U.S. Marines in the Persian Gulf, 1990-1991

THE 3D MARINE AIRCRAFT WING IN DESERT SHIELD AND DESERT STORM

HISTORY AND MUSEUMS DIVISION
HEADQUARTERS, U.S. MARINE CORPS
WASHINGTON, D.C.

COVER: 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.

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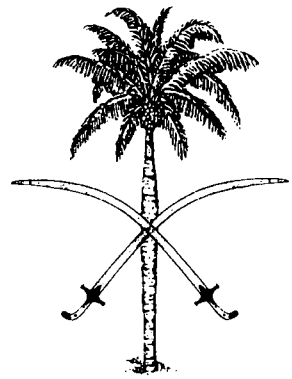

by
Lieutenant Colonel LeRoy D. Stearns
U.S. Marine Corps

HISTORY AND MUSEUMS DIVISION
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1999

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PCN 190 0031 4900

For sale by the U.S. Government Printing Office
Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328
ISBN 0-16-050176-8

Foreword

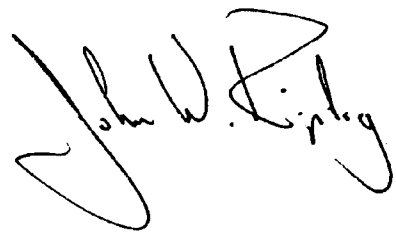
This monograph is an account of the activities of the Marines and units of the 3d Marine Aircraft Wing in support of the I Marine Expeditionary Force's efforts to liberate Kuwait. This document is part of a preliminary series of official Marine Corps histories that cover Marine Corps operations in the Gulf War.

On 2 September 1990, 3d Marine Aircraft Wing took command of Marine aviation forces ashore from a Marine composite aircraft group, which had hurriedly been moved to the Persian Gulf as part of Operation Desert Shield. The wing would grow to be the largest deployed in Marine Corps history. It would fly more than 10 different types of aircraft from eight airfield sites that required laying more than 4.5 million square feet of ramps, landing, and taxiing areas. In addition, the wing and its support groups would construct six 3,000-man base camps and establish a Marine Air Command and Control System that would operate across four countries in a joint and combined arena. When Operation Desert Storm began, the 3d Marine Aircraft Wing was ready and provided more than 18,000 fixed-wing and helicopter sorties in support of I Marine Expeditionary Force's mission of ejecting Iraqi forces from Kuwait.

Lieutenant Colonel LeRoy D. Stearns, Jr., a career aviator, attended the University of Texas at Austin before being commissioned in the Marine Corps and receiving his wings in 1979. Designated a CH-46 pilot, he joined Marine Medium Helicopter Squadron 162 at Marine Corps Air Station, New River, North Carolina, and subsequently was deployed with the squadron to the Mediterranean. In 1983, during the last of three such deployments to the Mediterranean, he flew combat missions in support of Marine and coalition forces during the crisis in Beirut, Lebanon. Following assignments in Hawaii and Okinawa, he attended the Marine Corps Command and Staff College, Quantico, Virginia, and then joined Marine Medium Helicopter Squadron 165, where he served as the squadron's operations and then executive officer. After a short tour with the Navy Staff as the amphibious warfare policy officer, Lieutenant Colonel Stearns attended the National War College and graduated in June 1997 with a master of science degree in national security strategy.

This monograph is predominantly based on unit command chronologies, more than three dozen interviews with key participants, comments from key participants on the draft monograph, and other source documents available at the Marine Corps Historical Center, Washington, D.C. The author began with an outline draft written by Major John T. Quinn II, and was assisted by two interns, Air Force Cadet Craig Prather, who assisted in laying out the appendices, and Mark M. Burgess of the University of Wolverhampton, England, who assisted in collection and layout of the photographs.

As this is a preliminary effort, the History and Museums Division encourages participants, scholars, and students to comment on this account and other monographs in the series.



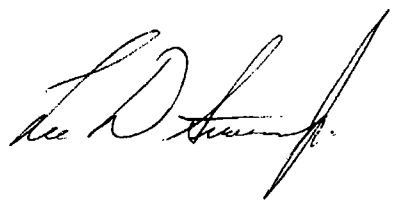
John W. Ripley
Colonel, U.S. Marine Corps (Retired)
Director of Marine Corps History and Museums

Preface

The material in this monograph was derived from unit command chronologies, oral history interviews, and official records of the U.S. Marine Corps. As such, it focuses on the commanders and their staffs. The true heroes of the 3d Marine Aircraft Wing during operations Desert Shield and Desert Storm were the individual Marines. Getting the bombs on target was not just a function of pilots and aircraft. The Marines who loaded ordnance and fuel, patched up and repaired, tasked and guided, fed and housed those aircrews were every bit as much contributors to the success of each bombing mission. The willingness to contribute their initiative, imagination, and long hours in a harsh environment to make up for shortfalls in equipment, doctrine, and the eviscerated peacetime tables of organization were critical to the around-the-clock wartime operations and success of the 3d Marine Aircraft Wing.

This monograph could not have been published without the professional efforts of the staff of the Marine Corps Historical Center. I would like to thank Dr. Jack Shulimson, Mr. Charles D. Melson, Mr. Charles R. Smith, and Mrs. Wanda J. Renfrow for their meticulous review and corrections to both style and content. I had the good fortune to have the daily support of the research librarian, Ms. Evelyn A. Englander, and the freedom of access to the documentary archives provided by Mr. Frederick J. Graboske and his staff. The Reference Section, headed by Danny J. Crawford, provided accurate and timely responses to my many inquiries, while the support branch under Lieutenant Colonel Leon Craig, Jr., and Captain Joseph Donald III, provided much of the administrative assistance. I am thankful for the assistance of two interns who worked on the project with me for several weeks, Air Force Cadet Craig Prather and Mr. Mark M. Burgess. Dr. David B. Crist assisted me in obtaining oral histories from critical sources. Mr. William S. Hill and Ms. Catherine A. Kerns worked closely with me in laying out the monograph. I am grateful for the advice and help I received from the Marine Corps reservists of MTU DC-7 who served as combat historians during Desert Storm. I would like to particularly thank retired Colonels Dennis P. Mroczkowski and Charles J. Quilter II, and Lieutenant Colonel Ronald J. Brown.

Outside of the History and Museums Division, I would like to express my thanks for their encouragement and review to General Terrence R. Dake; Lieutenant General Michael J. Williams; Major General Royal N. Moore, Jr.; Brigadier General Larry T. Garrett; Brigadier General Robert M. Flanagan; Colonel Manfred A. Rietsch; Major John T. Quinn II; and Captain Charles Grow.



LeRoy D. Stearns
Lieutenant Colonel, U.S. Marine Corps

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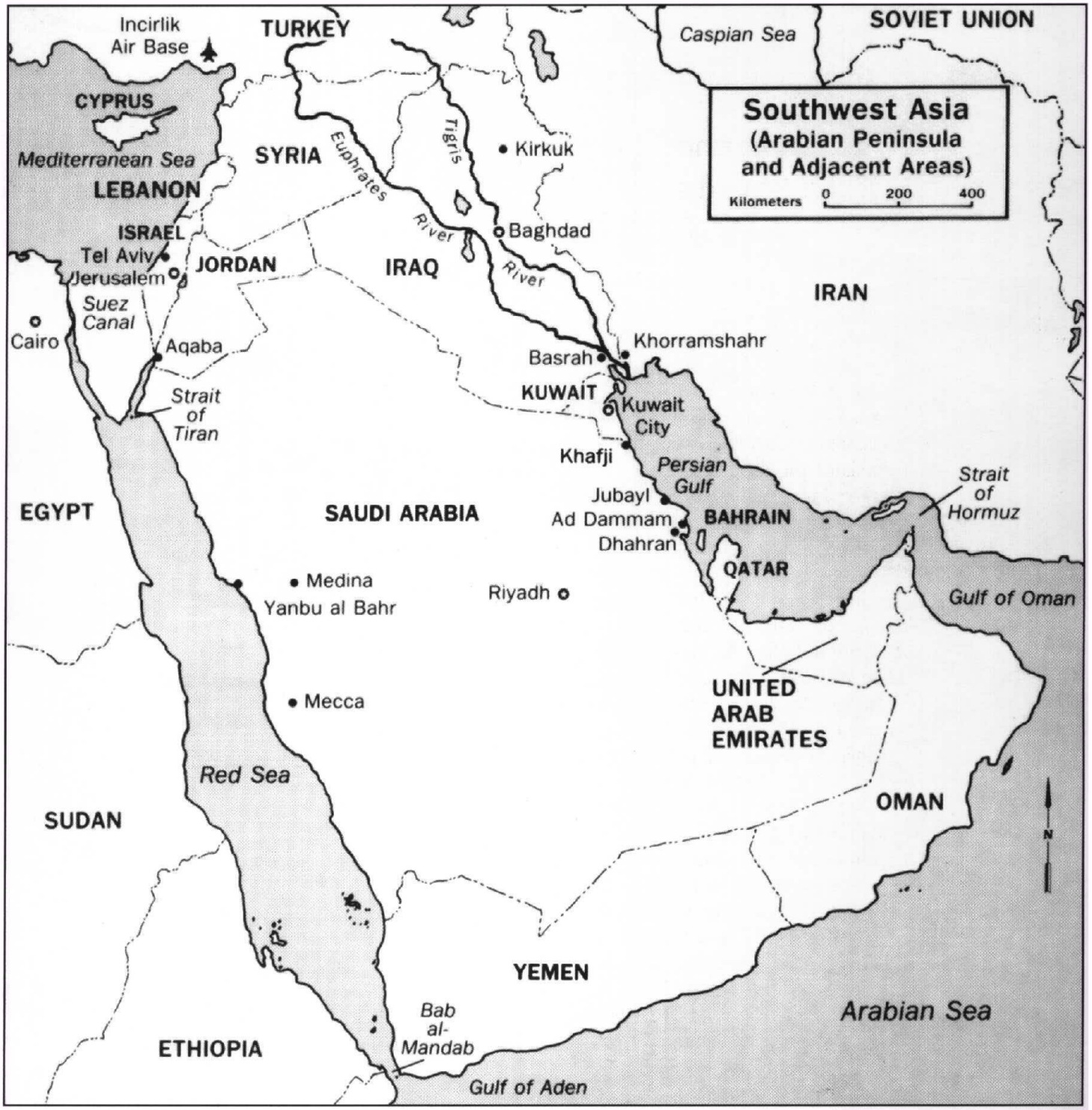
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U.S. Marines in the Persian Gulf, 1990-1991

The 3d Marine Aircraft Wing in Desert Shield and Desert Storm

Desert Shield Begins

Background and Alert

At approximately 0200 on 2 August 1990, the people of Kuwait were awakened by the unmistakable sounds of a military force on the move. Given the recent high tension between the government of this oil-rich nation at the top of the Persian Gulf and that of Iraq, its large and powerful neighbor to the north, few doubted the meaning of the noise filling the night sky. Iraq's President, Saddam Hussein, had conducted a highly public war of nerves with the ruling family of Kuwait during the late spring and early summer apparently designed to extort the forgiveness of the Iraqi debt to Kuwait accumulated over his nearly ruinous war with Iran during the 1980s. Saddam charged the Kuwaitis with drilling into the Iraqi side of the Al Rumalia Oilfield that straddled their common border, thus supposedly robbing the Iraqi treasury of much-needed revenue. Kuwait, the diminutive state to his south, served also as a convenient proxy target for Saddam's rage against the rulers of Saudi Arabia and the other Gulf states for refusing his insistence that they cut back on their production of crude oil, so that he could get the highest price possible per barrel.

On 2 August, Major General Royal N. Moore, Jr., commanding general of the 3d Marine Aircraft Wing (MAW) headquartered at Marine Corps Air Station (MCAS) El Toro, California, mused that this might be the one. He had commanded the wing for almost a year, since 18 August 1989. This native Californian had seen war before. He had served two tours in Vietnam, flew 287 combat missions, and was awarded the Distinguished Flying Cross. His second Vietnam tour was as a J-3 staff officer with the United States Military Assistance Command, Vietnam. This experience would be hard for the Marine Corps to find in 1990. His current duties included those of the deputy commander, I Marine Expeditionary Force (I MEF), where continuity has combat value. I MEF was about to have a new commander, Lieutenant General Walter E. Boomer.

As the course of events on 2 August progressed, those in power in the region faced two main questions. What was the extent of the incursion by the Iraqi dictator's army into Kuwait, and what would be the nature of the worldwide—and especially the American—reaction to this naked land grab by Saddam Hussein? The answer to the first question came quickly. By morning, it was clear

As Commanding General, 3d MAW, MajGen Royal N. Moore, Jr., was responsible for I MEF's air combat element of 467 aircraft during Desert Storm.

that Saddam had seized not only the disputed oilfields in northern Kuwait but also the capital as well. Several divisions of his elite strike force, the *Republican Guard Forces Command* (RGFC), led the assault on Kuwait City before proceeding southward toward the Saudi border.

The United States, eager to integrate Iraq into the western fold as a bulwark against Iran and its extremist views, had taken no public position on the Iraqi-Kuwaiti border dispute other than the desire to see it resolved peacefully. Despite significant attempts at normalizing the Iraqi-American relationship after

the end of war with Iran, Saddam's rhetoric had turned increasingly anti-American and anti-Israeli in the months preceding his move into Kuwait. The administration of President George Herbert Walker Bush, clearly taken aback by Saddam's invasion of an Arab neighbor, became extremely concerned about the direct threat to Saudi Arabia. On 4 August, senior administration officials, although initially divided on the best recourse to the invasion of Kuwait, quickly fell in behind the President's personal outrage against Saddam's actions. On 5 August, President Bush publicly declared Saddam Hussein's attack on Kuwait as "naked aggression" and stated: "this shall not stand." The President set out the United States national policy objectives:

1. Immediate, complete, and unconditional withdrawal of all Iraqi forces from Kuwait;
2. Restoration of Kuwait's legitimate government;
3. Security and stability of Saudi Arabia and the Persian Gulf; and
4. Safety and protection of the lives of American citizens abroad. [1]

These did not change throughout the entire storm that was brewing and would be the basis for drawing up the military objectives.

Rapid consultations with the Saudi leadership followed on the heels of this declaration, with senior U.S. officials pressing their Saudi counterparts on the need to respond decisively to the Iraqi threat. By the 6th, 11 Iraqi divisions were in Kuwait and positioning themselves along the southern border with Saudi Arabia. At this point Iraq had control of 20 percent of the world's oil reserves. Saudi oilfields appeared to be in jeopardy with little effective ability for U.S. Central Command (CentCom) to deter Saddam Hussein from grabbing an additional 20 percent of the world's oil reserves sitting just across the Kuwait border in Saudi Arabia.

A U.S. delegation including Secretary of Defense Richard B. Cheney, General H. Norman Schwarzkopf, USA, Commander, U.S. Central Command, and Lieutenant General Charles A. Horner, USAF, the Air Force Component Commander, Central Command (AFCent), met with Saudi Arabia's King Fahd in Riyadh to delineate the current Iraqi force disposition and to ask permission to begin sending a coalition force to defend Saudi territory. Late on 6 August, King Fahd agreed to a large American military deployment to his country as a necessary measure, and within a few hours, the Pentagon began what became Operation Desert Shield.

The United States Central Command, based at MacDill Air Force Base, Florida, was charged with planning and executing war plans and contingency operations in the Persian Gulf. CentCom, commanded since 1989 by General Schwarzkopf, was one of the five unified commands charged with broad geographic areas of responsibility. CentCom had recently executed a series of exercises titled "Internal Look 90" to test its new operational plans. Previous contingency plans focused on a Soviet invasion of the Persian Gulf but OpPlan 1002-90 envisioned a regional conflict. Thus CentCom OpPlan 1002-90 and the Internal Look exercises became the basis for deployment and movement to theater for the

3d Marine Aircraft Wing. It was obvious that with the Maritime Prepositioning Ships (containing enough supplies and equipment to support a Marine expeditionary brigade [MEB] for 30 days) stationed in Diego Garcia, a tiny British atoll in the Indian Ocean only seven sailing days away, that the United States Marine Corps would be an early response player in CentCom's request for forces.

After the meeting in Riyadh, 7 August became "C"(commencement) day for carrying out a highly modified deployment based on initial planning efforts and the "in work" OPLAN 1002-90 Time-Phased Force Deployment List (TPFDL). General Horner was tasked as CentCom forward to remain in Saudi Arabia to oversee the arrival, positioning, and "bed down" sites of the forces that began flowing into theater. General Schwarzkopf decided on a concept of operations that built up "trigger puller" combat forces in theater quickly at the expense of support forces by moving logistics further down the force deployment list.

In 1990, the fighting units of the Fleet Marine Forces were organized into Marine air-ground task forces (MAGTFs) which were flexible, task-organized combined arms teams. Although it varied in size and composition, each MAGTF had four common elements: a command element, a ground combat element (GCE), an aviation combat element (ACE), and a combat service support element (CSSE). The largest of these organizations was the Marine expeditionary force (MEF) which normally included one Marine division, one Marine aircraft wing, and a force service support group. The next smaller MAGTF, a Marine expeditionary brigade, usually included a regimental landing team, a Marine aircraft group, and a brigade service support unit group. The smallest permanent MAGTF was a Marine expeditionary unit (MEU), built around a battalion landing team, a composite helicopter squadron, and a MEU service support group. Marine air-ground task forces could stand alone or be used as building blocks to create a larger combat unit. Existing Marine Corps doctrine called for large MAGTFs to be created by "compositing," whereby the command elements of two or more units merged to create a single headquarters to ensure unity of command and eliminate redundant headquarters. Each of the subordinate elements were likewise absorbed into larger units. For example two MEB command elements might composite to form a MEF headquarters, the ground combat teams would create a Marine division, the merging aircraft groups would become a Marine aircraft wing, and the combat service support elements would make up the force service support group.

A composite Marine aircraft group (MAG) comprised the aviation combat element of a Marine expeditionary brigade. The task-organized air group included a headquarters, fixed- and rotory-winged squadrons and ground support detachments to provide the five functions of Marine aviation (offensive air support, anti-air warfare, assault support, aerial reconnaissance, and command and control of aircraft and missiles). Coordination for aviation among the MAGTF elements was achieved through the integrated Marine air command and control system. Composite MAGs adopted the number of its parent MEB and added a "0" to indicate the provisional nature. Thus, MAG-70 supported 7th MEB and MAG-40 supported 4th MEB. Ironically a deploying Marine aircraft group could become larger than the non-deploying Marine aircraft wing, as occurred in the case of MAG-70 in Desert Shield.

From the first few days of Operation Desert Shield, Fleet Marine Forces Pacific (FMFPac), I MEF, and the 3d MAW operated under the assumption that Marine Aircraft Group 70 would simply be the first aviation echelon of a MEF-sized deployment to the region. Sending a full aircraft wing was not simply a matter of Major General Moore deploying all of the 3d MAW's aircraft and aviation ground squadrons from the West Coast to Saudi Arabia. Moore first closely consulted with Lieutenant General Duane A. Wills, the Deputy Chief of Staff for Aviation (DC/S Air) at Headquarters, Marine Corps. Formal requests for additional resources had to be routed up the operational chain-of-command from the wing through I MEF to CentCom. Once CentCom approved the request and forwarded it to the Chairman, Joint Chiefs of Staff, the Joint Staff weighed its merits against the current and potential needs of the other warfighting commanders-in-chief, as well as the providing services capabilities. The Chairman then presented his analysis and recommendation to the Secretary of Defense, who reserved the final authority to order major troop movements in the name of the President.

Given the order to provide additional forces by the National Command Authorities, the Commandant of the Marine Corps and his DC/S Air had to find these additional aircraft squadrons from a relatively limited supply. The early decision to base most of the MAG-40 fixed-wing aircraft ashore with MAG-70 was a relatively uncomplicated one because those aircraft were already committed to the theater on paper. Obtaining additional units for Gulf duty, however, was more difficult. Factors internal to the Marine Corps such as squadron readiness levels, aircraft type, aircraft transition schedules, and even squadron decommissioning had to be taken into account by HQMC before it supported the dispatch of more units to Southwest Asia.

The 3d Marine Aircraft Wing Readies MAG-70

With the formal nod to the 7th MEB to prepare for movement to the Persian Gulf, what only days before had been the skeleton staff of MAG-70 at MCAS El Toro began to grow quickly to full strength and beyond. Its commander, Colonel Manfred A. "Fokker" Rietsch, who also double-hatted as the commander of MAG-11, welcomed representatives from the 3d MAW headquarters and the six groups of the wing as they flocked to his headquarters to fill out the MAG-70 contingency personnel roster. Even though no detailed list of units and their corresponding timetables for movement existed to match with CentCom's recently revised OPLAN 1002-90, units force-listed for the 7th MEB frantically readied for departure. With precious little information available about expected operating areas, movement timetables, and Iraqi capabilities, most units either fell back on earlier versions of the Operations Plan for guidance or relied on the recent experience of officers involved in Internal Look 90. Others drew on existing embarkation plans for the planned, but now preempted exercise, Display Determination 90, as a useful starting point.[2]

From Rietsch's own MAG-11, Marine Aerial Refueler and Transport

Col Manfred A. Rietsch reverted to his role as commander of MAG-11 on 2 September 1990, when MAG-70 stood down and 3d MAW stood up.

Squadron 352 (VMGR-352), commanded by Lieutenant Colonel Arlen D. Rens, prepared six of its 12 Lockheed KC-130 "Hercules" four-engine turboprop aircraft for the looming movement to the Persian Gulf . VMGR-352, nicknamed the "Raiders" had flown the venerable Hercules cargo plane since the late 1950s. Four of the KC-130s earmarked for Desert Shield were configured for aerial refueling, while the other two were stripped down for transport duties. The squadron's other six aircraft remained at El Toro in order to support the wide variety of training and support functions required by the stay-behind units of the 3d MAW.[3] The "Black Knights" of Marine Fighter Attack Squadron 314 (VMFA-314), commanded by Lieutenant Colonel George G. Stuart, also from MAG-11, readied for deployment as well, performing last-minute maintenance on its 12 McDonnell Douglas F/A-18A Hornets. In the interim, squadron pilots received threat briefings and weapons systems lectures, while those who had not previously done so qualified for strategic aerial refueling (tanking) with the Air Force's Boeing KC-135 "Stratotanker."[4] First introduced into the Marine Corps inventory in 1983, the "A" model of the Hornet by 1990 was in the process of being replaced by the more capable "C" model in 12 active-duty squadrons. This program had started with the conversion of the three McDonnel Douglas F-4S "Phantom II" fighter squadrons based at MCAS Kaneohe Bay, Hawaii, with MAG-24, but the transition had not yet reached the Corps' other fighter/attack groups in the continental U.S.[5]

Due to ongoing commitments, MAG-11's other Hornet squadrons were not available for immediate deployment in support of Operation Desert Shield. Fortunately, the "Death Angels" of VMFA-235 from MAG-24 were located at Nellis AFB, Nevada, for a "Red Flag" training exercise. This squadron departed its home station at Kaneohe Bay, Hawaii, in July with the expectation of returning in a few weeks. Instead, on 9 August, FMFPac ordered the F/A-18C squadron, commanded by Lieutenant Colonel William C. McMullen III, to join MAG-70. By nightfall the entire squadron had moved to El Toro, where it spent the next five days rectifying equipment shortfalls from MAG-11 stocks and preparing for movement to the Gulf region.[6]

MAG-11's two all weather Grumman A-6E "Intruder" squadrons, Marine All Weather Attack Squadron 121 (VMA[AW]-121) and VMA(AW)-242, were not available for deployment because they were undergoing transition to the F/A-18D, a two-seat version of the Hornet. VMA (AW)-121, the first tactical aircraft squadron to operate the F/A-18D, rolled out its first "D" model in May 1990. The squadron was redesignated Marine All Weather Fighter Attack Squadron 121 (VMFA[AW]-121) to reflect this change, but did not yet possess a full compliment of these aircraft.[7] VMA (AW)-242, which did not expect to see its first F/A-18D until year's end, was preparing to turn over its remaining A-6Es over to the Navy. Of the A-6Es in VMA (AW)-242, only four were capable of high performance flight maneuvers up to six and a half times the force of gravity (6.5 "Gs").* The others were limited to maneuvers of less than three "Gs" because of concerns over the strength of their wings.[8]

The 3d MAW also called upon its other fixed-wing group, MAG-13, based at MCAS Yuma, Arizona, to provide units to MAG-70. Located in the southwest corner of the state, MCAS Yuma was home to the wing's light attack force of McDonnel Douglas AV-8B Harrier IIs. This second generation vertical/short take-off and landing (V/STOL) aircraft, introduced into the Marine Corps inventory in 1983, was far superior to the 1960s-vintage "A" model of the Harrier operated by the Corps since 1971. The AV-8B, however, was still predominately a "day-only" attack aircraft, single seat, and built to replace both the AV8-A's and the Douglas A-4 Skyhawk. Technological changes in the engine, composite materials, and nozzle design, doubled either the payload or range of the AV8-B. Now with the six wing stations, a venerable 25mm gun pack and separate ammo pack, the Harrier II could fulfill its designed mission of close air support from flexible basing at V/STOL pads near the battle area. Two of MAG-13's Marine attack squadrons (VMA), VMA-211 and VMA-214, were in the process of accepting their first "night attack" versions of the Harrier as Operation Desert Shield unfolded. Only a few months earlier, VMA-211 had transferred its last A-4M "Skyhawk" to the reservists of the 4th Marine Aircraft Wing.

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* The Department of the Navy, in response to concerns over the durability of the Intruder's wings, had begun a wing replacement program for the fleet in the 1980s. Unfortunately, this program could only upgrade a few aircraft per year, so each squadron was expected to operate with a mix of restricted and unrestricted airframes well into the 1990s.

The night attack Harrier equipped with a navigation forward-looking infrared system, night vision goggle-compatible cockpit, and a night attack head-up display (HUD), significantly enhanced the Corps' unique V/STOL fleet. Like the F/A-18D, however, this new aircraft was in the first stages of introduction to the FMF and was not yet ready to support a contingency operation or combat employment.

Of the two remaining MAG-13 squadrons, VMA-513 was slated to rotate to the 1st MAW at year's end, and a six-plane detachment had just returned to Yuma in July from a six-month deployment with the 15th Marine Expeditionary Unit (Special Operations Capable) (MEU[SOC]). The 3d MAW thus tasked the VMA-311 "Tomcats" with the MAG-70 mission. Commanded by Lieutenant Colonel Dickie J. White, the squadron screened its personnel, staged its ground equipment for air embarkation, and readied 20 aircraft for movement to theater. Marine Aviation Logistics Squadron 13 (MALS-13) organized a contingency support package maintenance detachment to accompany the Tomcats.

Although it did not command any of these aircraft in peacetime, the 3d MAW anticipated the assignment of a six-plane detachment of Grumman EA-6B "Prowlers" to MAG-70 for deployment to the Gulf region. A highly modified variant of the Intruder airframe, the four-seat Prowler provided the Marines a potent electronic warfare (EW) weapons system. Its primary mission was to jam or spoof enemy air search and fire control radar for antiaircraft artillery and missiles, but it could also destroy those weapons using the AGM-88 HARM missile it carried under its wing. The 18 aircraft of the Marine Corps' Prowler fleet were based at MCAS Cherry Point, North Carolina, under command of 2d MAW. The squadron normally deployed a six-plane detachment to the 1st MAW at MCAS Iwakuni on a rotating six-month basis, leaving 12 back in the states for training and other assignments.

The Marine Corps' other unique aircraft squadron, Marine Tactical Reconnaissance Squadron 3 (VMFP-3) under MAG-11 at MCAS El Toro, was unable to answer the call to arms. Only hours before the 7 August commencement of Operation Desert Shield, the last of VMFP-3's sleek RF-4B "Phantom II" aircraft served as a backdrop for the squadron's budget-driven decommissioning ceremony.* The MAG-70 staff nevertheless briefly scrambled to deploy a few of the remaining aircraft to the Persian Gulf, but with the RF-4B's supply stocks and other unique equipment having been drawn down in the prior months, the aircraft no longer logistically supportable by Marine Aviation Logistics Squadron 11 (MALS-11). Unfortunately, its promised successor in function, a much-anticipated tactical photographic reconnaissance pod designed to be carried on the F/A-18, was still in development and ultimately would not reach the FMF in time to support the operation. The combination of these events would be the source of much aggravation for Marines in the upcoming months, as it left the Marines without a complete tactical reconnaissance capability.

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* In a message to Fleet Marine Forces, Pacific, the Commandant noted: "the costs of retaining RF-4B's have become prohibitive in the current budgetary environment." (CMC msg to FMFPac, subj: RF-4B Plan, 040001ZApr90, in VMFP-3 ComdC, Jan-Jun90).

The 3d MAW did not have to look beyond its own ranks to fill out a more modest initial helicopter requirement for MAG-70. At neighboring MCAS Tustin, three MAG-16 medium and heavy-lift helicopter squadrons readied for the contingency. The "Greyhawks" of Marine Medium Helicopter Squadron 161 (HMM-161), commanded by Lieutenant Colonel Gary J. Price and possessing 12 Boeing Vertol CH-46E "Sea Knight" medium-lift helicopters, flew their aircraft to El Toro, and began partially to disassemble them for transportation. This required the better part of a day, with another 12 hours on the distant end of the journey for reassembly. Three CH-46Es at a time could be transported in the cargo bays of the U.S. Air Force's giant Lockheed C-5 "Galaxy" strategic airlift aircraft.[9]

The CH-46 fleet began service with the Marines in 1964 and was overdue for replacement by a modern medium-lift transport aircraft. Originally designed to carry 24 combat-loaded Marines at a gross weight of 24,300 pounds, by early 1990, the standard gross takeoff weight of the Sea Knight had shrunk to 23,000 pounds or 15 Marines. Then, in May 1990, the entire fleet was grounded due to a failure in the aft transmission of a 3d MAW aircraft. Although returned to service the following month after an extensive fleet-wide safety check, the Sea Knight was further limited to a maximum gross takeoff weight of 22,000 pounds.* With extreme heat and high humidity being typical environmental conditions in the Persian Gulf region during the summer, the effect of this order was to reduce by half (eight) the standard number of combat troops who could be carried by the CH-46 on a sortie.

Lieutenant Colonel Daniel R. Rose's Marine Heavy Helicopter Squadron 462 (HMH-462) "Heavy Haulers" also prepared for deployment, gathering 12 operational Sikorsky CH-53D "Sea Stallion" heavy-lift helicopters by trading off five of their older "A" models with Marine Helicopter Training Squadron 302 (HMT-302) in return for five "D" models. The CH-53A first saw action with Marines in 1967 in Vietnam, and the "D" version had been a wartime engine and avionics upgrade to the original model. Its successor in function, the three-engined CH-53E Super Stallion, was introduced to the Marine Corps aviation inventory in 1981. The CH-53E could lift 16 tons at sea level at 90 degrees Fahrenheit. The CH-53s, both D and E, would become the backbone of vertical lift in the Gulf region where temperatures could reach 130 degrees. HMH-466, nicknamed "Wolfpack" and commanded by Lieutenant Colonel Raymond L. Nymeyer, prepared eight of its Super Stallions and flew them to El Toro for partial disassembly and embarkation. Wolfpack's first aircraft would arrive at the Saudi Naval Air Facility (NAF) Al Jubayl on 20 August. The CH-53E fleet was organized on paper into 16-plane squadrons, but HMH-466 had one detachment of four aircraft slated for deployment in December with HMM-268 (Reinforced) of the 11th MEU (SOC), and the remainder of the aircraft were either in overhaul

* A Fleet Marine Force, Atlantic message cites 4th MEB difficulties with 22,000-pound gross weight limitations. The fleet-wide grounding was in May, with aircraft returned to duty in June after extensive inspections. (CG FMFLant (PersFor) msg, subj: H-46 Maintenance Special Inspection, 031445ZOct90).

or maintenance. Another of MAG-16's heavy-lift squadrons, HMH-361, was scheduled to transition from the CH-53 "D" to "E" model, and were directed to take the four remaining HMH-466 aircraft.[10]

Forty miles south of El Toro at MCAS Camp Pendleton, the "Gunfighters" of Marine Light Attack Helicopter Squadron 369 (HMLA-369) readied their Bell-Textron AH-1W "Super Cobras" and UH-1N "Iroqois" (more commonly known as "Hueys") for duty in the Gulf. The AH-1W, known as the "Whiskey" to the close-knit community, was the latest version of the venerable Cobra gunship that had served Marines for a generation. It was faster and more powerful than its AH-1J and AH-1T "Sea Cobra" predecessors and could carry the laser-guided, tank-busting AGM-114 "Hellfire" missile. Like the earlier Cobra models, the Whiskey could fire the BGM-71 TOW (tube-launched, optically-tracked, wire-guided) missile and 2.75-inch rockets, and it carried a 20mm chain gun mounted in a chin turret, and could now do it in warmer climates. The Marine Corps had taken delivery of its first AH-1W in 1986.*

The potent Iraqi armored force confronting the 7th MEB dictated that the brigade deploy with the strongest possible anti-armor capability, and the Whiskey was viewed by the MEB as an ideal weapons system for the task. Lieutenant Colonel Michael M. Kurth, the commanding officer of HMLA-369, proposed to MAG-39 commander Colonel Coleman D. Kuhn, Jr., that his squadron deploy to the Gulf region with extra AH-1Ws. Colonel Kuhn took a plan to the 3d MAW for a 30-plane squadron and General Moore initially agreed, but airlift constraints soon reduced the number to 24. HMLA-369 traded six of its Hueys along with aircrews to HMLA-169 in return for six of the latter's AH-1Ws, giving HMLA-369 a total of 18 Cobras and six Hueys instead of the standard 12 and 12 complement.[11]

To supplement this air movement to theater, the Civil Reserve Air Fleet (CRAF) was activated to supplement Military Airlift Command (MAC). CRAF is a program in which commercial airlines agree to make aircraft available for Department of Defense (DOD) deployments in exchange for peacetime military business. This was the first CRAF activation, and it initially provided 18 long range international (LRI) passenger aircraft and 21 LRI cargo aircraft and crews. Oversized cargo such as helicopters would still require the C-5 to get them to the Gulf.[12]

The circumstances in the Gulf clearly dictated a strong fixed-wing aircraft mix for the 7th MEB; additional fighter and attack squadrons were sought by the wing to flesh out its air combat element. In a 12 August "think piece" message addressed to Lieutenant General Walter E. Boomer, who had assumed command of I MEF four days earlier, General Moore laid out his concept of operations for the build-up of Marine aviation in the Gulf. With the 4th MEB slated to depart within a week for the Gulf by amphibious shipping, but with no specific mission

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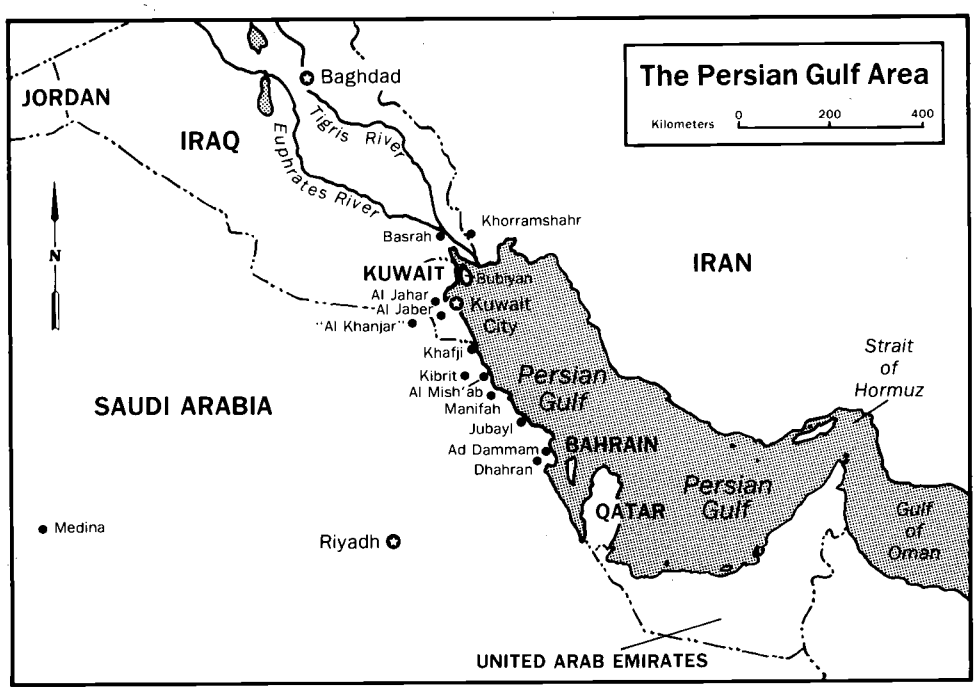
* The AH-1W had originally been designated the AH-1T+, but was differentiated by the more powerful T700-GE-401, 2,032-shaft-horse-power take-off engines and the night targeting system (NTS) incorporated on the newer model. (B. Fitzsimons, *Modern Fighter Aircraft: AH-1 Cobra*, (London: Salamander Books Ltd), 1987, pp. 4-13).

assignment from CentCom, Moore advocated the basing of MAG-40's non-amphibious fixed-wing aviation assets at MAG-70's bases in theater.[13]

Seeing essentially two squadrons of combat capable A-6E Intruders available for use between his wing and the 2d MAW, Moore recommended that the 2d MAW's most-ready A-6E squadron deploy first with MAG-70. Then the remaining combat capable aircraft at Cherry Point and El Toro could be combined and deploy as a squadron in support of the 4th MEB. Regardless of their order or assignment, he sought to have the two Intruder squadrons based ashore at the same site for economy of management and support. Moore likewise advocated the deployment of all 12 of the available EA-6B "Prowlers" to a single site under MAG-70. Further, General Moore wrote that ". . . on a philosophical note, my experience at CinCPac is that everything will not go as planned. We are not going to get 249 sorties to lift the 7th MEB immediately. Airplanes break, refueling trucks don't show up on time, crew rest becomes a factor, and most importantly, distance and changing priorities start to slide the aircraft." [14]

General Moore touched upon the plans for the MAG-70 deployment of helicopter, air control, wing support, and air refueling units. He also stated that between the 3d MAW, the 2d MAW, and the 1st MEB, there were sufficient fighter and attack assets to meet the immediate needs of the Gulf deployment. All told, he proposed a tactical aircraft mix of four Hornet, two Harrier, and two Intruder squadrons under MAG-70 in the Gulf region. The addition of other support aircraft raised that total to well over 100 fixed-wing aircraft ashore in theater. Gaining approval for this concept from I MEF and CentCom, Moore coordinated with the other commands to make it a reality as he prepared to move to the theater.



Also on 12 August, General Boomer, the I MEF commander, issued his Operation Desert Shield deployment order to his major subordinate commands. With C-Day already established as 7 August, General Boomer directed the 7th MEB to deploy first to the theater as I MEF (Forward) by strategic airlift in conjunction with the movement of Maritime Prepositioning Ship Squadron 2 (MPSRon-2) to Saudi Arabia from Diego Garcia. He instructed the brigade to establish rapidly and secure a lodgment in the area of Jubayl, Saudi Arabia, from C+8 to C+16. The 7th MEB would then join reinforcements (consisting of RCT-3 (-) (Rein), MAG-24 (-), and BSSG-1 (-)) flown in from the 1st MEB in Hawaii. These units would meet up with equipment offloaded at the Port of Jubayl from MPSRon-3.

The 7th MEB would then "composite" with the follow-on units to form I MEF. The arriving I MEF command element would absorb the 7th MEB staff, and the brigade's ground, air, and combat service support elements would report to the 1st Marine Division, 3d MAW, or the 1st FSSG, respectively, as they arrived in theater no later than C+23. Meanwhile, I MEF instructed the 5th MEB to deploy from the West Coast to the CentCom area of responsibility (AOR) by amphibious shipping. It was expected that 5th MEB would phase ashore in theater and be assigned to I MEF. The deploying 4th MEB out of the East Coast would stay at sea under the Naval component of Central Command, NavCent. It would be joined by the 13th MEU(SOC) out of the U.S. Seventh Fleet as well as by Amphibious Ready Group Bravo carrying elements of a regimental combat team (RCT) out of III MEF on Okinawa.

The I MEF order identified Dhahran Air Force Base as the aerial port of debarkation (APOD) for 7th MEB units. The MAG-70 fixed-wing bed-down site was Shaikh Isa Airbase, Bahrain, some 60 kilometers southeast of Dharhan. Located on the southern end of the island, the still incomplete Shaikh Isa air facility was not marked on available maps. The helicopters would stage 80 kilometers to the northwest of Dharhan at the airfield at the King Abdul Aziz Naval Base at the southern edge of the port of Jubayl.[15]

With its resources already heavily taxed filling out the 7th MEB force list, I MEF soon rescinded the order to deploy the 5th MEB. It also cancelled the movement of MAG-24 headquarters to the Gulf, but retained most of its subordinate units in the scheduled airflow. Where possible, General Boomer reinforced the 7th MEB with now-uncommitted 5th MEB units. The 3d MAW thus notified HMLA-367 and HMH-465 in mid-August to prepare to join MAG-70. Lieutenant Colonel Terry J. Frerker's "Scarfaces" of HMLA-367 gathered 10 AH-1Ws and 12 UH-1Ns for embarkation.

Like its HMH-466 neighbors, the "Pegasus" of HMH-465 deployed only half of its nominal 16 aircraft complement. A four-aircraft detachment from HMH-465 had been deployed since June with the 13th MEU (SOC), so Lieutenant Colonel Ronnie S. Johnson's Marines readied eight aircraft for the trip to Saudi Arabia while transferring the remainder to other MAG-16 squadrons.

The 3d MAW also ordered VMO-2, which operated several models of the North American OV-10 "Bronco" turboprop observation aircraft, to prepare for deployment to the Gulf region. Commanded by Lieutenant Colonel Clifford M.

Acree, VMO-2 operated 12 OV-10s at MCAS Camp Pendleton and supported the rotation of six others with MAG-36 in the Western Pacific. The squadron could only muster six aircraft for MAG-70 while still maintaining six others for state-side training commitments and scheduled overseas rotation. VMO-1 possessed eight of the older OV-10As plus four of the latest version of the Bronco, the OV-10D Service Life Extension Program (SLEP). The latter included forward-looking infrared radar (FLIR) that provided an impressive night and poor weather observation capability to the 3d MAW.

Unable to fit inside strategic transport aircraft and without an air-refueling probe, the only way for the squadron to move halfway around the world was by lengthy ocean voyage or ferry flight. General Moore suggested loading the Broncos on board the amphibious ships embarking the 4th MEB for transit to the Gulf region, but the acute shortage of East Coast "gators" resulted in there being room on board ship for only two OV-10s. The New River-based VMO-1 provided these to MAG-40, and they were craned on board the USS *Iwo Jima* (LPH-2) at the pier in Morehead City, North Carolina. The more risky method of ferry flight was the only recourse left for the VMO-2 aircraft, and thus, on 28 August, the first of six Broncos departed MCAS Camp Pendleton on a marathon eastward journey to Saudi Arabia.[16]

Internal and External Deployment Constraints on FMF Aviation

The single greatest factor in the contingency deployment decisions of mid-August was their impact on the Corps' unit deployment program (UDP), which had been in existence in some form since the post-Korean War drawdown of the mid-1950s. The unit deployment program dictated that, rather than permanently assigning nearly 25,000 Marines to III MEF in the Western Pacific, the Corps would maintain the bulk of III MEF through the rotation of infantry battalions, aircraft squadrons, and a variety of smaller units from the United States. By mid-1990, the program had evolved to where both the 2d and 3d MAWs as well as the 1st MEB's MAG-24 deployed a set mix of aircraft squadrons and detachments for standard (normally six-month) deployments to 1st MAW aircraft groups stationed on mainland Japan or on Okinawa.

The Marine Corps also maintained an ongoing commitment to provide CH-46E squadrons, reinforced with detachments of AH-1s, UH-1s, and CH-53s, to each deploying MEU. The MEUs embarking on board Tarawa-class amphibious assault ships were also normally assigned six-plane AV-8B Harrier detachments.* In the U.S. Pacific Command area of responsibility in 1990, I MEF was obligated to provide one of its three MEUs to an amphibious ready group that would deploy forward from the U.S. to the Japan-based U.S. Seventh Fleet. The other two MEUs of the force either prepared for such a deployment or had just

* The *Tarawa* (LHA-1) and her four sister ships—*Saipan* (LHA-2), *Peleliu* (LHA-3), *Nassau* (LHA-4), and *Belleau Wood* (LHA-5)—were designated assault ships, general purpose (LHAs). The *Tarawa* was launched in 1973.

completed one. II MEF maintained a similar cycle with one of its three MEUs deployed as Landing Force Sixth Fleet in the Mediterranean.

The Pentagon and the U.S. Pacific Command, with ongoing concerns both on the Korean Peninsula and the Philippines, fully expected the Marine Corps to maintain III MEF at the agreed-upon strength while meeting its regular Seventh Fleet landing force obligations. Thus, few if any of the units already deployed to, or shortly slated for the Western Pacific, could be reassigned to Operation Desert Shield. This complex and continuous movement of aircraft squadrons across the Pacific meant that FMFPac aircraft squadrons fell into one of four rough categories available for deployment.

The first category included those squadrons either deployed to the 1st MAW or with a Pacific Fleet MEU, as well as those within a few months of undertaking a scheduled deployment, which were already under the operational control (OpCon) of their new commands and thus unavailable for other assignment. A second category encompassed those squadrons that had recently returned from such a deployment. Traditionally, squadrons falling into this category conducted extensive maintenance and safety standdowns in the immediate post-deployment period and experienced a high level of personnel turnover due to transfer and end of service. They also normally had many of their personnel on extended annual leave after their long stint away from family and friends. A third category involved those squadrons, which were in the process of transitioning to a new aircraft type or model. The fourth category was a squadron preparing for decommissioning. The F/A-18D Hornet and the AV-8B Harrier II Night Attack transition programs were good examples of the former, while the decommissioning of the RF-4B squadron illustrated the latter. All of the above fell most heavily on the 3d MAW at just the time when events in its geographic area of responsibility rose to a boil and accounted for the relatively few fixed-wing squadrons available for immediate deployment within the wing.

With these constraints, only one of MAG-11's three F/A-18A squadrons was available for immediate deployment. VMFA-323 had deployed to Iwakuni, Japan, in April 1990 and was about half way through a normal tour with MAG-12. VMFA-531 had just returned to MCAS El Toro the same month after its six-month stint in the Western Pacific.[17] Half its aircraft were undergoing extended maintenance, and after a heavy summer turnover, many pilots and maintenance personnel were new to the squadron. VMFA-314, at home base the longest, was quickly assigned to Operation Desert Shield by the wing. VMFAT-101, the Corps' sole F/A-18 training squadron, could augment other squadrons or trade a few aircraft if required, but could not deploy.

Given the mission of reinforcing MAG-70 with MAG-40's fixed-wing squadrons in hand, Major General Richard D. Hearney, the commanding general of the 2d MAW, examined his options and identified the squadrons to deploy to the Persian Gulf with the 7th MEB. He called upon MAG-31 at MCAS Beaufort, South Carolina, to provide two Hornet squadrons for Gulf duty. The group in turn notified Lieutenant Colonel Thomas A. Benes' VMFA-333 and Lieutenant Colonel Andrew S. Dudley, Jr.'s VMFA-451 to prepare their squadrons for departure. The "Warlords" of VMFA-451 dispatched lead maintenance personnel to

NAS Rota, Spain, on 17 August on board two VMGR-252 Hercules, while the rest of the squadron readied themselves and their aircraft. Next door, the "Shamrocks" of VMFA-333, nicknamed "Trip Trey" because of their distinctive three shamrock squadron insignia, did likewise.

As recommended by General Moore, the 3d MAW shortfall of all-weather attack aircraft was covered by MAG-14 at MCAS Cherry Point. On 17 August, the "Bengals" of VMA(AW)-224, commanded by Lieutenant Colonel William J. Horne, transferred from MAG-14 to MAG-70. With the Bengals' operating a mix of restricted (G limited) and unrestricted A-6Es like the rest of the Corps' Intruder squadrons, neighboring VMA(AW)-332 traded some of its unrestricted aircraft to its deploying sister squadron.[18] VMA(AW)-242 flew its remaining aircraft from El Toro to Cherry Point on 14 August and handed over its four unrestricted A-6Es to the Bengals to bring the squadron up to full capability.[19] With VMA(AW)-332 slated to relieve VMA(AW)-533 in the Western Pacific at year's end, however, HQMC cancelled plans for the dispatch of a second Intruder squadron to the Gulf region.

Saddam Hussein's military presented a challenging air threat to Marine aviation. The Iraqi military possessed modern Soviet and French aircraft and fielded a world-class integrated air defense system (IADS). This sophisticated threat dictated the augmentation of MAG-70 with a strong airborne electronic warfare contingent. Having commanded the newly-commissioned Marine Tactical Electronic Warfare Squadron 2 (VMAQ-2) during 1975-76, few Marines were as familiar as General Moore was with the tremendous capabilities brought to modern air warfare by the Prowler.* In accordance with his recommendations, HQMC approved the commitment of the remaining Marine Prowlers to Desert Shield, and thus Lieutenant Colonel Richard W. Bates' "Playboys" readied their 12 remaining EA-6Bs for deployment.

The 2d MAW notified the VMA-542 "Tigers" of MAG-32, also based at Cherry Point, that they too would be joining MAG-70 in theater. Commanded by Lieutenant Colonel Theodore N. Herman, the Tigers had just returned from six months in the Western Pacific in June. Receiving its warning order on 16 August, VMA-542 quickly accepted AV-8Bs from VMA-223 and VMAT-203 to bring its total to 20 deployable aircraft. Short on personnel, the squadron joined 10 pilots and 37 enlisted Marines in the week prior to deployment.[20]

Marine Air Control Group and Marine Wing Support Group Issues

The 3d MAW's two non-flying groups, although not as well publicized, were nonetheless critical to the combat capability of MAG-70 and the 3d MAW. If the flying squadrons of a Marine aircraft wing could be likened to the various

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* Marine Composite Reconnaissance Squadron 2 (VMCJ-2) was redesignated VMAQ-2 on 1 July 1975. Prior to that date, each MAW had a dedicated VMCJ squadron consisting of both electronic warfare and photographic reconnaissance aircraft. In 1975, all EA-6A aircraft were clustered under VMAQ-2, while the RF-4Bs were based at El Toro under Marine Tactical Photographic Reconnaissance Squadron 3 (VMFP-3).

muscles of the human body, then the Marine air control group constitutes its brain and nervous system while the Marine wing support group its vital internal organs. No single aviation element can stand alone in combat, and the employment of only two of the three elements would render Marine aviation merely an appendage of the Navy or Air Force's theater air effort. All three elements are needed to provide the operational depth and breadth to a MEB or MEF.

Marine Air Control Group 38, headquartered at MCAS El Toro and commanded by Colonel Joseph Della-Corte, faced difficult choices from the start of its embarkation. The group, organized into functional squadrons and battalions based on mission, would provide the structure for the command and control of 3d MAW's aircraft and missiles in whatever clime and place they were assigned. Stateside support for the remainder of the 3d MAW would continue while meeting the additional challenge of providing the wing's combat needs on the other side of the globe in a joint/combined arena. MACG-38 would receive a warning order from 7th MEB to prepare for what would become Desert Shield. On 6 August, the execution order followed, but without movement dates.

The first significant issue addressed by Colonel Della-Corte revolved around the deployment of an air control squadron. MACG-38 contained two Marine air control squadrons (MACS), MACS-7, based at MCAS Yuma, and MACS-1 at Camp Pendleton. Each squadron provided the facilities, technical equipment, and experienced personnel for a Tactical Air Operations Center (TAOC). The TAOC was designed to control the airspace over Marine forces. It coordinated the defensive employment of fighters and missiles within that airspace "box" or "bubble," and controlled offensive air operations among local airfield air traffic control detachments and forward air support agencies.

MACS-7 operated a Marine Corps standard suite of air control equipment consisting of two long-range air search radars, the TPS-32 and the TPS-59, each with a range of several hundred miles, and two short-range or "gap-filler" radars known as TPS-63. The Marine Corps procured these expensive air search radars in small numbers and there were not enough to pre-stage them on board MPS ships. Thus, the bulky long-range radars had to be transported by strategic airlift or sealift.

MACS-1, the group's other air control squadron, was involved in the testing and service certification of the engineering development modules (EDMs) of the Tactical Air Operations Module (TAOM) slated for procurement by the Marine Corps in the early 1990s. At the outbreak of the contingency, the squadron possessed two EDMs, whose testing program was nearly complete. Their last major field test was scheduled for September, when MACS-1 was slated to accompany MAG-70 on Exercise Display Determination 90 using EDMs to provide an automated early warning and control capability to the 7th MEB.

If allowed to deploy with its new engineering development modules to the Gulf, MACS-1 would reduce the total amount of airlift necessary to move the control group detachment, although one of the aircraft would have to be an Air Force Lockheed C-5 Galaxy to accommodate the trailer-mounted TAOMs. With the up-to-date electronics built into the TAOM system, the two EDMs in hand could

cover a sizeable portion of the workload previously requiring the employment of a complete older system.* The TAOMs operated by MACS-1, however, were a "one-of-a-kind" system, and their supply and technical support were still the responsibility of the civilian contractor.

TAOM-unique parts were not yet in the Marine Corps supply system, thus they could not be replaced from MPS repair stocks.[21] Still, the use of the TAOM-equipped MACS-1 in the Persian Gulf region, albeit for even a short period of time, offered a distinct advantage. Colonel Della-Corte presented this information to the wing commander and recommended the squadrons deployment despite some technical and support risks. General Moore concurred and directed MACS-1 to move its equipment to El Toro for embarkation.

A similar dilemma confronted Della-Corte concerning his air defense units. The Yuma-based 2d Light Antiaircraft Missile (LAAM) Battalion, equipped with two firing batteries employing the Improved-HAWK (Home-All-the-Way-Killer) surface-to-air missile, normally would be employed in reinforced firing battery strength for a MEB-level contingency such as the one unfolding in the Middle East. The battalion had undergone a major equipment upgrade in 1987, designated as Phase III of the HAWK improvement program. This upgrade greatly increased the HAWK system deployability and reliability.

Using the Phase III HAWK system, the battalion could employ a variety of tactical configurations depending on the threat. The basic element of the system was the HAWK fire unit, a slice of a standard firing battery which contained a trailer-mounted three-missile launcher, a high-powered illumination radar (HPIR), a continuous wave acquisition radar (CWAR), and a battery command post (BCP). Improved computer software permitted the fire unit to engage multiple low-altitude targets at a time.[22]

Given the likely wide geographic dispersion within the 7th MEB area of responsibility, Colonel Della-Corte recommended that two austere firing batteries, each fielding two HAWK fire units, be deployed instead of the force-listed one reinforced battery. While far from ideal, this would allow for extended area defensive coverage and provide a deterrent against Iraqi air attacks on the critical debarkation ports and airfields.** The trade-off of airlift space, however, would cost the battalion some initial depth in maintenance and support until these elements could be brought forward. Weighing the cost versus the benefit, the MAG-70 commander quickly "bought off" on the plan. Concern for the large area and

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* The system "consisted of 150 personnel, two mobile-loaded engineering development modules (EDM), two radars (TPS-59 and TPS-63), and all available contractor support spares/maintenance float from Litton for a 30-day commitment. Initial 30-day commitment based on subsequent relief in place by unit with current TAOC system. Relief required based upon logistical supportability." (MACS-1 ComdC, 7Aug-2Sep90).

** "Based upon mission requirements (defend significant vital areas spread over a wide geographical area) the MAG-70 force-listed one HAWK firing battery was not sufficient to protect 7th MEB forces ashore nor the MPS offload. As a result, the decision was made to deploy four 'bare bones' fire units from 2 missile batteries. This decision provided at least the foundation of providing adequate air defense once assault follow-on shipping/airlift arrived." (Encl 1 to 2d LAAM Bn ComdC, 1Jul-30Sep90, p. 4).

point targets requiring air defense coverage also prompted the Stinger Missile-equipped 3d Low-Altitude Air Defense Battalion (3d LAAD) to seek to deploy in battalion strength instead of the programmed reinforced firing battery. The wing halted this effort due to airlift constraints and limited the 3d LAAD initial in-theater force to 45 Stinger teams.[23]

Headquarters and Headquarters Squadron 38 (H&HS-38), Marine Wing Communication Squadron 38 (MWCS-38), Marine Air Traffic Control Squadron 38 (MATCS-38), and Marine Air Support Squadron 3 (MASS-3), were all slated to deploy detachments consisting of about half their strength in support of MAG-70. Most of these units were manned at much less than table of organization (T/O) strength in early August due to traditional high summer turnover and other factors. Major Eric D. Zobel's H&HS-38, the home of the 3d MAW's Tactical Air Command Center (TACC), prepared to embark. Load plans would be adjusted numerous times between the execution order of 6 August and the first fly-in-echelon departure on 22 August. Just next door, MWCS-38 similarly organized a MEB-size detachment consisting of 250 of the squadron's 544 Marines. MATCS-38 augmented two of its four airfield detachments and added a headquarters section for deployment. MASS-3 readied a detachment, lead by Major Maurice B. Hutchinson, configured to operate a minimal DASC while awaiting the arrival of the rest of the squadron.[24]

MACG-38's preparations were complicated from the outset when the 7th MEB determined that no female Marines or sailors would deploy in deference to Saudi cultural customs. This created significant personnel difficulties for some of the control group squadrons since they had female officers and enlisted women Marines in key billets throughout their organizations. This instruction was modified several times, until 20 August, when the MEB finally determined women could be scheduled in the airflow. By that time, however, most of the units had made the required but unpopular personnel adjustments and had begun to deploy with alternates in place. As a consequence, very few women Marines were able to join their Middle East-bound units for several weeks.[25]

The I MEF order of 12 August to prepare for the possible deployment by sea of the 5th MEB caused MACG-38 to spend a day attempting to rearrange squadrons, personnel rosters, and equipment in order to support the simultaneous deployment of the 7th and 5th MEBs. With female service members already prohibited from serving on board U.S. Navy combatant ships, many control group units could not satisfy this new requirement and the 7th MEB prohibition on the early deployment of women to Saudi Arabia. As a consequence, shipboard detachments were built on paper by switching available male personnel from MAG-70, and females were then placed in the empty MAG-70 slots. The idea of an early 5th MEB deployment quickly faded, but precious time was again lost while the question of the deployment of women was addressed.*

MWSG-37 went through the same Desert Shield preparations as MACG-38, but the challenges its units faced were somewhat different. As the operation

* Captain John T. Quinn II recalled the difficulty units had with the switching out of women Marines, while serving as the assistant detachment commander for MWCS-38.

unfolded, its commanding officer, Colonel Ronald M. D'Amura, was scheduled to turn over command of the group to Colonel Robert W. Coop, the current wing G-3. With the group working to organize adequate service support for MAG-70, General Moore placed the change of command on hold for the moment. MWSS-373, based at El Toro and structured to support the unique needs of a fixed-wing MAG, was slated to deploy with the fixed-wing contingent of MAG-70. The squadron, commanded by Lieutenant Colonel Stephen D. Hanson, was well short of its authorized table of organization personnel strength, but would be providing some of the first Marines to Shaikh Isa, Bahrain, to act as the offload preparation party (OPP) and surveillance, liaison, and reconnaissance party (SLRP). These Marines departed El Toro on 12 August.

MWSS-374, commanded by Lieutenant Colonel Stephen G. Hornberger and based at MCAS Tustin with MAG-16, was notified it would support the MAG-70 helicopter detachment. This squadron was also significantly understrength in early August. Hornberger would later state:

> The squadron rolls showed 18 officers and 250 enlisted at the beginning of the period. In preparation for Desert Shield, personnel were recalled and augments from MWSS-171 were joined. Twenty officers and 427 enlisted stepped off for Operation Desert Shield on 13 August.[26]

The vast majority of both support squadrons' equipment was planned to be drawn from shipboard MPS stocks, while the personnel would be airlifted from El Toro and Tustin into the theater.[27] Most of their own equipment was left behind in California in the custody of stay-behind detachments. MWSG-37's other support squadrons, MWSS-372 at Camp Pendleton, MWSS-371 at MCAS Yuma, and MWSS-173 at Marine Corps Air-Ground Combat Center Twentynine Palms, remained at their respective stations but soon sent detachments to cover required operations at El Toro and Tustin.

Aircraft Basing and Tanker Support

Even as operational, administrative, and logistical details relating to the embarkation of MAG-70 were being dealt with by its staff and higher headquarters, the unresolved issue of prospective aircraft bases in theater hung like a cloud over planning. OPLAN 1002-90 assigned the 7th MEB to the defense of the Jubayl area in the oil-rich Eastern Province of Saudi Arabia. Al Jubayl, the first city of any substance on the coastal route south of the Kuwaiti border, was a logical place for the projected Marine cantonment. The commercial Port of Jubayl seemed ideally suited for the first "real-world" employment of the MPF, and it was complemented by the airfield on the southern outskirts of the city at the King Abdul Aziz Naval Base (KAANB).

On closer inspection, however, this airfield possessed some significant shortcomings for supporting an MPS offload and hosting a large rotary-wing

detachment. Its 8,000-foot runway had not been properly maintained for many years. Although nominally long enough to land a U.S. Air Force Lockeed C-141B Starlifter safely, the runway could not accommodate a sustained flow of airlifters due to its deteriorated condition. As one Harrier squadron commander later noted:

> The runway adjacent to a soccer stadium was an 8,000-foot stretch of badly deteriorated asphalt. Its small turnaround [and] parking area was in sad shape and barely sufficient for a 20-plane squadron. Overall, the potential for foreign object damage (FOD) would have been unacceptable during peacetime.[28]

In addition to these failings, there were no aircraft hangers and the base also lay within a few hundred meters of the major coastal north-south thoroughfare and thus its activities were open to observation by passers-by.

A dozen miles northwest of the city of Jubayl lay a much newer airfield with a runway that could accommodate the largest strategic airlift aircraft in the world. Landing at NAF Jubayl would become an unforgettable event for many 3d MAW Marines.* This airfield, used by several helicopter squadrons of the Royal Saudi Naval Force and known as the Jubayl Naval Air Facility (JNAF), also had very limited aircraft parking and taxi areas and as a result could only accommodate a few very large aircraft at one time.** Given time, however, these limitations and roadblocks could be overcome and the facility upgraded to suit I MEF's requirements.

Time, however, was of the essence in the first weeks of August 1990. Faced with the invasion of Kuwait and possible attack on Saudi Arabia, the authors of the draft OPLAN 1002-90 (Defense of the Arabian Peninsula) assumed "... that 19 days of pre-hostility deployments and nine more days of deployments after hostilities began would be available before lead enemy elements reached defensive positions near Al-Jubayl."[29] With essentially no warning of Saddam's attack into Kuwait and confronted with the very real possibility of the Iraqi Army continuing southward on short notice, the certainty of utilizing Jubayl as a port and airhead for MPS operations was very much in question during the first critical days of Operation Desert Shield. Given the overt Iraqi threat to eastern Saudi

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* Sergeant James I. Mabus of Marine Aircraft Control Group 38 described the image of arrival in Saudi Arabia that is most vividly seared into most Marines' memories: "Arriving in theater and the back hatch of the plane opening ... and the hot air shooting into the aircraft, stifling with the strong sent of jet fumes, someone in the plane said, 'This might not be hell, but we can see it from here.' One thought that the jet hot exhaust would end as one stepped off the aircraft and away from the tarmac, but as the smell left, the heat didn't stop. It took a while for the mind to accept that the two are separate, and that you are now in a truly foreign place that remains this hot all day long." (Attachment to H&HS-38 ComdC, Jan91).

** The 1:500,000 Tactical Pilotage Chart (JOG Air) carried by pilots referred to the port and city as Al Jubayl and the airfield northwest of the city as Jubayl.

Often, art can capture a sense of the reality of war in ways other media cannot. In this painting, Col H. Avery Chenoweth, USMCR (Ret), conveys an impression of the urgency that accompanied the build-up to Desert Shield/ Desert Storm as Marine aircraft fly into Jubayl the supplies so necessary to allied victory.

Arabia, the wing even went so far as to examine alternative airfields in Oman.*

Facing a dearth of suitable airfields in eastern Saudi Arabia, the Marine Corps was fortunate to have dispatched Major General Jeremiah "Digger" Pearson III to Saudi Arabia in early August from his assignment in Quantico, Virginia, to serve as the deputy commander Marine component command of Central Command (MarCent) in Riyadh. A recent CentCom Inspector General (1986-1988), Pearson was already acquainted with many influential persons in the region. He called upon one of those, Shaikh Khalifa bin Ahmad Al Khalifa, the minister of the Bahrain Amiri Defense Forces, and explained to him MarCent's airfield difficulties. The minister understood immediately and graciously offered the Marines some space at the busy Bahrain International Airport on the outskirts of the capital and the full use of Shaikh Isa Air Base, a partially-completed fighter base, in the southern portion of the island.[30]

At the same time, the Air Force component command of Central Command (CentAF) dispatched a multi-service team to the theater to assess the quality and quantity of available airfields for use by the large aviation force slated to descend upon the region within a few days. General Moore sent Lieutenant Colonel Stephen F. Mugg of the wing staff to join the team, and they too reported that the Jubayl area was less than ideal. The team drew roughly the same conclusion as had General Pearson about the proper sites for MAG-70, determining

* Captain John T. Quinn II, the assistant detachment commander for MWCS-38, recalled the urgency of early MAG-70 planning meetings he attended.

Getting aircraft to theater required the largest "tanker bridge" operation ever undertaken. Here, Marine F/A 18s refuel from tanker aircraft enroute to the Persian Gulf area.

that Shaikh Isa would be a more appropriate base for fixed-wing squadrons. The team report to General Horner recommended that the Marines use Shaikh Isa. General Schwarzkopf, in consultation with the Bahrainis, quickly concurred.[31]

Shaikh Isa Airfield seemed ideal to the Marines of MAG-70 when they arrived in mid-August. With a runway of 12,541 feet and 1.1 million square feet of ramp space, Shaikh Isa was one of the better facilities available in the region.[32] Located along the coast on the eastern side of Bahrain near its southern tip, the airfield was situated well away from the island's population centers. Although incomplete, most necessary ancillary facilities were available on the northeast corner of the base including mess halls and temporary berthing for hundreds of men in air-conditioned buildings. Two modern hangars and an air traffic control tower dominated the operational area of the base on the western side of the runway. A dozen smaller buildings in the area offered room for supporting units.

Inadequate basing in theater was only part of the problem confronting Marine aviation in mid-August; the other parts consisted of garnering enough strategic airlift and aerial tanker support to move MAG-70. A notional MPS MEB required the equivalent of 259 mainly Air Force C-141 sorties to fly-in enough personnel and equipment to marry up with and fully employ the stocks on board the MPS squadron. More than 50 of these sorties had to be C-5s to lift outsized cargo. The figure of 259 did not include tanker sorties to get the multitude of C-5s, C-141s, and fixed-wing tactical aircraft to their destinations halfway around the world.

For Operation Desert Shield, unfolding in an area of the world far

removed from most of the overseas U.S. military infrastructure, the level of tanker support required was extraordinary. With little base access west of the Philippines and east of Diego Garcia, U.S. aircraft sometimes had to be routed eastward nearly two-thirds of the distance around the globe. This optimized use of U.S. bases in the United States and Western Europe as well as the Atlantic and Mediterranean "tanker bridge" instituted by the U.S. Transportation Command (TransCom).[33]

An F/A-18 is shown being refueled from the perspective of the tanker. This is considered a "stop" on the tanker bridge to the Persian Gulf.

This "tanker bridge," although unprecedented in size and scope, could only support a limited number of aircraft in transit at any one time. In the first week of the operation, this key resource transported lead elements of the U.S. Ninth Air Force (starting on 7 August with two squadrons of Air Force McDonald Douglas F-15C Eagles from the 1st Tactical Fighter Wing) and the U.S. Army 2d Brigade, 82d Airborne Division, together with other XVIII Airborne Corps elements. With the Ninth Air Force commander, General Horner, positioned in Riyadh, Saudi Arabia, and deputized by General Schwarzkopf as the CentCom (Forward) commander, the emphasis on moving tactical aviation to theater as quickly as possible was predictably strong. However, this emphasis did not initially extend to Marine tactical aviation.

While this delay was being resolved, the 3d MAW began to move MAG-70's fixed-wing aircraft across the U.S. to East Coast air stations using Marine KC-130s reserve and intermediate staging bases enroute. The KC-130s that were required for this movement exceeded those available from active units. KC-130s of the 4th MAW provided immediate and constant support starting on 6 August, to Marine units staging from East Coast bases to the Gulf. Almost to a man, VMGR-452 pilots voluntarily took a military leave of absence from their civilian airline jobs to provide what was needed for their active duty counterparts to get to the Gulf.[34]

On 14 August, VMFA-235 and VMFA-314 departed El Toro for MCAS Beaufort and VMA-311 left Yuma the next day for Cherry Point. The squadrons spent the following period conducting additional training while awaiting Air Force tanker support for the trans-Atlantic leg of the journey to the Persian Gulf.[35] Although a KC-130 detachment accompanied Marine expeditionary units on occasion when they deployed to the Mediterranean, the Hercules was a tactical tanker by design. It did not have the capacity or speed to support effectively the large number of Marine jet aircraft slated to cross the Atlantic. This required Marine aviation to be dependent on the Air Force tanker bridge. Getting a time slot to enter a Marine squadron onto the Air Force tanker bridge would be a mandatory step in getting to the theater.

After several false starts, on the night of 21 August, Lieutenant Colonel "Scotty" Dudley's VMFA-451 Warlords would get its time slot on the bridge for departure from MAG-31, MCAS Beaufort, South Carolina. Fully combat armed, the Warlords' 12 F/A-18s began their trans-Atlantic flight and arrived in Shaikh Isa, Bahrain, on the afternoon of 23 August, reporting to MAG-70. While easily said, this understates the tremendous preparations required of all the squadrons departing for Desert Shield. A squadron typically had 8-10 ready-to-go aircraft out of 12 assigned on any given day during peacetime. The remainder were undergoing modifications, at a depot-level maintenance facility, or temporarily grounded awaiting parts. When the order to go to war came down, non-flying and missing aircraft are replaced from other squadrons in the MAG with no small amount of resentment. Augmenting the deploying squadron personnel to full table of organization likewise required other units to find volunteers to fill the peacetime 20 percent shortfall with pilots, as well as maintenance crews. Aircraft cannot oper-

ate very long without a spare parts supply. So packing contingency parts, in addition to all the individual and unit equipment to survive in an austere environment required a total MAG effort. Colonel Randolph H. Brinkley's MAG-31 met this challenge while sponsoring the West Coast squadrons as they transited through Beaufort and awaited their time slot for the tanker bridge.

Colonel Rietsch thought that the support provided by "Brinkley's MAG-31 was far above and beyond what I had expected. We literally cleaned them out of air-to-air missiles, and FLIR pods, plus some skilled people that we picked by name. This was really the 'Corps taking care of its own' at its best." [36]

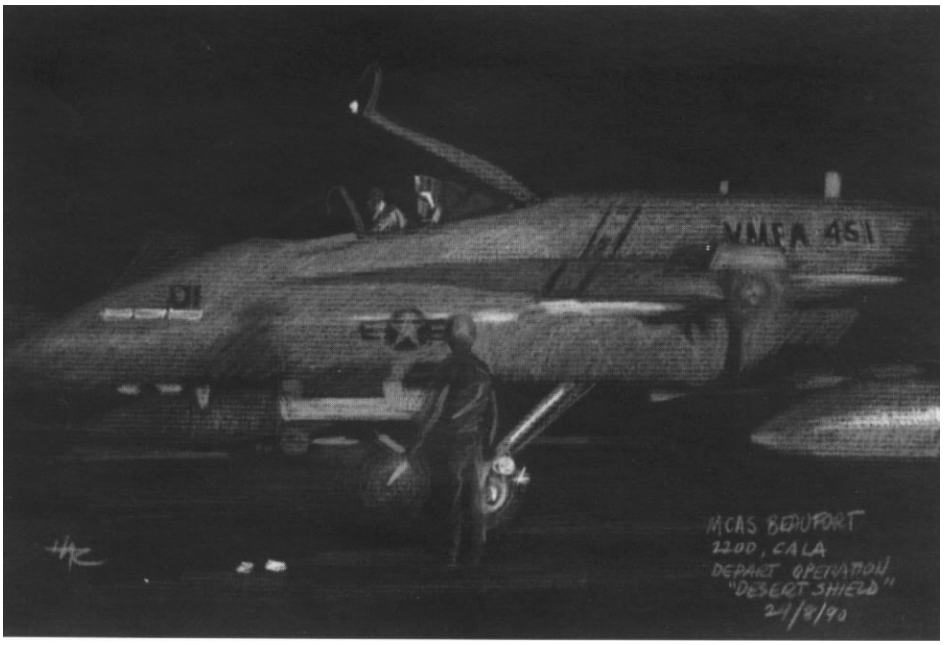
The night of departure for the Warlords had two flights of seven F/A-18s flying behind Air Force KC-10 tankers which carried enough fuel to get the 12 "flyers" across the Atlantic by airborne tanking about seven to nine times. The two spare contingency planes were for any aircraft that might have maintenance problems. These returned to Beaufort and their pilots slowly rode across the "pond" on a scheduled Marine KC-130.* The pilots of the squadron spent a "crew rest" period in NAS Rota, Spain, then departed the next day for Shaikh Isa.

The greatest part of the support required by the deploying squadrons had to arrive by sea. The MAG-70 combined offload preparation party (OPP) and surveillance, liaison, and reconnaissance party (SLRP), whose mission was to survey the port of entry and to prepare MPS equipment for offload and issue, departed Norton Air Force Base, California, on 12 August after a delay of several days. That same day, but half way around the world, three of the five ships of MPSRon-2 arrived at the commercial Port of Jubayl. On the 13th, the MAG-70 advance party left El Toro, and later that day the Military Airlift Command (MAC) turned on the airflow spigot and began to inundate El Toro with C-5s, C-141s, and chartered civilian aircraft.

Major General John I. Hopkins, commanding the 7th Marine Expeditionary Brigade of which MAG-70 was the aviation combat element (ACE), issued a warning order as early as 3 August. It was followed by a notional contingency force list on the 8th and an alert order. However, it was not until the 10th that 7th MEB, as the lead element of I MEF, was authorized by CentCom to deploy to the Gulf.[37] Hopkins arrived at Dhahran at 0400 on the 15th, and then proceeded to Jubayl to organize the inbound combat elements and set up defenses.[38] Upon arrival, 7th MEB found elements of the 2d Brigade, 82d Airborne Division, occupying hasty defensive positions around the port and the Jubayl Naval Air Facility, a dozen kilometers to the west. Laying their eyes on the two airfields closest to Jubayl, KAANB and NAF Jubayl, for the first time, Hopkins and his staff quickly realized the potential of NAF Jubayl as a aerial port of debarkation (APOD) and helicopter base. He broached the idea of switching MAG-70 helicopters to Jubayl with the local Saudi authorities, and on the 16th, they granted permission to reroute the airflow to Jubayl.[39]

While the 7th MEB advance party undertook its initial actions in Saudi Arabia, Lieutenant Colonel Michael M. Kurth's HMLA-369 "Gunfighters" went

* For a first person narrative compiled from his own journal, see Jay A. Stout, *Hornets Over Kuwait* (Annapolis, MD: Naval Institute Press, 1997).



Marine Corps Art Collection

The "Warlords" of VMFA-451 prepare to depart for the Persian Gulf, midnight, 21, August 1990. This sketch is by Col H. Avery Chenoweth, USMCR (Ret).

through a series of machinations to arrive at the squadron makeup of 18 AH-1W Super Cobras and six UH-1 Hueys. On 3 August, before receiving the warning order, the squadron began all the necessary preparations for deployment. Administration began checking that all pay was on direct deposit, ID tags made, wills and powers of attorney in order, records of emergency data updated, and serviceman's group life insurance audited and corrected. This was accomplished while attaching 20 Marines and transferring 25 others out of the squadron. That day as well, the Gunfighters requested approval for a prototype of the AIM-1 DLR night sight to be placed on the 20 mm gun system. On the 4th they modified body armor to ensure water egress, manufactured crew recovery straps to enable the AH-1Ws to recover downed aircrew, and began briefing the enemy situation, terrain, and weather. They reviewed ordnance available on the Maritime Prepositioning Ships and initiated requests for shortfalls. The "Gunfighters" also began a rapid action maintenance engineering change (RAMEC) for installation of the LORAN-C navigation system, operation-checked ordnance systems, and built and installed the mounts and power supply for the new AR-5 chemical protective system.

On 6 August, HMLA-369 was placed under operational control of MAG-70. The next day, the squadron drew individual combat gear and area maps, worked in dental checks, and set up load plans for the C-5s. On the 10th and 11th, aircraft were flown to El Toro, while the squadron equipment moved there by truck from Camp Pendleton. In addition, HMLA-369 bore-sighted all of its weapons and secured special paint from commercial sources in order to apply a desert-camouflage scheme to all aircraft. Nearly all of 3d MAW's squadrons had

to go through these same wickets, but few had such short notice. Lieutenant Colonel Kurth later estimated that he spent about $50,000 open purchase (purchase outside the normal items of military supply), for these preparations before the squadron left the United States.

HMLA-369 divided its 24 aircraft into four self-supporting detachments for movement to theater. The first C-5 out of El Toro carried four Hueys and two Cobras; the other three C-5s departed shortly thereafter. After a sharp discussion with wing staff officers, Lieutenant Colonel Kurth was able to include modest quantities of TOW missiles, 20mm cannon rounds, and 2.75-inch rockets with each detachment. He also broached the issue of Hellfire missiles, but was informed that they were scheduled to arrive in theater later. The squadron departed El Toro on the 14th and 15th on board C-5s, loaded with passengers; cargo; armed aircraft; weapons; nuclear, biological, and chemical (NBC) protective equipment; and meals ready-to-eat (MREs). The C-5s carrying squadron helicopters and personnel began arriving at Dhahran, Saudi Arabia, on 16 August, making HMLA-369 the first Marine squadron to arrive for Desert Shield.[40]

The remaining MAG-70 helicopter squadrons followed HMLA-369 out of El Toro beginning on 17 August. Colonel Larry T. Garret, commanding officer of MAG-16 would later recall HMM-161's difficulties in making the 17 August departure: "The CH-46 was undergoing yet another component upgrade . . . as new componets were just coming available. HMM-268 was working up for MEU (SOC) deployment and had all of its aircraft upgraded, because up until the Iraqi invsion of Kuwaut, it was the next squadron to deploy. All of a sudden HMM-161, on the force list for MAG-70 had to go within days, needed the aircraft with the latest dynamic component upgrades. Since simply Swapping the squadrons (HMM-268 for HMM-161) was disapproved, there was no alternative to a flip flop of aircraft. It was not a happy occasion . . . but it did get the job done."[41] Lieutenant Colonel Daniel R. Rose's HMH-462 also traded five CH-53A's to HMT-302 for five CH-53Ds to bring his squadron to 12 CH-53Ds. Lieutenant Colonel Raymond L. Nymeyer with HMH-466 brought eight CH-53Es and was the first heavy lift squadron in Saudi Arabia. MACG-38's various squadrons, missile battalions, and detachments were fed in whole or piecemeal as the airlift flow dictated. Marine wing support squadrons, MWSS-374 and MWSS-373, were intermixed with this flow to theater, as were aviation logistics contingency support packages (CSPs) from the four aviation logistics squadrons.

The only 3d MAW elements to move by sea consisted primarily of several hundred maintenance vans from the Marine aviation logistics squadrons, MALS-11 and MALS-16. They departed Port Hueneme, California, on 14 August on board the USNS *Curtiss* (T-AVB 4).[42] Lieutenant Colonel Michael J. Kennedy was the embarked troop commander for about 300 embarked 3d MAW support Marines.* The remainder of MALS-16 was augmented by MALS-39

* In a letter to the Commandant of the Marine Corps, the commanding officer of USNS *Curtiss* detailed how six days into the voyage the ship lost both boilers and was adrift for 72 hours. The Marines on board not only repaired the boilers but repaired the ship's radar as well. (Enclosure to H&HS-38 ComdC, 4Aug90-31 Mar 91).

personnel from Camp Pendleton. On 20 August the squadrons fly-in echelon departed El Toro and completed its transit to NAF Jubayl on 26 August. The *Curtiss*' sister ship, the USNS *Wright* (T-AVB 3), departed after loading much of MALS-14 on board.[43]

On 19 August, MAG-70 fixed-wing aircraft began trans-Atlantic flights from MCAS Cherry Point and MCAS Beaufort with Air Force tanker support. First in the queue across the Atlantic was VMA-311. After numerous air refuelings and a stop at NAS Rota, Spain, they arrived at Shaikh Isa Air Base the following day. The rest of the fixed-wing aircraft made trans-Atlantic flights following the same basic route. VMA-542 left Cherry Point in the company of four VMGR-352 KC-130s. The bulk of the squadron arrived at Shaikh Isa on 21 August, while the Hercules proceeded north to Bahrain International Airport because of limited ramp space at Shaikh Isa. VMFA-314 and VMFA-235 followed on the 22nd, and VMFA-333 and VMFA-451 arrived at Shaikh Isa on the 23d. VMA(AW)-224 and VMAQ-2 joined MAG-70 the next day, completing the group's initial fixed-wing flow with the exception of several aircraft delayed due to maintenance problems enroute.[44]

This initial flow of 3d MAW Marines to join up as a part of MAG-70, the aviation combat element of 7th MEB, did not bring any relief for the Marine Corps from ongoing commitments around the globe. As each Marine urgently prepared to meet the needs of their Corps and country on short notice there was precious little time to "square away" their personal affairs. What is left untold is the emotional strain on each family, as their Marine compartmentalized his life and moved toward an uncertain environment. The Marine Corps culture of deployment would ease this transition through a well-used family support structure. The Marines stepped off at the various airfields in the Persian Gulf with weapons and ammunition ready. They functioned in this strange new environment by relying on their instilled training and unit cohesion. That was enough to accomplish what the Corps had always asked of them, to successfully complete the mission.

Initial Marine Air Operations in the Gulf Region

The Defense of Eastern Saudi Arabia and Bahrain (15 August-8 November)

Liaison with CentCom and CentAF

Sensing that important issues were being decided on the ground in Saudi Arabia and that was where he could best influence events, General Moore on 14 August departed El Toro on board the C-5 transporting HMLA-369's first load of aircraft and arrived at Dhahran Air Base in Saudi Arabia the following day. Among the small group of 3d MAW staff officers accompanying Moore was Colonel Joseph W. Robben, Jr., one of the Corps' most experienced air control

officers and until July the commanding officer of MACG-38. Lieutenant Colonel Walter E. McTernan II headed up the advance G-2 (intelligence) shop. Colonel Terrance R. Dake, who had just joined the 3d MAW staff as the news of the Iraqi attack was breaking, brought along several members of the G-3 (operations) section. Colonel Dake later stated:

> I checked in on 3 August and the invasion when it took place was a surprise—we had some warning signs, but it seemed to take us by short notice. So MAG-70, as part of 7th MEB, we did everything we could to beef them up so that they were a robust ACE. By that I mean that we added people, looked at functions, . . . with the idea that when 3d MAW headquarters stood up, part of MAG-70 would join the staff and be the nucleus of the wing headquarters. That was our plan, and allowed General Moore then with some confidence, to go with a very small staff, 10 people as I recall.[45]

Upon his arrival in Saudi Arabia, General Moore immediately sought out General Horner. Busily coordinating the initial build-up of U.S. forces, General Horner reviewed with Moore and his staff the projected disposition of MAG-70 and the anticipated 3d MAW reinforcements. The Marines were impressed by General Horner's openness and practical approach to the situation at hand. General Horner welcomed them to theater and promised his best efforts at a smooth working relationship. After these initial consultations, Moore took most of the staff and headed to Shaikh Isa, Bahrain. He sent a team headed by Colonel Robben to work directly with Horner's staff, and to serve as a liaison element.* This move was crucial because on 10 August General Schwarzkopf designated General Horner as the Joint Force Air Component Commander (JFACC) and the ensuing air control and apportionment issues would be critical to the Marines warfighting effort.[46]

Initially the JFACC staff was joint in name only, with the manning, background, and outlook of a numbered U.S. Air Force headquarters, since it was built from CentAF headquarters personnel. At the outset, no non-Air Force officers were assigned to key decision-making billets on the JFACC staff. Instead, Navy, Marine, and Army officers served as liaisons between their component commanders and the JFACC, with no more influence on the development of the initial air campaign plan than had the Saudis or even the small allied NATO coalition members.

This Air Force planning focus was exacerbated from the start when General Schwarzkopf designated General Horner as the CentCom (Forward) commander. Preferring that General Horner concentrate on marshalling CentCom's forces in theater, Schwarzkopf on 8 August turned to the Air Force

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* MajGen Terrance R. Dake noted General Horner's positive reception of General Moore and his staff. He also highlighted Colonel Robben's work with the JFACC as a key contribution to the success of the 3d MAW. (MajGen Terrance R. Dake intvw, 21Feb96).

MajGen Moore on the flightline at Shaikh Isa in front of an A-6E. Gen Moore brought a wealth of experience to his position as Commanding General, 3d MAW. He previously served as the deputy assistant chief of staff, G-3, 1st MAW, assistant chief of staff, G-4, 2d MAW, and chief of staff 2d MAW.

Headquarters staff in the Pentagon for assistance in developing an immediate air plan should the Iraqis press on and attack into Saudi Arabia. The outline plan, developed by the so-called "Checkmate" staff inside the Air Staff's operations directorate in the Pentagon, revealed the indelible imprint of its director, Colonel John A. Warden III, USAF.[47]

Air Power Theory

Colonel Warden, a noted USAF air power theorist, had argued persuasively in a 1988 book that the focus of any air campaign should be primarily the enemy leadership and other strategic targets. [48] These leadership-related targets fell in the center of a conceptual five-ring "bull's eye," followed in declining order of priority away from the center, by key production, infrastructure, population, and fielded forces on the outer rim. As a result, enemy field armies and other operational and tactical-level targets were not deemed vital in Warden's construct. Colonel Warden had served as an instructor at the Air College at Maxwell Air Force Base, Alabama, where he lectured on the war-winning potential of a properly developed strategic air campaign, "victory through air power," without the need to commit to ground troops and their inevitable associated casualties. Using his theories, Warden and a small group of officers developed within days an outline plan for a strategic air campaign. This campaign was dubbed "Instant

Thunder" by Warden to highlight its difference from the piecemeal and halting "Rolling Thunder" air campaign employed early in the Vietnam War. "Instant Thunder" touted a massive unified attack against critical leadership targets in Iraq as the most effective means of getting Iraq to cease any attempted invasion of Saudi Arabia. In line with his conceptual construct, Instant Thunder accorded much less attention to the frontline Iraqi armored formations likely to head down the east coast of Saudi Arabia toward the Al Jubayl, Ad Dammam, and Dhahran area.

On 20 August, Colonel Warden and a few select officers briefed General Horner on this concept in Saudi Arabia. Horner objected to certain aspects of the plan, most notably its lack of emphasis on Iraq's leading mechanized formations, and sent Warden back to Washington. However, Horner retained most of Warden's officers on his staff and they formed what would become known as the "Black Hole," the highly secret planning cell for the air campaign. The cell worked to tailor the outline of Instant Thunder more to Horner's liking without compromising its basic thrust against the command structure of the Iraqi regime.

The Arrival and Beddown of MAG-70

Several hundred miles to the northeast of Riyadh, HMLA-369's initial detachment of four Hueys and two Cobras were unloaded from a C-5 at Dhahran Air Base. While the detachment readied its aircraft for flight, Lieutenant Colonel Michael M. Kurth looked up an old Marine Corps Command and Staff College classmate who commanded a Royal Saudi Air Force fighter squadron based at Dhahran. After remarking how they had "gamed out" a similar contingency during their student year together at Quantico, the Saudi officer briefed Kurth on the current situation in Kuwait. Later, meeting with the MAG-70 advance party, Kurth learned that Jubayl NAF was planned to be HMLA-369's ultimate destination. Kurth then gathered his aircrews and briefed a flight plan to Jubayl. After a long wait on the taxiway, at about 1800 his detachment got airborne and headed north. Ten miles short of the airfield at Jubayl, Kurth set his Huey and an accompanying Cobra down as they began to run short of fuel. A section of Hueys returned shortly with more fuel, and by 2000, he and his wingman joined the remainder of the detachment. The other three detachments followed and by 17 August, all 24 of the squadron's aircraft were in place at Jubayl. Kurth staged his aircraft on the flight line, which was already crowded with a variety of Apache, Kiowa, and Blackhawk helicopters from the Army's 2d Brigade, 82d Airborne Division.

Kurth later remarked that his initial worries about Hellfire missiles to support the defense of the key ports of entry during the first days of August were allayed in traditional Marine Corps fashion:

> When we got off the planes in Dhahran, there was a flatbed that was loaded. It was just sitting by itself. Nobody claimed it. So, in order to prevent those missiles from falling into the wrong hands, my S-4 offi-

> cer took protective custody of those hundred Hellfire missiles, and we moved them into a bunker at Jubayl. Some months later, they did find the rightful owners of those misplaced missiles and [they were] returned to them.[49]

Advance elements of MWSS-374 and MACS-1 had settled into King Abdul Aziz Air Base on the 17th, so detachments of the wing support squadron were sent up to Jubayl to support Kurth's Marines. They initially were not allocated working spaces inside the two Saudi Naval Forces hangars and had to set up outside the airport terminal building. Units at King Abdul Aziz, on the other hand, had access to locker and utility rooms at the modern, but largely unused soccer stadium on the eastern side of the airstrip, which they turned into incongruous squadron spaces.

While MWSS-374 scrambled to provide basic airfield services at King Abdul Aziz and erect tents for billeting, MACS-1 turned to the task of establishing an early warning and control site for the area. By 19 August, the Tactical Air Operations Module (TAOM) was in position east of the soccer stadium, and on the 20th, the TPS-63 radar was operating under manual control. The automated system became operational when the early warning and control (EW/C) linked with an orbiting Air Force airborne warning and control system (AWACS) aircraft for the first time on 25 August. With the automated EW/C in place, the squadron could provide a level of early warning of air attack to Marines in the area and give the arriving HAWK fire units and LAAD platoons a measure of target cueing (early warning on direction of a threat). Although essentially an appendage of the expanding Air Force command and control system, this was the most that the squadron could provide until the MAG-70 Tactical Air Command Center (TACC) was established and its long-distance tactical communications system was operating.*

On 15 August, MWSS-373's advance party arrived and began the task of surveying the facility and assigning work and billeting spaces for MAG-70. Like the other Marine wing support squadrons, there would be a priority list of operations and services to begin providing. This list was dependent on the status and condition of the airfield. Shaikh Isa was new, but would have to grow to accommodate the large number of people and inbound aircraft. On 20 August, when VMA-311's Harriers touched down at Shaikh Isa, they learned that they were not alone. A squadron of 24 F-4G Phantom II "Wild Weasel" aircraft from the U.S. Air Force's 35th Tactical Fighter Wing had arrived a few days earlier and had set-

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* A Tactical Air Command Center (TACC) was the principal Marine Corps air command and control agency from which air operations and air defense warning functions were directed. It was the senior agency and the operational command post of the aviation combat element commander. It provided the facility from which the aviation combat element commander and his battle staff planned, supervised, coordinated, and executed all current and future air operations in support of the MAGTF commander. The tactical air command center provided integration, coordination, and direction of joint and combined air operations.

tled into the two available hangars on base. This would become the format for the initial distribution of host nation facilities in both Bahrain and Saudi Arabia. First to arrive would claim and hold onto facilities.

The headquarters of the MACG-38 headquarters detachment and Detachment A, MWCS-38, landed at Dhahran on the 22nd, and by nightfall had moved across the four-lane bridge and causeway to the island nation of Bahrain and down to the southern tip to the as-yet-unmarked airfield of Shaikh Isa. Intermixed in the fixed-wing flow of 20-24 August were lead elements of MACG-38 and the remainder of MWSS-373.

Lead elements of HMLA-367 and HMH-465 arrived at the MAG-70 rotary-wing detachment at Jubayl NAF at the end of August, and the remainder of the squadrons' personnel and equipment were in place at Jubayl by the first week of September. The Hawaii-based 1st Marine Expeditionary Brigade also began to schedule the next echelon of forces for deployment to the Gulf during this period. From MAG-24, eight CH-53Ds from HMH-463 and a dozen CH-46Es from HMM-165 were prepared for air embarkation. MWSS-174 and MACS-2 also augmented the force, with the latter anticipated to relieve MACS-1 of its mission as the 3d MAW tactical air operation center (TAOC), since MACS-1 was operating the new tactical air operations modules and had only 30 days of parts and contractor support. Upon arrival in the Gulf, these units would marry up with their equipment sets being offloaded at the port of Jubayl from ships of the Guam-based MPSRon-3. Repeating the procedures undertaken by the 7th MEB forces, MAG-24's deploying squadrons scrambled to fill out personnel rosters and draw desert equipment as they waited for strategic airlift support. C-5s, C-141s, and civil reserve air fleet aircraft began arriving at MCAS Kaneohe Bay, Hawaii, in late August and promptly loaded the 1st MEB's deploying aviation, ground, and combat service support elements.

With the acute shortage of space on board the 4th MEB's aviation-capable amphibious ships combined with I MEF's desire for the early deployment of antiarmor weapons systems, it was decided to move the additional dozen AH-1Ws belonging to HMLA-269 to Saudi Arabia by strategic airlift. Thus, Lieutenant Colonel Kenneth W. Hill and his "Gunrunners" of HMLA-269 were embarked at Cherry Point, North Carolina, and flown on board C-5's to Dhahran. Arriving on 18 August, Hill's under-strength squadron, designated HMLA-269 (Forward), with 12 AH-1W Super Cobras, staged at the airfield in preparation for further movement. The rest of the squadron (six UH-1Ns and three AH-1Ts) deployed with MAG-40 and maintained the squadron designation, HMLA-269. Hill's Marines were able to take very little in the way of logistical support with them to Dhahran. General Hopkins therefore decided to keep HMLA-269 (Forward) at Dhahran while they conducted an intense weapons tactics instructor (WTI) supervised work-up to achieve combat readiness.[50] This work-up included training flights for weapon employment and night vision goggle proficiency.

The breakout and build-up of aviation ordnance was a continual challenge for MAG-70. Although squadrons were able to deploy with minimal quantities of defensive armaments on board their aircraft, actual combat operations would burn

through these small amounts in a few combat missions. The overwhelming majority of aviation ordnance required for such a contingency lay on board the MPS and afloat prepositioned ships only now beginning to offload their cargo at Jubayl and Damman, Saudi Arabia. Fuel was less of an initial problem with the Saudis providing adequate supplies directly from their refineries.

With MAG-70 split between two countries, Bahrain and Saudi Arabia, the MPS and ammunition ships would offload at the port of Jubayl and then reload the fixed-wing components and make the one-day transit to offload at the Mina container pier in Bahrain. Moving the vast quantities of material out of the ports was very difficult with the dearth of motor transport assets available to the brigade. Consequently, the task of building and securing dumps positioned away from the port areas, but close to the key airfields, demanded urgent attention. The 7th MEB would have to construct these ammunition supply points (ASP).

Initial Air Operations in Theater

With the Navy's two aircraft carriers still operating outside the Gulf in the Indian Ocean and with the U.S. and Royal Saudi Air Forces stretching to cover much of the Arabian Peninsula, General Horner assigned MAG-70 the mission of providing air defense coverage of the northern Persian Gulf area and the fleet units operating there. The air defense zone ran north to south from astride the Kuwait-Saudi border down through Bahrain and east to west from the Saudi coast to the edge of Iranian airspace. With the air distance from one end of the zone to the other covered in less than 15 minutes flying time and the threat level uncertain, Horner and the Navy required 24-hour-a-day fighter coverage of the area. With only a few days in country to get settled, such a combat air patrol (CAP) responsibility would be a challenge to sustain.

Providing land-based aviation to operate in support of the fleet had been a traditional Marine mission almost from the beginning of naval aviation. This mission in the northern Gulf, however, was to be unique in several respects. With responsibility for the Gulf resting with the Navy component commander of Central Command (NavCent), MAG-70's fighters operated under the tactical control of the fleet antiair warfare commander on board the USS *Worden* (CG-18) and other guided-missile cruisers, with mission call sign "Red Crown." To ensure against Iraqi aircraft splitting the air defense seam between sea and shore, General Horner charged the 3d MAW with establishing an interface between the *Worden*, the orbiting Air Force AWACS over northeastern Saudi Arabia, and the Eastern Sector Air Defense Command located at Dhahran.

The "Warlords" of VMFA-451 arrived at Shaikh Isa on the afternoon of 23 August, while the squadron's maintenance and staff sections were in place by the 26th. On the 26th, they began operations on a 24-hour-a-day basis manning the "Northern Gulf CAP." These were the first of what would become thousands of sorties providing air cover to 7th MEB and then to I MEF, relieving pressure on the Navy to maintain a northern Gulf CAP from its carriers outside the Gulf. Captain Jay A. Stout of VMFA-451described a typical combat air patrol mission:

Marine Corps Art Collection

White sand and hot runways were common to 3d MAW operations in the Persian Gulf as portrayed in Col H. Avery Chenoweth's painting of Marine F/A-18 Hornets refueling at Shaikh Isa Airfield in Bahrain.

Normally we would brief up to three hours prior, suit up, and go to our jets, running them through all their preflight checks. Then we would shut them down and sit around the maintenance spaces fulfilling the 30-minute and 15-minute alert criteria. When it came time to launch we would walk back out to the line and start up, then taxi out to the arming points, where all our weapons would be checked and readied. Finally about 20-30 minutes prior to our assigned CAP time, we would launch. All of this was accomplished using as little radio communication as possible. We carried two external fuel tanks, one under each wing, three or four AIM-7 Sparrow missiles, four AIM-9M Sidewinder missiles, along with a full load of approximately 550 twenty-millimeter rounds for the M61 cannon. Our CAP station was roughly two hundred miles north, just south of the Saudi-Kuwait border, and offset over water. When we reached our point, the previous section of jets would depart and we would take up station. Generally we would split and set up in an opposing race track pattern with legs about 20 miles long, so that we always had a radar from one of our jets looking north into Kuwait and Iraq. Normally we were controlled by Navy ships (Red Crown), with occasional control provided by a Marine air control squadron, or an Air Force AWACS (airborne warning and control system) aircraft. If equipment were working properly, which was surprisingly often, all radio comm would be transmitted in an encrypted mode.

In a perfect world our tactics called for us to operate at an indicated airspeed of about 350 to 400 knots, at medium altitude. We weren't operating in a perfect world. If we tried to operate at the desired speed, we would have run ourselves out of fuel much too quickly. We didn't

> have the fighter or tanker assets to afford that. Because of fuel restrictions, we were driven up to 30,000 feet and operated at air speeds as slow as 250 knots. We concentrated our radar scans to the lower altitudes. The radar coverage of our controlling units was not as good at low altitude as ours was. Essentially we were betting that with our own radars and those of our controlling units, and the capabilities of our electronic eavesdropping aircraft, we would have enough warning to reach a favorable airspeed and altitude, reconstitute as a formation, and engage the enemy in plenty of time. This was not unrealistic, and we became comfortable with the limitations. [51]

Normal on-station time was either an hour and a half, or three hours, with at least one refueling from an airborne tanker each period. The tanker was normally a Marine KC-130 at night, but during the day there was an Air Force KC-135, or KC-10 on station.

Colonel Rietsch, MAG-70/MAG-11's commanding officer, adopted a group combat air patrol station from 28 degrees North to 28 degrees, 30 minutes North latitude for these very specific reasons: the threat sector area of interest was 40 miles closer to shore than the Navy CAP; politically, the MAG-11 CAP was closer to Marines on the ground and protected the tactical seam between the Navy CAP and the Air Force overland CAP; and the CAP was able to pick up the enemy quicker as they were trying to come from the sea instead of chasing them from further out at sea.[52]

The Air Force KC-135 was considerably harder from which to refuel, especially at night. Lieutenant Colonel Richard W. Bates would remark on this difficulty in regards to VMAQ-2's trans-Atlantic crossing. VMAQ-2 departed in two six-plane elements for their trip to Bahrain at midnight from Cherry Point. The KC-135 was to lead them out the first two hours and then Air Force McDonnell Douglas KC-10 Extenders would take over the pathfinder and refueling role to Rota, Spain. According to Lieutenant Colonel Bates:

> There was a lot of difficulties with the KC-135 at night in marginal weather, with 2 of the 12 planes unable to refuel and having to tank from the KC-10 Pathfinders which is a much more straightforward proposition. It was an 8-1/2 hour flight to Rota and a further 8 hours to Bahrain. We spent 14 hours in Rota and then moved on. We flew over 16 hours in a day and a half. It was no mean feat to get all 12 aircraft there in a day and a half with a small maintenance detachment on the KC-10s. [53]

Maritime Prepositioning Shipping (MPS) Offload Issues

A maritime prepositioning ship (MPS) offload was a complex operation involving the unpacking, movement, storage, and issue of many thousands of separate items ranging from main battle tanks to small repair parts. For the MPS concept to work effectively, the squadrons, battalions, and detachments departing the

United States and overseas—some with only their individual equipment and weapons—had to have confidence that the equipment and supplies advertised as being included on board the MPS ships were in fact there and would be made available quickly to units once they arrived in theater. Command arrangements could appear unusual to the untrained eye. The Navy and Marine Corps saw the steps to be undertaken during the employment of an MPS as being akin to traditional amphibious operations, with the commander of the maritime preposition force assuming the role of commander amphibious task force (CATF) while the Marine expeditionary brigade would be the equivalent of the commander landing force (CLF). Thus, until the 7th MEB was firmly established ashore, the operation would be run by the Navy. Advance Marine expeditionary units were chopped to the MPF to provide security in the port while the offload commenced.[54]

In the first days there were two MPS squadron offloads. The first, MPS RON-2 (from the British atoll Diego Garcia in the Indian Ocean), consisted of the merchant vessels (MV) *Bonnyman*, *Anderson* and *Hauge* which had arrived pierside at Jubayl by 1800 on 15 August, with the MV *Fisher* arriving later. The same day, Commanding General, 7th MEB, and a nucleus of his command element staff arrived.

While the concept worked largely as advertised, the compressed timeline of the offload combined with the proximity of Regimental Combat Team (RCT) 7 to the staging area took a toll on the efficiency of the operation. Given the theater commander's desires, the combat forces, or the "teeth," arrived on the first fly-in echelon aircraft rather than the rehearsed Marine Corps combat service support detachment (CSSD) elements. Incidents involving the commandeering of vehicles and other items by leaders desperate to move their units quickly out of the overcrowded and unsanitary conditions at the port were reported. MAG-70 units generally arrived at Dhahran and then moved to Shaikh Isa, King Abdul Aziz, or Jubayl NAF. By the time units arrived at Shaikh Isa and were able to locate a place to bed-down, arrange for vehicles, and make the necessary travel arrangements to the port of Jubayl, they tended to find little organization at the port and less than their full allocation of equipment awaiting their signature. While the aviation Marines found in most cases superior living conditions, they would be initially hampered in accomplishing their mission by the lack of planned for but uncontrolled equipment distribution.

Colonel Rietsch recalled that "ground transportation was exceedingly scarce. The first units arriving at Shaikh Isa were given U.S. Air Force prepositioned vehicles. . . . [I] got a 1982 Dodge pickup with 200 miles on the odometer. Other vehicles were simply rented on the spot in Manama."[55]

MACG-38 units in particular encountered a shortage of electrical power generators. These were soon sorely missed, as they were critical to the 24-hour operation of the group's radar, facilities, communications, and all-important air conditioners to keep them running in the scorching heat of the Persian Gulf. Tactical vehicles were also in short supply. Equipment shelters that were supposed to be pre-loaded on board the backs of high-mobility multipurpose wheeled

vehicles (HMMWVs) and pick-up trucks, were found by MACG-38 representatives sitting on the pavement minus their prime movers. Lieutenant Colonel Dennis C. Sorrell, the commanding officer of Marine Air Support Squadron 3 (MASS-3) would lament that "the majority of rolling stock to support MASS-3 Det A was unavailable due to well-intentioned, but ill-conceived distribution from the MPS offload." MPSRon-3 would arrive on the 26th and its offload would progress more smoothly.

Initial MWSS Efforts in Theater

MWSS-374 and MWSS-373 also struggled with the after-effects of the MPS offload. MWSS-373 was fortunate to have the basic infrastructure at Shaikh Isa as a starting point, but the distance to Jubayl and the initial complexities of transportation to and from another country led to the same type of problems encountered by MACG-38 units. The squadron was able to shelter some Marines in brand-new, air-conditioned barracks at Shaikh Isa while it sought out tentage and prepared open areas for semi-permanent encampments. Meanwhile, the squadron established tactical fueling sites, internal airfield telephone and radio communications, messing, and organized transportation services around the base. The tactical airfield fuel dispensing system (TAFDS) bore some immediacy as Shaikh Isa's in-ground fuel system would support only two to three days of combat operations for the aircraft currently occupying the airfield.

The burgeoning numbers of tactical aircraft at Shaikh Isa required immediate attention. More than 120 jet aircraft were forced to occupy ramp space totaling only a few acres. Aircraft were lined up wing-tip to wing-tip, providing a lucrative target for Iraqi attack aircraft or saboteurs. More ramp space was required at the base as soon as possible; luckily MWSS-373 was joined at Shaikh Isa by the Air Detachment of the 7th Naval Mobile Construction Battalion (NMCB). The detachment of "Seabees" would be joined within weeks by the remainder of the battalion, as most of its heavy equipment would come by sealift. The Seabees were noted for expertise in permanent and semi-permanent construction at ports, airfields, and other facilities of naval interest. They had served side-by-side with Marines since World War II, and that tradition was carried forward in the Gulf from the earliest days of Desert Shield.

MWSS-374 found itself in quite different circumstances from its sister squadron to the south. Other than the unused soccer stadium at the south end of the base, King Abdul Aziz offered very little in terms of existing airfield support. The stadium was soon known as the "SCUD Bowl" because of its anticipated use as an aimpoint for the Soviet surface to surface missiles (SCUDs) known to be in the Iraqi arsenal. To make matters worse, the already undermanned squadron bled off precious personnel and equipment to support the growing helicopter presence at Jubayl NAF. The MWSS provided the aviation elements with: motor transport, heavy equipment; emergency decontamination in a nuclear, biological, and chemical (NBC) environment; construction and utilities; expeditionary airfield extensions; airfield crash fire and rescue; tactical aviation fueling; military police; internal communication; and meteorology. Each of these areas would place demands

F/A-18s of VMFA-451 and VMFA-333 line the runway at Shaikh Isa. Flight line overcrowding became an increasingly serious issue as 3d MAW continued its flow to theater.

on the MWSS's in theater. The rapidity of the build-up at Jubayl caused increasing problems for the squadron. The magnitude of the build-up was taxing. Lieutenant Colonel Stephen G. Hornberger's command chronology gives insight into the build up:

> MWSS-374 assumed official support responsibilities for Jubayl on 21 August, splitting the squadron's personnel and assets. Assistance was provided in the areas of water, food, shelter, and sanitation. 3,000 bottles of water were delivered daily, augmented by two water bulls. . . . [The squadron] relieved group guard and improved security positions. By 23 August, fresh fruit and juices were provided to augment MREs. By 27 August there were 1,400 personnel on board. There were 141 tents . . . [and] a 12-man shower unit became operational on that date. Population totaled 1,700 by 27 August. Wooden latrines were built by 29 Aug. On 30 August 1,000 cots were divided among the camp's 1,900 inhabitants. Hot chow began 31 August. By 2 September, Jubayl was home to 2,300. MWSS-374 had 209 personnel here and 244 back in King Abdul Aziz. The camp contained 214 tents and 44 latrines.[56]

Squadron logistics personnel were always on the prowl to meet needs. Upon arrival in Saudi Arabia, tents, liners, cots, and PRC-77s (short range radios) were hard to get. There was only a trickle of Class IX support items (repair parts for Marine Corps equipment). Sandbags and concertina wire required for rear area security were difficult to acquire. Marines made do and continued to upgrade both their defensive positions and living conditions as operations continued.

Lieutenant Zara E. Fulton of H&HS-38 in his quest for air conditioners to cool electronic equipment, displayed the "can do" nature of the Marine and an ability to trade:

> When first arriving in theater, our air conditioners were going down left and right and [we] didn't have the parts or expertise to fix them, so . . . we took a bag of Tootsie Roll Pops to MWSS-373 and traded them for two cases of the "new MREs." We then took the new MREs to an Air Force Det and traded the MREs for a maintenance contract team with parts (the Air Force didn't have the good MRE's). They ate well and we got four air conditioners up.[57]

The Establishment of the MACCS

At Shaikh Isa, Lieutenant Colonel Harvey R. Norton's MACG-38 detachment struggled to put together the scattered elements of the Marine Corps Air Command and Control System (MACCS). While the automated EW/C at King Abdul Aziz Naval Base began operating on 22 August, most of the group did not arrive in theater until that day. The forward element of H&HS-38 did not land until the 26th, after the main body, due to their C-141 being grounded enroute. Delays in the receipt of their MPS equipment coupled with misrouted fly-in echelon equipment pallets cost H&HS-38, MWCS-38, and MATCS-38 several days in setting up their systems. On 31 August, the communications squadron detachment established the first of its critical multi-channel microwave links between Shaikh Isa, King Abdul Aziz, and Jubayl NAF. Beginning on the 20th, the 9th

H&HS-38 Marines putting finishing touches on a hardback tent are, from left, GySgt Velanda K. Milton, Cpl Christopher King, GySgt Kieth A. Thrasher, Sgt Mark Hurst, and Cpl Lloyd F. Jackson.

An F/A-18 Hornet lands at Shaikh Isa, Bahrain. As the 3d MAW build-up continued, air traffic control services were provided by MATCS-38. In this environment close cooperation with host nation controllers was very important.

Communication Battalion provided multi-channel satellite connectivity from Shaikh Isa to the 7th MEB. However, the primary means of communications during these early days was the existing host nation commercial telephone lines.*

H&HS-38 was able to take advantage of several unoccupied buildings at Shaikh Isa to temporarily house the MAG-70 tactical air command center (TACC). Difficulties in collecting and moving embarked equipment from Dhahran to Shaikh Isa delayed the assembly of the TACC, which was further complicated by the incomplete distribution of expected allocation of MPS equipment. By the 28th, however, the TACC was operating 24 hours a day and had tactical digital information link (TADIL)-A down-links from the orbiting E-3A Sentry (AWACS), and established the TADIL-B link with the TAOC at King Abdul Aziz, courtesy of a 78-mile multi-channel radio link between the two bases. The attempt to integrate the Marine TACC with the host nation's system and not appear to be supplanting Bahraini control of their airspace failed. It was obvious that the control capability of the TACC must cover far beyond the Bahrain national air space limits. 3d MAW would be concerned with the airspace over northern Saudi Arabia and into Kuwait.

Antiair defense provided the Marines numerous challenges. The 2d Light Antiaircraft Missile (LAAM) Battalion flew-in four firing units in two missile

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* Several Marine officers would lament that communications were very unreliable and relied heavily on commercial phone lines. For an in-depth view of Marine communications see Major John T. Quinn II, *U.S. Marines in the Persian Gulf, 1990-1991: Marine Communications in Desert Shield and Desert Storm.* Washington, D.C.: History and Museums Division, HQMC, 1996. See also 7th MEB SitRep, 261436Zaug90.

batteries to cover the large area of vital interest with minimal support "footprint" and relied heavily upon maritime prepositioning ships for support. Battery A/2, 2d LAAM Battalion, established firing positions north of Shaikh Isa Airfield. Operating with only voice nets at the outset, the battery was integrated into the automated network after the group's multi-channel radio links were up. Battery B/2 established a firing unit north of King Abdul Aziz Naval Base, while the battalion headquarters located itself near the soccer stadium at King Abdul Aziz. From this site, Marine Air Control Squadron 1 provided early warning and control facilities to the 3d MAW and to the Saudi Eastern Air Defense Network in Dhahran under which the 7th MEB would operate. Command and control of Marine HAWK batteries was through the TAOC from MACS-1 and integrated with the Saudi Arabian Royal Air Force Eastern Sector Command Center (Sector 2) located in Dhahran. In early September the Marine Hawks were the only U.S. medium altitude surface to air defense in Saudi Arabia.

The advance elements of the 3d Low-Altitude Air Defense (LAAD) Battalion deployed early and integrated with the 7th MEB and the HAWK units upon their arrival. They consisted of seven M998 HMMVWs and 485 Stinger missile rounds, which was a standard based on initial estimates of the situation. However, the commanding officer, Lieutenant Colonel George S. Fick, would repeatedly request additional assets to cover the expanding zone as he was tasked to provide two sections to Shaikh Isa. To make matters worse from an antiaircraft defense view was that nearly half (207 rounds) of the missiles arrived in theater with no battery coolant units.

The 7th MEB directed that no Stinger teams were to be employed outside of the Jubayl port complex, but LAAD needed to position Stinger missile teams away from the vital area asset, in the quay to the north and west, to engage aircraft before their ordnance release. Lack of communications and security were contributing factors in this decision to keep LAAD in close. The 3d LAAD established contact on a borrowed Saudi UHF radio with the Saudi Eastern Sector Air defense network on 22 August.

Detachment A, Marine Air Support Squadron 3 (MASS), led by Major Maurice B. Hutchinson, set up the direct air support center (DASC) alongside the RCT-7 command post and began working on the close air support (CAS) and assault support procedures in support of the ground combat element's concept of operation. Early in September the detachment provided a direct air support center (DASC) with an echelon capability, a fire support coordination center (FSCC) team, and two air support liaison teams. The DASC initially would run mainly helicopter requests such as resupply, close in fire support (CIFS), and medical evacuations (Medevac), but by early September would be coordinating simulated close air support (SimCAS). By mid-September, an airborne DASC capability also existed within the 3d MAW, carried aloft by a specially configured Marine KC-130.

Air traffic control services were provided at the Marine airfields by elements of MATCS-38. At Shaikh Isa Air Base, the squadron's Detachment B would optimize the existing airfield equipment and work with host nation con-

trollers. At King Abdul Aziz and Jubayl these air traffic control services were provided by Detachment C in more austere conditions. The tactical air navigation system (TACAN) had to be rebuilt at Jubayl after not working for several years. A Marine TACAN was set up at King Abdul Aziz. Radar approach control was established at all three airfields, while another detachment was formed to provide service to the CH-53s at Ras Al Ghar.

Overall, the deployment of the reinforced 7th MEB proceeded quickly and efficiently considering the press of events and the execution of an untried employment plan. Many functional areas demanded the immediate attention of leaders throughout the brigade during the last week of August, but General Hopkins' 7th MEB Marines worked to resolve these problems and improve the brigade's defensive posture. Despite the difficulties encountered during the two-week deployment of the 7th MEB, General Hopkins remained confident of the ability of his Marines and sailors to carry out their assigned mission. On 25 August, he reported the brigade as combat ready to CentCom.

The 3d MAW Stands Up

Compositing and Reorganization

Even as the 7th MEB and MAG-70 began to congeal as a fighting force in Saudi Arabia and Bahrain, the clock had already begun to run out on their existence as a tactical command. The reinforcing units from MAG-24 and the rest of 1st Marine Expeditionary Brigade began to arrive in theater during the last week of August. The four ships of the Guam-based MPSRon-3 tied up to the massive pier at Jubayl on the 25th. As equipment was disgorged from the ships into holding areas, RCT-3 with its two infantry and one artillery battalion undertook a more orderly acceptance of it than 7th MEB predecessors. On 3 September, the 7th MEB and the new arrivals joined to become I MEF. The same day 3d MAW, and the 1st FSSG command elements, took command of their respective forces in theater as major subordinate commands of I MEF. On 6 September, enough of the 1st Marine Division forward command post was in place to absorb RCT-7 and RCT-3 and assume the I MEF's ground combat element responsibilities.

During the first week of September, MAG-24's elements flew directly into Jubayl NAF. HMH-463 and HMM-165 quickly offloaded and reassembled their aircraft and joined up with the helicopter detachment already in place. MWSS-174 gathered its equipment from the port of Jubayl and settled into King Abdul Aziz, thereby allowing MWSS-374 to concentrate its efforts at Jubayl NAF. The increased support at King Abdul Aziz allowed VMA-311 to move from Shaikh Isa to Aziz on 23-24 August. MACS-2's personnel and equipment also went directly to King Abdul Aziz on 6 September. The squadron began to integrate its personnel with the MACS-1 "Watchstanders," but Lieutenant Colonel Carl E. "Chico" Treutle's squadron remained as the lead unit for several more weeks.

With only a skeletal command and control system in place, the transition

of the aviation combat element from a composite Marine air group to a full aircraft wing nevertheless proceeded quickly. This transition was aided by the fact that General Moore had been in theater since 15 August and was thoroughly familiar with the key issues confronting his command. On 3 September he assumed command of the Marine aviation units ashore from Colonel Rietsch and operated from the same tactical air command center at Shaikh Isa. Building a 24-hour around-the-clock wing staff proved more challenging, since nearly two decades of peacetime manpower constraints did not provide the depth required for the task at hand. Moore had deliberately loaded up MAG-70's staff as it deployed with the intent of facilitating the eventual transition to a wing headquarters, but some essential gaps remained in early September.[58] Many senior wing personnel, including Brigadier General Harold W. Blot, the assistant wing commander, remained in California minding the wing's rear echelon.

On 3 September, MAG-70, already larger than the 1st MAW, split into three aircraft groups. Colonel Rietsch retained command of the fixed-wing aircraft at Shaikh Isa and Bahrain International under the colors of MAG-11. MACG-38 continued as a nominal detachment led by Lieutenant Colonel Harvey R. Norton until 20 September, when Colonel Joseph Della-Corte arrived from El Toro with most of his remaining group staff. MWSG-37 headquarters and headquarters squadron (H&HS), however, remained at El Toro. The three support squadrons reported directly to the wing through the offices of the logistics department (G-4). Few 3d MAW groups or squadrons were able to bring all their personnel forward, as a substantial number of "short-timers" and other non-deployables required a certain amount of oversight in the absence of dedicated "housekeeping" units.

With MAG-16's staff also split between California and Saudi Arabia, Colonel Larry T. Garrett appointed Lieutenant Colonel Michael J. Aguilar from

One of the 19 AV-8Bs of VMA-311 is pictured at Jubayl. Arriving on 20 August, the "Tomcats" were the first fixed-wing squadron from 3d MAW in theater.

MAG-50 as the group executive officer, while Lieutenant Colonel Lonnie A. Howerton moved down from MAG-70 to become the logistics officer. Other positions in the staff were filled by squadron augmentees. Most of MAG-70's headquarters personnel remained at Shaikh Isa, either with Colonel Rietsch at MAG-11 or augmenting the small wing staff General Moore had brought from El Toro.

Colonel William A. Forney, an experienced fighter pilot who, several years earlier had commanded MAG-15 at Iwakuni, Japan, held down the wing chief of staff position. Slated to assume command of MWSG-37, Colonel Robert W. Coop was brought out from El Toro by Moore to serve as the acting wing logistics officer, with additional responsibility for the deployed Marine wing support squadrons. Colonel Terrence R. Dake, a former commanding officer of HMX-1, moved up to take Coop's job as the wing operations officer (G-3). The wing logistics officer (G-4), Colonel Ronald M. D'Amura, remained at El Toro with the MWSG-37 headquarters for the time being. Rounding out the principal staff was Lieutenant Colonel Rudolph Lowery as the personnel officer (G-1), Lieutenant Colonel Walter F. McTernan II as the intelligence officer (G-2), and Lieutenant Colonel Philip J. O'Brien as the communications officer (G-6).

At King Abdul Aziz, VMA-311 temporarily remained as a forward detachment of MAG-11 until 7 October, when General Moore sent Colonel John R. Bioty, Jr., to King Abdul Aziz Naval Base to establish MAG-13 (Forward). Bioty, who had relinquished command of VMA-331 in June, quickly formed a small staff comprised of MAG-70 officers and squadron augmentees from VMA-311, VMO-2, MWSS-174, and MALS-13 (Forward).[59] The 3d MAW would find it necessary to designate site commanders due to geographic location. Each site commander would have operational control of all 3d MAW assets at his location. Administrative control would remain with the units' parent commands. In case of MACCS units including 1st MEB units, the parent command would be MACG-38, located at Shaikh Isa. Site commanders were the commanding officer of MAG-11 at Shaikh Isa, the commanding officer of MAG-16 at Jubayl NAF, and the commanding officer of MAG-13 at King Abdul Aziz.[60]

Joint Air Doctrine Issues

One of the first issues the wing staff had to address was the subject of the ownership of the airspace over I MEF's area of responsibility and, in particular, its defensive positions around Jubayl and to the north. Unlike the first weeks of Desert Shield, when the few orbiting Air Force AWACS aircraft were the only effective air control agency in place, the establishment of the MACCS now gave the wing the ability to effectively control the airspace over the I MEF area of responsibility. Participating in a major joint air operation for the first time since the Vietnam War, General Moore and his staff expected to be confronted with Air Force opposition to subdividing theater airspace.*

Air Force doctrine espoused air warfare as a distinct and superior form of

* Following the war, Marine and Navy critics argued that the JFACC system in the Gulf was so thoroughly an Air Force operation that it did not deserve the "joint" designation.

the offensive. Given the appropriate resources and wide latitude from political leaders, Air Force leaders argued that an air campaign focusing on strategic targets could break the enemy's will and compel him to surrender or desist without the U.S. having to resort to a costly and possibly unpopular ground campaign. This form of nearly unrestricted air warfare against deep or strategic targets demanded that ground officers who favored using air power primarily against tactical targets be kept at arms' length. To ensure that the air commander in a joint operation possessed the authority to direct or redirect strikes across the length and breadth of the theater in pursuit of campaign objectives, Air Force doctrine also demanded that airspace not be ceded or parceled out to other services or allies.

In the Korean War, after moving from the "fire brigade" defense of the Pusan Perimeter to mobile warfare during the drive up the Korean peninsula, the Marines were able to pair 1st MAW with its supported 1st Marine Division up to and during the crucial withdrawal from the Chosin Reservoir, although both were commanded by an Army general at X Corps. Once the 1st Marine Division was placed in the main Eighth Army line in 1951, however, the commander of the Far East Air Forces succeeded in splitting off the wing from the division and using it in general support of the Eighth Army. While some tactical control over 1st MAW was later restored to the 1st Marine Division commander, the efficacy of the air-ground team was much less than the Marines knew was possible. As Marine units were withdrawn from the war in the wake of the armistice, their leaders spent a great deal of time and effort thinking about ways to ensure the future integrity of the Fleet Marine Force.

The Air Force, however, continued to view tactical aviation as being effectively employed only under the aegis of a theater air commander. In Vietnam, this view was aggressively promoted to MACV commander General William C. Westmoreland, USA, by U.S. Seventh Air Force commander Lieutenant General William W. Momyer. Through Momyer's efforts, the 1st MAW, after three years of relative independence, was forced during 1968 into an Air Force-dominated "single manager" system that featured a high degree of centralized control from Saigon. The Seventh Air Force presumed to know the relative importance of scheduled and on-call close air support sorties well enough to redirect them if it saw a need to do so.[61]

Marine aviation, which had been painstakingly defended before and reauthorized by the U.S. Congress in the years since the Korean War based upon the full understanding of its unique requirements and methods, was severely constrained under this system. Response times for close air support requests plummeted and even high priority pre-planned sorties were diverted for other purposes. Marines of that era again vowed to fight future efforts to institute such a "unified" air command system, although some saw the best tactic for this purpose was to "out game" the Air Force from the inside.[62]

The Goldwater-Nichols Act of 1986, much to the disappointment of many Marines, cemented the authority of a CinC to appoint a Joint Force Air Component Commander (JFACC). In the name of unity of effort, the JFACC could translate the CinC's broad directives into a theater-wide air campaign. As such, the JFACC through the authority of the CinC could set targeting priorities,

apportion airspace, and direct the "excess" sorties of the respective service components. This idea of excess sorties was created by the 1986 Omnibus Agreement.* All services agreed that the Marine air-ground task force (MAGTF) commander would retain operational control of his organic air assets, and would provide sorties in excess of the MAGTF direct support requirement to the joint force commander (JFC) for tasking through the air component commander. However, the JFC could redirect efforts through reapportionment and reallocation of any MAGTF tactical air sorties when they were required for higher priority missions. This later apportionment, apportioning aircraft by percentage of a particular asset that would be required in the joint effort, and allocating, the assigning by sortie and mission through the air tasking order (ATO) process, was what concerned the otherwise lightly fire-powered Marines.

The Air Force, which expected to be the JFACC in any large conflict, designed its numbered Air Force headquarters to fulfill this role. The preferred mechanism of control over its own air units as well as those of the Navy and Marines was the air tasking order (ATO). The ATO served as the daily master plan for the JFACC and listed all of the strikes, CAPs, tanker missions, and other supporting functions for a 24-hour period.

Using the computer-assisted force management system (CAFMS), the planners at the numbered Air Force could garner targeting input from the various component commands, assign appropriate targets, build a mission package, eliminate conflicts between that package with others planned, and make required changes. This could be done in theory on a 72-hour cycle while still leaving time for the pilots at the wings and groups who would execute these missions to do the requisite detailed planning. The Navy and Marines, accustomed to decentralized planning and mission coordination based on airspace delineation or "route packages," were deeply suspicious of both the efficacy of the Air Force system in crowded airspace and its perceived inflexibility when confronted with last-minute requests for support.

Many of the leaders of Marine aviation, oriented toward the specific support of their ground comrades-in-arms, saw the ATO system as antithetical to their way of doing business. They feared the "joint strategic missions" would require so many assets that the optimum support of the specifically trained and equipped MAGTF team, and ultimately the Marine on the ground, would be compromised. Although joint doctrine continued to recognize the unique qualities of the Marine air-ground task force, many Marines remained skeptical about Congress granting so much power to the JFACC. The institutional memory of Air Force generals in recent conflicts who demanded absolute control over Marine jets and the exclusion of helicopter aviation in the name of doctrinal purity remained quite fresh in the minds of Marine leaders as Desert Shield unfolded in August 1990.

Fortunately for Marines, the senior airman in theater was at heart a practical man when it came to questions such as these. General Horner made it clear in his earliest discussions with General Moore and his representatives that he had

* General Paul X. Kelly informed the Marine Corps with his White Letter No. 4-86, which contained the 1986 Omnibus Agreement.

no doctrinal axe to grind with Marine aviation. Horner and Moore agreed that all of 3d MAW's A-6 and EA-6 sorties and half of its F/A-18s would be committed to the joint air effort. The wing's AV-8Bs, OV-10s, KC-130s, and the Beechcraft C-12, however, would be reserved for Marine employment.* Their scheduling would be forwarded to the JFACC for inclusion in the ATOs for the purpose of coordination. This initial agreement remained in effect until the approach of the ground campaign.[63]

As with many joint understandings, the devil was found to be in the details of the complex air command and control system then being built in theater. Marines traditionally sought a three-dimensional airspace "box" over their forces in the field within which their aviation assets had free reign to respond to calls for defensive or offensive air support from the MAGTF commander or his subordinates. Marine air also wanted to operate with few restrictions over the adjacent enemy's airspace so as to wage the battle both against the enemy's frontline troops as well as against targets deeper in his territory such as supply dumps and mechanized reserves. The major air control measure that delineated the maximum forward responsibility of friendly ground forces was the fire support coordination line (FSCL).

The FSCL in earlier wars was normally located at the outer range limit of friendly artillery, but the growing range of rocket artillery and attack helicopters in the U.S. Army inventory disturbed this traditional marker. The Army began to demand a more distant FSCL in order that it gain the freedom to fire and maneuver at will in battle without having to coordinate with the Air Force. The Marines, historically short on artillery and thus heavily reliant on offensive air support to bridge the battlefield fire support difference, were more accepting of a FSCL closer to the forward line of troops, as long as their aircraft could range deeper when required without undue burden or limitation.

In Riyadh, Colonel Robben summarized the status of Marine aviation in the joint and combined air command and control environment in a memo to Major General Pearson.[64] For the purpose of preserving the language of Marine aviation at the time, the memo is quoted in the footnote below.** On the key issue of offensive air support (OAS), he noted that the JFACC's concept was that the control of aircraft would be primarily through the Air Force's airborne command control and communications system. Under this system the MAGTF commander did

* Some Marines would argue that this was the very reason that the Marine Corps had AV-8s. Neither the Navy, nor the Air Force were likely to grab them, except for CATF's occasional emergency defense of the amphibious task force.

** Colonel Robben noted that "to use the USAF ABCCC as the key C2 agency to achieve unity of effort managing CAS for U.S. Army forces and all 'kill zones' just forward of the joint combined FSCL. Other USAF C2 agencies (TACC, CRC, ASOC, AWACS, TACPs) are involved in the process, but ABCCC is viewed as the focal point for battle management. USMC CAS will be handled through USMC agencies (USMC TACC, TAOC, DASC, DASC[A], FACs, and TAC [A]). The MAGTF commander does not 'control' the airspace beyond the joint combined FSCL, but he has the flexibility to use the airspace as required." (MarCent Liaison Officer memo to CentAF and Com MarCent Rear, subj: Airspace Control in Desert Shield, 11Sep90).

not "control" the airspace beyond the joint combined FSCL, but he would have the flexibility to use the airspace as required.

Robben reported that the JFACC, while initially refusing the full-time assignment of medium and high-altitude airspace to I MEF, recognized the need for the Marines to exercise control at times of large segments of airspace to effect close air support and other offensive air operations. Robben explained that these segments of airspace, designated high-density airspace control zones (HIDACZs), would be established for Marine use by mutual agreement with all joint combined agencies. The following criteria would apply to the HIDACZs:

> [HIDACZs] are established at the direction of the USMC and as coordinated between USAF tactical air command center and the USMC tactical air command center for pre-planned, or airborne command, control and communications (ABCCC) and the Marine direct air support center (DASC) for immediate.
> - Are defined volumes of airspace.
> - Require airspace users to be controlled by Marine tactical air operations center (TAOC) or the Marine direct air support center.
> - Require Marine air-ground task force commander to control the air defense weapons control status (TAOC controls through the eastern sector control center).
> - Are characterized by extensive use of a variety of weapons.
> - Require approval from either DASC or TAOC before aircraft can transit.
> - Occasional spill-out of both close air support aircraft and/or artillery fire from High Density Air Control Zone (HIDACZ) is anticipated.

In summary Colonel Robben noted that, even though the 3d MAW did not gain full control of the airspace in question, the arrangements with the JFACCC " allow the MAGTF commander the flexibility to complete his mission." In terms of specific air defense and air control responsibilities, he briefed General Pearson that the 3d MAW TAOC "provides early warning and fire direction for the USMC HAWK battery in the Al Jubayl area and controls CAS operations in the USMC HIDACZs." [65]

In addition, Marines agreed that the tactical air operations center (TAOC) would provide track and surveillance production for 3d MAW's tactical air command center (TACC) and the other air control agencies. They would provide primary back up track and surveillance for the combat air patrol (CAP) under AWACS control in northeastern Saudi Arabia, and the Marine fighters under NavCent control in the northern Persian Gulf. Although it took several more weeks of discussions by Moore, Pearson, and Robben with their counterparts, General Horner, on 25 September, gave over temporary control of the HIDACZ corresponding to the I MEF AOR to the 3d MAW.[66]

Operations and Training

Throughout its first month in Bahrain, MAG-11 maintained the full-time CAP schedule over the northern Gulf through the rotation of daily responsibilities among its four Hornet squadrons. The group also began to step up its offensive training program, conducting by September's end a variety of antiair, strike, and simulated close air support operations with fellow Marines as well as United States and Bahrain Air Force units. The exercise of some of the D-Day ATO strike packages were called Mirror Strikes, and were rehearsed during both day and night. The strike package would include all escort, tanker, command and control, jammer, and striker assets that would be used in the mission. It would be conducted over the same distance as the actual mission, except heading south over Saudi airspace instead of north over the actual target area. This mirrored effect lead to the naming of the exercises as Mirror Strike exercises.

In between this tactical training and the combat air patrol sorties, the Marines at Shaikh Isa weathered a series of very important person (VIP) visits as well as the arrival of a 450-bed Army hospital. VMGR-352 was still at Bahrain International. Beginning in September, MCAS El Toro Station Operations and Maintenance Squadron Detachment "A" joined the KC-130's at Bahrain International providing a Beechcraft UC-12B Super King Air to relieve the smaller lift requirements, the constant VIP missions, and various movements among the air bases.

MAG-13 (Forward) joined its OV-10s on 26 September, when the first of six VMO-2 aircraft (three OV-10As and three OV-10Ds) completed their 30-day ferry flight operation from Camp Pendleton. The two OV-10Ds from VMO-1, after being craned off the USS *Iwo Jima* (LPH-2) at the port of Jubayl, flew off the pier for the short hop to King Abdul Aziz where they joined up with VMO-2. Although the main body of squadron personnel arrived at King Abdul Aziz on 3 September, the six VMO-2 aircraft followed a circuitous route across the North Atlantic. Supported by two Marine KC-130s with the squadron's maintenance detachment on board, Lieutenant Colonel Clifford M. Acree's Broncos finally departed the United States after several maintenance problems. The Broncos stopped at sites including Sondrestrom, Greenland; Keflavik, Iceland; Kinloss, Scotland; and Lakenheath, England, before heading south across the Mediterranean to Saudi Arabia.[67]

At Jubayl NAF, MAG-16 sought alternate bases for some of its aircraft due to severe flight line crowding. Aircraft were parked as if on board ship with the blades folded and as tightly packed as possible. The Seabees and MWSS worked around the clock to provide more ramp parking space, but aircraft were arriving faster than space could be made for them. Parking on the sand caused additional maintenance problems and was avoided. Colonel Larry T. Garrett would recall "Although we could find no one to make a decision to allow the use of Ras Al Ghar, Major General Moore finally told me to just go occupy it, and that's what we did"[68]

On the 10th, HMH-465 started to redeploy to a large parking lot at the Ras Al Ghar Saudi Marine Base, located 12 miles south of King Abdul Aziz Naval

A CH-53E of HMH-466 "Wolfpack" refueling at Ras Al Ghar. Safety was improved by the move to Ras Al Ghar, but at a cost to communications and supportability.

Base. This site offered the advantage of being co-located with the developing 3d Marines' rear encampment (Camp Daly). Despite this effort, a taxiing CH-53E made contact with the rotor blades of a parked helicopter on 12 September. Although shards of steel and fiberglass flew across the ramp area, the mishap did not result in serious injury to personnel or major aircraft damage.

By the 26th, HMH-465 was joined by HMH-466 and HMH-463. HMH-462, with the exception of some split site operations, remained at Jubayl, as did Sea Knight squadrons as well as HMLA-367 and HMLA-369. Conditions were measurably improved by this reshuffling at Jubayl, although contact with the detachment at Rhas Al Ghar was intermittent at times as the communications system scrambled to keep up with the wing's rapid expansion. The wing continued its efforts to make space for HMLA-269 (Forward) at Jubayl, but Moore decided, in the interim, to leave Hill's squadron at Dhahran Air Base.

Keenly aware of the hazards posed by the adjustment to a strange environment, aviation safety remained at the forefront of commanders' concerns. In spite of this awareness, accidents wore down the strength of the force from the outset. On 7 September, a Cobra from HMLA-269 hit the ground during a low-level nighttime night vision goggles (NVG) training mission. On 13 September, a CH-53E from HMH-465 crashed on take-off from King Abdul Aziz. Inadvertently attempting a take-off on only one engine after refueling, the pilot of the aircraft lost control as it transitioned out of ground effect, crash-landed, rolled, and caught on fire. The aircraft was a total loss. A few weeks later, an A-6E collided with a radio tower near Manifa Bay, during a night flight. It returned to base with damage but no injuries.[69]

With 1st Marine Division setting up defensive positions north of Jubayl NAF, MAG-16 started providing a range of logistics, transport, and medical evacuation support to Major General James M. Myatt's command. After General Myatt pushed his composite Light Armored Infantry Battalion (Task Force Shepherd) and the 3d Battalion, 9th Marines, further up toward the "Triangle"

area during the second week of September, MAG-16 and MWSS-374 developed a forward arming and refueling point (FARP) at a run-down airstrip at nearby Manifa Bay.* With the assistance of CSSD, the airstrip was patched where possible and stabilized with fuel oil to keep the sand and chunks of asphalt from being whipped around by rotor wash. The strip was designated as FARP Foss in honor of the noted World War II Marine fighter ace and later South Dakota governor, Joseph J. Foss, who was awarded the Medal of Honor.**

A few radio nets and a temperamental telephone line were all that linked the FARP with the rest of the expeditionary force in its first weeks. Still, the site was an integral part of the defensive scheme, with a normal compliment of two Cobras, two Hueys, and two Sea Knights on hand to respond immediately to an Iraqi incursion or a medical emergency. The resupply plan established as early as 22 August, was to organize a landing support battalion (LSB) detachment at the Manifah jetty and resupply from the sea by landing craft utility (LCUs) from the port of Jubayl. Aircraft and crews were generally rotated back to Jubayl every few days. Flight operations from FARP Foss generally consisted of reconnaissance missions in addition to limited training with the neighboring division units.

Aviation Logistics

After a round of discussions concerning a unified aviation logistics support structure for Marine forces in the Gulf region, General Boomer on 15 September outlined his concept of employment of the aviation logistic support ships (TAVB) arriving in theater to Major General Harry W. Jenkins, Jr., the commanding general of 4th MEB.*** Citing the need to position the aviation logistics support near the preponderance of Marine aircraft, Boomer decided that:

> The USNS *Wright* will ultimately operate pierside at Manama Port, Bahrain, primarily supporting fixed-wing aircraft, but will first download rotary-wing and AV-8B assets at Al Jubayl Port, Saudi Arabia, to provide the initial assets for MAG-16 and MAG-13. The USNS *Curtiss*

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* 1st Marine Division Operational Order 2-90 assigned Task Force Shepherd the mission of screening the division's front from Safaniya to a point 60 miles west. For details on the ground operations see Charles H. Cureton, *U.S. Marines in the Persian Gulf, 1990-1991: With the 1st Marine Division in Desert Shield and Desert Storm.* (Washington: History and Museums Division, HQMC, 1993).

**While serving as executive officer of VMF-121 at Guadalcanal, Captain Joseph J. Foss was awarded the Medal of Honor. The award citation, in part, reads: "Engaging in almost daily combat with the enemy from October 9 to November 19, 1942, Captain Foss personally shot down 23 Japanese planes and damaged others so severely that their destruction was extremely probable."

*** Major General Terrance R. Dake noted that this was one of the few "rice bowl" issues he encountered during the operation, and thus it went to the general officer level for resolution. The complicating factor was that the *Wright* was also designated as the TAVB for the 4th MEB/MAG-40 (MajGen Terrance R. Dake intvw, 21Feb96).

> will do just the opposite. It will first down-load fixed wing assets at Manama Port and then proceed to Al Jubayl Port where it will operate pierside, primarily supporting rotary wing and AV-8B aircraft. [70]

The Bahrain International Airport served as the common airhead for aviation logistics support for Marine forces in theater.[71]

Ashore at Jubayl, MAG-16 began to notice signs of the harsh desert environment. Sand erosion was found on UH-1N and CH-53D rotor blades after the first weeks of flight operations.* This problem soon manifested itself throughout the helicopter fleet and extended not only to rotor blades but also to aircraft engines and windshields. The group instituted a combination of measures in an attempt to reduce the effects of sand erosion. These included heavy-duty Teflon tape placed on the leading edges of rotor blades, the maximum use of concrete or asphalt landing zones, and increased minimum flight altitude, in order to reduce the ingestion of sand into the aircraft engines. The wing limited its CH-46Es to eight combat-loaded Marines due to the combination of prior airframe flight restrictions and the effect of the extreme high heat and humidity of the region. Mission capable aircraft availability of the helicopter fleet was at 51.7 percent at the end of August and only began to rise towards the end of October when it reached 58.8 percent as the group struggled with maintenance and supply challenges.[72] 3d MAW's fixed-wing availability was considerably better.**

The Seabees and Expansion of Wing Support

With the basic infrastructure already in place at Shaikh Isa Airfield, MWSS-373 was able to devote its efforts toward expanding the tactical aviation fuel-dispensing system (TAFDS), internal transportation, and security. North of the base, a low valley was developed into an aviation ordnance dump. Habitability at the site, although good by most standards, received more attention. The Seabees began pouring cement hardstands for billeting and framing them with lumber in order to provide a modicum of comfort. These improvements were quite modest when compared with the Air Force's new air-conditioned billeting tents springing up around the base, but they were nonetheless greatly appre-

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*Brigadier General Larry T. Garrett would later comment: "We calculated that about 70 landings out in the unprepared desert was all it took to erode the turbine blades in the CH-53E engines to the point that an engine change was required. This caused us some serious concern as we started looking at the prospects of combat operations lasting beyond a couple of weeks. Seventy landings could be only a few days of work in high tempo operations." (BGen Larry T. Garrett, comments on draft, 27Jun99).

** 3d MAW's overall aircraft mission capable rates for October were 69.6 percent. The break down by aircraft type was: F/A-18A, 79.6 percent; F/A-18C, 78.9 percent; EA-6B, 76.8 percent; A-6E, 78.5 percent; KC-130, 82.9 percent; OV-10A, 59.0 percent; OV-10D, 87.7 percent; AV-8B, 75.3 percent; AH-1W, 64.1 percent; UH-1N, 67.8 percent; CH-46E, 55.7 percent; CH-53D, 63.2 percent; and CH-53E, 43.3 percent (3d MAW ComdC, Oct90).

ciated. Regular or "A" ration meals appeared at the dining facilities after several weeks of "chicken and rice"-type dishes, with MREs covering lunch for most.

The Seabees of NMCB-7 and MWSS-373 cooperated on a variety of projects at the airfield. The Seabee's first priority was the construction of an access road and ammunition supply point (ASP). As the Seabee commander reported:

> The work consisted of building berms to create storage cells and act as blast deflection and security barriers. An open bomb storage area with adjacent container stacking areas were leveled. Work started on C+39 and completed on C+118. The customer then occupied storage modules as soon as each was complete. A total of 73,590 cubic yards of fill was used to build this project. [73]

Work on the expansion of ramp space commenced in mid-October. The Seabees leveled and compacted a 600,000-square-foot area north of the existing ramp. The project would not be complete until virtually all the Marine Corps' AM-2 matting (a type 2 aviation matting material used for covering soil to create expeditionary runways, ramps, and helicopter pads) arrived later in the fall. Several Marine and Air Force tenants who had settled in the area—including the tactical air command center's vans and generators—were forced to displace during this phase. Work started near the airfield tower and proceeded to the north along the western side of the taxiway.

At King Abdul Aziz, the focus of effort was on expanding ramp space, but with a twist designed to take advantage of the Harrier's unique capabilities. Navy Seabees began construction in September on a "3,500-foot AM-2 aluminum-matting parallel taxiway-parking area that provided parking with direct access to the runway for 50 aircraft."[74] They did so in a manner that allowed the Harriers to pull directly onto the airstrip, and taking advantage of their short takeoff capability, get airborne with any combat load in under 1,500 feet of roll. This allowed for simultaneous takeoffs and landings, increasing the sortie rate at the airfield. The environs west and north of the soccer stadium became the center of billeting and messing as well as much of the MALS-14 complex. East of the stadium, and to the seaward side of the base, aviation ordnance was staged. The Seabees started expanding the King Abdul Aziz Airfield on 4 September, and described the accomplishments as:

> The first part of this multi-phase job was to do the site work and lay AM-2 matting for a 3,600 foot by 72 foot parallel taxiway which would include 20 "hides" for aircraft parking and two access taxiways. Later work included installation of a 150-foot-square Vertical Take Off/Landing pad for AV-8 Harrier jets, a second 42-foot-by-620-foot taxiway of AM-2 matting; eight parking hides for OV-10 Marine reconnaissance aircraft; a 96-foot-by-316-foot helicopter refueling pad; and an AM-2 mat Harrier Jet Engine power test stand. All matting at Aziz was laid on soil cement-stabilized sand. The detachment also did site preparation for a second full-length taxiway that would be

paved by a local contractor. This work also included twenty additional hides for AV-8s.[75]

Jubayl NAF presented MWSS-374's engineers and motor transport personnel a host of challenges. The area's most salient characteristic, aside from its 10,000-foot airstrip and tall air traffic control tower, was very deep sand. Consequently, every temporary construction project rested on an inherently unstable foundation. Nevertheless, with the help of NMCB-5's sailors, the squadron started to erect hardback tents with wooden-pallet flooring. The expansion of aircraft ramp space also required extensive soil stabilization efforts. After locating a borrow pit outside the base perimeter, Marines and Seabees began an around-the-clock effort to mine the gravel and transport it to the southeast side of the runway. There it was dumped on top of a graded sand surface and used slowly, but steadily to build up the surface to the required firmness. It took anywhere from one to three feet of compressed structural fill to achieve the necessary base.[76]

Table: Early 3d MAW squadrons and aircraft locations [77]

Location (Unit)	Squadrons	Number / Type of Air-Craft
(Manifah Bay (MAG-16)	HMLA-369 (Det)	8 AH-1W Super Cobras 2 UH-1N Hueys 4 CH-46s Sea Knights
Jubayl NAF (MAG-16)	HMLA-367/ 369	19 AH-1W Super Cobras 16 UH-1N Hueys
	HMM-161/ 165	24 CH-46E Sea Knights
	HMH-462/ 463	16-20 CH-53D Sea Stallions
King Abdul Aziz (MAG-13)	VMA-311	20 AV-8B Harriers
	VM0-2	8 OV-10 Broncos
Ras Al Ghar (MAG-16)	HMH-465/ 466	15 CH-53E Sea Stallions
	HMH-462	4 CH-53D Sea Stallions (9-26 Sep.)
Dhahran (MAG-16)	HMLA-269	12 AH-W Super Cobras
Shaikh Isa (MAG-11)	VMFA-235/ 314/ 333/ 451	48 F/A-18 Hornets
	VMA-542	20 AV-8B Harriers
	VMA (AW)-224	10 A6-E Intruders
	VMAQ-2	12 EA-6B Prowlers
Bahrain International (MAG-11)	VMGR-352	8 KC-130 Refuellers

The Maturing Theater, September-November 1990

End Strength Cap and Rotation Plans

As September turned to October, the efforts of the scattered 3d MAW units in eastern Saudi Arabia and Bahrain began to show significant results. The long-awaited arrival of AM-2 matting on 8 October translated into immediate breathing space for taxiing aircrews and flight line personnel. The last of I MEF's original flow of personnel ended at the point after General Schwarzkopf capped Marine end strength in theater at 42,000.[78] The 3d MAW's share of this total was well below that necessary for the full support of its substantial "teeth." The "tail" would have to make due, and thus the two support squadrons and MACG-38 continued to operate far short of their full strength.

As the U.S.-led coalition's strength solidified, Saddam Hussein backed away from an offensive posture and shifted his military effort to the fortification of Kuwait. This presented a new challenge to President Bush and the other coalition leaders. Depending on the strength and perseverance of the allied coalition, Saddam's effort to hold onto Kuwait might outlast the combined diplomatic, military, and economic effort to dislodge him. One factor in this calculus was the amount of time U.S. forces could remain on Islamic soil without alienating its conservative population. Another was the patience of the highly-trained U.S. combat troops for a year or more of inaction in the often desolate environment of the Arabian Peninsula.

Back in Washington, D.C., the staff at Headquarters, Marine Corps, struggled with various options designed to sustain a MEF-sized force in the Gulf for a year and beyond if required. The Commandant, General Alfred M. Gray, Jr., convened a Southwest Asia Sustainment Working Group to study the question and make recommendations. With a Navy commitment in hand to provide enough amphibious shipping to sustain an afloat MEB presence for a year, the group recommended a reduction of the forces assigned to I MEF in theater. The expeditionary force command element would remain in place, but certain Surveillance, Reconnaissance, and Intelligence Group (SRIG) companies and detachments would be withdrawn. Likewise, the 1st Marine Division headquarters would remain in Saudi Arabia, but withdrawing a reinforced-regiment slice would halve the number of its in-country battalions, from 10 down to five. A regimental combat team back in the States would be designated to reinforce rapidly the division if required. The 1st Force Service Support Group (FSSG) would similarly be halved in strength, but prepared to accept field reinforcements. As these I MEF elements where withdrawn, a brigade from a MPS squadron would be reassembled in theater and staged for rapid distribution of equipment to a reinforcing fly-in echelon.[79]

The situation confronting the structure of the 3d MAW was viewed somewhat differently by the working group. Like the division headquarters, the wing headquarters would stay in theater, but much of the aviation infrastructure would also have to remain on the ground in order that the airfields could quickly accept additional forces. Thus, the working group recommended that all three major 3d

MAW airfields be kept in full operation. This required that the three Marine wing support squadrons currently in theater remain there, as well as their air traffic control and communications support. The better part of three Marine aviation logistics squadrons would also stay in place. A two-battery HAWK battalion would be retained to protect the widely-dispersed critical facilities in the I MEF area of responsibility. In general, Marines in these units would be replaced around the one-year point by a system of individual rotation and detachment rotation which would be instituted.

Based on a planned unit movement of aircraft squadrons to meet long-term commitments to the 1st MAW, Marine expeditionary units, and carrier air wings, the working group recommended retaining the core of the current wing-level capability in the Gulf region. The 3d MAW's fixed-wing force ashore would consist of three F/A-18, one AV-8B, and one A-6E squadrons together with EA-6B, KC-130, and OV-10 detachments. It determined a minimum rotary-wing commitment in Saudi Arabia of two CH-46E, two AH-1/UH-1, one CH-53E, and one CH-53D squadron for the foreseeable future. To sustain this base, the group recommended the immediate withdrawal of HMLA-269, a Harrier squadron, four AH-1Ws from HMLA-369, and a six-plane EA-6B detachment. Even with these adjustments, the group estimated the need to mobilize approximately 2,500 members of the Selected Marine Corps Reserve (SMCR) to sustain the reduced MEF in the Gulf beyond a year. The aviation portion of this mobilization would include an AH-1J squadron, the 4th LAAD Battalion, and portions of 4th MAW's Marine air traffic control squadron and Marine wing support squadron to maintain a minimally acceptable six-month overseas and six-month at home rotation.

These plans mirrored those being worked on by the other Service headquarters in the face of the theater's extraordinary demands, and all required the concurrence of CentCom before they were put into effect. In October, General Schwarzkopf issued guidance concerning the possible rotation of forces from the theater. He instructed that servicemen be rotated with their units whenever possible, and that the forces be replaced with equivalent strength units. This policy obviated efforts by HQMC to reduce the size of the 42,000 Marine contingent in the Gulf region to a level more sustainable for the long term.

The Planned Relief of the Afloat 4th MEB

Because of the pressure to conform to the Navy's preferred six-month deployment cycle, the replacement of the 4th MEB with an equivalent brigade by early 1991 was a high priority effort for HQMC in October. Early in the month, the Commandant warned the 5th MEB to prepare to deploy between December and early January 1991 as a relief-in-place for the 4th MEB in the Persian Gulf. In order to bring the brigade up to strength, Brigadier General Peter J. Rowe, the commanding general of the 5th MEB and I MEF (Rear), was forced to embed the 11th MEU(SOC) into the MEB. At Camp Pendleton, most of a regimental landing team was assembled around the headquarters of the 5th Marines using active duty units. HQMC filled in gaps in ground combat and combat support units through the mobilization of elements of the reserve.

The preparation of MAG-50 for deployment to the Persian Gulf proved more challenging. Built around MAG-39 headquarters, now under the command of Colonel Randall L. West, MAG-50 faced an uphill battle from the start of its work-up period. Of the remaining medium-lift helicopter squadrons under MAG-16 (Rear), only HMM-268 (Composite) was immediately available for deployment, due to its established position as the air combat element (ACE) for the 11th MEU(SOC), already partly configured to deploy by year's end. The squadron thus had four of HMH-466's CH-53Es assigned in addition to its 12 CH-46Es. To bring MAG-50 up to a fully capable brigade aviation element required two medium-lift squadrons, a heavy-lift squadron, a light attack helicopter squadron, and a composite Marine aviation logistics squadron. The MAG also needed a Harrier squadron, a MWSS, and a large detachment from MACG-38. FMFPac assigned HMM-265 at MAG-24 to MAG-50 as its second medium lift helicopter squadron, but it would have to wait until the 5th MEB arrived in Hawaii enroute to the Gulf before joining up with the group.

General Blot assigned MALS-39, MWSS-372, and HMLA-169, all based at Camp Pendleton, to MAG-50. HMLA-169 could field a dozen UH-1Ns, but it had to scramble to fill out the squadron with attack helicopters after having supported the quick mount-out of HMLA-369 and HMLA-367 several months earlier. It managed to gather six AH-1Ws together by late November by taking several aircraft directly from the assembly line and all the available Super Cobras out of Helicopter Medium Training Squadron 303, save one. This severely limited future pilot training for the Super Cobra. At Yuma, Detachment B, VMA-513 joined MAG-50 with six aircraft while the remainder of the squadron readied for a mid-December deployment to the 1st MAW. The MEB preferred a full squadron, but neither VMA-211 nor VMA-214 would be ready to deploy in squadron strength with their night attack Harriers until the summer of 1991 at the earliest.

HQMC turned to the Reserves to fill out the group. On 13 November, HMA-773, Detachment C, MASS-6, and 15 teams of Battery A, 4th LAAD Battalion, were mobilized and on 23 November joined MAG-50.[80] HMA-773 brought 14 AH-1Js when they arrived at Camp Pendleton from NAS Atlanta.

Even with help from the Reserves, MAG-50 looked thin by Marine Corps and Navy standards. The NavCent commander, despite airing reservations to his amphibious task force and landing force commanders throughout the fall about the viability of a MEB-sized amphibious assault as an offensive option, argued for a robust 5th MEB as a replacement for Jenkins' command.* In an early November

* In a personal message to General Jenkins, General Hopkins, after his 1 October 1990 meeting with Admiral Mauz, reported that the admiral "saw no realistic mission for a brigade-sized amphibious force in the offensive scenario. In his view, the only viable offensive mission for the 4th MEB would be admin offload and employment to improve our force ratios [ashore]." General Jenkins, in reply, relayed his impressions of his discussions with Admiral Mauz. While Mauz and he agreed on a variety of options relating to countering an Iraqi attack into Saudi Arabia, Jenkins noted that there was a lack of interest in amphibious operations—other than raids—relating to a theater offensive to expel Iraqis from Kuwait. Jenkins reported that "[t]here is no question that his staff is mesmer-

1990 message to General Boomer, Vice Admiral Henry H. Mauz, Jr., USN, expressed concern over MAG-50's shortage of air control, Harrier, and Super Cobra assets in the face of the likely employment of the 5th MEB in theater.

General Boomer concurred with Admiral Mauz's concerns and promised to examine the possibility of transferring some of his ashore assets out to sea dependent on the mission. 3d MAW weighed in against this possibility, citing its greater need for antiarmor assets and arguing for only a small early warning and control (EW/C) facility with MAG-50 based on its limited fixed-wing aircraft and air defense capabilities.[81]

II MEF and 2d MAW Replacement Considerations

With 5th MEB deployment issues well on their way to resolution—although to almost no one's satisfaction—HQMC next turned its attention to the planned turnover of I MEF with II MEF in 1991. As with the case of the 5th MEB, the Marine Corps planned to reach deeply into the Selected Marine Corps Reserve (SMCR) to fill the sizeable gaps in the II MEF line-up. With the 24th MEU(SOC) due to relieve the 26th MEU(SOC) in the Mediterranean in January and the 4th MEB already deployed, the 2d Marine Division had only four of its nine infantry battalions and two of its three infantry regimental headquarters available for duty in the Gulf. I MEF (Rear), already attempting to mount out the 5th MEB, could provide only the 1st Marines headquarters; the 1st Battalion, 1st Marines; a skeletal 1st Battalion, 11th Marines; and a few other scattered companies and detachments. HQMC determined that the reservists of the 4th Marine Division would provide the difference. Likewise, the 2d FSSG looked to the Reserves to make up for the detachments deployed with BSSG-4.

The 2d MAW, with a healthy slice of its fixed-wing aircraft already in the theater with the 3d MAW, expected to rely somewhat less on the Reserves by gaining residual I MEF and 1st MEB units to flesh out its command. Two of four Hornet squadrons, a Harrier squadron, and two fixed-wing Marine aviation logistics squadrons would become replacements for MAG-11 and MAG-13 (Forward).

The replacement rotary-wing group would consist of either the MAG-26 or MAG-29 headquarters, but with four of the six helicopter squadrons coming from FMFPac. MACG-28 would deploy to replace MACG-38 with minor augmentation from the Reserves and FMFPac. On 3 November, after weeks of preparation and consultation with HQMC, FMFLant published its planning order for

ized by the perceived mine threat. They consistently view the employment of amphibious forces as a separate entity without giving thought to other land forces in a coordinated campaign. The attrition of the opposition down to acceptable force ratios prior to engagement is another subject that is not analyzed. We have some of the same problems with our counterparts here. I think that the saving grace will be that the decision to employ amphibious forces if required will come from much higher levels. I believe that the same applies to the decision on the retention of a MEB in the theater." (CG I MEF msg to CG 4th MEB, subj: 4th MEB Employment Options, 020717Z Oct 90; CG 4th MEB msg to CG I MEF, subj: 4th MEB Employment Options, 041400Z Oct 90).

the sustainment of MarCent.[82] The difficulty of keeping a Marine expeditionary force the size of I MEF and a brigade afloat off the coast of Kuwait for an extended period, in addition to meeting daily world-wide commitments, was a complex and difficult exercise for the Marine Corps.

Helicopters and Task Force Cunningham

In the Jubayl area throughout September and October, helicopter availability for training remained somewhat limited in the face of the heavy operational tasking of the rotary-wing fleet. The sustainment of the forward arming and refueling point (FARP Foss) at Manifa Bay continued to be the group's highest priority. HMLA-369 led this effort on behalf of the group. In addition to assault support training, MAG-16's CH-46 squadrons took turns providing a section of aircraft for aerial medical evacuation (MedEvac) duty at FARP Foss. The four heavy-lift squadrons answered calls for support ranging from aircraft recovery to logistics. Perhaps the most unusual mission of the period was HMH-462's repair of an Iranian H-53 that had been commandeered by a defector flying to Saudi Arabia and left at Jubayl NAF. Once minor repairs and test flights were completed, the squadron flew the aircraft down to Dhahran on 2 November for its planned return to the Iranian government.

Assault support training began to take on greater intensity as the 1st Marine Division sought to develop a full range of counterattack options to strengthen its defensive plan. General Myatt wanted to employ heliborne assaults and raids to impede the Iraqi advance. The latter would be conducted using a battalion from RCT-3. Colonel John H. Admire, RCT-3's commander, rotated heliborne training among the four battalions assigned to him in the fall for this purpose. Numerous exercises were conducted. An "Imminent Thunder" series exercised the quick (30-minute notice) FARP mission of the CH-53s with anywhere

Two AH-1Ws and a UH-1N of HMLA-369 "Gunfighters" are refueled during Exercise Imminent Thunder. Marine, Navy, and U.S Air Force aircraft, as well as Navy ships, participated in Imminent Thunder exercises throughout November.

from seven to 10 AH-1W Cobras. Several day and night company-sized inserts and extracts were practiced. The night missions were conducted with the aid of night vision goggles (NVGs). At any given time, RCT-3 had the majority of its forces forward along the "Cement Ridge" main defense area, rotating one battalion to concentrate on training and refurbishment at Camp Daly. Starting with company-level raids in October, RCT-3 gradually worked toward the objective of battalion-sized operations.

The largest heliborne training event of the fall, took place on 2 November, when MAG-16 supported the 1st Battalion, 6th Marines with a helilift of 300 passengers and 12 HMMWVs using eight CH-53s and four AH-1Ws. CH-53s became the backbone of the troop assault lifts because of the weight restrictions on the venerable CH-46s. On 24 August, a "Wolfpack" CH-53E from HMH-466 had demonstrated the capabilities of heavy lift as it successfully recovered a sunken Saudi Naval Air Forces' Dauphine II helicopter that had been forced to ditch in 15 feet of water off the coast.

With the division strung out along a corridor nearly 120 kilometers long but less than 25 kilometers wide for much of that length, General Myatt planned a defense in depth designed to cause attrition of Iraqi armored formations attacking down the main north-south highway along the coast. FARP Foss at Manifa supported the 3d Battalion, 9th Marines, just to the north as well as Task Force Shepherd to the west. Three dozen kilometers to the south, Task Force Taro manned the main defensive line at Cement Ridge. Between Cement Ridge and Jubayl, the heavily-mechanized RCT-7, designated Task Force Ripper, formed Myatt's mobile counterattack punch. With the waters of the Persian Gulf to his east, Myatt's primary concern was the possibility of the Iraqi army splitting the seam between his tactical area of responsibility (TAOR) and that of the XVIII Airborne Corps to his west.

Myatt engaged in an occasionally acrimonious debate with the XVIII Airborne Corps commander about the efficacy of the other's defensive plans and the threat they posed to the Marines' flank. Myatt sought to use well-coordinated attack helicopter and fixed-wing strikes to shore up this flank if required. Given the designation Task Force Cunningham, he sought to build an air maneuver element out of 3d MAW assets that would be in direct support of his division. The massed employment of Hellfire-armed Super Cobras in direct support of the 1st Marine Division's defensive scheme of maneuver was a central feature of Task Force Cunningham.

Myatt's concept ran contrary to Marine aviation doctrine, which positioned the wing in general support of the expeditionary force. The wing commander, based on the MEF commander's guidance and the tactical situation, fed both fixed- and rotary-wing aircraft forward through the wing's direct air support center located with the division headquarters. Rather than have the bulk of attack helicopters tied up in direct support of one task force in the division, Moore argued that it would be far more efficient to retain them under the tactical air command center's control. He agreed, however, to test the concept to see if it provided better support to Myatt. General Moore placed his new assistant wing commander (AWC), Brigadier General Granville R. "Granny" Amos, in charge of the

task force and sent him forward to Jubayl to work with Myatt.

Mixing fixed- and rotary-wing aircraft into the task force also presented unique challenges in the joint environment. Under the joint force air component commander (JFACC) system, all fixed-wing sorties were to be scheduled on the air tasking order (ATO), while the listing of rotary-wing sorties were not. [83]

On 19 October, the Task Force Cunningham concept was briefed to ground and air commanders and their staffs at Jubayl NAF during a meeting host-

Granville R. "Granny" Amos was promoted to brigadier general after a tour in command of the 22d MEU (SOC), and was assigned duty as Assistant Wing Commander (Forward), 3d MAW, in October 1990. He was a helicopter pilot of considerable renown and had commanded HMM-261(C) during the October 1983 invasion of Grenada, and its subsequent deployment to Beirut, Lebanon.

ed by General Amos. Many issues needed resolution, with command, control, and communications, not surprisingly, the most significant single constraint. General Amos opted to use a UH-1N equipped with the ASC-26 communications package as an airborne forward command post from which he could talk to the division, the DASC, the aircraft dispatched forward from Manifa Bay, and the main bases to the south. Amos said of the overall Task Force Cunningham concept: "the way we were going to use the Cobras . . . direct support . . . lots of people liked the idea. I was not really enamored with that idea of massive attack, Cobras in direct support of one regiment . . . or whatever . . . because if you shoot your wad at one time, you don't really have anything to follow-up."[84]

On the 30th, Task Force Cunningham was exercised in support of the 4th MEB. The mission was to deny the enemy use of the coastal main supply routes, while destroying his armor and support vehicles forward of the friendly force battle positions. The aircraft heavy Task Force Cunningham was also to support the flanks of Task Force Ripper's engagement and blocking positions, and prevent enemy units moving south. As 3d MAW's Command Chronology relates:

> The employment of TFC [Task Force Cunningham] was dependent on surveillance, identification and proper notification. The enemy must be seen, positively identified and his main body located in the order of march. The mission commander through the use of TAC(A)/ FAC (A), would coordinate Naval Gunfire, CAS, and CIFS employment . . . . AH-1s would take advantage of the shock effect of fixed-wing (FW) bombing and the Suppression of Enemy Air Defenses (SEAD) of Naval Gunfire, if available, in order to defeat enemy armor in detail. AH-1s would defeat the enemy in zone, in detail, with priority to air defense artillery (ADA), armor and command vehicles. The goal is overwhelming force in a short period of time to complete the mission.[85]

From the wing's perspective, the command and control of Task Force Cunningham proved difficult. While attempting to provide close air support aircraft directly to Cunningham, the 3d MAW at the same time continued to answer doctrinal calls for support through the DASC from the division's other units, such as 3d Battalion, 9th Marines, and Task Force Shepherd. Apportioning resources between the multiple forces slowed down the functioning of the Marine air command and control system and resulted in close air support aircraft encountering lengthy delays in the stack (holding position for aircraft awaiting instructions and clearance to targets).[86]

Tactical Air Operations and Training in the Fall

As the round-the-clock combat air patrol (CAP) over the northern Persian Gulf entered its second month, MAG-11's Hornet pilots settled into a predictable routine of CAP missions alternating with training flights. With four Hornet

squadrons on deck, Colonel Rietsch established a plan that rotated units among CAP duty, training, and no-fly days for both crew rest and maintenance. The routine was broken on occasion by unusual Iraqi air activity or heightened U.S. or coalition naval operations. In one such instance, MAG-11 flew combat air patrol for the USS *Wisconsin* when she ventured into the northern Gulf on 27 September.

After weeks of negotiations, the 3d MAW in early October gained access to the King Fahd aerial gunnery ranges. The F/A-18s got the first crack at the ranges on the 3d, dropping MK-76 training bombs. The 3d MAW's integrated air defense system was exercised repeatedly throughout the early fall. In mid-October the 3d MAW hosted a two-day meeting of I MEF air liaison officers and tactical air control party personnel to review procedures for command and control and close air support.

Although short on true all-weather aircraft, General Moore nonetheless stressed night training for his fixed-wing groups. On 19 October, the 3d MAW conducted mass night strikes in multiple training areas to test this capability. The wing also began a series of combined training exercises with the Bahraini Air Force, which focused on the defense of the Emirate from air attack. Joint exercises with the U.S. Air Force followed throughout October. MAG-11 teamed up with the U.S. Air Force for a simulated strike mission on Al Dhafah Air Base in Abu Dhabi on 25 October, and at month's end Marines and airmen executed a joint simulated strike mission against Shaikh Isa Airfield. The mission exercised all phases of an offensive air strike. The wing's vigilance was tested briefly on 2 November when three Iraqi warplanes penetrated Saudi airspace near Rietsch's northern Gulf CAP. This provided a healthy dose of realism for the initial CentCom-Saudi air defense exercise which commenced on 3 November.

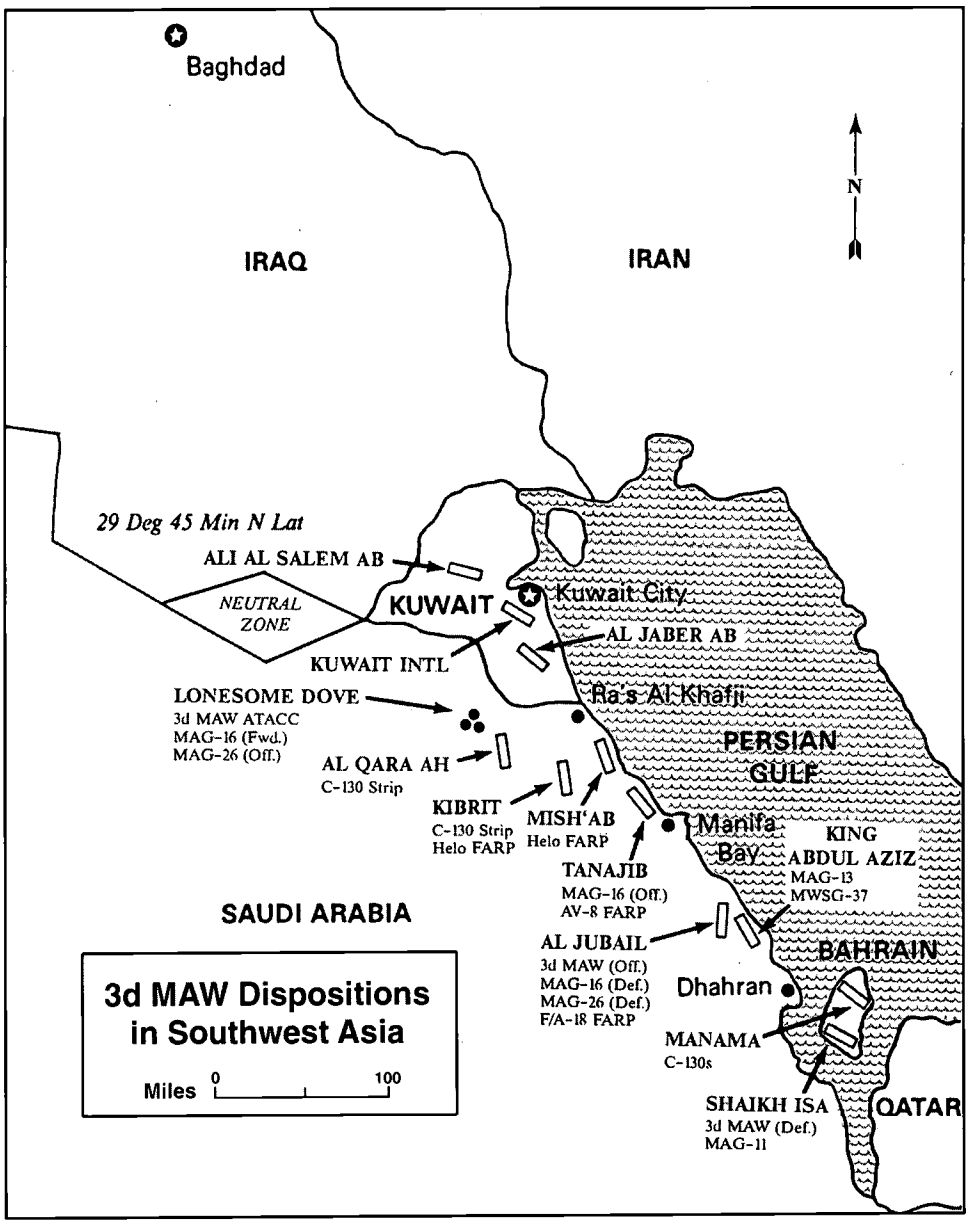
After more than two months worth of sustained effort, the Seabees and MWSS-174 expanded the airfield facilities at King Abdul Aziz Naval Base sufficiently to accommodate more aircraft. Over 4-5 November, VMA-542 moved its 20 Harriers to Abdul Aziz from Shaikh Isa and was transferred to MAG-13 (Forward). The move yielded welcome space at Shaikh Isa, but the facility remained above its aircraft capacity despite ongoing efforts to improve the situation.

Late Desert Shield

Early November 1990 - Early January 1991
The Shift from the Defensive (November)

President's Reinforcement Announcement

As the effort of economic sanctions to force Saddam Hussein out of Kuwait threatened to settle into a long-term stalemate, the Bush Administration decided by the end of October to reinforce CentCom in order to mount an offensive against Iraq in early 1991. With mid-term elections approaching on 7 November, President Bush decided to hold off on the public announcement of this



measure until afterward, but gave the go ahead to Secretary of Defense Richard Cheney and Joint Chiefs Chairman General Colin L. Powell, USA, to prepare plans for the build-up.[87] II MEF and the 5th MEB were already slated to replace I MEF and the 4th MEB in theater in the spring of 1991, but with the build-up, their units would now be added to the command structure already in place.

After quickly providing a generic list of the types of units needed to CentCom on 9 November, General Boomer followed up with a message on the 13th containing a very detailed roster of the forces he desired. To flesh out his current structure in theater, he requested most of the I MEF elements remaining on the West Coast. On the aviation side, this amounted to a fixed-wing group

headquarters (MAG-13), its Marine aviation logistics squadron, an additional Harrier squadron, the 3d MAW headquarters squadron, and the headquarters squadron of Marine Wing Support Group 37. Boomer also asked for the two remaining F/A-18C squadrons in Hawaii under the 1st MEB. From II MEF, he sought Major General William M. Keys' 2d Marine Division reinforced with a strong contingent from the 4th Marine Division. To support the additional forces, Boomer requested most of the 2d FSSG and the 2d Surveillance, Reconnaissance, and Intelligence Group (SRIG), although he specifically noted that neither of their command elements were required.

Out of the 2d MAW, General Boomer needed strong detachments from MACG-28 augmented heavily by the Reserves, as well as a strong Reserve component of the three support squadrons he wanted for the 3d MAW. The greatest single addition of aviation resources came in the form of the I MEF request for a full helicopter group out of New River, with over half of the squadrons to be provided by the Marine Corps Reserve. I MEF staff also saw the need for another squadron's worth of KC-130s, with half coming from the 4th MAW, a Reserve OV-10 squadron, and a squadron of A-6 Intruders.

3d MAW Reinforcement Challenges

With a large aviation combat element already in place, and augmentation instead of replacement as the order of the day, General Moore developed a list of the 3d MAW's reinforcement requirements. These centered on increasing the depth of the wing's reach, improving its night and all-weather attack capabilities, enhancing its combat service support, and adding redundancy to an overstretched air command and control system. Although not a doctrinal approach to force structure decisions, airfield capacity limitations served as a key consideration throughout the wing's planning for reinforcements.[88] In the first week of November, as he looked to potential offensive scenarios after the start of the new year, General Moore, in a message to I MEF, requested a second complete helicopter group, additional fighter and attack aircraft squadrons, and significant augmentation to his air control group.

With MAG-11, MAG-13 (Forward), and MACG-38 headquarters in place, Moore intended that all but the second helicopter group fall under the existing command structure. The wing commander estimated that both MAG-16 and the additional rotary-wing group would have to operate out of bases much nearer to Kuwait if they were to carry out the offensive plans being sketched out at CentCom and I MEF. He emphasized the necessity for additional wing support capabilities in theater. He noted that the air control and wing support assets on board ships with the 4th MEB were not likely to be used in the roles envisioned for the brigade in theater, and thus asked that MWSS-274, H&HS-28, and MACS-6 be brought ashore to join the wing.[89]

Back in Washington, D.C., Headquarters, Marine Corps staff "scrubbed" the I MEF request and attempted to match up General Moore's desires with available squadrons and groups. Working with FMFLant and FMFPac, HQMC judged

nearly all the requested support to be available, but it required some shifting of active units and an extensive mobilization of the 4th MAW to bring to fruition. Unbeknownst to Moore, HQMC added the 2d MAW forward headquarters to the list as well as a sizeable detachment from MACG-28, including a complete air control squadron, a HAWK battery, and two Stinger batteries. The MWSG-37 headquarters, however, was conspicuously absent from the list of planned reinforcements. HQMC also added the headquarters of MAG-14 along with MALS-14 and VMGR-252 (-), the latter reinforced with a detachment from VMGR-234 of the 4th MAW to the fixed-wing element. To meet the 3d MAW's additional fighter and attack requirements, HQMC attempted to orchestrate a ballet of squadrons among the two coasts, Hawaii, and the Western Pacific, while maintaining other deployment requirements around the world. The result allowed for the dispatch of an Intruder squadron, a Harrier squadron, and two Hornet squadrons to the Gulf.

Although generally pleased with the forthcoming support, General Moore took exception to several of the CMC-directed changes to the initial I MEF reinforcement request. In a message to General Boomer, he disagreed with the addition of 2d MAW (Forward) headquarters, MAG-14, and MACG-28 (-) to the force list. He wrote to Boomer that "the obvious intent is to stand up a second wing, albeit skeletal." Speculation abounded in theater as to the possible employment of two MAWs there in support of likely offensive operations, possibly by dividing up some of the six traditional functions of a MEF aviation combat element, or by establishing separate wing areas of responsibility. Moore strongly opposed this line of reasoning and noted that, in accordance with the original I MEF proposal, "it is cleaner, [with] less overhead, to place the additional squadrons under existing groups, with the exception of MAG-26 which is a required element. More importantly, the operational lines are simpler which translates to a more responsive aviation combat element. It is suggested that those command elements, if they come, be integrated into current I MEF ACE units (i.e., 3d MAW, MAG-11, MACG-38)."[90]

Concentrating on the fixed-wing plan, Moore stated "[f]or some reason HQMC does not appear to recognize MAG-13 (Forward) as a fixed-wing MAG." He defended its status, stating that it would operate all of the Harriers and Broncos from King Abdul Aziz and thus it required MALS-14's personnel and equipment in support. General Moore also noted that the planned reinforcing A-6E squadron, if only equipped with four unrestricted aircraft, could better be used as a smaller attachment to VMA (AW)-224 rather than as a separate squadron. He repeated his earlier assertion that much of what he needed by way of air control reinforcement was already in theater on board ships with the 4th MEB. Moore again requested the dispatch of the MWSG-37 headquarters as well as that of the 3d LAAM Battalion. Finally, he stressed the importance of the early arrival of the fixed-wing reinforcements lest they encounter the type of delays experienced in August as they jockeyed for scarce USAF tanker support. HQMC took note of the concerns expressed by Moore and promptly revised the force list to reflect the desired changes.[91]

2d MAW Builds the Augmentation Force

With both MAG-26 and MAG-29 at MCAS New River, North Carolina, drawn down by the August dispatch of MAG-40 to the 4th MEB, the provision of a second full helicopter group to the 3d MAW presented a significant challenge for the Marine Corps. Attempting to maintain the scheduled rotation of forward MEUs and a minimal contingency capability, the 2d MAW was forced to mix units to produce a complete group for deployment. The 26th MEU (SOC) with HMM-162 (C) was only halfway through its projected six-month float, and the 24th MEU (SOC) with HMM-264(C) was slated to take its place with the Sixth Fleet in the Mediterranean in February 1991.*

Major General Richard D. Hearney, the commanding general of 2d MAW, would deploy 50 percent of his aircraft assets, 65 percent of his air command and control assets, and 80 percent of his support assets to the Gulf by the end of the year.[92] General Hearney designated MAG-26, under the command of Colonel Michael J. Williams, as the headquarters of the group destined to deploy to Saudi Arabia. HMM-261, HMM-266, and HMH-362 (-) formed the core of MAG-26. HMLA-167 had one detachment with the 26th MEU and had transferred other aircraft to HMLA-269 before their departure to the Gulf, but was nonetheless slated by the wing to deploy with MAG-26. To help make up for MAG-26's aviation logistics shortages, General Hearney transferred MALS-29 from its parent group to MAG-26. He also sent HMH-464 (-) to MAG-26 with eight CH-53Es. The 3d MAW requested that the number of CH-53Ds deployed not exceed 20, and that no more than eight CH-53Es accompany MAG-26 because of the limitations on ramp space. MAG-26 also transferred HMT-204 and the rest of MALS-26 to MAG-29, together with its remaining CH-53E and CH-53D aircraft. Williams' group was also temporarily assigned a detachment of Broncos from VMO-1.

This intra-wing reshuffling still left shortages across the board in MAG-26. In response, HQMC turned to the 4th MAW for support. It ordered the mobilization in late November and early December of HMM-774, HMM-764, HML-767, and HMA-775 to build up MAG-26. HMM-774, based at Norfolk, Virginia, brought 12 CH-46Es to the mix, while HMM-764 from MCAS El Toro added another dozen Sea Knights. HMA-775 from Camp Pendleton consisted of 11 AH-1J Sea Cobras, while the Belle Chase, Louisiana-based HML-767 operated 12 UH-1Ns. Detachment A, HMH-772 out of NAS Alameda, California, provided six RH-53Ds to the MAG-26 portfolio.

General Hearney initially proposed to cluster the Reserve squadrons at New River prior to their deployment so that they could train with their active-duty counterparts. Because of the time that would be lost due to a cross-country transfer, Detachment A, HMH-772, mobilized at its home station and trained locally

* A Marine Expeditionary Unit contained a composite (C) helicopter squadron as the aviation combat element (ACE). This ACE was normally a Marine medium helicopter squadron (HMM) with four CH-53s, four AH-1s, two UH-1s and 4 AV-8 aircraft attached.

while awaiting transportation to the Gulf region. HMA-775 and HML-767 flew to New River and were hosted by New River units while awaiting deployment. In early December, HMM-764 was dropped from the Persian Gulf force list after consultations with the 3d MAW, but FMFLant requested its mobilization to fill out holes in its other contingency response capabilities.

The 3d MAW also recommended that HMLA-167 be retained in the United States in reserve since it was proving to be too difficult to muster enough AH-1Ws to justify its deployment. The 2d MAW concurred, and thus the squadron remained at New River with MAG-29 and attached the remaining CH-53s at New River to its rolls after their parent squadrons departed with MAG-26. VMO-1, also ordered to deploy to Saudi Arabia, was transferred to MAG-29 pending the shipment of its 12 aircraft to the theater.

As was the case with the other 2d MAW communities, the reinforcement of the 3d MAW's air command and control element was greatly complicated by the earlier departure of the 4th MEB. Much of the remainder of MACG-28 was nevertheless committed to the 3d MAW without the group and several squadron headquarters. I MEF and the 4th MEB continued to negotiate the transfer of the MEB's H&HS-28 detachment ashore together with the MASS-1 and MACS-6 detachments and finally reached agreement on 5 December.[93] The 3d LAAM Battalion and the 2d LAAD Battalion each gained a battery from their Reserve counterparts before deployment. MWCS-28 and MATCS-28 also contributed detachments to the overstretched MACG-38 in the theater.

From Marine Wing Support Group 27, MWSS-273 and MWSS-271 readied to deploy to the Gulf. MWSS-273 was a helicopter support squadron, while MWSS-271 at Bogue Field, North Carolina, was prepared to support fixed-wing operations. The status of the shipboard MWSS-274 remained under discussion between I MEF and 4th MEB. Anticipating approval for the shift of rotary-wing assets northward, General Moore remained committed to moving MWSS-274 ashore as soon as possible to undertake the rapid development of the desired airstrip at Mishab.

With the 3d MAW already in possession of much of the 2d MAW's fixed-wing assets, little remained at FMFLant air stations that could be deployed to the Gulf. MAG-14, whose staff was serving as the nucleus of MAG-40, had been reduced to a cadre group consisting of VMGRT-253, VMGR-252 (-), and VMA (AW)-332. VMGR-252 (-), which had already contributed a two-aircraft detachment to support Desert Shield, was ordered to ready four more for deployment. This second detachment was assigned to VMGR-452 (-) out of Stewart Airport, New York, which mobilized on 1 December. Instead of deploying to the Gulf as originally planned, VMGR-234 mobilized at Cherry Point to augment the 2d MAW. VMA (AW)-332 was slated to relieve VMA (AW)-533 in the Western Pacific in December. MAG-32 commanded only VMAT-203 and VMA-223, with the later responsible for supporting the Sixth Fleet with an on-call detachment. At MCAS Beaufort, MAG-31 was down to VMFA-115, VMFA-251, and VMFA-122, but the latter was scheduled to deploy to the 1st MAW during January 1991 to replace VMFA-312.

The onus of the fixed-wing reinforcement of the 3d MAW thus fell on

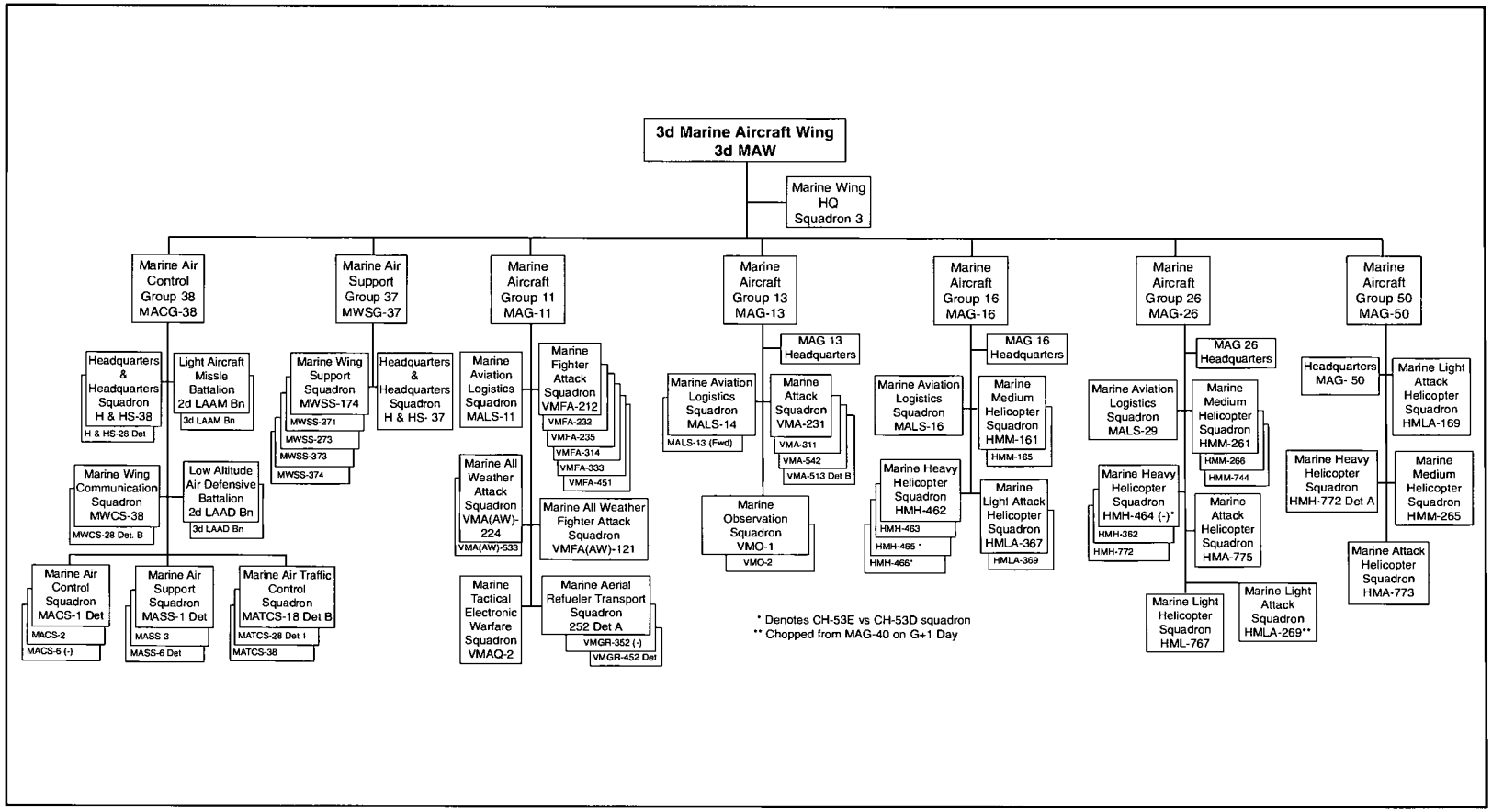


Table: 3d MAW Organization in the Persian Gulf

FMFPac. Lieutenant General Robert F. Milligan, Commanding General, Fleet Marine Force, Pacific, ordered MAG-24's remaining Hornet squadrons, VMFA-232 and VMFA-212, to make ready to join VMFA-235 under MAG-11. He also tapped VMFA (AW)-121, which was in the process of speeding through its F/A-18D transition, to prepare to deploy a detachment to the Gulf region after the start of the new year. VMFA-531 remained committed to replace VMFA-323 at Iwakuni, Japan, during January. Milligan instructed VMA (AW)-533, then deployed to the 1st MAW, but preparing a deployment to the Philippines, to be ready for Gulf duty in late December. VMA (AW)-332 out of MAG-14 would take its place in the Western Pacific with four unrestricted and six restricted A-6 airframes. VMA-231, forward deployed with the 1st MAW since the summer, was ordered to be ready for movement to the Gulf. Its place in the Western Pacific line-up would be filled by VMA-513(-) out of Yuma, Arizona.[94] This ballet accounted for all the Marine Corps aircraft assets moving to cover a worldwide commitment.

The 4th MAW Call-Up

To cover gaps in the Western Pacific and to hedge against other contingencies, HQMC prepared mobilization plans and orders for much of the remaining Reserve aviation units. HMM-764, dropped from Persian Gulf plans, joined MAG-16 (Rear) and remained at El Toro. The mobilization of many of the rest of 4th MAW's rotary-wing units was postponed until early 1991, when decisions on their eventual employment could be based upon the early results of the looming combat. Detachment A of HMH-772, based at NAS Willow Grove, Pennsylvania, was slated to operate in the desert with MAG-26. The remainder of the squadron was told to prepare for deployment to MAG-36 on Okinawa, Japan. The NAS South Weymouth, Massachusetts-based HML-771 and HML-776 out of NAS Glenview, Illinois, were also tasked to deploy to Okinawa, with six UH-1Ns each. This allowed HMLA-267 (-) to return to Camp Pendleton to sustain the AH-1W training program.

The call for fixed-wing Reserve assets was much smaller than that for rotary-wing. VMO-4 eventually mobilized and moved to MCAS New River under MAG-29. VMAQ-4 based at NAS Whidbey Island, Washington, and flying the older EA-6A model of the Prowler, was already slated to stand down in 1991 in preparation for its transition to the EA-6B. After several months of uncertainty, Headquarters, Marine Corps, ordered its activation in March 1991 in preparation for its deployment to MAG-12 to relieve Detachment X of VMAQ-2. As part of its call up, the squadron undertook transition training on the EA-6B.

The remainder of Marine Corps Reserve fixed-wing aviation consisted of one F/A-18A squadron, three F-4S Phantom squadrons, and four A-4M Skyhawk squadrons. Several of the Phantom and Skyhawk squadrons were slated to transition to older model Hornets as the active fleet took delivery of the F/A-18C. With several of the active-duty Hornet squadrons scheduled to support Navy carrier rotations during the next year, and with others available for deployment in an emergency, a long-term commitment to the Gulf would likely require Reserve

Hornet support. The short-run commitment would be met by the judicious use of active squadrons, and was due mainly to dissimilar aircraft in the Reserves. The Reserve Phantom fleets had been drawn down on spares in anticipation of the impending transition. With a much-reduced aviation logistics base to work from, HQMC decided early on that the deployment of these squadrons was not worth the maintenance and supply headache. The logistical cost of the A-4Ms combined with their presumed vulnerability in the high-threat theater also weighed heavily on the HQMC decision against their activation. Much of the available aviation logistics stocks had been committed to the support of the Free Kuwait A-4 squadron that had escaped Iraqi destruction in August 1990 and was based at Dhahran, Saudi Arabia. The political value of Free Kuwaiti A-4s participating in the eventual liberation of their homeland dictated that they receive high priority support.

Exercises Imminent Thunder and Devil Dog I

While working out the details of the wing's reinforcement, General Moore and his staff set their sights on an approaching joint and combined exercise dubbed Imminent Thunder designed to test CentCom's planned defensive air operations. Running from 15 to 20 November, the exercise aimed to refine joint command and control issues, communications, planning, and coordination. Internally 3d MAW wanted to validate "surge" capabilities for both strike and close air support operations. The wing's training opportunities, however, were curtailed somewhat by an altitude restriction of 9,000 feet imposed by the Saudi eastern sector commander. With a high antiaircraft artillery (AAA) threat expected at lower altitudes, General Moore anticipated the need to train his aircrews to operate from altitudes of up to 20,000 feet.

In conjunction with Imminent Thunder, the 3d MAW provided around-the-clock support for a highly visible practice amphibious landing by the 4th MEB north of Jubayl. Operation Devil Dog I, as the landing was labeled, was

A Marine of HMLA-369 carries TOW missile tubes as he and another ordnance man run toward an AH-1 Sea Cobra to simulate reloading during Exercise Imminent Thunder. Such training exercises were to prove invaluable when the offensive campaign began.

originally intended to hit the beach close to the Kuwaiti border at Mishab, but the CINC moved it further south near Manifa Bay in order not to precipitate an unwanted clash with Iraqis. Although through-the-surf operations were curtailed due to heavy seas, the rest of the operation proceeded apace. The wing conducted both barrier and surface combat air patrol for the amphibious task force and supporting surface ships. General Boomer lauded the effort, noting that the two exercises "far exceeded our original objectives" despite the difficult weather." [95]

The 3d MAW pilots reported a "busy sky" in the area of Devil Dog I exercise area, which pleased General Moore because he felt that it gave them a feel for what high tempo air operations would be like. Having validated the defensive scenario in the previous week, General Moore looked forward to concentrating on preparation for offensive operations. In particular, he stressed the need for the improvement of skills such as air combat maneuvering (ACM). The exercises did unveil some problems that 3d MAW needed to correct. One such area highlighted by Moore was the delay in moving close air support (CAS) aircraft to a target quickly. Fixed-wing aviators complained that they were spending too much time in the "CAS stack" while awaiting a target assignment by the direct air support center (DASC). In a post-exercise meeting of Tactical Air Control Party (TACP) personnel, Moore encouraged participants to find a way to minimize the backup of aircraft by the DASC in order to free those aircraft for other sorties. [96]

Aviation training ranges required close coordination and were in short supply. There was a tendency by JFACC in Riyadh to centralize control over a regional process of scheduling ranges. The system in use through mid-November brought all the operators face-to-face on a weekly basis, allowing each representative to articulate the priority of his requests and to arbitrate a schedule that would be set for the following week. General Moore argued that "Centralized control will not improve this system."[96] Other training included mock raids on LAAM HAWK missile batteries and even LAAD teams in stinger profile exercises. The raids would include a wide range of aircraft including U.S. Air Force and coalition aircraft.

The Eastern Sector combat air patrol continued to be a 24-hour-a-day requirement that for the most part was considered "a boring burden" for the Marine F/A-18 squadrons. On occasion the boredom was broken. On 6 November, at 0858, two MAG-11 F/A-18s on the Northern Gulf CAP were vectored on three groups of Iraqi "bogies" heading south, testing the air defense system. The six "bogies" were approaching in three sections, five miles apart. The first section was at 30,000 feet, the second at 24,000 feet, the third at 8,000 feet, and all travelling about mach 1.0. The controlling agency waived the normal 28 degree 30 minute north restriction when the bogies in this stacked attack profile were at 55 nautical miles. The combat air patrol's wingman was away, plugged into the tanker miles back. The closest point of intercept was 10 nautical miles at 28 degrees 50 minutes north and 48 degrees 55 minutes east. The aircraft commander was never given permission to fire by the controlling agency and so weapons condition remained "white and tight" throughout the incident.[98]

Rules of engagement (ROE) were a hot topic of discussion within the

F/A-18 ready-rooms. ROE for the Northern Gulf CAP essentially required that the Marine crews remain south of the arbitrary 28 degree 30 minute north boundary to ensure no provocation or accidental engagements occurred. Second, the bogie had to be in an attack profile, as in a high rate of closure, and/or, his weapon system locked onto your aircraft. The Marine pilots would then turn in an attempt to create lateral separation, and if the bogie continued to take up that separation his hostile intent was confirmed. Third, normally the Navy antiair warfare ship "Red Crown" would be the controlling agency and would identify the type of aircraft and clear the combat air patrol to engage with both secure voice and data link communications. This is where the discussion was to turn to pilot discretion. The controlling agency seemed to the pilots to have to wait for confirmation to be able to lift the tight restrictions on weapons. With every second of hesitation the closure distance was decreasing dramatically.* The closure distance for one squadron was 12 nautical miles, or if the pilot felt threatened, then there was no set distance for release of a missile.**

This type of ground controlled intercept, with varying attack profiles tickling the northern Gulf defenses, occurred several times during November and would always occur when one of the two F/A-18s were away and plugged into the tanker. The MAG-11 commanding officer, Colonel Manfred A. "Fokker" Rietsch, was the pilot facing the choice of firing a missile on one occasion and on another, Major General Jeremiah W. Pearson, Deputy Commanding General, U.S. MarCent, was "just about to squeeze [a missile off] when they turned away seaward, and so I turned and saw that my wingman had just caught up with me".[99]

Rietsch would recall another anxious moment for the northern Gulf CAP in late November when four of his MAG-11 Hornets were stranded aloft by an unexpected early morning fog that blanketed the entire coast. The pilots had no viable alternate airport, and all the tankers were grounded by the dense fog. Rietsch called the commander of VMGR-352, Lieutenant Colonel Arlen D. Rens, at Baharain International Airport and laid out the Hornets' plight. A doughty senior crew volunteered and took off in zero visibility weather from the officially closed airport. Airborne, the greatly relieved Hornet pilots plugged into the KC-130 with low fuel warning lights blinking, and offering their heartfelt thanks to the tanker crew. This would not be the only time that the tankers saved aircraft in *in extremis* fuel situations during this operation.

The alert status would be increased for the Christmas period and again as the 15 January United Nations deadline approached. The table, next page, indi-

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* Close coordination between the Navy command and control and the TACC continued to improve through these incidents with liaison visits both ashore and afloat, such as took place on 12 November between the commanding officer and staff of the *Worden* (CG-18) and the TACC.

** According to Lieutenant Colonel Andrew S. Dudly, Jr., commanding officer of VMFA-451: "We normally give down to 12 nautical miles, but I leave that up to the individual flight commanders . . . . I also told them that I don't care what Red Crown or anyone else says, if they feel threatened then I would rather one of their guys was going home in a parachute than one of our guys." (LtCol Andrew S. Dudley intvw, 19Dec90)

cates the fixed-wing aircraft alert status that was implemented for the high threat period in December 1990.

Table: 3d MAW alert status during high threat condition set in December[100]

Misson Type	Aircraft	Alert Duration
CAS (A)	4 F/A-18	2 hr standby (24 hrs./ day)
CAS (B)	4 A-6E	2 hr standby (24 hrs./ day)
CAS (C)	2 EA-6B	2 hr standby (24 hrs./ day)
CAP (A)	4 F/A-18	0730-1130 hrs (L)
CAP (B)	4 F/A -18	1330-1630 hrs (L)
Tanker (A)	2 KC-130	30 min alert
Tanker (B)	1 KC-130	2 hr alert

Preparing the Strategic Air Campaign

Even as Imminent Thunder played out in front of the world news media, Marines at Riyadh and Shaikh Isa followed the JFACC staff as it developed plans for an offensive air campaign. Although information concerning the details of the plan was closely held, a general outline emerged consisting of four discrete phases of air warfare. Phase I called for a strategic air offensive to "gain and maintain air superiority, destroy strategic command and control, chemical and biological weapons delivery systems and production facilities, strategic reserves [*Republican Guard Forces Command*, (RGFC)], and Iraqi supply and industrial bases."*[101] Phase II focused on an air offensive in the Kuwait Theater of Operations (KTO) against command and control, air defense radar and air defense weapons systems, and *Republican Guard* theater reserves. Phase III concentrated on battlefield preparation through air attacks against forward defensive positions, indirect fire systems, armor reserves, and *Republican Guard* units. Phase IV would be the bread-and-butter mission of Marine aviation: air support for the ground offensive to liberate Kuwait.[102]

While watching the creation of strategic target sets, General Moore in early December directed his staff to begin on the list of targets in the Marine area of interest for the wing. This rapidly became the I MEF target list with considerable MEF input. By mid-December there was a noticeable shift away from the strategic bombing focus to building target folders for targets within the MarCent

* Although not included in the early drafts, the Secretary of Defense instructed CentCom to add the RGFC to the strategic target list because they were key to the Iraqi position in Kuwait and a serious offensive threat to Iraq's neighbors.

Members of a remotely piloted vehicle company prepare to launch a Pioneer. A RPV company included five to seven officers and 50 enlisted Marines, and maintained about five mission-capable Pioneers.

area of interest. The new focus became the building of a targeting cell which could quickly process intelligence and battle damage assessment (BDA) to shorten the time it took to complete mission planning and get bombs on target. JFACC targeting would only be a piece of overall targets struck by Marine aviation. JFACC targeting was supposed to be controlled by a Joint Targeting Control Board (JTCB), but "the authority of the board was low, as it was staffed with relatively low ranking officers."[103] Rather than the doctrinal joint targeting review process, "the Black Hole officers developed their own master target list and master attack plan to make target nominations and sortie allocations, and thereby to construct the air tasking order (ATO)."[104] For Marines, the keys to the JFACC targeting would be inside information provided by two Marines on the "Black Hole" strategic air campaign staff in Riyadh, Major Jeffery L. "Oly" Olsen, an F/A-18 pilot, and Captain Rolf A. "Bugsy" Siegel. Two other key factors would be General Moore's direct and often daily contact with General Horner and Colonel William A. "Bull Moose" Forney, who had previously served on an Air Force staff with General Horner. General Moore would later comment: "Fact is that General Horner would do almost anything for Bull Moose."[105]

Due to the lack of organic imagery in 3d MAW, the remotely piloted vehicle company (RPV), which flew the unmanned aerial vehicle "Pioneer," became a critical asset for viewing the near battlefield in real time.* The RPV company belonged to the 1st Surveillance, Reconnaissance, and Intelligence Group (SRIG), and worked directly for the I MEF. On 28 November, 1st and 3d RPV, which had been set up and operating out of Jubayl was joined by 2d RPV which had its first flight the next day.[106] Once the war started, these unmanned aerial vehicles proved valuable in the targeting process.

Ordnance shortage became a problem in early November when theater-wide requirements for aviation ordnance shifted from a 30-day supply to a 60-day supply. The causes of the ordnance shortage were complex, but can be broken

* Each RPV system was comprised of eight air vehicles, associated payload packages, a ground control station, a portable control station, and two remote receiving and launch/recovery subsystems.

down to three basic areas: first, the system constantly questioned any ordnance calculation that was different from the non-nuclear ordnance requirements (NNOR) method.* Second, CINCPac was tasked to support Marine aviation ordnance, but would not break the "fair share" regardless of the number of aircraft, or the 3d MAW-derived 60-day requirement.** Third, administrative delays along with shipping and supply problems made it obvious that Desert Storm needed worldwide sourcing and was a significant drain on worldwide resources.[107] General Moore on 18 December stated: "Ordnance is being worked hard at all echelons. Had detailed discussion with Vice Admiral Stanley R. Arthur, USN [NavCent], on strike planning and ordnance afloat. What I hear is encouraging, however, the proof will be in the ordnance available after the first 30 days of operations."[108]

MAG-11 laid out its ordnance requirements simply. The group took the number of F/A-18s in theater (72), times 85 percent availability (60), and multiplied by the 6 days of contingency, 5 days of surge, and 49 days of sustained CAS/DAS operations, for a total of 60 days aviation ordnance supply required. MAG-13 based its requirement on five days of surge and 55 days of sustained sor-

Table: 3d MAW Daily Bomb Requirements[109]

Aircraft	Armament	Surge	Sustain
A-6E	MK-20	108	72
A-6E	MK-82	108	72
AV-8B	MK-20	702	306
AV-8B	MK-82	702	282
AV-8B	MK-83	264	108
F/A 18	MK-20	360	240
F/A 18	MK-83	360	240

* Non-nuclear ordnance requirements was a national method used to determine the amount of ordnance by type and by theater. Marine Corps aviation ordnance was procured with Navy "blue dollars" and competed with all Navy ordnance requirements. Full NNOR levels were rarely procured.

** Fleet Marine Force ordnance belonged to the respective CINCs, who earmarked a percentage of the aviation ordnance based on the level of planned participation in the execution of the OPLAN. This percentage was the Marine Corps' "fair share," regardless of the actual number of aircraft or the size of the MAGTF.

Table: 3d MAW 60-day bomb requirements

Armament	MAG-11	MAG-13	3d MAW	DON (NNOR)
MK-20	18,372	20,340	38,710	27,260
MK-82	4,212	19,020	23,230	6,797
MK-83	15,408	7,260	22,660	20,910
MK-84			720	1,257

tie rates. The accompanying tables indicate 3d MAW daily bomb requirements and 3d MAW 60-day ordnance requirements for level of effort weapons respectively. MK-20 (rockeye), MK-82 (500-pound general purpose bomb), and MK-83 (1000-pound general purpose bomb) were the level of effort weapons, and shortages of these bombs would most affect 3d MAW's operations. The MK-84 was a 2,000-pound general-purpose bomb.

Once 3d MAW determined its requirements, it had to ensure it had a 60-day supply on hand. This was never accomplished. Even if no ordnance had been dropped on 28 February, at the end of the ground campaign, the ordnance supplies in theater would still not have been at the required levels.[110] General Moore would later state: "And in fact at the end of the campaign 3d MAW had only 7-10 days of ordnance left and this was after a large (on loan) load of MK-82 bombs from the Navy and the Air Force."[111]

One problem was that because of the difference in Department of the Navy estimate of requirements and the 3d MAW requirement, 3d MAW was repeatedly asked to revalidate its requirements.* The Ships Parts Control Center (SPCC) through which all requests for ammunition to support USMC class V (A) (aviation munitions) in Desert Shield had to flow, cancelled certain ammunition requisitions because either the assets were not available, or Pacific Fleet exceeded its fair share levels. As late as 30 November, 3d MAW's 60-day requirement of MK-82s, MK-83s, and MK-20s were being cancelled. On 4 December, 3d MAW asked SPCC to hold in abeyance cancelled requisitions pending the Chief of Naval Operation's (CNO) response to lifting the fair share limitations. On 6

* CNO 060239ZDEC 90 requested the wings to revalidate its "60 day requirements for many weapons such as . . . Rockeye, MK82/83/84, . . . appear excessive compared to global NNOR 60-day requirement and just completed OPNAV operation specific modeling effort" 3d MAW's response was: "The ordnance requirements stated reference are revalidated." USCINCCENT 271230ZDEC 90 requested all components revalidate their 60 day aviation ordnance requirements. CNO 010113ZFEB 91 to CG I MEF "Request you revalidate your first 60 day requirement based on target/OPLAN revisions, actual expenditures and projected expenditures." This ongoing revalidation frustrated and ultimately delayed the arrival of 3d MAW ordnance.

December, CNO stated: " We will do whatever is necessary to satisfy USMC in-country requirement, but before we break fair-share policy, we must ensure the following actions have been taken." These actions were: (1) MPS assets are properly accounted for; (2) Marine Corps assets in Europe under NavEur control have been used to offset the requirements; and (3) requirements have been revalidated by CMC and CNO. Lieutenant General Duane A. Wills, Deputy Chief of Staff for Aviation, HQMC, was heavily engaged in these aviation ordnance issues.[112] On 18 December, CNO partially lifted the fair share limits.[113] SPCC interpreted CNO's authorization to break fair share policy as covering only end items, and so on 16 January CNO directed SPCC to break fair share policy on ancillary components needed to build up the specified ordnance end items. [114] By this time, 3d MAW was at war.

Rotary-Wing Training and Operations

After the Thanksgiving holiday, the pace of helicopter operations increased as the 1st Marine Division began to formulate plans for large-scale heliborne operations in conjunction with possible offensive options. Confronted by two strong obstacle belts, the division looked to the heliborne assault as an important means to unhinge the enemy defense and block the movement of his armored reserves toward the division breach point at the front. RCT-3, with its rear camp adjacent to the CH-53 base at Ras Al Ghar, was chosen by General Myatt to lead this effort. Under Colonel John H. Admire, RCT-3 manned the division main defensive line at "Cement Ridge" north of Jubayl from mid-September and had practiced company-sized heliborne assaults and raids in conjunction with that mission.

Admire was confronted with significant obstacles while planning for the heliborne force mission. Pending the arrival of ground reinforcements from Camp Pendleton and Okinawa, the division assigned RCT-3 to be a mechanized task force through the end of the year, thus causing the RCT commander to split his attention between two very different missions. This was compounded by the availability of helicopters to exclusively support rehearsing a large heliborne mission.

MAG-16's helicopter fleet, while enjoying better overall maintenance success than before, still struggled to cover all of its taskings. Its UH-1Ns were frequently tasked for visual reconnaissance and command and control missions for the 1st Marine Division, and its heavy-lift squadrons prepared for full employment in conjunction with the move of the force northward in mid-December. Training missions bled off many of the AH-1s and UH-1s in November for close-in fire support (CIFS) work, and the 1st Marine Division continued to call for them into December.

The two CH-46E squadrons shared medical evacuation and troop lift duties, and continued to operate under the onerous 22,000-pound gross weight limits. This essentially restricted the CH-46E to about eight to 10 combat loaded troops. The Naval Air Training and Operating Standardization (NATOPS) maximum gross weight limit for the CH-46 was 24,300 pounds which equated to car-

rying about 16 troops in this desert environment. Out at sea, the 4th MEB felt this limitation on CH-46 squadrons even more keenly. The continued inability to lift a large force ashore resulted in difficulties in assessing accurately any landing plan that relied heavily on the helicopter force. Early on, General Jenkins asked for authority to waive the limits on the CH-46.[115] On 27 August, the commander Naval Air Atlantic (COMNAVAIRLANT) granted authority for the 4th MEB commander to waive the 22,000-pound restriction only if the brigade was committed to combat, or another absolute necessity.[116]

At Jubayl NAF, Colonel Garrett and the MAG-16 staff concentrated on preparations to move the group to Tanajib by the end of January. In the meantime, training continued at a heavy pace to get the group to peak combat readiness. Live fire on Saudi ranges during November included shooting eight TOW missiles, seven Hellfire missiles, and 7,800 rounds, spent training door gunners.* Support of the MEF's breaching exercises, medical evacuation, mass casualty, and close in fire support were key exercise objectives. There were, however, a number of missions being tasked and flown that had little to do with getting the MAG combat ready. Daily range sweeps, logistics movements, and 413 hours of very important person (VIP) flights occurred in December alone.[117]

Night vision goggle (NVG) training was hampered by the difficulty in getting training areas and the lack of a visual horizon at low levels due to fine dust in the desert environment. Procedures were established in December so that squadrons could operate with NVGs in specific training areas and be assured of separation even without positive aircraft control. Safety was an issue throughout the preparation for combat, and measures were constantly being added to ensure less mishaps on the crowded ramps and nearby airfield airspace. Even so, mishaps took a toll before the fighting began. On 24 November, HMH-465 lost a CH-53E during a NVG flight. The aircraft experienced an engine fire shortly after lifting a dual point external load. The crew set the load down, landed, and removed what components they could before the fire consumed the aircraft. No Marines were injured.

Earlier, on 8 November, a tactical troop insert with two CH-53Ds, two CH-53-Es and two UH-1s as escorts was conducted. Unique to this mission was the inclusion on board of reporters from the *Washington Post*, the *New York Times*, and the American Broadcasting Company. They were present at the brief, shown how to use NVGs, and rode in the UH-1s with General Amos. They quickly appreciated the enhancements that night vision goggles made. General Amos stated, "I wish we could get all of those who have been critical of NVG ops to put on the goggles and experience the ability to literally see in the dark. Once accustomed to the goggles there are few that would feel it was safer to work at night without them."[118] The tone was that standard operating procedure for helicopters at night was with NVGs.

The ground forces would be faced with many competing high-priority missions as well. RCT-3 was limited to small-scale helicopter lifts throughout late

* On the night of 30 December, four AH-1W Super Cobras fired four Hellfire missiles with 100 percent success. (3d MAW SitRep, 291701ZDec90).

A Marine door gunner on board a CH-46. Getting door gunners trained and qualified became a serious squadron focus. Nearly 31,000 training rounds were fired toward that goal in December.

November and early December. Most of that training was concentrated in the 1st Battalion, 3d Marines, although even it was unable to arrange a single battalion-sized lift during this period. The lifts that could be scheduled generally were conducted using a division of CH-53Ds, although on occasion a section of AH-1Ws practiced armed escort in conjunction with the lift. CH-53Es, designed expressly for the purpose of moving the M-198 howitzer and other large pieces of ground combat equipment, rarely were used for this purpose during practice lifts. In November, MAG-16 had 14 CH-53Es, with only about half of them available on any given day for tasking due to maintenance problems. The balance between day-to-day taskings and the requirement for specific combat event training was as applicable in peacetime as it was in Desert Shield. Colonel Garrett would later remark that the ground combat element "had its eye on a big helo assault from day one in this operation but we were never free of an enormous requirement to move people, equipment, and supplies. There weren't a lot of ways to get things around in the desert and the closer we got to combat ops, the greater the need became."[119]

Confronted with these difficulties, General Myatt, the 1st Division commander, continued to press for the development of a viable heliborne assault capability. On 6 December, Myatt assembled his staff and subordinate commanders

for a map exercise in which possible offensive operations were formally examined for the first time. As Christmas approached, RCT-3, now designated Task Force Taro, displaced its rear headquarters from Camp Daly northward to Manifa Bay to make room for inbound reinforcing units. While a necessity, this action placed the bulk of the designated heliborne force 50 miles from its supporting helicopter group at Jubayl. With minimal fuel supplies at Manifa and an increasing demand for heavy-lift helicopter support for the movement of 1st FSSG units forward, Taro was limited to small-scale heliborne training pending the relocation of rotary-wing assets north. Finally on 5 January, MAG-16 provided a large-scale troop lift rehearsal with 12 CH-46s, 12 CH-53Ds, 8 AH-1Ws, and 1 UH-1 for command and control. A similar rehearsal would take place on 7 January, but with eight AV-8s and two OV-10s added in support of 3d Marines.[120]

Supporting the Shift North

Even while the planning progressed, there was still the mission at hand, defense of the coalition, and the force build up. Additionally, the opposing Iraqi force might not adhere to the U.S.-led coalition's expectations or time line. On 17 November, I MEF, in Desert Shield Order 005, laid out an updated general enemy situation and issued a three-phase plan tasking each major subordinate command (MSC) with mission specific orders. It stated in part:

> Iraq continues to consolidate its defensive positions in and around Kuwait. In place is a three-tiered defense consisting of: infantry in the south and along the coast, backed up by armored/mech. in central Kuwait, with a strategic reserve of RGFC [*Republican Guard*] armor in southern Iraq. Although the Iraqis continue to improve their defensive positions, with extensive engineering efforts ongoing along the

MAG-16 rehearses a heliborne assault. Not until January did an exercise of this scale take place. Previously, the largest such training event had been in early November as part of Imminent Thunder.

Photo courtesy of TSgt H. H. Deffner, USA

> FLOT [forward line of troops], they retain the capability to conduct a limited attack into Saudi Arabia with one armor and three infantry divisions in 12 hours, or a major attack with four armor and four mechanized infantry divisions in 36-48 hours. This attack could be supported by up to 200 sorties per day less attrition. Use of terrorism/UW [urban warfare], SCUD SSMs [surface to surface missiles], CW/BW [chemical warfare/biological warfare], FAE [fuel air explosives], and ICM [improved conventional munitions] to support either the offense or defense is likely.

From this defensive mission, 3d MAW was tasked by phase to:

Phase I: "Drive the enemy off the coastal road north of Mishab in order to slow attack and destroy this element to the max extent possible. If enemy Corps headquarters can be located, destroy it in order to disrupt C2 [command and control]."
Phase II: "First priority to drive second echelon off coastal road north of Mishab causing at least 30 percent attrition. Second priority is CAS [close air support] to 1st MarDiv."
Phase III: "Be prepared to mass assets against most critical enemy penetration."*[121]

Throughout Desert Shield was the worry of chemical or biological warfare, as well as the threat of terrorist activity. Nuclear, biological, and chemical (NBC) training was taken seriously at the individual level. Intelligence indicated that Iraq had the capability and had shown the willingness to use chemical weapons. Pacific Command intelligence stated: " The Iraqis have, however, taken positive steps toward forward basing of chemical munitions to provide ready access to the artillery, helicopter, and aircraft units that would employ them."**I MEF elements in the vicinity of Jubayl, Shaikh Isa, and Bahrain International began taking Pyridostigmine Bromide (nerve agent pretreatment) and Cipro (bio-

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* Supporting units, such as ArCent, were to protect the western flank and to provide tactical ballistic missile defense with Patriot Battery (F Battery, 2-7 ADA) for the port of Jabayl. AFCent, in coordination with the JFACC, would provide "counterair, air interdiction, offensive air, air recon, EW, and control of missiles and aircraft outside the I MEF AOR in support of joint combined operations." NavCent would provide "Naval gunfire and air support as feasible. Provides port, harbor security Det TACON [tactical control] to I MEF to assist in security ops at Jubayl port. Conducts amphibious operations as required." (I MEF MSGID/order/005, 171000Z Nov 90.)

** The intelligence picture painted Iraq's offensive chemical and biological warfare programs as beginning in the early 1970s. In 1983, the Iraqis began using mustard agent, and in March 1984, became the first nation ever confirmed to have used a nerve agent in a conflict. Iraq used chemical weapons in its war with Iran from 1983 until the ceasefire. As the war progressed, Iraqi forces became more adept at using chemical weapons. Their increased use of chemical weapons throughout the war with Iran made it evident that Iraqi leaders viewed chemical weapons as an effective and worthwhile military asset. (PACOM msg, 13Oct90).

logical warfare prophylactic antibiotic) when the threat was upgraded.* The AR-5 aviation gas mask was new to nearly all units and aircrews were learning the capabilities and limitations of the masks. Helicopter crews took this more seriously than many in the fixed-wing squadrons.[122] Wider decontamination plans were coordinated at the group and wing level. The dissemination and knowledge of the plans varied at each airfield.

As it prepared for the arrival of reinforcements, the 3d MAW staff began to study the best method of supporting offensive operations should Iraqi forces fail to withdraw from Kuwait. With a solid list of inbound units in hand, General Moore considered their time of arrival and base loading before determining their final location. With the expansion of facilities at Shaikh Isa and King Abdul Aziz nearing completion, Moore called for the bulk of the inbound fixed-wing aviation to arrive early. Finding a temporary home with sufficient ramp space for MAG-26 proved more troublesome. Informed by CentCom that Jubayl NAF would be a major aerial port of debarkation for reinforcing air and ground units, Moore was faced with the prospect of the airfield being clogged by several large strategic lift aircraft at a time disgorging vehicles by the dozens and troops by the hundreds. This was a poor operating environment for MAG-16 already in residence even without the addition of another helicopter group.

General Moore and his staff, having set their sights on the acquisition of two airfields near the coast in the northeastern corner of Saudi Arabia for rotary-wing use, pressed CentCom to help the wing gain rapid access to them. The first facility, the airstrip that serviced the Saudi Naval Base at Mishab, was less of an issue to the Saudis because it was already under their military's control. With a pier and deep-water access, Mishab was a strong site from a bulk fuel and ammunition point of view. Its drawback, however, was that it offered few supporting facilities for maintenance, billeting, or refueling, and provided little aircraft parking space. More troubling, its location was barely 50 kilometers from occupied Kuwait. The base lay solidly within the Arab Joint Forces Command-East area of responsibility. Marine ground forces were still prohibited from venturing that far north so as to prevent a chance encounter with the Iraqis. Although desiring entry into the field sooner, the wing was told to expect to place its first units there by the end of December. Unfortunately, nearly a month of engineering and facilities preparation was required before the wing could move a helicopter group there.**

The second facility of interest was an Arabian American Oil Company (ARAMCO) Oilfield support complex near the complex of Tanajib located 30 kilometers to the south of Mishab. It boasted an airstrip with moderate ramp space, and a host of seemingly underused buildings within short driving distance.

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*I MEF directed units in certain areas to begin taking nerve agent pretreatment and biological warfare antibiotics. (CG I MEF (SURG/G-3) msg, 171252ZJan91). Some units, including the majority of 3d MAW, were directed to stop taking the pretreatments on 24 January 1991 (I MEF msg, 230750ZJan91).

** The approval of Mishab as an operating site did not occur until 1 December and was promptly followed by MWSS-273 beginning camp preparations (3d MAW Sitrep 011710 Dec 90).

Many of the workers had been evacuated from the site in the early days of the crisis, and a small cadre of Saudis and foreign workers had run it on a reduced basis for the past few months. It too, required the expansion of facilities prior to hosting a helicopter MAG, but this promised to be a much easier task than that at Mishab.

Rights to the Tanajib facility, however, were jealously guarded by ARAMCO, which depended on the site to support its highly productive oil wells in the northern Gulf. The company did not want any military activity there that would interfere with these operations. Frustrated at the impasse, the wing passed the issue up the chain-of-command and hoped that a favorable resolution would be found before it was too late.[123]

As an interim measure, General Moore decided that MAG-26's maintenance activity and helicopters would stage at Jubayl NAF pending their eventual displacement to Mishab. The living spaces and squadron administrative areas, however, would be located at one of the 2,500-man tent cities that the Seabees and Marine engineers started to erect on the outskirts of Jubayl in early December. These tent cities were designed to temporarily house the inbound II MEF units while they drew their equipment from MPS stocks or opportune sealift from the East Coast. Given the distance of 10 miles or more between the tent camp and the airfield, this arrangement created undeniable inconvenience for the incoming units. Jubayl, however, was already overtaxed by one group, and the addition of several thousand transients a day was expected to prove an enormous burden even without the addition of others. Colonel Frederick McCorkle, commanding officer MAG-29, and Colonel Robert A. ("Rag") Berns, commanding officer MACG-28, visited in November to obtain information and requirements which would help their subordinate units to prepare for the deployment and attachment to 3d MAW in this austere environment.

The planning for the expansion north now completed, General Moore pushed to have Marine Wing Support Group 37 headquarters established to accomplish the plan. On 18 December, Colonel Robert W. Coop stood up his MWSG-37 staff at King Abdul Aziz. His transition was relatively smooth because he arrived with General Moore in August as the 3d MAW's acting logistics officer (G-4). Several items that plagued his earlier efforts at providing support for the 3d MAW revolved mainly around getting a blanket purchase agreement from I MEF.* In early January, this would finally become a reality. In contrast, Marines envied the USAF commanders who had been given large spending authority dubbed "Cadillac chits" to cover unforeseen contingencies.

MWSG-37 was the last of 3d MAW's groups to form and there was little responsive communications capability remaining. They purchased and employed

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*Colonel Coop remarked on logistics difficulties: "Let me say this again. The biggest hindrance of me getting my job done was the fiscal policies of MEF. It became a near show stopper in most cases. It would take weeks and days to get something done at MEF . . . . They would question every request to the point of ludicrous[ness]." (Colonel Robert W. Coop intvw, 20Mar91, hereafter, Coop intvw).

throughout 3d MAW a Motorola Saber radio system.* This system consisted of three repeaters and 100 Motorola Saber III radios, and provided instant, mobile, and secure communications to the secret level. This greatly eased 3d MAW's lower echelon command and control problems.[124]

Table: Marine Wing Support Group 37 [125]

Marine Wing Support Squadron	Primary Location	Primary Supported Unit
MWSS-174	King Abdul Aziz, Naval Air Station	MAG-13 (Forward)
MWSS-271	King Abdul Aziz, Naval Air Station	Planned to support MAG-16 at Tanajib
MWSS-273	Ras Al Mishab	Planned to support MAG-26
MWSS-373	Shaikh Isa	MAG-11
MWSS-374	Al Jubayl, Royal Naval Air Facility	MAGG-16 and MAG-26, 3d MAW HQ

The 3d MAW Air Command and Control System

In conjunction with the movement of bases and personnel northward, the 3d MAW planned for the northward shift of the Marine air command and control system (MACCS) in order to provide better support for possible offensive options. Although the wing headquarters had resolved many of the difficult communications challenges presented by its location in the far southern portion of the I MEF AOR, General Moore recognized that his air command and control system did not have the high level of redundancy required to wage an extended air war in Kuwait. The physical distance between his headquarters at Shaikh Isa, Bahrain, and the large I MEF concentration in the Jubayl area also occasionally hampered coordination with the other elements of the force. After consulting with General Boomer, Moore decided to move his headquarters into Saudi Arabia to facilitate his command of the wing.[126]

Meeting with his staff and his control and support group commanders,

*The Air Force had been using several thousand hand-held Motorola Saber radios effectively throughout the theater and had repair capability for them in Riyadh. MWSG-37 had to send a couple of units to the Air Force for repair and received same-day turnaround on them. (Coop intvw).

General Moore determined that Jubayl NAF would be the location of his new headquarters. Although austere, unlike King Abdul Aziz, Jubayl offered the necessary real estate for a full-blown headquarters. After scouting out possible areas, the staff chose an undeveloped site at the southwest corner of the airfield astride the airport access road. The wing tasked MWSS-374 to prepare the area for the wing and air control group headquarters squadron. Finally nearing completion of the extensive expansion of aircraft ramp space for the airfield, NMCB-5 was also called upon to help out, although all the engineering units in the Jubayl area were heavily involved in the construction of the tent cities around Jubayl. With his at-hand support squadrons pushed to the limit and the airlifted reinforcements not likely to be able to function until early January, General Moore continued to press for the transfer of MWSS-274 from the 4th MEB so that it could be used immediately to prepare Mishab Airfield for the arrival of MAG-26.[127]

For Colonel Della-Corte's Marines at MACG-38, the shift of the MACCS northward was a complex task. Because of the limited air control equipment ashore, this shift would have to occur in carefully timed phases. MACS-2, located at King Abdul Aziz and running the TAOC, was clearly out of position to support offensive operations. A move of the TACC, however, required that MACS-2 be substantially reinforced in place so that it could serve temporarily as the alternate TACC. Only after the TACC was reassembled and functioning smoothly at Jubayl NAF could MACS-2 be then shifted to a more optimal position near Mishab. Starting on 2 December, Marines from H&HS-38 began the shift to King Abdul Aziz to build up the watch team there. This move was assisted by the transfer ashore of the 4th MEB's H&HS-28 detachment.

MWCS-38 consolidated the communications system at Shaikh Isa to be able to recover and stage as much equipment as possible for use at Jubayl NAF. The squadron benefited greatly from the early arrival of elements of Detachment B, MWCS-28. The new TACC at Jubayl was operational and control transferred on 23 December after having operated temporarily out of King Abdul Aziz. Now MACS-2 could begin to move the tactical air operations center forward to the Ras Al Mishab area. On 18 December, the advance party had departed and within 14 days the new TAOC at Mishab was up and fully operational. Additionally, individual efforts in tweaking the MACCS were ongoing. Software changes in November and December dramatically improved the Tactical Digital Information Links (TADIL) connectivity, reliability, and information flow. There were high levels of "anomalous propagation and weather ducting" peculiar to the Gulf region that interfered with the AN/TPS-32 and AN/TPS-59 radars. The problems were not just physical. General Moore on 29 December would state: "I have a full plate of issues and requirements that must be worked in concert with AFCent and NavCent."[128] He directed his staff to ensure that procedures were in place that allowed aircraft from an aircraft carrier in the Gulf to enter the Marine air command and control system.

With I MEF consisting of only one division until December, the location of the DASC was in accordance with Marine Corps doctrine which assigned its position with the division headquarters. I MEF would shortly consist of multiple

ground combat elements, and the question of the employment of a full DASC capability with each division came to the forefront of the discussions. Colonel Della-Corte now wrestled with the best air support system to support two Marine divisions in the attack. In Vietnam, both the 1st and 3d Marine Divisions had DASCs co-located with their headquarters, but they were situations involving semi-permanent divisional areas of responsibility. Temporary DASCs were often formed, however, for specific situations.

Although plans were still in the formative stage, I MEF envisioned a rapid advance by both divisions to Kuwait City and possibly beyond. This clearly called for highly mobile air support agencies with each division, but it also seemed to necessitate a higher-level DASC to apportion air support and coordinate with the MEF-level FSCC envisioned by General Boomer.

With a dearth of assets in theater but reinforcements on the way, Della-Corte and Lieutenant Colonel Dennis C. Sorrell, the commander of MASS-3, felt that a DASC with each division was within reach in terms of resources and was doctrinally sound. They believed that it was the proper role of the TACC to apportion assets between divisions based on the MEF commander's mission guidance. The MEF, on the other hand, favored a strong FSCC and DASC clustered at the MEF's main headquarters, with the divisions relying on their organic FSCC and division air officers to meet their combat requirements. Over the objection of the 3d MAW and MACG-38, General Boomer decided in favor of the MEF-level DASC. He promised significant augmentation to each division—soon labeled an air support element (ASE)—to help coordinate and manage their air support needs.

Pulling a fully manned DASC away from the 1st Marine Division proved to be an awkward task for Colonel Della-Corte. General Myatt, accustomed to the DASC being co-located with his headquarters and relying heavily on 3d MAW close air support and close-in fire support for the planned assault into Kuwait, balked at losing this valuable resource. On 6 January, MASS-3 sent out ASE I led by Captain Patrick A. Coronado, to support Myatt's 1st Division, and on 14 January, sent out ASE II under Captain David F. Stadtlander to support 2d Division. Each ASE was physically co-located with the division fire support coordination center, providing limited air support control functions and information communications relay capability to the MEF DASC. The combined demands of the two ASEs and a DASC, as well as an airborne DASC capability, forced MACG-38 to strip radio vehicles and additional communications assets from its other squadrons to meet the demand. MASS-3 was able to cover the heavy personnel commitment through the augmentation of MASS-1 personnel. MACG-38 initially manned the airborne DASC with a reserve crew from Detachment C, MASS-6. On 8 January, MASS-3 executed the movement order to start the relocation of the main DASC to support I MEF headquarters at Safaniya to the south of Mishab.

The Concept of the Helicopter Tactical Air Command Center (HTACC)

The restructuring of the MACCS throughout the I MEF area of responsibility, although promising to shorten communications lines and thus ideally

improving their reliability and redundancy, still left a dilemma for General Moore in the realm of aviation command and control. Throughout the late summer and fall, the 3d MAW had wrestled with the issue of how best to control helicopter aircraft in flight. The MACCS, although in theory a system of control for all aircraft and missiles, was optimized more to the needs of fixed-wing aircraft and antiaircraft missiles. Rotary-wing aircraft if tasked to fly in support of a division, checked out upon departure from their base and then checked in with the DASC when entering a division TAOR. The DASC then handed them off to their designated forward air controller or air officer as appropriate. The DASC, however, would seldom have direct radio contact with that forward air controller.

Control of helicopters between home base and the DASC was often quite tenuous. Flying north of Jubayl at very low altitude, they were frequently unable to make radio contact with the TAOC at King Abdul Aziz while enroute to the DASC. In-flight diversions or maintenance-related landings could not be quickly confirmed or reported in this communications-free area, thus leaving the group operations sections of the DASC uncertain of the status of the mission for long periods. The repositioning of the TAOC to the Mishab area promised some improvement in this area, but General Moore and his helicopter group commanders believed that more could be done to improve this situation.

Moore decided that the detachment of H&HS-28, recently moved ashore from the 4th MEB to help man the ATACC and support the TACC's move to Jubayl, would be moved northward once this task was complete to serve as the wing's helicopter TACC, or HTACC. Described by some as an expanded version of a helicopter direction center (HDC) employed on board ship, the HTACC attempted to bridge the doctrinal and physical gap between the TACC at Jubayl and the DASC to be co-located with the MEF main command post. It was not, however, a separate control agency, but rather an entity designed to allow most helicopter-related decisions to be made in the northern area of responsibility—and thus presumably more aware of the situation on the ground—rather than left to the TACC in the south. In January, General Moore dispatched his Assistant Wing Commander, Brigadier General Amos, to set up the HTACC to control helicopter aviation in the offense.

Developing the Marine Offensive Plan

As the 3d MAW wrestled with reinforcement, basing, and air control issues, I MEF and 3d MAW staff officers examined a variety of offensive plans. CentCom in late November gave the Army's central command (ArCent) responsibility for the main ground attack in which its two corps would penetrate Iraqi lines far inland beyond the Wadi Al Batin and then sweep north and east in a giant encirclement of Iraqi forces in the Kuwaiti theater of operations (KTO). To facilitate the ArCent effort, General Schwarzkopf instructed General Boomer to plan a supporting attack into Kuwait with the purpose of fixing the Iraqi *III Corps* and Saddam's operational reserves in southern Kuwait and isolating the Kuwaiti capital from the rest of the theater.

Although without a specific written order to do so, but relying on the CinC's broad guidance, in early December, General Boomer examined a variety of offensive options covering possible attacks on a variety of axis into southern Kuwait designed to cut off Kuwait City and the Iraqi *III Corps* from the rest of the Kuwait theater of operations. On 15 December, the staff briefed possible courses of action that boiled down to two primary plans of attack. A so-called "Southern Option" called for I MEF ground forces, led by the 1st Marine Division, to penetrate Iraqi lines in southern Kuwait to the east of the Al Wafra Oilfield and then link up with an amphibious assault on the coast below Kuwait City before encircling the capital. A "Northern Option" called for Marine ground forces positioned around the Kuwaiti "heel" to cut across the lower portion of Kuwait, meet up with an amphibious assault from the sea, and then complete an encirclement of the capital. This offered a shorter axis of attack and split the seam of the Iraqi defense between the *III Corps* in southern Kuwait and the *IV Corps* to the west of the capital.

From an aviation perspective, both options had strengths and weaknesses that varied greatly depending on what community was involved. In preparing the staff estimate, the MEF developed its primary aviation planning assumptions listed in the accompanying table.

Table: Aviation planning assumptions

Rotary Wing	Fixed Wing
70 percent aircraft availability	Air superiority
6-8 flight hours per aircraft	SAMs reduced by 75 percent
50 nm sortie radius	85 percent aircraft availability
FARP(S) Required	Ordnance will be available
Transports available for	
Immediate re-supply/ MEDEVAC	
Moonlight Waxing above 20 percent	

With I MEF preparing to move its initial support units northward into the Mishab area, the southern option looked to be the less problematic of the two. A single axis of attack, shorter medical evacuation trips, and the eventual over-water support offered by an offensive up the coast favored rotary-wing operations, while fixed-wing operations would benefit from simplified command and control, shorter distance to the objective, and limited exposure to enemy fire. It would also give more time for air to interdict Iraqi operational reserves before they could be

brought to bear against the attacking Marine divisions. The major drawback, apparent to the MEF staff, was the fact that the southern option required the divisions to attack through a greater concentration of frontline Iraqi strength to get to the MEF objectives. This also left significant enemy strength on the interior flank of the I MEF attack capable of threatening a counterattack against the point of penetration.

The MEF staff recognized that the northern option was the bolder of the two and that it might accomplish the mission more rapidly. It viewed the southern option, however, as being more deliberate, providing greater operational flexibility, and offering the effective employment of the amphibious forces. In the end, the staff recommended to General Boomer that the southern option be adopted. Boomer took the recommendation under consideration, but he was troubled by the thought of attacking into the enemy's strength and continued to press for other options.[129] Complicating this task was the decision in mid-December by General Schwarzkopf to transfer the British 1st Armored Division from I MEF to the U.S. VII Corps. Although promised an armor brigade from ArCent as partial compensation, the net effect of this transfer was to seriously reduce the combat power of the MEF. This in turn heightened the role of Marine air in the pending conflict.

A result of the delayed ground scheme of maneuver selection was that MACG-38 units became some of the northernmost Marine units within the area of responsibility. While this was a unique position for command and control agencies it afforded the tactical advantage of not having to displace these agencies during critical periods when the ground combat element was moving forward in the offense.[130]

Reinforcements Begin to Arrive

As agreed to by I MEF and FMFLant, the massive flow of reinforcements arrived in the theater beginning with fixed-wing aircraft from FMFPac in mid-December. VMFA-212 and VMFA-232 finished their long journey from Hawaii to Shaikh Isa on 16 December. Next, on 19 December, came the first of two detachments of VMA (AW)-533 routed from the Philippines westward through Diego Garcia. The remaining detachment arrived on the 21st. The following day, VMA-231 flew into King Abdul Aziz after travelling eastward around the globe from Iwakuni, Japan. Finally, on 14 January, the long awaited F/A-18Ds from VMFA(AW)-121 with their two seat, night and airborne forward air control capability arrived with five aircraft.

Large advance parties from MACG-28 and MWSG-27 units arrived at Jubayl during the third week of December. After drawing their equipment from the recently-offloaded MPSRon-1 at the port, MWSS-273 sent its lead elements to Mishab on the 29th. Marines of Detachment B, MWCS-28, accompanied them northward, and together they immediately began preparing the base for MWSS-273. On the 30th, the MAG-26's advance party arrived at Jubayl, leading a long flow of helicopters starting with 12 UH-1Ns from HML-767 the following day.

F/A-18C Hornet strike aircraft from VMFA-212 "Lancers" fly in formation during Persian Gulf operations. The Lancers began their long journey from MCAS Kaneohe Bay, Hawaii, on 10 December, and flew via MCAS El Toro, California; MCAS Beaufort, South Carolina; and NAS Rota, Spain.

To cover the build-up in the north, MACG-38 on 17-18 December moved a HAWK fire unit from Bahrain to the vicinity of Mishab together with the MACS-2 advance party. After two weeks of around-the-clock effort, the TACC at Jubayl became fully operational at noon on the 23d. That accomplished, MACS-2 shut down the TAOC at King Abdul Aziz just before midnight on the 27th and began to shift it to its new site west of Mishab with the goal of becoming operational no

The F/A-18D flown by LtCol Stephen F. Mugg, Commanding Officer of VMFA(AW)-121 "Green Knights," is pictured at Shaikh Isa.

later than 3 January. The squadron quickly brought up its TPS-63 radar to the new site, and on the 30th it reported radar coverage into Kuwait City down to 4,000 feet.[131] The air control tower, as well as a tactical aerial navigation beacon (TACAN) operating on low power to send a signal out to only 30-40, miles was operational on the 15th. Aerial resupply of aviation ordnance to build up a three day supply began immediately.

In late December, VMO-1 loaded six OV-10Ds on board the USS *Theodore Roosevelt* (CVN-71) and five OV-10As and one OV-10D on board the USS *America* (CV-66) for the Atlantic leg of their journey to join MAG-13

An OV-10 of VMO-1 takes off from the America *for Rota, Spain. From there it flew to the Persian Gulf. VMO-1 had been flying OV-10Ds since 29 February 1980. The D model "Bronco" had a laser range finder designator system. The Gulf War was the Bronco's swansong, with the aircraft being retired from Marine Corps' service shortly afterwards.*

(Forward) at King Abdul Aziz. Although not matching the extraordinary journey of VMO-2 five months earlier, it was nonetheless an impressive effort to get the squadron to Saudi Arabia. On 8-9 January 1991, as the carriers neared Spain, the squadron flew its aircraft off the decks to NAS Rota. Met by there by Marine KC-130s, the first echelon of VMO-1 began its "Trans-Med" on the 11th with three Broncos assigned to each Hercules. Stopping enroute at Palma de Mallorca, Spain; NAS Sigonella, Italy; Souda, Crete; Cairo, Egypt; and Jeddah, Saudi Arabia, the leading echelon arrived at King Abdul Aziz on 17 January, where it met the squadron's main body of ground personnel. The second echelon of aircraft arrived at King Abdul Aziz on the 26th with the last aircraft arriving two days later.[132]

Table: 3d MAW personnel levels, 16 Dec 1990-15 Jan 1991[133]

Date	Total 3d MAW Personnel in-Theater
16 December 1990	8,823
18 December 1990	9,078
20 December 1990	9,414
25 December 1990	10,113
1 January 1991	11,088
10 January 1991	13,817
15 January 1991	14,480(*)

(* At this point 3d MAW included 342 female personnel.)

The movement of the MACCS along with the preparation of bases and facilities for the inbound flow of forces was an all-consuming task for 3d MAW. From a 16 December base of 8,823 total personnel assigned to 3d MAW in theater, there began a dramatic increase. Now the close air support; nuclear, biological, and chemical; night vision goggle; gunnery; and other combat readiness training would have to be covered with all the inbound reinforcements. The F/A-18s, in particular, needed the time to work up their mission of suppressing of enemy air defenses with the Block III HARM missile. Some of the inbound units had anticipated being assigned to the Gulf and conducted all the basic training they could. VMFA-212 in MAG-24 actually deployed from Hawaii to Yuma, Arizona, as an entire squadron to conduct fleet contingency training that was Gulf area tailored prior to further deploying to Shaikh Isa on 10 December. VMFA-212 complained about the fact that the first "hands on" usage with the tactical aviation mission planning system (TAMPS) was in theater, and "having no working FLIRs

(forward looking infra-red) available to train on prior to deploying."* VMA-231 mentioned that the "last to go" left with less experience and depth in aircrew and maintenance due to filling out the table of organization of the "first to go" squadrons. This filling out the "first to go" occurred in helicopter squadrons as well.**

Marine Aircraft Weapons and Tactics Squadron 1 (MAWTS-1) located in Yuma, Arizona, sent a detachment on 22 December that was a welcomed source of expertise in a variety of fields. General Moore was especially interested in an in-depth look at the best way to structure the MACCS to meet the needs of different echelons of command.[134] The flying squadrons were not so thrilled to have to support additional augment pilots with combat flights and flight hours.

At 1200 on 14 January the tactical information broadcast system (TIBS) was brought on line at the TACC, and would give real time information to the intelligence section. Two weeks earlier the KC-130 began carrying the Senior Scout signal intelligence (SIGINT) package which helped fill the void in organic airborne SIGINT collection capability and provide near real time input to the TACC via TADIL link. This adjusted warning would be critical in the rapid development of aerial engagements. The EA-6Bs from VMAQ-2 would continue to fly the "junkyard track," a block of air space adjacent to and south of the Iraq and Kuwait border. Primarily they were conducting electronic surveillance missions using their tactical electronic reconnaissance processing evaluation system (TERPES) to add to the electronic order of battle. The TERPES cell from VMAQ-2 consisted of two officers and 20 enlisted Marines and served as the interim intelligence fusion center with the wing and group intelligence personnel and the secret compartmented information facility (SCIF).[135] On occasion the information collected directly helped predict SCUD (Soviet surface-to-surface ballistic missile) launches. Some of the early intelligence analysis showed that Iraqi aircraft had increased their activity over their own active surface to air missiles (SAMs) without any pattern of corridors. This indicated that Iraq could schedule and coordinate fighter engagement periods with their air defense assets. Without the sector defense centers to coordinate this, the Iraqi pilots would be reluctant to fly over their own standing free-fire SAMs in Kuwait.

The shift from Operation Desert Shield to Operation Desert Storm would take place on 15 January with the start of the air offensive bombing campaign; however, this did not mark the end of flow to theater of 3d MAW's air assets. A

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* The TAMPS machine that was designated to come out to MAG 24 never made it past FMFPac, where it was used in the intelligence briefings instead of making it to the tactical squadron, or at least, the group level where tactical planning was being conducted. (LtCol James M. Collins intvw, 18Mar91).

** Lieutenant Colonel John F. Petine, commanding officer, HMM-266, described the process his squadron went through beginning in August: "We ended up giving one of the squadrons that did go [then] air planes and pilots and people. I had to give them a detachment that became part of their squadron, and I never saw those guys again . . . . I had to rebuild with 10 new pilots in November." (LtCol John F. Pettine, C.O. HMM-266, intvw, 21May96.)