10 as an airborne forward air controller to get them to targets. Actual close air support missions controlled by a ground forward air controller (FAC) were rare in comparison to the number of total missions flown. Commenting on the difficulties of a close air support mission, Colonel Rietsch noted:

> I flew a close air support mission for the grunts and the biggest problem we had was—luckily the target they wanted us to hit was very, very definable and visually could be able to talk the guy on. They tried to mark the targets for us with artillery and they couldn't get a really deep phosphorous artillery round within a thousand meters of the target.[258]

The Cobras, in delivering their close in fire support, had nearly as much trouble working with the ground forward air controllers (FAC). As HMLA-369 would note in their command chronology, they had built up a close working relationship with the ground forward air controllers of the 1st Marine Division during the many exercises of Desert Shield. They were somewhat less comfortable with the forward air controllers of 2d Marine Division, especially with their laser designating capability.[259] The ground FAC would rarely be able locate and identify Iraqi targets, even when they were delivering fire on them.[260] Routinely the ground forward air controller would talk the lead Cobra aircraft into the general area of the Iraqi position, and then ask him to identify the target with his telescopic sighting unit (TSU). The Cobras, due to poor visibility caused by haze and smoke, were seldom able to identify the target at more than 1,500 meters, and at times aborted to avoid the possibility of fratricide. This type of engagement had crews actually hovering over enemy positions ahead of the forward line of friendly troops and engaging enemy vehicles at close ranges. These distances were well short of their weapons' more favorable stand-off ranges.

Intelligence down to the squadron level was a problem as well. The best

Table: Direct Enemy Action Losses

DATE	SQUADRON	PERSONNEL	STATUS
17 January 1991	VMO-2	LtCol .Acree CWO4 Hunter	POW POW
28 January 1991	VMA-311	Capt Berryman	POW
9 February 1991	VMA-231	Capt Sonborn	POW
23 February 1991	VMA-542	Capt Wilboun	KIA
25 February 1991	VMA-542	Capt Walsh	Recovered by friendly forces.
25 February 1991	VMO-1	Maj Small Capt Spellacy	POW KIA

information pilots received was, first, from the returning aircraft; second, from the F/A-18Ds in the fast forward air controller role; third, from the airborne direct air support center (DASC[A]); and finally, in the case of OV-10s and helicopters, from the ground air officers. The squadron intelligence was always a day late in any threat brief. The only way to get a current indication of the forward line of troops was through the DASC(A) or ground FACs.

At 0935 on 25 February, VMA-542 lost its second AV-8B of the war. Captain John S. Walsh, call sign "Jump 42," was shot down under the cloud deck of 11,000 feet in the vicinity of Al Jaber Airfield by a probable hand-held surface-to-air missile. He ejected and was recovered minutes later in "no-man's-land" by Marines attacking Al Jaber. A Huey from HMLA-369 picked him up at 1400 and returned him to Lonesome Dove.

About 1400, an OV-10 from VMO-1 piloted by Major Joseph J. Small III, the squadron's aircraft maintenance officer, with Captain David M. Spellacy as the aerial observer, was lost while on a forward air control airborne mission. An AV-8 pilot saw the OV-10 maneuvering from antiaircraft artillery fire. He next observed an explosion in the air in the vicinity of the OV-10 and later saw the wreckage. A report from the surviving pilot, Major Small, after spending 10 days as a prisoner of war, indicated the loss was from an infrared guided surface-to-air missile. Captain Spellacy was initially listed as missing in action and later declared dead from enemy actions.[261]

The radar warning receiver (RWR, most often pronounced 'raw gear') in the OV-10, as in most of the helicopters, was the ALR-39, which was nothing more than a "fuzz buster" that points with a strobe in the direction of the threat. The strength of the strobe is supposed to give an idea about the range of the threat. It did not indicate the two primary threats that shot down 3d MAW aircraft, which were undirected antiaircraft artillery and the shoulder-fired infrared surface-to-air missile (IR SAM). Nearly any type of radar could set off the ALR-39, as Captain Daniel P. Gannon of VMO-1 noted: "It's a terrible piece of equipment. All it did was manage to . . . scare the hell out of me more than anything. We were locked up by our own people . . . by everybody in the world . . . no discrimination . . . It just didn't help at all."[262]

During the war, 3d MAW aircraft conducted several psychological warfare operations. On occasion A-6s were tasked to drop leaflets. Hueys often were

tasked to fly with a 2,700-watt loud speaker system with pre-taped messages and an Arab linguist. A typical psychological operation mission was flown by a section of Hueys on the night of 25 February with night-vision goggles near Al Jaber Airfield. Iraqi troops came out to surrender to the voices, and their locations would be forwarded to the nearest friendly troops. Forty-four Iraqi troops surrendered to Task Force Ripper from this night's mission. Lieutenant Colonel William C. Grubb, Jr., from the MEF would make an important observation concerning the Iraqi prisoners: "The key factor was that to a man the Iraqi prisoners I talked to said it was stupid to be in Kuwait . . . . They would tell us that fighting the Iranians was a fairly important thing to do . . . but fighting the United States over Kuwait was idiotic. We don't know how good these guys could have been, because they didn't want to be there; not because they were necessarily scared of us—although 40 days of pounding from the air and naval gunfire had its effect. They thought fighting us for Kuwait was the dumbest thing they had ever been exposed to and they were so happy to get a chance to survive."[263]

At about 0130, General Moore received indications from an F/A18D on night-vision goggles that a major Iraqi retreat from Kuwait City was taking place. General Boomer decided to close the door and ordered 3d MAW to launch as many night attack aircraft as possible onto the main road out of Kuwait City. Rainy weather again restricted the attack to A-6s and F/A-18s with night attack forward looking infrared radar capability. The first A-6 attacks bottled up the corridor with CBU-78 Gator air-delivered mines. This forced the retreating traffic off the highway and around the bottleneck into the desert.

G + 2, 26 February

Dawn on G + 2 was not characterized by fog as on previous days, however, with a wind shift the smoke was at times too thick for sunlight to penetrate. The road out of Kuwait City was far enough from the black, smoke-filled skies allowed for unrestricted bombing. It was bombed heavily at first light and throughout the day on the 26th, and later became known as the "highway of death."

At 0640, a section of Hueys was launched from 1st Division's command post on an emergency medical evacuation for a patient who had suffered a heart attack at Task Force Ripper's position about five miles north of Al Jaber. Captain David A. Sobyra was the section leader and directed his wingman to set down while he proceeded on slowly, just above the ground in smoke that reduced visibility to less than one-eighth a mile. Approaching the landing zone, based on the global positioning system, the visibility continued to decrease. The forward air controller helped guide Captain Sobyra by the sound from his rotor blades. The patient was picked up and transported to Lonesome Dove. In this case the crew had the global positioning system equipment, a good location, and good terminal communications.

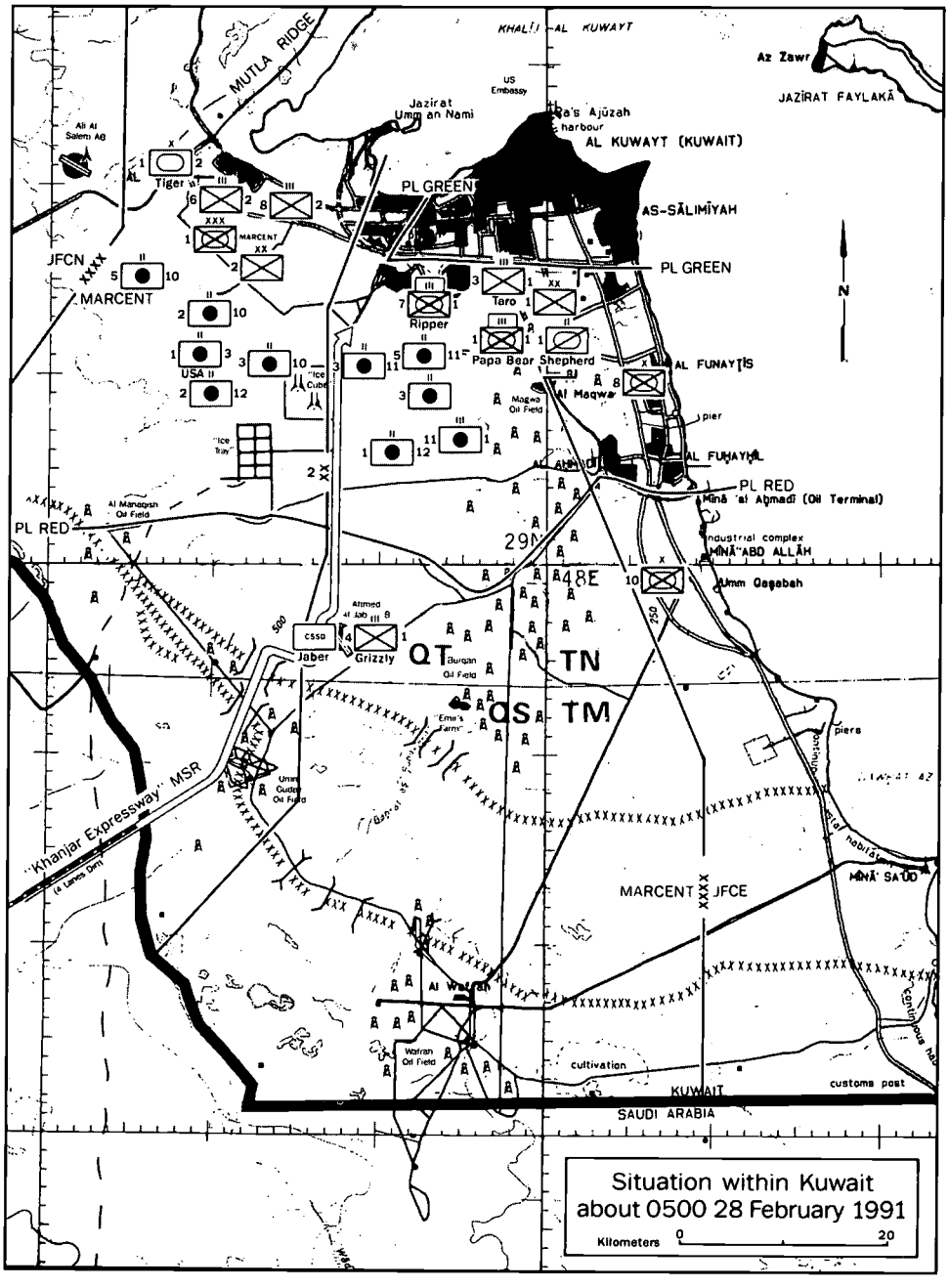
This medical evacuation, though difficult, went as planned. Captain

A Marine Harrier flies over a portion of the "Highway of Death," the route taken as the Iraqi army pulled out of Kuwait. This provided a target-rich environment for air attack in the closing days of the war.

William F. Davis, who worked as a helicopter "fragger" in the operations section during Desert Storm, later commented on the more normal medical evacuations as he saw them executed: "Airlift and maintenance limitations, limited navigation capabilities, limited communication capabilities, aircrew training, and accurate location reporting are just a few of the problems that I dealt with on a daily basis . . . ."[264] Pilots made daily decisions on whether to attempt a mission during adverse weather conditions using antiquated equipment, knowing that word to launch, location, and how to contact the unit may well have been garbled.

Once Task Force Grizzly had reported Al Jaber secure, an echelon of the direct air support center (DASC) broke away from the MEF headquarters and was deployed forward to Al Jaber Airfield to prepare for the main DASC operations. The need for setting up another forward arming and refueling site at Al Jaber was evident from a simple time-distance analysis as the divisions moved north. The prior planning would make this evolution seem simple, though lack of communications plagued this forward site.

Cobras quickly took up Al Jaber as the nearest forward arming and refueling point to support the 1st Marine Division as it continued its attack north. Lieutenant Colonel Michael M. Kurth would earn the Navy Cross for actions in leading Cobras over a 10-hour period though the intense smoke of the burning Al Burqan Oilfields. He would return to the holding point and guide a division or section of Cobras at a time through the smoke and under power lines to the unit that most desperately needed them. Kurth's Huey had an experimental forward looking infrared radar and laser designator that he used with considerable success in directing fires on the most threatening targets facing Task Force Ripper. His



Huey was forward of the friendly lines where he was able to designate the targets. At one point Kurth and his entire crew were flying in full chemical protection gear including gas masks until the area was declared clear of chemicals. The chemical detection tape on their left skid indicated a possible chemical attack. This was later found to have been caused by the smoke of the oil fires.[265]

Three HAWK firing units operated near the border of Kuwait beginning on 23 February. By 26 February, one unit operated out of Al Jaber, another out of Al Jahra, and the third out of Kuwait International Airport.

During the afternoon of the 26th, Major General Richard D. Hearney, deputy I MEF commander at the main command post, ordered Regimental Landing Team 5 (RLT 5) up through the breaches to handle the large influx of prisoners of war. General Boomer had taken his mobile command post and moved into Kuwait near 2d Marine Division headquarters. MAG-50, now ashore at Tanajib, would be tasked by HTACC to fly Battalion Landing Team 3/1 directly to the "Ice Tray" region to handle prisoners of war and provide security for the supply routes.

The 1st Marine Division continued to attack to the northeast until reaching a phase line at a set of east/west high power lines about 10 miles south of Kuwait International Airport. Both Task Forces Papa Bear and Ripper fought a series of skirmishes with some enemy units surrendering and others fighting, until they reached a coordinating feature, a set of power lines south of Kuwait City. At 1530 Task Force Ripper kicked off its attack to surround the final objective. It would occupy the north and western portions of Kuwait International Airport and Task Force Shepherd would take the terrain to the east of the airport. By 1800, Task Force Papa Bear had moved through sandstorms and near-zero visibility toward the last Iraqi defensive position between it and the airport. Movement and coordination were difficult and the task force would hold up at the airport perimeter road at 2300.

The 2d Marine Division with the Tiger Brigade kicked off their final attack at 1200 to take the Al Jahar intersection. At about 1320, the Tiger Brigade engaged 20 tanks and captured 500 Iraqis, but pressed on encountering unexpected mine fields along the Mutla Ridge west of Kuwait City. About 1930, the Tiger Brigade seized and sealed off the two major highway intersections north of Al Jahar, overlooking the "highway of death." The rest of 2d Marine Division seized their objectives south and east of Al Jahar.

Marine CH-46 helicopters from 3d Marine Air Wing sit parked at Kuwait International Airport, Kuwait City, after the ground war portion of Operation Desert Storm.

Photo courtesy of Sgt Charles G. Grow

G + 3, 27 February

At first light, about 0615, Task Force Shepherd began its final attack on the Kuwait International Airport, and by 0645, Marines had hoisted the United States flag and the Marine Corps colors from the flagpoles in front of the airport's terminal. This would become the site of 1st Marine Division headquarters and marked the taking of the last of I MEF's original objectives. Considerable fighting was left for the Army in closing the escape route at the Iraqi border. The Marine ground offensive had come to an end.

During the entire ground drive toward Kuwait City, Marines encountered several units worth of undamaged gear and bunkers fully supplied with months' worth of food and munitions that the Iraqis had left behind. Well engineered underground complexes with interlocking fires and defenses in-depth were laid out and almost untouched by the weeks of bombing. The dug-in equipment was operational and nearly invisible from more than a few meters away. Existing intelligence capability was either not targeting specifically enough to engage these units, or they were intentionally left untargeted. Additionally, the Iraqi soldier was simply unprepared to fight and die over another country. He generally surrendered in mass after token resistance at each defensive point. Counter attacking units were the exception and were normally heavy mechanized or tank units.

At about 0650, an AV-8B from VMA-331 operating from amphibious shipping was reported down by a probable infrared surface-to-air missile (IR SAM). While it was not a 3d MAW aircraft, it was a fellow Marine aviator. Captain Reginald C. "Woody" Underwood was leading the second section of a four-plane launch from the *Nassau* (LHA-4) that was controlled by an F/A-18D on targets along the northern highway out of Kuwait City as it crossed the Iraq border near Safwan. Weather was reported as 10,000 feet overcast, but the division leader, Captain Ben D. Hancock, reported being just under the cloud deck at 8,000 feet when the tactical radio call was made: "Break, Break, Flares!"* Hancock reported multiple missiles in the air with at least two heading toward "Woody" as he pulled up into the clouds. "Woody" reported, "I'm hit," followed by "I can't control it." His AV-8B crashed, and the F/A-18D assumed on scene commander as the remaining AV-8s reached "Bingo fuel."**[266] Captain Reginald C. Underwood would be the third and final Marine aviator to die due to direct enemy action.

An Air Force F-16 was downed just a few miles from the downed AV-8B a short time later. Two F/A-18s from VMFA-314 provided antiaircraft artillery suppression as combat search and rescue helicopters attempted to recover a downed pilot, 10 miles west of Basra in Iraq. Of all coalition fixed-wing aircraft attrition due to enemy action, 71 percent were from infrared surface-to-air mis-

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* "Break, Break, Flares!" is a tactical call made by any pilot in the flight that sees a missile launch. Every pilot in the flight is to make a hard turn and put out flares to decoy any inbound missile.

** Bingo fuel is the minimum fuel required for a pilot to return to the briefed return field and shoot an approach to a landing.

siles and antiaircraft artillery, 13 percent are unknown and 16 percent were from radar, guided surface-to-air missiles.[267]

G + 4 28, February

Shortly after 0500 on the 28th, Marines heard President Bush on the World Service of the British Broadcasting Corporation ordering the cessation of hostilities effective at 0800 on 28 February 1991. I MEF transmited the following message with the CINC's concurrence:

> Cease all offensive operations effective 280500Z 0800C. Remain in current positions and assume defensive posture. Wartime rules of engagement remain in effect. Be prepared to resume offensive operations. Forces are allowed to defend themselves.[268]

Al Jaber proved untenable due to the large amount of unexpended ordnance, clouds of oil well smoke, and the unhealthful conditions left by the Iraqi predecessors.[269] The forward echelon of the direct air support center (DASC) returned to the MEF forward command post. This would mark for the wing, the beginning of the realization that occupation of Kuwait would be as short lived as possible. The MEF command post was originally intended to forward deploy to Al Jaber also, but was directed to return to Jubayl.

From 28 February to 5 March, units of the 1st Marine Division remained at the Kuwait International Airport. After the signing of the peace at Safwan, like the sounding of "EndEx" (end of exercise), each unit clamored to be out of Kuwait and fought for its position in returning to the United States. The same tanker and aluminum bridges that brought them over would have to work in reverse. There would still be the combat air patrols to man, the medical evacuation duty to stand, and the supply support to fly. But units would be withdrawn as quickly as the logistics system could handle them. Focus was now on safety and not losing another Marine in this hazardous environment, as well as returning with all the equipment that represented the Marine Corps' future.

From G-Day until G + 4 all of 3d MAW's fixed-wing aviation communities flew at surge rates. A summary of the G-Day air tasking order is depicted in the table on page 168. This tasking provided that four AV-8 and four F/A-18 attack aircraft be launched every 30 minutes. This equated to a two-plane section of close air support aircraft over the Kuwaiti battlefield every six and a half minutes.

The rotary-wing aircraft were just as busy flying a variety of missions to supply the two divisions. Medical evacuations after G-Day increased considerably, shifting from the common vehicle accidents to injuries involving ordnance. Troop lifts would continue in support of all the units on the battlefield despite the relative ineffectiveness of the Task Force X-Ray mission. Close-in fire support by Cobras and OV-10s would continue through the last day of fighting and resemble the "push CAS" system used by the fixed-wing in the final days. Even so, the Cobra crews would lament that they felt they were underused on the battlefield and never fully met surge rates. The fact was that the average helicopter crew

Table: Summary of G-day period ATO [270]

Aircraft mission	Station time/ time on target	Total sorties
KC-130		
DASC(A)	24-hour coverage	8
Tanker	24-hour cover on Gooseberry	as required
Tanker	0230-1430 cover on Berryberry	as required
Senior Warrior		
OV-10		
West TAC(A)	24 hours	7
East TAC(A)	24 hours	7
FAC(A)	24 hours	10
F/A-18D		
East FAST FAC	0300-1500, continuous	12
West FAST FAC	0300-1500, continuous	12
Night FAST FAC	1500-0300, 30 minutes per hour	6
AV-8B		
CAS stack	0300-1500, section every 15 minutes 1500-0300, section every 30 minutes	144
DAS	0400-1500, section every 30 minutes	44
F/A-18		
CAS stack	0245-1445, section every 15 minutes 1445-0245, section every 30 minutes	144
SEAD/AAW CAP	24 hours	24
A-6E		
CAS/DAS	1530-1800, two singles per hour 1800-0000, four singles per hour 0000-0230, two singles per hour	35
EA-6B		
East ECM orbit	24-hour coverage	8
West ECM orbit	24-hour coverage	8

NOTE: Times are Zulu time.

member spent a far larger portion of each mission in the vicinity of the enemy in Kuwait. The table on page 169 shows a breakdown by aircraft of 3d MAW rotary-wing sorties flown in Desert Storm.

Post Ceasefire and the Credit Scramble

General Moore wanted 3d MAW's record in Desert Storm to be based upon its effect on the enemy and not upon the statistics of number of bombs dropped, or sorties flown. However, a sampling of these statistics needs to be used to display the magnitude of the effort.

3d MAW's effect on the enemy can be recounted in the artillery raids that

Table: Rotary Wing Sorties [271]

DATE	AH-1J/W	UH-1N	CH-46E	CH53D/ E	TOTAL SORTIES	TOTAL HRS. FLOWN
17 Jan	28	37	27	40	132	NA
18 Jan	25	10	41	36	112	NA
19Jan	14	22	28	39	103	NA
20 Jan	40	7	28	23	98	NA
21 Jan	24	2	26	32	84	NA
22 Jan	22	6	30	26	84	NA
23 Jan	22	4	28	27	81	NA
24 Jan	15	11	39	39	104	NA
25 Jan	24	13	31	42	110	NA
26 Jan	36	10	41	56	143	NA
27 Jan	31	19	32	48	130	NA
28 Jan	22	27	37	73	159	NA
29 Jan	22	28	46	73	169	NA
30 Jan	30	26	77	69	202	NA
31 Jan	NA	NA	NA	NA	NA	NA
01 Feb	NA	NA	NA	NA	NA	NA
02 Feb	53	37	25	53	168	NA
03 Feb	57	22	48	37	164	NA
04 Feb	30	31	29	44	134	NA
05 Feb	31	19	41	54	145	NA
06 Feb	39	17	51	53	160	NA
07 Feb	42	22	29	34	127	232
08 Feb	34	26	39	33	132	230
09 Feb	38	17	27	39	121	211
10 Feb	30	19	30	32	111	255
11 Feb	20	29	30	332	111	258
12Feb	29	15	41	65	150	313
13 Feb	29	32	37	60	158	285
14 Feb	43	18	63	75	199	374
15 Feb	17	23	27	55	122	275
16 Feb	30	38	34	54	156	262
17 Feb	28	35	29	59	151	262
18 Feb	37	20	47	64	168	331
19 Feb	14	35	42	27	118	174
20 Feb	28	28	63	62	181	281
21 Feb	30	28	29	28	115	215
22 Feb	38	22	64	50	174	244
23 Feb	25	35	34	25	119	180
24 Feb	37	30	40	39	146	248
25 Feb	29	29	20	87	165	408
26 Feb	30	27	52	107	216	456
27 Feb	58	39	48	105	250	501
28 Feb	34	36	13	29	112	209

the wing participated in from the beginning of Desert Storm. As General Myatt later said, the objective of the artillery raids was not "to destroy artillery pieces," but rather "we were trying to defeat the minds of the Iraqi soldiers."[272] The goal was to make them too gun-shy to come out of their bunkers to man the artillery pieces already loaded and aimed at the breaches.

Total amount of ordnance dropped has little meaning unless it is tied to what the ordnance was dropped on, and what its effectiveness was. This is difficult to measure, except to note that most Marine ordnance, especially as the ground offensive approached, was delivered one or two bombs at a time on marked targets, making multiple passes for accuracy and corrected by aerial observation. The focus was on countering the forces that would hinder the

Table [273]

Listing of Selected Munitions Employed in Desert Storm 17 Jan-28 Feb 1991[273]*

Munitions	Expended			
	Air Force	Navy	Marine Corps	Total
General-Purpose Bombs				
Mk-82 (500 lb)	59,884	10,941	6,828	**77,653**
Mk-83 (1,000 lb)		10,125	8,893	**19,081**
Mk-84 (2,000 lb)	10,467	971	751	**12,289**
Mk-117 (B-52)	43,435			**43,435**
CBU-52 (fragmentation bomb)	17,831			**17,831**
CBU-87 (combined effects munition)	10,035			**10,035**
CBU-89/78 (Gator)	1,105	148	61	**1,314**
Mk-20 (Rockeye)	5,345	6,814	15,828	**27,987**
Laser-Guided Bombs				
GBU-12 (laser/Mk-82)	4,086	205	202	**4,493**
Air-to-Surface Missiles				
**AGM-114 Hellfire (AH-64 and AH-1W)	Army = 2,876	30	159	**3,065**
AGM-65 All Models (Maverick)	5,255		41	**5,296**

Notes:

*The selected munitions were those most often employed in the Kuwait theater. Other types of laser-guided bombs and air-to-surface missiles were used in the war, but not, principally, in the Kuwait theater. Totals given are those employed on all targets, however, not just those in the Kuwait theater. See cited tables for a listing and totals of all weapons expended during the war.

**The Navy and Marine Corps also fired a total of 283 BGM-71 TOW munitions from helicopters.

Marines from accomplishing their mission of getting to, cutting off, and freeing Kuwait City.

On 28 February, the final day of the war, the 3d MAW had 406 aircraft and 15,655 personnel, excluding MAG-50. It flew 13 different types of aircraft in more than 18,000 sorties with a readiness level of more than 85 percent during Desert Storm. It operated from five major sites (Shaikh Isa, King Abdul Aziz, Jubayl, Tanajib, and Lonesome Dove) and three minor sites (Mishab, Kibrit, and Ras Al Ghar). It built up, supported, and operated these facilities with everything from billeting, food, and showers, to fuel, ordnance, and command and control.

OV-10 from VMO-1 being loaded on 24 April 1991 on the Maritime Prepositioning Ship MV PFC Anderson *for transportation to Morehead City, North Carolina, a 35-day trip.*

The wing built six base camps each housing more than 3,000 Marines, and six expeditionary airfields. In the process it helped lay more than 3.5 million square feet of AM-2 matting and one million square feet of asphalt. This did not include many remote forward arming and refueling sites and HAWK missile sites.

The enormity of the coordination of tying 3d MAW into the larger theater Joint Force Air Component Commander, along with coalition aircraft cannot be overstated. The process was one of airspace management to include positive and procedural airspace control, boundaries, and missile engagement zones, but the air tasking order was a primary tool.

General Moore would reiterate that the joint force air component commander process of having one single manager had its limitations in trying to fight a fluid battle. The air tasking order was cumbersome, but when viewed more as a coordination process it was needed. There were no blue-on-blue air engagements and no midair collisions. That is remarkable when in excess of 2,000 coalition sorties a day were being launched at the war's peak.[274]

MAG-13 Commanding Officer, Colonel Bioty, later stated: "Things worked better over there [Saudi Arabia] than we made them out to be back here. The real war was fought when we started to write the books about Desert Storm."[275]

Logistics and support issues were for the most part overcome by the will and determination of individual Marines. Lieutenant Colonel Michael J. Aguilar, a Cobra pilot and executive officer of MAG-16, would believe that one of the major headaches he had to deal with was the various support units brought in to

None of the returning Marines were more relieved to be welcomed home than the five Marines held as prisoners of war.

help the MAG. "It was very frustrating when the Rear Area Security came in and said, 'We're here to help you,' the postal service came in and said, 'We're here to help you,' disbursing came in and said, 'We're here to help you.' All those combat service support functions came in to help us, and the overhead for that assistance to the group was tremendous with respect to number of people required from the group. Additionally, we had to provide them with transportation . . . tents . . . they did not show up with the personnel or equipment to provide that service that consequently came out of hide. A Marine aircraft group is not structured to do that."[276]

Additionally, communication and motor transportation assets were in

Iraqis working to by-pass a bridge blown to cut supply lines from Iraq.

such short supply as to cause a constant struggle to accomplish the mission. For example, MAG-16 had no organic transportation. The group's commanding officer, a colonel, and nine lieutenant colonel squadron commanding officers did not have transportation, except for three Government of Japan-donated "jeeps," and a rented four-door Ford Crown Victoria that the group commander used the entire time in-country. Colonel Garrett later recalled one plan to augment transportation. While flying border reconnaissance in early January, "we spotted a really nice Mercedes sedan that had been abandoned just across the berm . . . no more than a couple of hundred meters. We developed a splendid variant of a TRAP (tactical recovery of aircraft and personnel) to liberate a potential staff car, but alas, could not secure approval to execute."[277] Transportation was always a factor in everything from getting aircrews to the aircraft to just drawing MREs to feed the squadrons. The Marine wing support squadrons had enough problems just trying to provide their own transportation to give the groups the support they needed. The frustration level was high when Marines observed other services show up with their vehicles, their tents, their cots, and all the support required by their fighters, as opposed to the "trigger pullers" that have to go scrounge for support.[278]

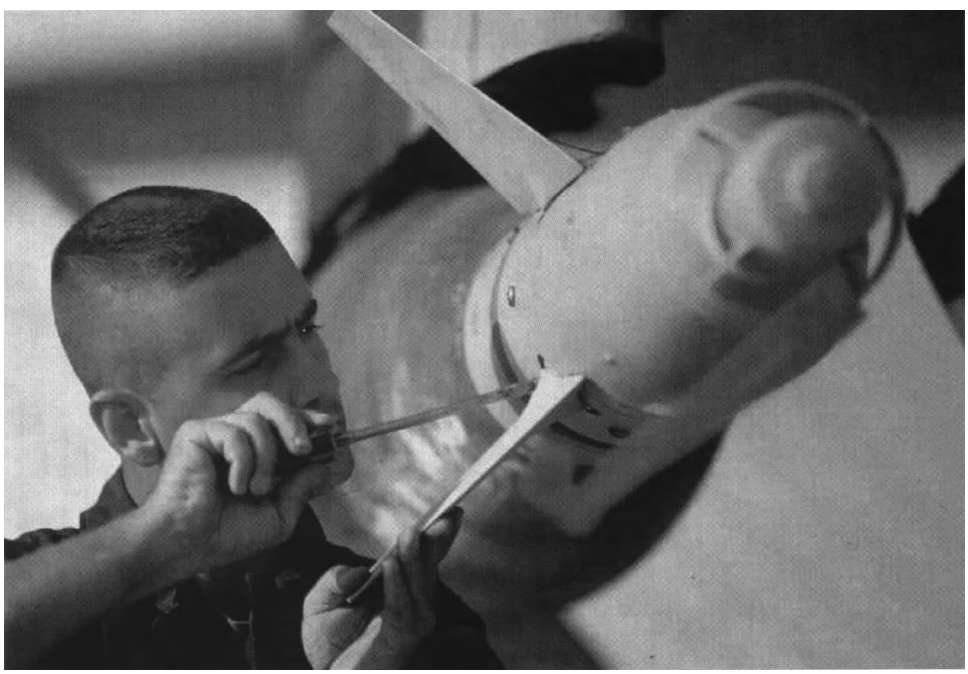
Aviation did a lot of things right. Adaptability and flexibility in leadership and the Marines "can do" spirit overcame not only the few things done wrong, but also the doctrine that did not apply to most of what faced the aviators of Desert Shield and Desert Storm. Of the things done wrong, none turned into "showstop-

pers." In the helicopter community especially, Vietnam-era equipment was adapted and flown with aircrew skills overcoming the difficulties of a new, riskier environment.

Time and again, commanders would praise their Marines as making the difference in this war. Lieutenant Colonel Richard L. Owens of MALS-14 would say: "When you talk about aviation logistics, whether it is maintenance, avionics, ordnance, or supply . . . it is very, very complicated . . . funding rules . . . crossing TyComs (type commanders for the aircraft, one on the East Coast and one on the West Coast) with different regulations on how to transfer material... we did all of those things . . . it was a real tribute to the caliber of Marines . . . we just improvised as we went along and the Marines were superb."[279]

Colonel Williams of MAG-26 had two major concerns coming into theater late. His first concern was the logistics and communications supporting the group in the harsh conditions in Saudi Arabia. He found they were able to scrounge support from other local commands to operate. "We had to improvise quickly." His second concern was how his group would perform together when some of the Reserve squadrons were not joining MAG-26 until they met in country. "It did not cause any problems. They did a wonderful job. They were enthusiastic and professional in everything they did." The group ended up spread over 200 miles. "That's like having the group headquarters at New River and the group at Washington D.C . . . They made it work . . . I was confident of my Marines' ability going into a combat situation." Lieutenant General Boomer would call the group the unsung heroes. "Both Lieutenant General Boomer and General Norman

Cpl Jeff Jenkins of VMA (AW)-224 attaches the fins to a 1,000-pound air-to-ground missile on the wing of an A-6E.



Schwarzkopf expressed how proud they were of the group, but they could never be as proud as I," concluded Williams.[280]

3d MAW was never convinced that the Air Force's strategic bombing would accomplish the theater goals of getting Iraq out of Kuwait. The Marines slowly pulled more and more sorties to the tactical arena and bombed forces in Kuwait. This does not mean that the Joint Force Air Component Commander and the Air Tasking Order were not supported in the destruction of strategic or integrated air defense targets. It was, but, all the while, Marine aviation husbanded some assets and remained focused on what it was convinced it would take to get the MEF job done.

The welcome home for the heroes of this war was far different from the reception of those that served in the Vietnam War. America would proudly open her arms to the returning warriors of Desert Storm. The five Marine prisoners of war—Lieutenant Colonel Clifford M. Acree, Chief Warrant Officer-4 Guy L. Hunter, Major Joseph J. Small III, Captain Russell A.C. Sanborn, and Captain Michael C. Berryman, all 3d MAW aircrew—would receive special recognition. They received two of this nation's most prestigious awards which no serviceman ever aspires to attain, the Purple Heart and the Prisoner of War Medals.

General Amos had some prophetic words and an admonition for those historical writers who would inevitably follow this war:

> We are going to discuss it for years. Books are going to be written. The Marines . . . will self-flagellate and point fingers . . . . But, I think that we've got to be careful of, as we are writing things down, that we don't lose sight of what our mission was and the fact that we did it. We . . . did it! . . . . We had problems. We sat down at all levels and came up with solutions to the problems, not necessarily from the book. The only problem we never solved was to identify friend from foe on the ground . . . unfortunate . . . the final outcome is the same . . .we won. Look at how we did it as we are putting all this stuff together.[281]

The 3d Marine Aircraft Wing had 15,655 personnel that pulled together as a team to provide I Marine Expeditionary Force with Marine aviation when and where it was needed to accomplish the mission. General Schwartzkopf told General Boomer on the tactical radio shortly after Kuwait International Airport was reported secured, summing up the drive that the MEF had made to reach its objectives: "It was another glorious chapter in the history of the Marine Corps."

Notes

The primary sources for this monograph are unit command chronologies (ComdC) on file at the Marine Corps Historical Center (MCHC), Washington Navy Yard, Washington, D.C. The oral history interviews of participants cited are tape recordings on file at the Oral History Unit, MCHC. Participants correspondence with the author, in the form of letters and electronic mail messages, are on file with author's backup materials at MCHC.

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Appendix A
3d MAW Chronology

AUGUST

2 Aug 1990	- Iraq invades Kuwait.
6 Aug 1990	- Saudi Arabia requests U.S. assistance.
	- 3d MAW receives Warning Order.
8 Aug 1990	- LtGen Boomer assumes command of I MEF.
	- MAG-70 chops OPCON to CG 7th MEB.
12 Aug 1990	- Three ships of MPSRon-2 arrive Port of Jubayl, Saudi Arabia.
13 Aug 1999	- MAG 70 Advance Party departs MCAS El Toro, California.
	- MAC Airflow for MAG-70 main body begins.
	- USNS *Curtiss* (TAV-B) underway.
14 Aug 1990	- First helicopters (AH-1W) depart El Toro.
	- First fixed-wing aircraft depart El Toro.
15 Aug 1990	- CG 3d MAW arrives in theater to assist MAG-70.
	- MACS-1 TAOM departs El Toro.
	- CG 7th MEB arrives in theater.
	- HMLA-369 first MAG-70 aircraft arrive in theater.
16 Aug 1990	- H&HS-28 embarks on board USS *Spartenburg*.
17 Aug 1990	- MACS-1 TAOM arrives Dhahran, Saudi Arabia.
	- Civil Reserve Air Fleet activated.
20 Aug 1990	- VMA-311 (AV-8s) first fixed-wing arrive in theater.
24 Aug 1990	- MAG-70 declared combat ready.
	- H&HS-38 arrives Bahrain.
	- VMA(AW)-224 arrives Shaikh Isa, Bahrain.
	- MAG-70 begins CAP missions over the northern Persian Gulf.
25 Aug 1990	- MajGen Hopkins reports 7th MEB combat-ready.
	- MACS-1 TAOM operational at King Abdul Aziz.
	- TACC arrives at Shaikh Isa, Bahrain.
30 Aug 1990	- TACC established at Shaikh Isa, Bahrain.

SEPTEMBER

1 Sep 1990	- TACC operational.
3 Sep 1990	- MAG-70 dissolves and 3d MAW stands up under OPCON of I MEF.
	- FARP site Camp Foss is opened and utilized.
	- MAG-11 (Shaikh Isa) and MAG 16 (Jubayl) stand up.
4 Sep 1990	- CINCCENT visits Shaikh Isa.
7 Sep 1990	- TAOC controls Eastern CAP zone for first time.

- 3d MAW surge operations demonstrated.
- VMA-311 began conducting four-plane CAS training missions in working area utilizing internal FACA.

8 Sep 1990 - CG I MEF visits TACC.

13 Sep 1990 - CJCS Gen Powell visits 3d MAW.
- HMH-465 loses a CH-53E in a Class "A" mishap.

14 Sep 1990 - CJCS Powell visits TACC.
- First simulated strike on Shaikh Isa.

17 Sep 1990 - SS *Wright* (TAVB-3) arrives at Jubayl, Saudi Arabia.

21 Sep 1990 - UH-1N and CH-53D rotor blades reported to show signs of sand corrosion.

22 Sep 1990 - 3d MAW conducts night surge operations exercise.

23 Sep 1990 - 3d MAW begins combined training exercise with Bahrain AF.

24 Sep 1990 - CMC Gen Gray visits 3d MAW.

25 Sep 1990 - RSAF grants 3d MAW permission to use King Fahd live fire range
- 3d MAW given control of air space over defensive positions of I MEF Ground Combat Element.

26 Sep 1990 - VMA-311 flew first CAS training missions ISO I MEF with I MEF ground FACs.

28 Sep 1990 - 3d MAW helicopters begin using NVG/Live Ordnance training range.

OCTOBER

3 Oct 1990 - F/A-18s conducted first hot training mission using MK-76.
- VMA-311 began flying Kill Zone tactics in training area 19 using a four-plane Recce formation.

4 Oct 1990 - Conducted major calibration/offensive attack profile to exercise 3d MAW defensive air interdiction capability and air defense C2.

5 Oct 1990 - VMA-311 began working with "Hardrock" FACs using Laser CAS tactics.
- COMUSMARCENT directs special team to begin planning for an offensive operation.

7 Oct 1990 - Col Bioty stands up MAG-13 (Fwd).
- VMA-311 chopped to MAG-13 (Fwd).

8 Oct 1990 - MAG-11 and MAG-16 receive first AM-2 matting (917 bundles) to expand ramp space.

10 Oct 1990 - First Tactical Air Exercise conducted.

11 Oct 1990 - CAS strip alert launch to test C3 and aircrew responsiveness.

13 Oct 1990 - All elements of Task Force Cunningham meet.

14 Oct 1990 - MALS-11 (Fwd) maintenance fully operational.
- MAG-16 conducts reaction team drills.
- BGen Amos visits Jubayl Airport and is briefed on Task Force Cunningham.

- NVG LLL training suspended by CG 3d MAW.

16 Oct 1990 - Intelligence Flow exercise under supervision of USCENTAF.

18 Oct 1990 - 3D MAW hosts two-day visit of 35 AOs and TACP personnel to discuss CAS and C2 procedures.
- TACEX exercising 3d MAW Battle Staff integration into TACC.
- CG 3D MAW meets with senior Bahraini officer to discuss combined actions in event of attack.

19 Oct 1990 - Multi-plane mass night strike conducted to test 3d MAW's night-attack capability.
- AWC BGen Amos hosts Task Force Cunningham meeting at Jubayl NAF.

20 Oct 1990 - MEF plans Battle Staff Planning Group.

23 Oct 1990 - MAG-16 begins support of TF Cunningham.

25 Oct 1990 - MAG-11 supported USCENTCOM exercise in Abu Dhabi.

29 Oct 1990 - HMH-465 completes a company-sized lift on NVGs.

30 Oct 1990 - TF Cunningham exercises in support of 4th MEB.
- 3d MAW and USAF units conduct joint simulated strike mission against Shaikh Isa AB. The mission exercised all phases of an offensive tactical mission necessary to conduct a deep air strike.

31 Oct 1990 - MAG-11 conducted a long range CAS mission ISO 4th MEB PhibEx in Oman.

NOVEMBER

1 Nov 1990 - MAG-16 safety standdown.
- CINCCENT directs initial offensive planning.

2 Nov 1990 - MAG-16 trooplift for 1/6. 300 PAX and 12 HMMWVs with 8 CH-53s and 4 AH-1Ws.
- Three Iraqi aircraft penetrate Saudi airspace.

4-5 Nov 1990 - VMA-542 departs Shaikh Isa for KAANB and chopped to MAG-13 (Fwd).
- VMA-311 first sortie flown to test DECM Pod against HAWK sites.

5 Nov 1990 - 7th Armor Bde flow complete at 10,000+ personnel.

6 Nov 1990 - SecNav visits 3d MAW.

7 Nov 1990 - 3d MAW helicopters participate with LAAD teams in Stinger pro-file exercises.

8 Nov 1990 - Conducted Devil Dog One rehearsal with CAS, CAP, SEAD, EW assets.
- Flew tactical NVG troop insert.
- I MEF T/O = 1st Mar Div + 7th Armor Bde + 3d MAW + 1st FSSG.

10 Nov 1990 - Largest armored, mechanized MEF in Marine Corps history celebrates the 215th Marine Corps birthday in the AOR.

12 Nov 1990	- Capt USN Hunt, CO of USS *Worden* (CG-18) visits 3d MAW to refine air defense and C2 coordination.
13 Nov 1990	- Special recognition for H&HS-38 role in SAR effort for downed UK Jaguar. - 1st MarDiv and 7th Armor Bde conduct three day force-on-force exercise.
14 Nov 1990	- VMA-311 conducted ELINT mission and SIM DAS strike for operation Desert Triangle to probe within 15 km of southern Kuwait border and observe enemy reaction. - Reinforcements added to planning. - 1 MEF T/O = 1st and 2d MarDiv + 1st Armored Div (UK).
15 Nov 1990	- Imminent Thunder exercise commences at 0100.
16 Nov 1990	- ROE for defense of Bahrain signed by 3d MAW, RAF, BDF, and 35th TFW. - Initial courses of action brief to CINCCENT.
15-16 Nov 90	- MAG-11, and VMFA-333 attend the Fighter Tactics Development Meeting held at NAS Oceana to discuss the current situation in the Gulf.
18 Nov 1990	- CG 3d MAW meets with Crown Prince of Bahrain to discuss basing of aircraft at Shaikh Isa. - VMA-311 conducted SIM CAS ISO 4th MEB for Operation Devil Dog One.
19 Nov 1990	- Devil Dog One commences as part of Imminent Thunder. VMA-311 launches 50 sorties ISO Imminent Thunder.
21 Nov 1990	- 3d MAW participation in Imminent Thunder ends at 1100. Flew 904 fixed-wing sorties, and obtained OPRDY of 83%.
22 Nov 1990	- Supported Presidential visit with six CH-53E and two UH-1N. - President and Mrs. Bush have Thanksgiving dinner with MEF.
24 Nov 1990	- MAG-11 conducts counter-terrorist drill. - HMH-465 Loses a CH-53E due to engine fire.
27 Nov 1990	- VMGR-352 conducts first helicopter air refueling in SWA.

DECEMBER

1 Dec 1990	- Two HMLA-369 Hueys on NVGs provide a pre-dawn insertion and extraction for Force Recon.
2 Dec 1990	- VMAQ-2 reported end tray radar activity that indicated potential SCUD launch. Three SCUDs launched at targets inside Iraq. - MEF south, west, and north option developed.
5 Dec	- Flow of II MEF reinforcements begins.
10 Dec 1990	- Control passed to Alternate TACC (ATACC) at KAANB.
11 Dec 1990	- II MEF reinforcements begin to arrive. - 1st MarDiv support base moves north to Manifah Bay.
12 Dec 1990	- LtGen Trainor briefed 3d MAW personnel on Iraqi ground troops H&HS-28 participates in Sea Soldier III

15 Dec 1990 - MEF decision brief's south option selected.
- Full Oplan developed.
16 Dec 1990 - VMGR-252 (Det) arrives in theater.
17 Dec 1990 - Arrival of VMFA-212 and VMFA-232.
18 Dec 1990 - 18 AV-8s of VMA-231 arrive in theater from Japan.
- Col Robert W. Coop stands up MWSG-37.
19 Dec 1990 - TAOM operational at Jubayl NAF.
- MEF tops 40,000 Marines in-country.
20 Dec 1990 - VMA(AW)-533 arrives in theater.
22 Dec 1990 - SecDef visits 3d MAW.
- MPS offload complete.
24 Dec 1990 - Control passed from ATACC Bahrain to TACC al Jubail
- Oplan briefed to CMC.
- 1st Armored Div (UK) transferred to operational command of ARCENT/; Tiger Bde transferred to MEF.
25 Dec 1990 - Christmas show of force at Kuwaiti border by VMA-235.
27 Dec 1990 - Bob Hope performs at Shaikh Isa with USO team.
- VADM Arthur COMUSNAVCENT visits 3d MAW.
31 Dec 1990 - VP Quayle visits KAANB.
- MEF tops 50,000 Marines in country.

JANUARY 1991

Early Jan 1991 - Southwest option refined and reintroduced.
1 Jan 1991 - Decision made to base KC-130s that will carry Senior Scout SIGINT package at Shaikh Isa.
- HMLA-369 CO, XO, combat division, and section leaders meet with TF Ripper.
- ACE tops 300 aircraft in-theater.
- VP Quale visits MARCENT.
- CG approves MARCENT Oplan.
1-9 Jan 1990 - MWSS-174 installs 19,800 sq ft of AM-2 matting to extend TAFDS refueling site at KAANB.
2 Jan 1991 - Briefing for Division and FSSG commanders on all four phases of offensive air campaign
- MACS-2 radar site established north of Al Mishab by elements of MWSS-174.
3 Jan 1991 - Mirror Strike/combat profiles flown to test plans.
- 3D MAW participated in CENTAF exercise Fish Barrel.
- MAG-11 establishes combat ops center.
- MV *Galveston Bay* offloaded by MWSG-37 at Port of Jubayl and equipment distributed to support squadron.
4 Jan 1991 - Procedures established to allow USN aircraft to enter MACCS.
- MWSS-272 in country, personnel and equipment staged at KAANB\.

5 Jan 1991	- MWSS-273 displacement to Al Mishab completed.
6 Jan 1991	- DASC manning and structure issues brought to CG I MEF for resolution. - Moved I MEF CP forward to vicinity of Safaniya.
7 Jan 1991	- Wing HQ move to Jubayl NAF completed (7 days ahead of schedule). - Site survey conducted at Al Kibrit by MWSS-271 for future FARP site.
8 Jan 1991	- MEF reports six Iraqi helicopters cross border near OP 4. The helicopters were in contact with Saudi and Marine interpreters on ground. Helicopters request to land in Dhahran, were refused and advised to land 30 miles south of the border. Four landed at Al Kafji and two landed near OP 4.
9 Jan 1991	- Decision made to use roads or other hard surfaces for helicopter landing and refueling if necessary.
10 Jan 1991	- 3d MAW alert posture increased IRT threat of Iraqi preemption
11 Jan 1991	- Airborne F/A-18 CAP increased to four aircraft in response to increased Iraqi air. - Construction begins on FARP sites at Al Kabrit. - 7th Armored Bde transfer to operational control of 1st Armored Div (UK)
12 Jan 1991	- CG proposed to lift several peacetime restrictions on CH-46 and CH-53 aircraft in order to carry more Marines. - Construction begins on airfield at Al Mishab.
14 Jan 1991	- VMFA(AW)-121 arrives in theater. - Weather prevents air support for breaching exercise. - TAFDS at Al Kibrit operational with two refueling points.
15 Jan 1991	- UN deadline for Iraq withdrawal. - Phase I targets reevaluated and additional targets identified. CG decides to include AV-8B aircraft into Phase I planning. -CommEx tested links with airborne DASC. Two DASC(A)s now exist.
17 Jan 1991	- Desert Shield complete. - Desert Storm begins. - Phase I on Desert Storm air campaign commences. - Fixed-wing groups attack position in Iraq and Kuwait. - VMO-2 loses an OV-10, lieutenant colonel and chief warrant officer taken prisoner.
18 Jan 1991	- First F/A-18D missions as Fast FAC.
19 Jan 1991	- CG I MEF visits CG 3d MAW to discuss next 48-96 hours. MV *Atlantic Freighter* offloaded by MWSG-37 at Port of Jubayl and equipment distributed to MWSS-271 and MWSS-273. - Tiger Bde (USA) closed with 2d MarDiv. - First Iraqi soldiers surrender in AOR.
20 Jan 1991	- FATP sites and five VTOL pads operational at Al Kibrit.

TAFDS with six refueling points and CFR support available for aircraft.
- VMA(AW)-224 leads start of BAI campaign in southern Kuwait.

21 Jan 1991
- Many JFACC sorties cancelled due to weather.
- Efforts made to work around JFACC tasking to strike Phase II targets.
- Iraqi *III Corps* HQs struck.
- MWSS-271 begins displacement to Tanajib from KAANB.

22 Jan 1991
- Weather continues to hamper campaign.
- Aircraft from every 20 minutes over South Kuwait controlled by F/A-18Ds.
- ROWPUs operational at Al Mishab.
- Southwest option selected in 1st Division breach.

23 Jan 1991
- ATO from JFACC is refined.
- GCE moving north to assume offensive posture.
- CG invited Div planners to wing meeting in response to breach ing and passage of lines.
- MWSS-273 assists U.S. Navy SEALs with boat operations at Al Mishab.

24 Jan 1991
- Weather cleared and targets attacked throughout Kuwait.
- Stocks of MK-83 ordnance were extremely low. CG I MEF requested to assist in ammo resupply.
- MWSS-271 main body moves to Tanajib.
- 1st MarDiv conducts initial artillery raid on enemy.

25 Jan 1991
- MAG-16 ordered to relocate from Jubayl to Tanajib by 3 Feb. Ordnance problems at Shaikh Isa force MK-82s to be flown there via C-130.
- Strikes on Basrah, and *Republican Guard* all aborted due to weather.
- MV *Cumberlain Express* offloaded by MWSG-37 at Port of Jubayl and equipment distributed to support squadrons.
- SAAWC coordinates Kill Zone tactics with AWACS.

26 Jan 1991
- Iraq begins dumping oil from Mina Al Ahmadi oil terminal into Persian Gulf.
- First combined arms raid against Iraqi positions.
- MEF goes over 100 EPWs.

27 Jan 1991
- CG on board to start attacking Phase III targets. He is con cerned that critically low ordnance stocks cannot support sus tained effort.
- JFACC apportionment continues. Therefore, Phase III targets cannot be fully implemented.
- CG 3d MAW established target priorities.
- MWSS-271 displacement to Tanajib completed.
- VMFA(AW)-121 flies first sortie in a Marine night attack con figured aircraft.

28 Jan 1991
- CG decides that only he or AWC can approve JFACC targets for 3d MAW.
- VMFA-333 flies first sortie against Baghdad.
- VMA-311 loses an AV-8, pilot taken prisoner.
- TAFDS operational at Tanajib.

29 Jan 1991
- 3d MAW concept of operations for Phase III is released.
- Iraqi attack on Khafji.
- MAG-16 helicopters transport 33,400 lbs of ordnance to counter Iraqi incursion.
- AH-1W helps to counter the attack.
- MV *Ciudad De Manta* offloaded by MWSG-37.

30 Jan 1991
- Meeting with 1stMarDiv pinpoints requirements for Phase IV support.

31 Jan 1991
- Ordnance shortage continues to be hotly contested issue. CG requests expeditious handling of ordnance.
- Khafji retaken from the Iraqi forces.
- MAG-16 moved from Jubayl to Tanajib.
- Refueling operations shut down at Manifah Bay.

FEBRUARY

1 Feb 1991
- AM-2 matting arrives for ramps at Tanajib and Mishab.
- First operational delivery of CBU-78 "Gator" by Marine air craft, VMA(AW)-533 on Kuwait Coastal Highway.
- NAVCENT requests 3d MAW assume 24-hour CAP over amphibious forces and to provide tanker support for USN air craft.
- MAG-16 closes to Tanajib.
- Battle for Khafji ends with Saudis retaking the town .

2 Feb 1991
- At approximately 1840(L), HMA-775 suffered its first Class A mishap. An AH-1 crashed during an emergency MedEvac conducted on NVGs; both pilots were KIA.
- I MEF targets throughout Kuwait hit continuously day and night.
- TACC operations personnel attend a 3d MAW planning confer ence to develop joint airspace control procedures to support I MEF ground scheme maneuver.

3 Feb 1991
- HMM-261 conducts a SAR mission for a downed HMLA-775 Cobra.
- HMLA-369 loses a UH-1N when it crashes into the ground; four fatalities result.
- USS *Missouri* arrrives on station to provide naval gunfire support for the MEF and JFC-E.

4 Feb 1991
- MajGen Hearney visits 3d MAW to discuss strategy of I MEF targeting.

	- CG stresses importance of combat checklist. - MWSS-273 establishes a FARP site at Al Quaraah.
5 Feb 1991	- CG visits both divisions and discusses a wide range of topics. - 3d MAW flew steady stream of sorties into Kuwait. Best production day with BDA to date. - CG 3D MAW decides to employ H&HS-28's AN/TSQ-155 (IDASC) at Lonesome Dove to operate as HTACC.
6 Feb 1991	- Flak traps around Al Jaber AF were struck.
7 Feb 1991	- CG decides to place more emphasis on Route #6 in Kuwait. - MAG-26 will colocate with FSSG at Al Quarrah, Saudi Arabia. - Alternate TACC will locate at Al Quarrah along with light HAWK battery.
8 Feb 1990	- Ground offensive plan changes along with logistical support plan - Al Khanjar established.
9 Feb 1991	- CG continued to refine aviation support for Phase IV. - MWSS-174 establishes AV-8B facilities at Tanajib. - VMA-231 loses an AV-8; pilot and taken prisoner.
10 Feb 1991	- CG announces lack of MK-80 series bombs will prevent 3d MAW's maximum possible prosecution of air campaign. - CG announces that he only has enough stocks to support I MEF and cannot be tasked to support EPAC sector. - Detailed air control procedures submitted by TACC operations personnel to 3d MAW plans for inclusion into the Pilot Controller Handbook.
11 Feb 1991	- MALS-29 advance party moves from Mishab to Lonesome Dove - MWSS-271 and 1st FSSG completes AAFS site at Tanajib. - MWSS-374 establishes an F/A-18 "hot turnaround point" at Jubayl NAF. - HMM-261 flew a section with Gen Moore on board to recon Lonesome Dove for upcoming move.
12 Feb 1991	- CG 3d MAW met with other MSCs to present current plan for Phase IV air operations. - MWSS-273 stands up at Al Mishab. - HMM-165 provided MedEvac/Emergency extract for first cross border artillery raid.
13 Feb 1991	- Air control exercise used to test capabilities for Phase IV. - Night Eagle Laser Targeting System delivered to MAG-16. - First HARM (AGM-88) missile shot by Marine unit taken by VMAQ-2 EA-6B. - HMLA-369 flies Gen Schwarzkopf to 2d Mar Div's forward position for a planning meeting.
14 Feb 1991	- Decision made to have the DASC(A) fly two six hour sorties per day in order to give the crew experience/situational aware ness.

- CG discussed airspace control measures with JFACC in Riyadh.
- MEF displaces to Al Khanjar.
- Southwest option modified in 2d Division breach.

15 Feb 1991
- Direction given for planners to draft 72-hour G-Day ATO.
- Hawk batteries are in place to cover Al Khanjar and 2ndMarDiv staging area.
- LtGen Boomer visits 2d LAAM Bn sites.
- MAG-16 inserts reconnaissance element onto Maradin Island.
- HML-767 launched two Hueys on first armed escort mission from LZ Falcon, Al Kibrit, Saudi Arabia.
- HMLA-369 launches first Hellfire missile in combat using the Night Eagle Laser system.

16 Feb 1991
- CG 3D MAW met with 5th MEB staff member to discuss inte gration.
- F/A-18 "hot turnaround point" operations begin at Jubayl NAF supported by MWSS-374.
- MWSS-174 establishes HERS FARP site at Al Qarrah.

17 Feb 1991
- Some relief on ordnance shortage when MV *Danah* offloaded at Port of Bahrain.
- NAVCENT agrees to release of up to 3500 MK-20 Rockeye bombs
- MAG-26 main body departs for Lonesome Dove.

18 Feb 1991
- MAG-26 HQ moved to Lonesome Dove.
- Ground and squadron commander briefed on ground scheme maneuver.

19 Feb 1991
- HTACC operational at Lonesome Dove.
- GCE displacement to offensive zones complete.
- DCS and ACE units moving forward.

20 Feb 1991
- CG met with wing planner to discuss pre-G-Day ATO for both FW and RW.
- HMM-165 loses a CH-46 attempting to land on NVGs.

21 Feb 1991
- CG attends sand table exercise hosted by TF Ripper.
- All helicopter ATO functions are transferred from the TACC, Al
- Jubayl NAF to HTACC Lonesome Dove.

22 Feb 1991
- Planners work out final details of 3d MAW/5th MEB integra tion.
- Forward deployed aviation assets to Lonesome Dove.

23 Feb 1991
- MAG-50 deployed limited number of aircraft to Tanajib.
- MWSG-37 sets up and operates two mobile FARPs in support of MAG-16 and MAG-26 operations at the Kuwaiti border.
- CG meets with helicopter group and squadron commanders to clarify helicopter situation for first three days of ground war.
- At 0600 surge operations begin and will continue until G+1 or beyond.
- VMA-542 loses an AV-8; pilot is killed in action.

24 Feb 1991	- Ground offensive begins at 0300Z. - MAG-16 helicopters insert TF X-Ray into blocking position inside Kuwait divert to Lonesome Dove. - HMM-161 loses a CH-46 on an NVG takeoff during the lift for Task Force X-Ray. - HML-767 picked up a captured Iraqi general in Kuwait on Night Vision Goggles and transported the prisoner to MEF HQ. - All communities fly at surge rates. Oplan executed.
25 Feb 1991	- Poor weather created a bottleneck. - HMM-165 leads the second insertion attempt of Task Force X-Ray - CG participates in conference calls with other MSCs. - It was decided that future helicopter operations require a FARP site near Al Jaber. - VMA-542 loses an AV-8; pilot is recovered by friendly forces. - VMO-1 loses an OV-10, Major Small is taken prisoner, pilot is killed in action. - MAG-26 begins move for Kuwait, concurrently planning starts for retrograde move to CONUS.
26 Feb 1991	- MAG-16 inserted security, NBC, EOD, and FARP personnel into Ahmed Al Jaber AF, Kuwait. - Cobras from HMLA-269 join the battle, and put under OPCON to MAG-26 at Lonesome Dove. - MajGen Moore briefed on concept of echeloning the TACC for ward to Kuwait City by H&HS-38 personnel.
27 Feb 1991	- CG increased sortie rate above surge level to take advantage of good weather.
28 Feb 1991	- MWSS-271 sets up FARP at Al Jaber, and provides fuel and ordnance to MAG-16 and MAG-26 helicopters. - Temporary ceasefire implemented at 0800(L).

MARCH

3 Mar 1991	- Ceasefire accepted at Safwan Airfield.
8 Mar 1991	- VMFA-212 loses two F/A-18s in a mid-air collision.

Appendix B
Glossary

A

AAA — Antiaircraft Artillery
AAFS — Amphibious Assault Fuel System
AB — Airbase
ABCCC — Airborne Battlefield Command and Control Center
A-Box — Fire support box
ACE — Aviation Combat Element
AFCent — U.S. Air Force component of U.S. Central Command
AI — Air interdiction
ANGLICO — Air and Naval Gunfire Liaison Company
AO — Air Officer
AOR — Area of Responsibility
APC — Armored Personnel Carrier
APOD — Aerial Port of Debarkation
APS — Afloat Prepositioned Ship
ASE — Air Support Elements
ASOC — Air Support Operations Center (USA/USAF)
ASP — Ammunition Supply Point
ATACC — Advanced Tactical Air Command Center
ATC — Air Traffic Control
ATDL — Army Tactical Data Link
ATO — Air Tasking Order
AWACS — Airborne Warning and Control System
AWC — Assistant Wing Commander

B

BAI — Battlefield Air Interdiction
BARCAP — Barrier Combat Air Patrol
BDA — Battle Damage Assessment
BCP — Battery Command Post
BDF — Bahrain Defense Force
BW — Biological Warfare

C

C2 — Command and Control
C3I — Command, Control, Communications, and Intelligence
CAAT — Combined Antiarmor Team

CAFMS — Computer-Assisted Force Management System
CAP — Combat Air Patrol
CAS — Close Air Support
CATF — Commander Amphibious Task Force
CE — Command Element
CentCom — U.S. Central Command
CFR — Crash Fly Rescue
CG — Commanding General
CIFS — Close-in Fire Support
CinC — Commander-in-Chief
CinCCent — CINC of Central Command, U.S. Central Command
CJCS — Chairman of the Joint Chiefs of Staff
CLF — Commander Landing Force
CMC — Commandant of the Marine Corps
CNO — Chief of Naval Operations
CO — Commanding Officer
COC — Combat Operations Center
CommEx — Communications Exercise
ComUSNavCent — Commander, U.S. Navy component of U.S. Central Command
CONUS — Continental United States
CP — Control Point
CRAF — Civil Reserve Air Fleet
CRC — Control and Reporting Center
CSAR — Combat Search and Rescue
CSP — Contingency Support Package
CSS — Combat Service Support
CSSD — Combat Service Support Detachment
CSSE — Combat Service Support Element
CV — Aircraft Carrier
CVW — Carrier Air Wing
CVWR — Reserve Carrier Air Wing
CWAR — Continuous Wave Acquisition Radar

D

DAS — Deep Air Strike
DASC (A) — Direct Air Support Center (Airborne)
DASC — Direct Air Support Center
DOD — Department of Defense
DOS — Days of supply

E

EAF — Expeditionary Airfield
ECM — Electronic Countermeasures
EDM — Engineering Development Module

ELINT — Electronics Intelligence
EMCON — Emission control
EOD — Explosive Ordinance Disposal
EPAC — Eastern Province Area Command
EW — Electronic Warfare
EW/C — Early Warning and Control
F

FAC — Forward Air Controller
FAC(A) — Forward Air Controller (Airborne)
FAE — Fuel Air Explosive
FARP — Forward Arming and Refueling Point
Fast FAC (A) — Fast Forward Air Controller (Airborne), F/A- 18D
FAST — Fleet Anti-terrorism Security Team
FEBA — Forward Edge of Battle Area
FIE — Fly-in Echelon
FLIR — Forward Looking Infrared Radar
FMF — Fleet Marine Force
FMFLant — Fleet Marine Force Atlantic
FMFPac — Fleet Marine Force Pacific
FOD — Foreign Object Damage
FROG — Free Rocket Over Ground Missile
FSCL — Fire Support Coordination Line
FSSG — Force Service Support Group

G

GCE — Ground Combat Element
GPS — Global Positioning System

H

H&HS — Headquarters and Headquarters Squadron
HARM — High Speed Antiradiation Missile
HAWK — Home-All-the-Way Killer Missile
HC — Helicopter Combat Support Squadron
HCS — Helicopter Combat Search and Rescue/Special Warfare Support Squadron
HDC — Helicopter Direction Center
HEFS — Helicopter Expeditionary Fuel System
HIDACZ — High Density Air Control Zone
HM — Helicopter Mine Countermeasures Squadron
HMH — Marine Heavy Helicopter Squadron
HMLA — Marine Light Attack Helicopter Squadron
HMM — Marine Medium Helicopter Squadron
HMMWV — High Mobility, Multipurpose Wheeled Vehicle
HMX — Marine helicopter squadron

HPIR — High Power Illumination Radar
HQMC — Headquarters, Marine Corps
HS — Helicopter Antisubmarine Squadron
HSL — Light Helicopter Antisubmarine Squadron
HT — Helicopter Training Squadron
HTACC — Helicopter Tactical Air Command Center
HUD — Head-up display
HUMINT — Human Intelligence
HVA — High Value Asset
HVU — High Value Unit

I

IADS — Integrated Air Defense System
ICM — Improved Conventional Munitions
IDASC — Improved Direct Air Support Center
IFF — Identification, Friend or Foe
IMINT — Imagery Intelligence
INTEL — Intelligence
IOC — Initial Operational Capability
IR — Infra-Red
IRT — In response to
ISO — In support of

J

JCS — Joint Chiefs of Staff
JFACC — Joint Force Air Component Commander
JFC — Joint Force Commander
JNAF — Jubayl Naval Air Facility
JSTARS — Joint Surveillance Target System

K

KAANB — King Abdul Aziz Naval Base
KTO — Kuwait Theater of Operations

L

LAAD — Low Altitude Air Defense
LAAM — Light Antiaircraft Missile
LAI — Light Armored Infantry
LAN — Local Area Network
LDT — Laser Detector Tracker
LGB — Laser Guided Bomb
LLL — Low Light Level

LNO — Liaison Officer
LRI — Long Range International [passenger aircraft].
LSB — Landing Support Battalion

M

MAC — Military Airlift Command
MACCS — Marine Air Command and Control System
MACG — Marine Air Control Group
MACS — Marine Air Control Squadron
MAG — Marine Air Group
MAGTF — Marine Air-Ground Task Force
MALS — Marine Air Logistics Squadron
MANPADS — Man Portable Air Defense System
MARCENT — , U.S. Marine Corps component of U.S. Central Command
MarDiv — Marine Division
MASS — Marine Air Support Squadron
MATCS — Marine Air Traffic Control Squadron
MAW — Marine Air Wing
M-Box — Maneuver Box
MCAS — Marine Corps Air Station
MCCDC — Marine Corps Combat Development Command
MEB — Marine Expeditionary Brigade
MedEvac — Medical Evacuation
MEF — Marine Expeditionary Force
MEU — Marine Expeditionary Unit
MEU(SOC) — Marine Expeditionary Unit (Special Operations Capable)
MHE — Materials Handling Equipment
MPSron — Maritime Prepositioning Ship Squadron
MRE — Meal Ready-to-Eat
MRL — Multiple Rocket Launcher
MRR — Minimum Risk Route
MSC — Major Subordinate Command
MV — Merchant Vessel
MWCS — Marine Wing Control Squadron
MWHS — Marine Wing Headquarters Squadron
MWSG — Marine Wing Support Group
MWSS — Marine Wing Support Squadron

N

NAF — Naval Airfield
NAS — Naval Air Station
NATOPS — Naval Air Training and Operating Procedures Standardization
NAVCENT — U.S. Navy component of U.S. Cenral Command
NBC — Nuclear, Biological, and Chemical

NM — Nautical Mile
NMCB — Naval Mobile Construction Battalion
NNOR — Non-nuclear Ordnance Requirements
NVG — Night Vision Goggles

O

OAS — Offensive Air Support
OP — Observation Post
OpCon — Operational Control
OPP — Offload Preparation Party
OpRdy— Operational Readiness

P

PacFlt — Pacific Fleet
PACOM — Pacific Command
Pax — Personnel
PMO — Provost Marshall Office; military police
POET — Primed Oscillator Expendable Transponder
PTO — Pilot Training Officer
PLRS — Position Location and Reporting System

Q

R

RAF — Royal Air Force (United Kingdom)
RCT — Regimental Combat Team
RGFC — Republican Guard Forces Command
ROE — Rules of Engagement
ROWPU — Reverse Osmosis Water Purification Unit
RPV — Remotely Piloted Vehicle
RSAF — Royal Saudi Air Force
RTB — Return to Base
RWR — Radar Warning Receiver

S

SAAWC — Sector Antiair Warfare Coordinator
SAM — Surface-to-air Missile
SAR — Search and rescue
SCUD — Soviet surface-to-surface missile
SEAD — Suppression of Enemy Air Defense
SEAL — Sea, Air, and Land (Navy Special Operations Team)

SecDef — Secretary of Defense
SecNav — Secretary of the Navy
SIGINT — Signals Intelligence
SIM — Simulated
SIMCAS — Simulated Close Air Support
SLEP — Service Life Extension Program
SLRP — Surveillance, Liaison, and Reconnaissance Party
SMCR — Selected Marine Corps Reserve
SOC — Special Operations Capable
SOP — Standard Operating Procedure
SPCC — Ships Parts Control Center
SRI — Surveillance, Reconnaissance, and Intelligence
SRIG — Surveillance, Reconnaissance, and Intelligence Group
SSM — Surface-to-surface Missiles
STOVL — Short Take-Off Vertical Landing
STT — Single Target Track
SWA — South West Asia

T

TAC (A) — Tactical Air-Coordinator (Airborne)
TACAIR — Tactical Air
TACAN — Tactical Air Navigation system
TACC — Tactical Air Command Center
TacEx — Tactical Exercise
TACP — Tactical Air Control Party
TADIL — Tactical Digital Information Link
TAFDS — Tactical Airfield Fuel Dispensing System
TALD — Tactical Air Launched Decoy
TAMPS — Tactical Aircraft Mission Planning System
TAOC — Tactical Air Operations Center
TAOM — Tactical Air Operation Module
TAOR — Tactical Area of Responsibility
TAR — Tactical Air Response
TAVB — Aviation Logistics Support Ship
TERPES — Tactical Electronic Reconnaissance Processing and Evaluation System
TF — Task Force
TFW — Tactical Fighter Wing
TO — Table of Organization
TOO — Target of Opportunity
TOS — Time on Station
TOT — Time on Target
TOW — Target-on-Wire Missile
TPFDL — Timed-Phase Force Deployment List

U

UAV — Unmanned Aerial Vehicle
UDP — Unit Deployment Program
USNS — United States Naval Ship, civilian manned
UW — Urban Warfare

V

VA — Attack Squadron
VAW — Carrier Airborne Early Warning System
VC — Fleet Composite Squadron
VF — Fighter Squadron
VFA — Strike Fighter Squadron
VFC — Fighter Composite Squadron
V/STOL — Vertical/Short Take-Off and Landing
VMA — Marine Attack Squadron
VMA(AW) — Marine All Weather Attack Squadron
VMAQ — Marine Tactical Electronic Warfare Squadron
VMFA — Marine Fighter Attack Squadron
VMFA(AW) — Marine All-Weather Fighter Attack Squadron
VMGR — Marine Aerial Refueler Transport Squadron
VMO — Marine Observation Squadron
VP — Patrol Squadron
VPU — Patrol Squadron Special Projects Unit

W

WTI — Weapons Tactics Instructor
WP — White Phosphorus

X

XO — Executive Officer

Appendix C
USMC Tactical Aviation Flying Units
January 1900

1st Marine Aircraft Wing		
MCAS Kaneohe	**MCAS Iwakuni**	**MCAS Futenma**
MAG-24	MAG-12	MAG-36
VMFA-212	VMA(AW)-332 (MAG-14)	HMH-462 (MAG-16)
VMFA-232	VMA-542 (MAG-32)	HMH-466 Det B (MAG-16)
VMFA-235	VMFA-115 (MAG-31)	HMM-164 (MAG-24)
HMM-262	VMFA-531 (MAG-11)	HMLA-169 (MAG-39)
HMM-265	VMFP-3 Det A (MAG -11)	VMO-1 Det B (MAG-29)
HMM-364	VMAQ-2 Det Z (MAG-14)	VMO-2 Det B (MAG-39)
HMH-463		VMGR-152

2d Marine Aircraft Wing		
MCAS Cherry Point	**MCAS Beaufort**	**MCAS New River**
MAG-14	MAG-31	MAG-26
VMGR-252	VMFA-122	HMM-261
VMAQ-2	VMFA-251	HMM-266
VMA(AW)-224	VMFA-312	HMH-362
VMA(AW)-533	VMFA-333	HMH-461
	VMFA-451	HMLA-167
MAG-32		
VMA-223		MAG-29
VMA-231		HMM-162
VMA-331		HMM-263
		HMM-264
		HMH-464
		HMLA-269
		VMO-1

3d Marine Aircraft Wing			
MCAS El Toro	**MCAS Yuma**	**MCAS Tustin**	**MCAS Camp Pendleton**
MAG-11	MAG-13	MAG-16	MAG-39
VMGR-352 (-)	VMA-211	HMM-161	HMLA-267
VMFP-3 (-)	VMA-214	HMM-164	HMLA-367
VMFA-314	VMA-311	HMM-166	HMLA-369
VMFA-323	VMA-513	HMM-261	VMO-2 (-)
VMFA(AW)-121		HMH-361	
VMA(AW)-242		HMH-363	
		HMH-465	
		HMH-466 (-)	

NOTE: 11th MEU (SOC) and 24th MEU (SOC) were deployed at the beginning of the year with HMM-163 (REIN)(MAG-16) and HMM-365 (REIN) (MAG-29) respectively.

Appendix D
USMC Aviation Non-flying Units
January 1990

1st Marine Aircraft Wing		
	MWSG-17	**MACG-18**
MWHS-1 Camp Foster	HQSDN-17 Camp Foster	MWCS-18 Camp Foster
MWCS-18 Camp Foster	MWSS-171 Iwakuni	MASS-2 Futenma
MALS-12 Iwakuni	MWSS-172 Futenma	MACS-4 Futenma
MALS-36 Futenma		H&HS-18 Futenma
		MATCS-18 Futenma
		1st LAAD Bn Futenma
		1st LAAM Bn Futenma

2d Marine Aircraft Wing		
	MWSG-27	**MACG-28**
MWHS-2 Cherry Point	MWSS-271 Cherry Point	MWCS-28 Cherry Point
MWWU-2 Cherry Point	MWSS-272 New River	MASS-1 Cherry Point
MALS-14 Cherry Point	MWSS-273 Cherry Point	MACS-5 Beaufort
MALS-26 New River	MWSS-274 Cherry Point	MACS-6 Cherry Point
MALS-29 New River	HQSQDN-27 Cherry Point	H&HS-28 Cherry Point
MALS-31 Beaufort		MATCS-28 New River
MALS-32 Cherry Point		2d LAAD Bn Cherry Point
		2d LAAM Bn Cherry Point

3d Marine Aircraft Wing		
	MWSG-37	**MWCG-38**
MWHS-3 El Toro	MWSS-371 Yuma	MWCS-38 El Toro
MWWU-3 Yuma	MWSS-372 Camp Pendleton	MASS-3 El Toro
MALS-11 El Toro	MWSS-373 Camp Pendleton	MACS-1 Camp Pendleton
MALS-13 Yuma	MWSS-374 Camp Pendleton	MACS-7 Yuma
MALS-16 Tustin	HQSQDN-37 El Toro	H&HS-38 El Toro
MALS-39 Camp Pendleton	MWSS-173 29 Palms	MATCS-38 Tustin
		3d LAAD BN Camp Pendleton
		3d LAAM BN Yuma

NOTE: Data compiled from HQMC Command Center Operational Summary, January 1990.

Appendix E
4th Marine Aircraft Wing (Reserve) Units
January 1990

Tactical Flying Units			
MAG-41	**MAG-42**	**MAG-46**	**MAG-49**
VMFA-112 NAS Dallas	VMAQ-4 Whidbey Island	HMM-764 El Toro	VMO-4 NAS Marrieta GA
VMFA-134 El Toro	VMA-124 Memphis TN	HML-767 New Orleans	HML-771 S. Weymouth
VMGR-234 NAS Glenview	VMA-131 Willow Grove	VMGR-452 Newburgh NY	HMH-772 Willow Grove PA
VMFA-321 Andrews AFB	VMA-133 NAS Alameda	HMM-774 NAS Norfolk VA	HMA-773 NAS Marietta GA
	VMA-142 NAS Cecil Field	HMA-775 Camp Pendleton	HML-776 NAS Glenview
	VMA-322 S. Weymouth MA		

Non Flying Units		
4TH FIIU	**MACG-48**	**MWSG-47**
MALS-41 NAS Dallas	MWCS-48 NAS Glenview	MWSS-471 Minneapolis MN
MALS-42 NAS Alameda CA	MASS-4 El Toro	HQSDN-47 Selfridge MI
MALS-46 El Toro	MASS-6 S.Weymouth MA	MWSS-474 Philadelphia PA
MALS-49 Willow Grove PA	H&HS-48 NAS Glenview	MWSS-473 S. Weymouth
MWHS-4 New Orleans	4TH FAAD Pasadena CA	MWSS-472 El Toro
	MACS-23 Buckley Anglico	
	MACS-24 Dam Neck VA	
	MATCS-48 NAS Memphis	
	4TH LAAM Fresno CA	

Appendix F
Command and Staff List

Unit	CO	Aircraft Type & #	Tailcode//Nickname	XO
3D MAW	MajGen Royal N. Moore Jr.	N/A	N/A	BGen Granville R. Amos
MWHS-3	LtCol David G. Keck	N/A	N/A	
MAG-11	Col Manfred A. Rietsch	N/A	N/A	Col Donald A. Beaufait
MALS-11	LtCol John J. Moyer	N/A	N/A	Maj Robert B. Finney
VMFA-212	LtCol James M. Collins II	F//A 18C (12)	WD Lancers	Maj David H. Peeler
VMFA-232	LtCol Victor A. Simpson	F//A 18C (12)	WT Red Devils	Maj Robert W. Elflein
VMFA-235	Col William C. McMullen III	F//A 18C (12)	DB Death Angels	Maj James E. Hunter Jr.
VMFA-314	LtCol George G. Stuart	F//A 18A (12)	VW Black Knights	Maj Robert B. Clark
VMFA-333	LtCol Thomas A. Benes	F//A 18A (12)	DN Shamrocks	Maj Robert E. Schmidle Jr.
VMFA-451	LtCol Andrew S. Dudley Jr.	F//A 18A (12)	VM Warlords	Maj David F. Goold
VMFA(AW)-121	LtCol Stephen F. Mugg	F//A 18D (12)	VK Green Knights	Maj Robert J. Kennedy
VMA(AW)-224	LtCol William J. Horne	A6-E (10)	WK Bengals	Maj Thomas J. McElrath
VMA(AW)-533	LtCol Waldo B. Cummings Jr.	A6-E (10)	ED Hawks	LtCol John Langdon II
VMAQ-2	LtCol Richard W. Bates	EA-6B (12)	CY Playboys	Maj Rickey B. Johnson
VMGR-252 Det A	Maj Gerald W. Sternal	KC-130F (3), KC-130R (3)	BH Otis	Maj Thomas P. Brehm
VMGR-352(-)	LtCol Arlen D. Rens	KC-130R (7)	QB Raiders	Maj Gerald W. Sternal
Det VMGR-452	Maj L. M. Gillespie	KC-130T (7)	NY Yankees	

Unit	S1	S3	Maintenance	SgtMaj	Strength O//E
3D MAW	LtCol Rudolph Lowery	Col Terrence R. Dake	Col Timothy L. LaPlaunt	Frederick T. Pattee	1,829//13,826
MWHS-3					
MAG-11	Maj John F. MacDonald Jr.	LtCol John P. Cushing Jr.		Wayne E. Stimam	409//2,858
MALS-11			Maj Gilbert B. Diaz	Thomas E. Chapman	16//860 (1 Civ)
VMFA-212	Capt Kent A. Carpenter	Maj William F. Guilfoyle	Capt Keith C. Shultis	Stephen H. Mellinger	24//158
VMFA-232	Capt Thomas E. Glazer	Maj Aaron K. Chapman	Maj John D. Dewitt Jr.	Carlos R. Ramirez	20//168
VMFA-235	Maj Robert L. Knoy	Maj Michael R. Sobyra	Maj Henry C. Dewey III	Michael J. Patri	19//168
VMFA-314	Maj Thomas R. Shaw	Maj Robert M. Knutzen	Maj James L. Brinkman	John H. Smith	25//156
VMFA-333	CWO2 Calvin G. Colbert	Maj Charles F. Mitchell	Maj David H. Shutt	Robert D. Brown	22//155
VMFA-451	Capt William H. Buckey	Maj Charles R. Hull	Maj William G. Butler III	Ottis Kokensparger	24//157
VMFA(AW)-121	Maj Harmon A. Stockwell	Maj Jeffrey A. White	Maj John C. Rader	MSgt Eugene Simpson	18//97
VMA(AW)-224	Capt Mark J. Ruger	Maj John J. Guevremont	Maj Martin Post	Kenneth D. Miller	32//185
VMA(AW)-533	Maj Gary F. Skinner	Maj Mark E. Condra	LtCol Leif R. Larsen	Robert L. Hampton	34//170
VMAQ-2	Capt Robert S. Slater	Maj Edmund B. Mayer Jr.	Maj Richard C. Dunn	Haskell B. Jackson	67//204
VMGR-252 Det A		Maj Willie A. Franchi			115 (Combined)
VMGR-352(-)	Capt Steven B. Dorman	Maj Michael L. Heath	Maj Russell H. Bell	Horace H. Thomas	44//212
Det VMGR-452					21//7

Unit	CO	Aircraft Type & #	Tailcode//Nickname	XO
MAG-13 (Fwd)	Col John R. Bioty Jr.	N/A	N/A	LtCol Bazil Kostin
MALS-13 (Fwd)	Maj Christopher D. Platt	N/A	N/A	Maj Charles E. Ripley
MALS-14	LtCol Richard L. Owen Jr.	N/A	N/A	LtCol W. L. Wolf
VMA-231	LtCol William R. Jones	AV-8B (19)	CG Ace of Spades	Maj Donald E. Fleming Jr.
VMA-311	LtCol Dickie J. White	AV-8B (19)	WL Tomcats	Maj Richard C. Branch
VMA-542	LtCol Theodore N. Herman	AV-8B (18)	WH Tigers	LtCol Kevin E. Leffler
VMA-513 Det B	Maj Eddie L. Holcomb	AV-8B (6)	WF Nightmares	Maj Georges E. Leblanc III
VMO-1	LtCol Richard R. Lazisky	OV-10A,& D+ (11)	ER Sweet	Maj Jerry G. Gelling
VMO-2	Maj Steven J. Antosh	OV-10A,& D+ (7)	UU Hostage	Maj Robert L. Wills

Unit	S1	S3	Maintenance	SgtMaj	Strength O//E
MAG-13 (Fwd.)	CWO Patrick J. Devoss	Maj John B. Paulger	Maj Charles E. Ripley	Jimmy C. Harris	140//1010
MALS-13 (Fwd.)	Capt Craig A. MacVeigh	Capt Craig A. MacVeigh	Maj Charles E. Ripley	MSgt Larry A. Lord	8//272
MALS-14	WO William H. Wilkinson II	Maj James L. Sasser	Maj Charles E. Ripley	William M. Russell	29//553
VMA-231	Capt Frederick J. Whittle	Maj Robert J. Borgatti	Capt John T. Rahm	Karl Brooks	34//190
VMA-311	Capt Dino Peros	Maj Kenneth G. Williams	Capt Edmund S. Flores	Pasquale Lamaestra	33//205
VMA-542	Capt Thomas S. Rutledge	Maj Wade C. Straw	Maj James M. Lee Jr.	1stSgt Michael W. Castleman	32//198
Det B VMA-513	Capt Thomas Carnesi III	Maj Georges E. Leblanc III	Capt Francis P. Bottorff	MSgt Daniel V. Avino	13//120
VMO-1	Maj Wayne E. Breakfield	Maj Ronald B. Broschart	Maj Joseph J. Small	Johnny B. Young Jr.	39//143
VMO-2	Capt Daniel J. Aheam	Capt Roger D. Miller	Major Charles A. Chambliss	Morris Warner	25//104

Unit	CO	Aircraft Type & #	Tailcode//Nickname	XO
MAG-16	Col Larry T. Garrett	N/A	N/A	LtCol Michael J. Aguilar
MALS-16	LtCol Henry A. Commiskey Jr.	N/A	N/A	Maj Charles S. Young Jr.
HMM-161	LtCol Gary J. Price	CH-46E (12)	YR The First	LtCol Larry M. Underwood
HMM-165	LtCol Marvin D. Hall	CH-46E (11)	YW White Knights	Maj Philip R. Westcott II
HMLA-367	LtCol Terry J. Frerker	AH-1W (10) // UH-1N (12)	VT Scarface	Maj Tommy L. Bray
HMLA-369	LtCol Michael M. Kurth	AH-1W (17) // UH-1N (5)	SM Gunfighters	LtCol Kenneth J. Conatser
HMH-462	LtCol D. R. Ross	CH-53D (12)	YF Heavy Haulers	Maj George J. Whitlock
HMH-463	LtCol John R. Mills	CH-53D (8)	YH Pegasus	LtCol Mark J. Brousseau
HMH-465	LtCol Ronnie S. Johnston	CH-53E (8)	YJ Warhorses	Maj Richard D. Rogers
HMH-466(-)	LtCol Raymond L. Nymeyer	CH-53E (8)	YK Wolfpack	LtCol Robert V. Bush Jr.

Unit	S1	S3	Maintenance	SgtMaj	Strength O//E
MAG 16	Maj Robert H. McCormick Jr.	LtCol Robert N. Leavitt		Hinton T. Tucker	292//1652
MALS 16	1stLt Randall K. Gipson	Maj Wesley Wieckowski	Maj B. J. Robinson	C. L. Constance	24//464
HMM-161	Capt Robert F. Wheeler	Maj Mitchell A. Cook	Maj Richard M. Rasmussen	A. S. Ignacio	31//124
HMM-165	Capt Cleatus K. McDonel	Maj Raymond E. Schwartz III	Capt Glenn W. Rosenberger	David E. Cummings	30//116
HMLA-367	Maj Eugene J. Cole	Maj Gary D. Shaw	Maj Barry M. Ford	James S. Misa	50//233
HMLA-369	Maj Michael L. Steele	Maj Sidney E. Mills	Maj Michael W. Quinlan	E. W. Jones	57//220
HMH-462	Capt Joel A. Marquardt	Maj Stephen L. Forand	Maj Philip B. Gleason	H. W. Wise	31//153
HMH-463	1stLt James J. Leneghan	Maj David C. Johnson	Maj Ralph K. Read	Lloyd G. Helmkamp	24//134
HMH-465	Capt Timothy W. Fitzgerald	Maj Francis M. McComb	Maj Mark D. Stotzer	W. E. Ellard	26//121
HMH-466(-)	Capt Alfred C. Soto	Maj Donovan J. Spurgeon	Capt Alan D. Schroeder	John M. Gallegos	25//150

Unit	CO	Aircraft Type & #	Tailcode//Nickname	XO
MAG-26	Col Michael J. Williams	N/A	N/A	LtCol Lewis J. Gebhard
MALS-29	LtCol John F. Phelps	N/A	N/A	LtCol John C. McCalla
HMM-261	LtCol Emerson N. Gardner Jr.	CH-46E (12)	TV Raging Bulls	LtCol Thomas L. Moore
HMM-266	LtCol John F. Pettine	CH-46E (12)	ES Griffins	Maj Robert S. Loftis
HMM-774	LtCol Steven K. Bowman	CH-46E (12)	MQ Wild Goose	LtCol James R. McIntosh
HMH-464 (-)	LtCol Ralph F. Tice	CH-53E (8)	EN Condors	Maj James E. Lenderman Jr.
HMH-362	LtCol Robert A. Forrester	CH-53D (6)	YL Ugly Angels	
Det A HMH-772	LtCol Thomas J. Miller	RH-53D (6)	MT Roadhogs	LtCol Richard D. Hamilton
HMA-775	LtCol Paul W. Martin	AH-1J (11)	WR Coyotes	LtCol Rick M. Husty
HML-767	Col Al C.Boudreaux	UH-1N (12)	MM Nomads	

Unit	S1	S3	Maintenance	SgtMaj	Strength O//E
MAG-26	LtCol Richard J. Gallagher	LtCol John T.Hill		Donald B. Stark	287//1508
MALS-29	CWO3 John R. Grezlik	Capt David L. Abrams	Maj Jerome F. Rolinger	Kim W. Hubbard	29//531
HMM-261	Maj Phillip D. Peterson Jr.	Maj Arthur M. Reynolds Jr.	Capt Michael P. Abraham	Ernest R. Young	32//129
HMM-266	Capt Rex R. Bartles	Maj John W. James	Maj Richard D. Hafenbrack	David L. Ford	38//120
HMM-774	Maj Robert C. Santucci	LtCol Victor T. Cronauer	LtCol Mark A. Peterson	Jim H. Goolsby	30//146
HMH-464 (-)	Maj John E. Montemayor	Maj Stephen P. Taylor	Maj John R. Suter	Sigifredo Duran	29//117
HMH-362					
Det A HMH-772	Maj William R. Haines	Maj Mike L. Lovejoy	Maj Hugh A. Henry	1stSgt Anthony J. Brilla	17//120
HMA-775	Maj Dale D. Mossbarger	Maj Roy A. Arnold	Maj Joseph P. Hansen	Donald L. Fox	31//147
HML-767					

Unit	CO	Location	XO
MWSG-37	Col Robert W. Coop	King Abdul Aziz Naval Base, Saudi Arabia	LtCol David A. Stockwell
H&HS-37	Maj Clifford C. Holbrook	King Abdul Aziz Naval Base, Saudi Arabia	Capt Sheila A. Jones
MWSS-174	LtCol James P. Chessum	Al Jubayl, Saudi Arabia	Maj John G. Molter
MWSS-271	LtCol Richard H. Zegar	Tanajib, Saudi Arabia	Maj Roger E. Penrod
MWSS-273	LtCol William L. Riznychok	Ras Al Mishab, Saudi Arabia	Maj Robert S. Whitehead
MWSS-373	LtCol Stephen D. Hanson	Shaikh Isa AB, Bahrain	Maj Donald F. Beck
MWSS-374	LtCol Stephen C. Holbrook	RNAF Al Jubayl, North, Saudi Arabia	Maj Robert C. Nelson II

Unit	S1	S3	SgtMaj	Strength O//E
MWSG-37	Maj Beverly A. Short	LtCol Daniel C. Cassell	Ralph A. Buchanan	131//2927
H&HS-37			1stSgt Charles E. Tolliver	15//65
MWSS-174	CWO2 Patrick J. DeVoss	Capt John D. Thomas Jr.	Robert A. Foss	24//590
MWSS-271	WO Joan M. Ceurvels	Maj Douglas A. Evans	Bruce A. Hyland	25//544
MWSS-273	Capt. Bruce A. Murphine	Maj. James H. Neal Jr.	Thomas J. Crisp	750 (Combined)
MWSS-373	CWO4 Charles R. Jarrett	Maj Larry W. Berquist	Robert Baldwin	25//639
MWSS-374	CWO2 Ann M. Harber	Maj Martin J. Wasielewski	Leonard R. Sweet	26//584

Unit	CO	Mission// Equipment	XO
MACG-38	Col Joseph Della-Corte	N/A	LtCol Harvey R. Norton
H&HS-38	Maj Eric D. Zobel	TACC	Maj Harry P. Parmer
Det H&HS-28	Maj Royce Gibson		
Det MASS-1	LtCol Robert D. Hughes	DASC	
Det MACS-1	1st Lt Paul Q. Le		
MWCS- 38	LtCol Timothy J. Himes	Communication Nets (TACC-TAOC Link)	Maj Carl E. Rogers
Det B MWCS-28	Capt Ronald W. Snyder	Communication Nets (TACC-TAOC Link)	
2d LAAM Bn	LtCol John E. Ryan	HAWK	Maj Marvin D. Dick
3d LAAD Bn	LtCol George S. Fick	Stinger	Maj William T. Stooksbury
MACS-2	LtCol John R. Garvin	TAOC	Maj John J. Kassay Jr.
MACS-6 (-)	LtCol Ronald J. Armstrong	TAOC	Maj Charles F. Triplett
MASS-3	LtCol Dennis C. Sorrell	DASC	Maj Maurice B. Hutchinson
Det MASS-6	Maj Kevin B. Davis		
MATCS-38	Maj Robert J. Bozelli	Air Traffic Control (TACAN, MRAALS)	Capt Gregory W. Grove
Det I MATCS-28	Capt Kurt V. Lorhman		
Det B MATCS-18	Capt Patrica F. Warren		
2d LAAD Bn	LtCol Richard K. Bartzer	Stinger	Maj Wiliam S. Vandermeer Jr.
3d LAAM Bn	LtCol Louis L. Boros	HAWK	Maj Thomas M. Adkins

Unit	S1	S3	SgtMaj	Strength O//E
MACG-38	Maj John K. Neel	Maj James T. Ronaghan Jr.	David A. Garrett	307//2665
H&HS-38	Maj John K. Neel	Maj Royce Gibson	1stSgt Alex P. Pacheco	33//102
Det H&HS-28				
Det MASS-1				10//28
Det MACS-1				
MWCS- 38	WO Carla M. Gonzales-Schwarz	Maj Alan A. Turk	John L. Phinisey	31//374
Det B MWCS-28				
2d LAAM Bn	Capt Damien X. Lott	Capt Gregory K. Wilkinson	Ronald F. Rajkovich	36//524
3d LAAD Bn	Capt Philip G. Mena	Capt Scott B. Frosch	Alphonso C. Brooks	20//178
MACS-2	1stLt John M. Neumann	Capt James J. Dormer III	James A. Bamberger	32//214
Det A MACS-6	MSgt P. J. Davis	Capt. David F. Aumuller	MGySgt Kenneth A. Innis	
MASS-3	2dLt Michael C. Berigan	Maj Clifton E. Washington	Kim Hagen	35//148
Det MASS-6				
MATCS-38	CWO3 Joseph G. Hendrickson	1stLt William J. Nix	David L. Tainsh	27//160
Det I MATCS-28				
Det B MATCS-18				
2d LAAD Bn	Capt Paul G. Gayan	Capt Stephen P. Lynch	George L. Anger	23//257
3d LAAM Bn	MSgt John W. Hamilton Jr.	Capt William P. Cabrera II	David S. Nagorniak	31//474

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