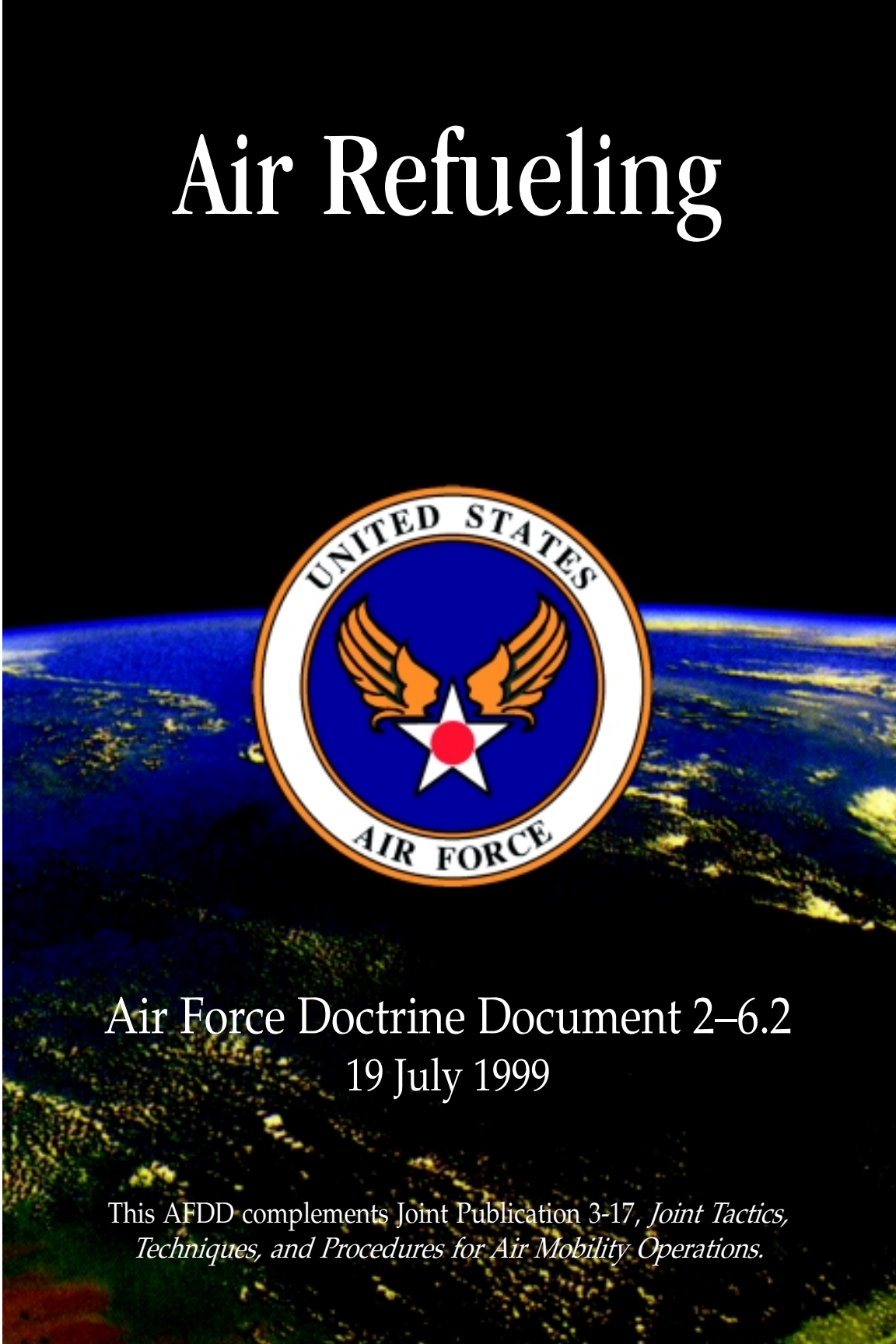
Air Refueling



Air Force Doctrine Document 2–6.2

19 July 1999

This AFDD complements Joint Publication 3-17, *Joint Tactics, Techniques, and Procedures for Air Mobility Operations.*

BY ORDER OF THE
SECRETARY OF THE AIR FORCE

AIR FORCE DOCTRINE DOCUMENT 2-6.2
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FOREWORD

The Armed Forces of the United States face challenges more ambiguous and less specifically focused than during the cold war. During the cold war air refueling operations were focused on supporting the bomber force of our nuclear deterrence triad. These challenges can no longer be described as a single threat against which the bulk of our defense effort could be focused, but can be characterized as multiple risks from multiple axes. Today, air refueling is conducted to provide rapid response, increased range, and extended airborne operations for bombers, fighters, airlift, command and control, and intelligence, surveillance, and reconnaissance aircraft from the Air Force, Navy, Marines, and US allies and coalition partners. Air refueling is one of the distinguishing characteristics making the United States the predominant air power nation on the globe. Modern air warfare, as we have come to know it, is simply not possible without air refueling. Employing our limited air refueling assets to gain the greatest advantage to the warfighting commanders in chief (CINCs) around the globe requires a level of knowledge and experience of its application in combat, mobility, and logistics that is not easily acquired. Air Force Doctrine Document, 2-6.2, *Air Refueling,* is written to provide this knowledge for understanding, planning, and executing these air refueling forces.

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INTRODUCTION

PURPOSE

Air Force Doctrine Document (AFDD) 2-6.2, *Air Refueling* has been prepared under the direction of the Chief of Staff of the Air Force (CSAF). This document establishes doctrinal guidance for the application of air refueling forces and is consistent with, and complementary to, capstone doctrine contained in AFDD 1, *Air Force Basic Doctrine*; AFDD 2, *Organization and Employment of Aerospace Power;* and operational doctrine contained in AFDD 2-6, *Air Mobility.*

APPLICATION

AFDD 2-6.2 applies to all active duty, Air Force Reserve Command (AFRC), Air National Guard (ANG), and civilian Air Force personnel. The doctrine in this document is authoritative but not directive; therefore, commanders are encouraged to exercise judgement in applying this doctrine to accomplish their missions.

SCOPE

This publication establishes doctrine for the proper employment of air refueling assets in support of national security strategy and national military strategy. This publication provides a background and description of air refueling and describes its characteristics and applications. AFDD 2-6.2 explains the fundamentals, provides guidance for command and control, and presents planning and support considerations for successful air refueling operations.

CHAPTER ONE

GENERAL

If you want peace, understand war.

B.H. Liddell Hart

OVERVIEW

This publication supports AFDD 2, *Organization and Employment of Aerospace Power,* and AFDD 2-6, *Air Mobility Operations,* by providing basic concepts and principles on how to guide commanders on the proper employment of air refueling assets. It explains how air refueling assets, the backbone of global engagement, act as force enablers and multipliers. This chapter also provides background and describes air refueling applications. Finally, this chapter describes how air refueling contributes to the six core competencies of the US Air Force.

BACKGROUND

Since the early days of Carl Spaatz and the historic flight of the '*Question Mark*', air refueling has evolved from a concept to a key component of the Air Force's global engagement vision. Originally designed to extend the range of heavy bombers, air refueling was soon adapted to fighter, cargo, and a wide variety of support aircraft.

In the summer of 1948, at the height of the Berlin airlift, the Strategic Air Command (SAC) activated the first two Air Force air refueling squadrons. The first aircraft were modified KB-29M Superfortress tankers and a modified Superfortress bomber. On 1 October 1957, tankers first went on ground alert to support deterrence against the growing nuclear threat from the Soviet Union. Beginning in 1964, air refueling was first used to extend the range and payload of F-100 fighters during operations in Southeast Asia. All these firsts culminated in the most intense operational use of air refueling: DESERT SHIELD and DESERT STORM. US Air Force tankers flew over 141,000 hours, offloaded 1.2 billion pounds of fuel during 85,000 refuelings, and transported nearly 17,000 passengers and 6,500 tons of cargo.

FLIGHT OF THE QUESTION MARK

On 27 June 1923, the Army Air Service conducted its first successful air refueling. Captain Lowell H. Smith and Lieutenant John P. Richter set new marks for duration and distance. The 6-hour and 38- minute flight of a DH-4B at San Diego was made possible through two hose refuelings by a second DH-4B.

Throughout the mid-1920s numerous air refuelings were accomplished and new endurance records were set. Despite the Army Air Service's contribution to air refueling exploration, air refueling still was not regarded as the acceptable method to overcome endurance and payload problems. This changed, however, when the "Question Mark" landed on 7 January 1929.

In January 1929, in a test of both the practical value of air refueling and crew and aircraft endurance, a modified Atlantic (Fokker) C-2A, the "Question Mark," established a world duration record of 150 hours, 40 minutes, and 15 seconds—almost 6 days of non-stop flying and the equivalent of 11,000 miles. The Army Air Corps' high-wing, trimotor monoplane had been specially outfitted with a large capacity fuel tank in the cabin for receiving fuel and with lines and hand-operated pumps for transferring the fuel to the wing tanks. The tankers, two modified Douglas C-1 biplanes, were each equipped with two 150-gallon cabin tanks and a 40-foot fueling hose. Shuttling in the airspace between Santa Monica and San Diego, California, a distance of approximately 110 miles, the tankers made 143 contacts with the "Question Mark," allowing it to remain airborne until engine problems forced it to land. Tanker-receiver contacts averaged 7.5 minutes and a total of 5,700 gallons of fuel were transferred through the 1.75-inch diameter hose. Oil, food, water, and other items were also passed during the refueling contacts. The transfers occurred as both aircraft flew at approximately 80 miles per hour, at a separation of 15 to 20 feet.

70 Years of Air Refueling

While air refueling has been the key element in modern airpower employment, force downsizing, a reduction in overseas presence, and increased global responsibilities have brought a need for a robust, flexible, and versatile air refueling force.

Air refueling is an integral part of global mobility and brings added capability to combat, combat support, and air mobility aircraft for all

airpower operations. It is equally applicable to all stages of a contingency—deployment, employment/sustainment, and redeployment. ***Air refueling enhances the unique qualities of airpower across the full spectrum of military operations.*** It enables operations and multiplies the effects of operations at the tactical, operational, and strategic levels of war, and will continue to play an important role in our national security strategy well into the future.

> ***Faced with the potential of reduced overseas bases for all US forces, the concept of global reach becomes increasingly important and highlights the aerial tanker as a critical asset in meeting future needs. Air Force tankers refuel Air Force, Navy, Marine and many allied aircraft, leveraging all Service capabilities on land, sea, and in the air. Aerial refueling increases the range, on station times, and ordnance capabilities of receiving aircraft — true force multiplication . . . The increased emphasis on rapid response and global reach will only enhance the value of our tanker force.***
>
> **The Air Force and U.S. National Security:**
> **Global Reach—Global Power,**
> **Department of the Air Force White Paper,**

AIR REFUELING DEFINED

Air refueling is the in-flight transfer of fuel between tanker and receiver aircraft. An aircraft's ability to remain airborne is limited by the amount of available fuel. Air refueling increases the range, payload, loiter time, and ultimately the flexibility and versatility of combat, combat support, and mobility aircraft.

COMPONENTS

Air refueling forces are drawn from active duty, Air Force Reserve Command (AFRC) and ANG components. Collectively, these components provide the crews, airframes, and support forces that conduct intertheater and intratheater air refueling operations in support of functional and geographic combatant commanders. These forces are capable of supporting operations across the entire spectrum of conflict.

✪ **Active Duty Component.** Active duty air refueling forces are assigned to either a functional combatant command, (e.g., US Transportation Command [USTRANSCOM]) or one of the geographic combatant commands (e.g., European Command, [USEUCOM], US Pacific Command [USPACOM], or Atlantic Command [USACOM]). The forces assigned to the Commander in Chief, United States Transportation Command (USCINCTRANS) typically perform intertheater and continental United States (CONUS) missions, but also deploy to augment forces assigned to a geographic CINC or to a joint task force (JTF). Forces assigned to geographic CINCs typically perform intratheater missions and provide support to JTFs operating within their area of responsibility (AOR). These forces conduct the core day-to-day air refueling missions and most of those requiring specialized training and equipment. Active duty forces offer a CINC the most accessible and flexible refueling support because they are readily available for worldwide taskings.

✪ **Air Reserve and Air National Guard Components**. AFRC and the ANG provide more than half the US Air Force air refueling capability. These assets are an integral part of the Air Force's peacetime operations, flying air refueling missions in support of national taskings every day. During crises, volunteers or activated AFRC/ANG units augment the active duty air refueling force, providing substantial increases in air refueling capacity. Personnel are usually experienced operators who train to the same standards as the active air refueling force. Access to AFRC/ANG forces is provided through a system of volunteerism or through formal activation of units; therefore a portion of AFRC/ANG forces are mission ready and available at all times. However, for major contingencies activation of AFRC/ANG units is normally required. The National Command Authorities (NCA) can mobilize AFRC and ANG forces in response to war and significant regional conflicts. When mobilized, AFRC and ANG units are placed on active duty status and augment the active duty forces for both intertheater and intratheater operations.

Air Force Reserve and Air National Guard forces' augmentation is crucial during any major crisis.

AIR REFUELING APPLICATIONS

Air refueling allows airpower forces to increase levels of mass, surprise, economy of force, flexibility, versatility, and maneuverability and can concentrate more assets for offensive operations. The overall effect of these applications is a force enabler and force multiplier in airpower employment.

Tankers enhance combat airpower's ability to achieve ***mass*** by allowing them to carry larger payloads producing greater effects. Refueling a combat aircraft shortly after takeoff extends its range and enables ***concentration*** of firepower deeper in the AOR. Air refueling enhances the ability of airpower forces to achieve ***surprise*** by allowing indirect approaches, terrain masking, and multiple axes of attack to seek out targets the enemy least expects to be attacked.

Air refueling maximizes the use of each combat/combat support asset launched by increasing its flight time. This increased flight time lets combat aircraft strike multiple targets on the same sortie and lets combat support assets increase station time. In addition, increasing an aircraft's flight time will make additional aircraft available for reassigning towards other objectives, thus achieving ***economy of force.***

Air refueling enhances *maneuver* at each level of war. Additional fuel provides attack aircraft the ability to fight longer and out-last the engaged enemy's extended range and endurance, putting enemy aircraft at a distinct disadvantage. Mobility aircraft allow commanders maneuver flexibility by inserting troops and cargo into theaters at key moments in the war. It enables maximum utilization of airpower resources and thus multiplies the force available, allowing greater ***persistence*** in engagements, operations, and campaigns.

Because their range is increased by air refueling, airpower assets can be based beyond the effective range of enemy weapons. This increases security and frees up assets for ***offensive*** operations. Increased range, loiter time, and payload enhance ***mass*** and ***maneuver***. Air refueling enhances ***flexibility and versatility*** allowing airpower to reach distance targets with the payload needed to create tactical, operational, and strategic-level effects.

FORCE ENABLEMENT

Air refueling is an airpower enabler and multiplier. Air refueling gives aircraft the needed range, payload, loiter time, and flexibility required for success.

✪ The Aerospace Expeditionary Force, airpower's answer to unexpected crises, is predicated on tankers escorting and refueling aircraft en route to the AOR, and air refueling airlift aircraft flying non stop to the destination with critical personnel, supplies, and equipment.

✪ Global attack missions using nuclear or conventional bombers would be impossible without the range provided by air refueling.

KC-135R and F-16s. Air refueling assets allow combat aircraft to reach anywhere in the world on short notice.

✪ Air refueling puts the 'rapid' in rapid global mobility, allowing airlift and deploying combat aircraft to fly direct from the CONUS to the AOR without delaying at en route bases. This capability is especially important during the halting phase of a shooting war or during the first few days of a disaster response.

✪ Air refueling enables Strategic Brigade Airdrop-taking airborne troops from CONUS garrisons and air-dropping them directly into the combat zone.

✪ Air refueling enables combat aircraft to be based outside the effective range of enemy aerospace forces and still strike targets anywhere in the theater.

FORCE MULTIPLICATION

By increasing the range, payload, loiter time, and flexibility of a given aircraft, air refueling multiplies that aircraft's *combat effectiveness*. With air refueling, an aircraft can fly farther, carry more, remain engaged longer, fly faster when engaged, and retain its flexiblity.

AIR REFUELING AND US AIR FORCE CORE COMPETENCIES

> **Core competencies are at the heart of the Air Force's strategic perspective and thereby at the heart of the Service's contribution to our nation's total military capabilities. They are not doctrine per se, but are the enablers of doctrine. They are the basic areas of expertise that the Air Force brings to any activity across the spectrum of military operations, whether as a single Service or in conjunction with the core competencies of other Services in joint operations. The US Air Force's fundamental service to the nation is its ability to develop, train, sustain, and integrate the elements of air and space power to execute its core competencies across the spectrum of peace and war.**
>
> **AFDD 1**

Air refueling operations are employed as a part of, and in support of, the Air Force's six core competencies: rapid global mobility, precision engagement, global attack, air and space superiority, information superiority, and agile combat support. Air refueling operations enable these competencies and are enabled by them.

Rapid Global Mobility

Air refueling's primary contribution to rapid global mobility is accomplished by escorting and refueling deploying aircraft (deployment support) so that they may fly nonstop to their destination. This significantly reduces reliance on en route staging bases for support.

Tanker units incorporate the rapid global mobility competency through the Integral Tanker Unit Deployment (ITUD) concept. Tankers deploy

with almost all of their support equipment, personnel, and supplies on board the unit's aircraft. This allows them to begin immediate operations at the deployed location with minimal impact on the airlift system.

Air refueling enhances the combat effectiveness of aerospace power.

Precision Engagement

Air refueling enhances this core competency by increasing the range, payload, loiter time and flexibility of airpower assets applying both lethal and nonlethal force. Air refueling gives airlift aircraft the capability to fly from the CONUS and airland or airdrop combat troops against an adversary or supplies into a disaster area. The increased loiter time provided by air refueling allows intelligence, surveillance and reconnaissance (ISR) assets to collect and provide critical information. Finally, air refueling enhances the ability of strike aircraft to employ precision weapons anywhere within their area of operations (AO).

Global Attack

The air refueling force enables the global attack competency. Most aircraft do not possess an unrefueled range to carry a significant payload to another theater, employ the weapons, and then recover to a secure landing base. Air refueling can provide this capability. In fact, most aircraft in global attack missions require multiple air refuelings.

Air and Space Superiority

Air refueling enhances the ability to gain and maintain air superiority in three important ways. Aircraft can be based further away from the enemy and still perform their assigned missions. Because of the relative security afforded by distant basing, fewer aircraft must be devoted to defensive operations, thus freeing them up for offensive operations. The increased range afforded by air refueling then multiplies the effects of aerospace forces conducting offensive operations.

Air superiority, in turn, acts as a force enabler for air refueling operations. Most tankers do not possess any threat detection or defensive capa-

bilities. Localized or mission-specific air superiority allows tankers to accomplish their mission unfettered.

Information Superiority

While air refueling does provide some force multiplication for ISR and battle management assets engaged in information superiority, air refueling primarily depends upon the benefits gained from information superiority. Because of the tanker's lack of threat warning and defensive systems, the air refueling mission relies on up-to-the-minute information on enemy threats, and reliable communications to changes on those threats. Air refueling is also dependent on secure information exchanges to ensure both tanker and receiver crews are in receipt of the correct rendezvous information. This is especially true in a dynamic theater employment environment.

Agile Combat Support

Air refueling contributes to agile combat support by supporting the mobility operations. A key to agile combat support is a responsive transportation system that quickly moves parts, equipment and supplies rapidly to the destination.

Air refueling units also provide most of their own support organically. Under the ITUD concept, most of a deployed unit's support comes from its home station. The unit uses its own aircraft for sustainment airlift. This allows dedicated airlift aircraft to support other forces.

SUMMARY

Air refueling has steadily evolved in focus with the changes in the national security strategy. As an integral part of airpower employment, it is both a force enabler and force enhancer that fosters airpower's ability to achieve even greater levels of mass, surprise, economy of force, flexibility and versatility, maneuverability, and to persistently concentrate assets during offensive operations. Even though the preponderance of the world's tanker aircraft are in the US Air Force, the high demand placed on these assets makes proper employment critical. Air refueling, when properly employed enhances, enables, and multiplies the strategic, operational and tactical effects of any air operation.

CHAPTER TWO

AIR REFUELING OPERATIONS

Air refueling is an integral part of US airpower across the range of military operations. It significantly expands the employment options available to a commander by increasing the range, payload, and flexibility of air forces. Therefore, aerial refueling is an essential capability in the conduct of air operations worldwide and is especially important when overseas basing is limited or not available.

AFDD 1

GENERAL

The capability of air refueling forces must be consistent with our overall national strategies, as well as, with the operational doctrine of airpower forces supported by air refueling. Changes in emphasis from the Single Integrated Operation Plan (SIOP) mission to conventional employment and global mobility are examples of this evolution. To continue as a mission enabler and force multiplier air refueling operations must keep pace with changes made to the supported operations.

Anchor Areas and Air Refueling Tracks

Air refueling is normally conducted in one of two ways: in an anchor area, or along an air refueling track.

✪ In **anchor areas**, the tanker flies a racetrack pattern within defined airspace while waiting for receiver aircraft to arrive. Once joined with the receiver, the tanker then flies in an expanded racetrack pattern while refueling the receiver. **Anchor air refueling is normally used for intratheater operations where airspace is confined or where receivers operate in a central location.** Anchor areas are best suited for small, highly maneuverable aircraft, especially in marginal weather conditions.

✪ Air refueling accomplished along an **air refueling track** is **the preferred method for intertheater operations.** The tanker rendezvous can be accomplished in two ways. The tanker can orbit at a desig-

nated point along the track awaiting the receiver's arrival, or the tanker and receiver can be preplanned to simultaneously arrive at a designated rendezvous point.

In certain circumstances, it may be advantageous to combine the anchor and track methods on a single mission. This can be especially useful when multiple strike packages refuel with multiple tanker formations.

Tanker Formation Refueling

Multi-ship formations allow tankers the flexibility of refueling receiver aircraft.

Many missions require tankers to refuel their receivers while in a multiple-ship formation. Mission requirements may dictate several different types of tankers and multiple receiver types in the same formation. **Formation refueling is one of the most demanding operations due to the number of aircraft in a confined block of airspace and because receiver aircraft may be constantly joining and leaving the formation.** Cell formations operations may alleviate airspace constraints by allowing the same number of tankers to operate in less vertical airspace than if they were to operate individually.

Joint and Multinational Operations

Joint and multinational operations require teamwork and unity of effort, principles that are fundamental to air refueling. When working with other Services, and nations that may have developed their own cultures, there is a potential danger in the differences in procedures and terminology, which may cause misunderstandings and confusion. *Such operations therefore, require a standard set of tactics, terminology and procedures.* For example, Allied Tactical Publication 56, Air to Air Refueling, was published to standardize operating procedures and enhance interoperability among North Atlantic Treaty Organization (NATO) member nations possessing air refueling assets. While the detailed procedures will depend on aircraft type, mode of employment and national require-

YOUNG TIGER

Introduction of the KC-135 into the US Air Force inventory in 1957 provided significantly improved means of aerial refueling for SAC's bomber force. With it, refueling could be done at speeds approaching or equaling those of the receiver aircraft. While refueling the bombers was its primary mission, in 1959 the KC-135 was successfully tested with jet fighters and assigned to refuel Tactical Air Command (TAC) aircraft during some exercises and movements to and from overseas bases.

Yet it wasn't until January 1965, when the 4252d Strategic Wing stood up at Kadena AB, Okinawa, that the Air Force established a Tanker Task Force solely to support an ongoing tactical operation. Code named YOUNG TIGER, this task force grew from 15 aircraft in 1965 to 195 aircraft stationed across Southeast Asia by the time of LINEBACKER II in 1972. Over these nine years, YOUNG TIGER crews completed more than 89,900 air refuelings, offloading some nine billion pounds of fuel to combat aircraft.

During the height of the cold war, YOUNG TIGER demonstrated the importance of tanker aircraft in conventional warfare. Although tankers continue to support the bomber leg of America's nuclear triad to this day, they are recognized as invaluable contributors to the Air Force's conventional arsenal as well.

The United States Air Force in Southeast Asia, 1961-1973

ments, many allies should be able to achieve sufficient commonality so that a combined set of procedures can be developed. Commanders of any multinational force should agree as soon as possible on a common set of doctrine, tactics, and procedures for particular operations.

In addition, airspace is a primary limitation to air refueling operations. Standardizing multinational cell formation procedures allows a variety of air refueling assets to operate in compressed airspace. This is particularly important when large tankers may be refueling multiple receivers or formations of receivers.

To generate the maximum combat airpower in multinational operations all military capabilities must be integrated to the fullest extent. Multinational exercises are a key component to common doctrine and

interoperability. These exercises should be used as often as feasible to foster a common understanding. The doctrine and procedures established by the multinational commander will provide additional flexibility, deployability and sustainability in multinational air operations.

- SIOP SUPPORT
- GLOBAL ATTACK SUPPORT
- AIR BRIDGE SUPPORT
- DEPLOYMENT SUPPORT
- THEATER SUPPORT
- SPECIAL OPERATIONS SUPPORT

AIR REFUELING MISSIONS

These missions represent the broad, fundamental, and continuing activities of the Air Force's air refueling system. US Air Force forces perform these missions in support of strategic-, operational-, and tactical-level objectives across the spectrum of conflict.

SIOP Support

The 'Single Integrated Operation Plan (SIOP)' refers to the combat employment of intertheater nuclear-equipped forces under US Strategic Command (USSTRATCOM) operation plans (OPLANs). Air refueling assets are incorporated into the SIOP to support the bomber leg of the nuclear triad. They allow bombers to deliver payloads to any location in the world and recover to a suitable location. Air refueling enables strategic bombers to reach the most distant targets, even when launching from CONUS bases.

SIOP-committed tankers also refuel USSTRATCOM command and control aircraft. This platform provides the NCA the ability to continue to direct military action from an airborne command post regardless of the situation.

Global Attack Support

Air refueling allows the US Air Force to rapidly project aerospace power anywhere on the globe. Combat and combat support platforms can launch from the CONUS and reach practically any target in the world without reliance on intermediate or in-theater staging bases. The ability to carry out intertheater strike missions is crucial given the majority of US air forces are based primarily in the CONUS. This fact coupled with the range of US interests and the uncertain nature of the world make this ability critical to an effective security policy. Air refueling of global attack support missions provides a wide range of response options.

✪ Air Expeditionary Forces (AEF) can rapidly deploy and deliver desired effects within 48 hours of notification, even engaging targets on the inbound deployment, when necessary.

✪ Bomber aircraft can fly direct to any country to neutralize strategic targets and then return to the CONUS without stopping.

✪ Airlift aircraft can fly directly from the CONUS to provide humanitarian assistance, peacekeeping forces to support peace operations, or airdrop combat troops to reinforce those already in contact with the enemy or open a lodgment for deployment of forces.

Global Attack in Practice

Joined with airlift, the capability provided by in-flight refueling makes rapid global mobility a reality for all Services, and constitutes a major element of today's power projection strategy. In 1986, Operation ELDORADO CANYON, the US raid on Libya, was made possible by aerial refueling support to attacking forces. Tankers were critical to achieving mission objectives, in spite of airspace and political restrictions. Five years later, B-52s operating out of the CONUS demonstrated the global strategic reaction capability afforded by air refueling. Flying halfway around the world, B-52s launched cruise missiles against Iraqi air defense sites in the opening minutes of DESERT STORM. Tankers allowed them to conduct a 'theater' mission directly from their home location at Barksdale AFB, LA.

1998 Air Mobility Master Plan

✪ Long-range reconnaissance and intelligence gathering platforms can provide commanders a decisive information edge over the enemy, and systems are being developed for airborne information attacks.

The demonstrated capability to conduct global attack is in itself a potent tool of national policy because of the deterrent effects produced. Adversaries must now consider the full range of options available to the US, giving little or no warning to the aggressor. Air refueling provides CONUS-based airpower forces a *global presence* without having to rely on an *in-theater presence*.

Air Bridge Support

An air bridge is an airborne line of communication linking the CONUS and a theater, or multiple theaters. The air bridge consists of a series of en route locations outlining an uninterrupted air route of travel linking the CONUS and a theater, or multiple theaters, for rapid deployment and sustainment of forces. *In addition to airlift and air refueling assets, an air bridge consists of an enroute mobility support structure to sustain the logistical trail.*

Air refueling accelerates air bridge operations since refueling stops can be reduced or eliminated. Eliminating en route stops reduces US reliance on forward staging bases and the possibility of aircraft delays due to maintenance or airfield/airspace saturation. Air refueling also allows airlift assets to maximize payloads without sacrificing range. This significantly increases the efficiency of deployment operations by making direct delivery of aircraft, personnel and materiel possible.

While air refueling increases the speed and throughput of an air bridge, it is not without costs. It consumes more flying hours, more fuel, and increases aircrew fatigue. Dedicating tankers to air bridge support also means they cannot be used for other missions and thus may degrade capabilities in other areas. Exceptions to this are global attack and deployment support, which can be, supported by air bridge support tankers if planned on or near the air bridge route.

Deployment Support

Deployment support is escorting and air refueling fighter aircraft during intertheater deployments. Air refueling extends the range of deploying fighter aircraft allowing nonstop flights and a more rapid

response to a regional crisis. The capability of assets to fly nonstop to a theater eliminates the need to obtain landing rights in other foreign countries. Tankers that carry cargo and passengers on refueling missions are termed 'dual-role' tankers. Dual-role tankers are especially useful during fighter or integral tanker unit deployments.

Force Extension. The best means to provide deployment support, given a limited number of tanker aircraft, is force extension ~~the~~ refueling of one tanker by another tanker. With force extension, the number of tankers used for deployment support is reduced. Whenever possible, force extension missions should be planned along air bridge routes to use tankers supporting air bridge movements. Tanker support to aircraft deployments is divided into two categories: Coronets and Aerospace Expeditionary Forces (AEF.)

Coronets. Coronets are movements of aerospace forces in support of contingencies, rotations, exercises, or aircraft movements for logistics purposes. Coronets normally have long lead times for planning, tasking, and execution. Planners should use this opportunity to maximize the efficiency of deployment support tankers.

Air Expeditionary Forces (AEF). Air refueling provides commanders the ability to move AEFs rapidly to meet theater-specific needs, from humanitarian relief to combat operations. Designated AEF forces maintain readiness to rapidly deploy in support of a theater CINC. As a general guideline, applicable concept of operations (CONOPS) for operations will posture AEFs to employ combat power from a forward operating location (FOL) within 48 hours of receiving an execute order. This guideline assumes designated units receive 24 hours of warning from initial notification to receipt of an execute order directing aircraft deployment. Upon receipt of a Chairman, Joint Chiefs of Staff (CJCS) warning, planning or alert order, Air Mobility Command (AMC) may preposition global air mobility support forces in order to build the support network required for an air bridge. Depending on mission requirements, the AMC tanker/airlift control center (TACC) may position tanker aircraft and crews in preparation for deployment and may coordinate with the theater Air Mobility Operations Control Centers (AMOCC) for theater air refueling support, if required.

Theater Support

During a combat operation, **the highest priority for intratheater air refueling forces is normally supporting combat and combat support aircraft executing the air campaign.** This is especially true during the initial phases of a conflict. Combat aircraft may be based well outside enemy threats to protect them from hostile attack, and may need tankers to give them the range needed to engage their targets.

Air refueling increases the endurance of air combat support assets. Airborne Warning and Control System (AWACS), joint surveillance target attack radar system (JSTARS), the airborne battlefield command and control center (ABCCC), and various airborne reconnaissance aircraft are among the many crucial airborne platforms used to help manage, direct, conduct, and evaluate air combat operations. However, without in-flight refueling, these assets have limited endurance and require extensive regeneration periods between sorties.

Tankers allocated for theater support may be called upon to provide air refueling support to air bridge operations. The Director of Mobility Forces (DIRMOBFOR) must judge the capabilities of and requirements for tankers assigned or attached to the theater to determine their ability to provide air bridge support. When air bridge support operations will adversely impact theater support operations, the joint force air component commander (JFACC) must consider the JFC's overall campaign objectives when deciding how to allocate tanker missions.

Special Operations Support

Air refueling increases the range, payload, and endurance capabilities of special operations forces (SOF) assets, allowing them greater flexibility and versatility in mission accomplishment. Specially trained air refueling forces are designated to provide air refueling in support of SOF elements. **When assigned or attached to a joint task force (JTF), these forces may fall under a special operations functional component commander who reports directly to the JTF commander.**

MC-130P and MH-53s air refueling. Special operations air refueling supports many types of SOF assets.

OTHER MISSIONS OF AIR REFUELING

In addition to the six primary air refueling missions, air refueling assets are used in several other circumstances.

- ✪ emergency air refueling
- ✪ airlift
- ✪ aeromedical evacuation
- ✪ combat search and rescue

Emergency Air Refueling

Some air refueling aircraft may be kept on ground or airborne alert to provide short-notice support for airborne fuel emergencies. Fuel emergencies can result from missed refuelings, en route winds greater than planned, battle damage, or excessive time engaged with enemy aircraft or targets.

While dedicated ground alert aircraft normally meet emergency air refueling requirements, excess fuel capacity of airborne tankers can provide at least a partial emergency air refueling capability. **Carrying fuel in excess of mission requirements, known as 'tankering fuel,'** ensures that airborne tankers maintain a limited emergency refueling capability.

Intertheater Operations. Whenever possible, intertheater missions should be planned either over, or in close proximity to, existing air bridge routes. This allows tankers positioned for air bridge support to also provide emergency air refueling support.

When intertheater missions cannot be planned along air bridge routes and the mission is deemed important enough to provide emergency air refueling support, planners should use a combination of ground and airborne spare aircraft. Ground spare aircraft are maintained in various stages of readiness depending on mission requirements. Airborne spare aircraft consist of one or more tankers that accompany the air refueling formation, but do not participate in any air refuelings unless required to do so. No matter which option is used the concepts must be adequately delineated in mission directives so tankers, receivers, and participating command and control elements are thoroughly familiar with the procedures to be used in a fuel emergency.

Intratheater Operations. The dynamic environment and quick tempo of intratheater operations provide a more pressing need for emergency air refueling support. Nevertheless, *intratheater operations generally are characterized by shorter distances and numerous refueling assets, making tankers more responsive to requests for emergency air refueling support.* The preferred method of providing emergency support is through a combination of ground and airborne aircraft.

Ground alert aircraft and crews primarily provide units the capability to meet mission requirements when fuel emergencies occur due to battle damage or excessive time engaged with enemy aircraft or targets. The best tanker aircraft for ground alert duties are those capable of quick response times, high cruise speeds, and a takeoff fuel load large enough to accommodate all offloads. Ground alert tankers and crews may be dedicated solely to this function.

Because of airspace limitations in an AOR/joint operation area (JOA) the best means of providing an airborne emergency air refueling capability is through a 'reliability orbit'. Reliability orbits are normal air refueling anchor areas that have dedicated altitudes and procedures for both tankers and receivers involved in emergency air refueling. Depending on the size of the area of operations and the number of aircraft involved, planners may need to dedicate airspace for several reliability orbits. In addition, when tankers have excess fuel at the end of their scheduled mission, they can offload it to a receiver capable tanker rather than returning to base with the excess fuel.

KC-10 air refueling F-14/18s. The KC-10 can transport up to 75 people and about 170,000 pounds of cargo in addition to performing its primary mission of air refueling.

Airlift

Refueling platforms can act as augmentation to the airlift fleet. This capability is most important during the deployment phase when airlift requirements are highest, and requirements for theater support refuelings are the lowest. During contingencies, commanders should continually evaluate tanker allocations to airlift missions, weighing the loss of assets from traditional tanker missions, against the benefits gained by a larger, augmented airlift fleet. This evaluation must consider the objectives of the entire joint campaign and not just those of the air component.

Another key application of tanker aircraft in an airlift role occurs during tanker unit movements. Tanker units deploying to a theater or en route location will typically airlift their own support requirements under the ITUD concept. This allows tanker units to have key supplies and personnel on hand as soon as they arrive at their deployed location, and it relieves the air transportation system of at least a portion of their requirements. For more information on airlift operations, refer to AFDDs 2-6, *Air Mobility Operations* and 2-6.1, *Airlift Operations.*

Dual-role Tanker. Tankers perform the dual role function when they accomplish airlift and air refueling on the same mission. A dual-role mission maximizes the inherent airlift capability of tanker aircraft. Dual

KC-10 on ramp with cargo. A tanker's dual role capability can reduce the required airlift needed for unit deployments.

missions are typically associated with fighter deployments. *Dual role operations maximize the full capabilities of tanker aircraft.* Tankers forward position to a deploying unit's location to upload cargo, personnel, and equipment needed to ensure the ferried unit can begin immediate operations once in theater. Once airborne, tankers escort deploying fighters to their final destination, refueling them along the way. Upon arrival, the tankers download their cargo and passengers who may immediately reconstitute and launch the deployed fighters. This allows arriving aircraft to be ready for follow-on missions quickly, simplifying required coordination for airlift support of deployments, and reducing the number of dedicated airlift aircraft required to support an operation.

Aeromedical Evacuation (AE)

AE is a specialized form of airlift for transporting ill or injured personnel under medical supervision to appropriate medical treatment facilities. Aeromedical transportation of patients requires aeromedical crew members to be with the patient prior to, and during the movement. During contingency operations, a capable AE system complements and supports the theater medical infrastructure, allowing a smaller in-theater medical footprint.

Normally, tanker aircraft are used only in the emergency aeromedical evacuation role. If tankers are used in the AE role the medical community has carry-on medical equipment to provide patient care that does not require aircraft modification. Routine AE is currently conducted via

other cargo aircraft, but as these aircraft near retirement, the tanker fleet is being looked at as a possible replacement for the AE mission. Air refueling operations will not routinely be accomplished during AE missions. Unless properly marked, identified, and exclusively used for medical purposes, tankers used for emergency medical evacuations do not qualify as noncombatant medical equipment and the aircrews do not fall under the protections afforded medical personnel by the Geneva Conventions.

Combat Search and Rescue (CSAR)

Tanker aircraft provide a limited capability to assist search and rescue operations as a communications and coordination link between airborne and ground-based elements. This capability derives from the tanker's long endurance characteristics and organic communications equipment. Tankers can provide refueling support to aircraft first on scene until dedicated search and rescue (SAR) forces arrive. In the case of a downed fighter, the wingman will attempt to remain on scene to ascertain the downed crewmen's status and provide protection until CSAR forces arrive. During this process, the tanker will normally remain at altitude, relaying information where communications connectivity is easiest, and will refuel on scene forces as required. For more information on search and rescue, refer to AFDD 2-1.6 *Combat Search and Rescue.*

SUMMARY

Air refueling assets function in six distinct missions, each with unique characteristics and requirements. Air refueling forces perform each of these missions under varying environmental and threat conditions. They must be adequately trained and exercised to operate in coordination with other Service and allied/coalition tankers and receivers. Air refueling is in high demand across the spectrum of operations because it provides force enablement and force multiplication to each mission. Commanders must continually evaluate the allocation of tankers to these primary missions, and adjust the force mix to the combination that best fulfills the JFC's objectives.

CHAPTER THREE

COMMAND AND CONTROL

> ***There is no other science where judgments are tested in blood and answered in the servitude of the defeated, where the acknowledged authority is the leader who has won or who instills confidence that he can win.***
>
> **Bernard Brodie**

GENERAL

Command and control (C2) is based on the command relationships and control authorities set forth in the operation order (OPORD) for a given contingency or by direction of the Secretary of Defense when an OPORD is not issued. Effective C2 relationships and command lines of authority must be based on Air Force doctrine; doctrine that recognizes the airman's unique, theater-wide perspective. This chapter discusses the types of C2 for all forces, the transition from peacetime C2 to contingency operations, and C2 specifics for each of the missions.

Air refueling assets can be used in any of the primary or secondary missions, so centralized C2 is essential to effectively fuse the capabilities inherent in those missions. Air refueling's theater and global ranging capabilities impose theater and global C2 requirements, which can only be fulfilled through the integrating function of centralized command under a knowledgeable airman. *Centralized control and decentralized execution of air refueling forces are critical.* This C2 structure will allow concise guidance and organization.

Delegation of execution authority to responsible and capable lower-level commanders is essential to achieve effective span of control and to foster initiative, situational responsiveness, and tactical flexibility. Decentralized execution allows unit commanders to respond to unforeseen events that inevitably occur as a result of the 'fog and friction' of war.

TYPES OF COMMAND AND CONTROL

It is critical that commanders, planners, and operators understand the command relationships and control authorities associated with the employment of US forces. Using standardized terminology and structures facilitates rapid transition from peace to contingency and wartime operations. The following discussion is key to that understanding.

Combatant Command (Command Authority) (COCOM)

Forces are normally assigned to unified combatant commands and fall under the combatant command authority of that unified commander. The majority of the US Air Force's air refueling assets are assigned to the Commander in Chief, United States Transportation Command (USCINCTRANS), who exercises authority through the Commander, Air Mobility Command (AMC/CC), the air component commander. Mission requirements may dictate transferring ***operational control*** of air refueling assets to other functional or geographic CINCs.

Operational Control (OPCON)

Specified air refueling forces may be ***transferred and OPCON delegated to another CINC*** at the direction of the Secretary of Defense in response to a contingency or other long-term requirement that exceeds theater capabilities. This **ch**ange of **OP**CON is known by the acronym ***"CHOP"*** and the forces involved are ***"attached"*** to the supported CINC**.** The supported CINC will normally ***exercise*** OPCON of these forces through the functional or Service component commander. In this relationship, the supporting CINC is acting as a force provider to the supported CINC.

Tactical Control (TACON)

TACON is designed to provide control over individual tasks, sorties, or movements. As such, it should be delegated to the lowest level of execution authority. In some circumstances, AMC/CC may delegate TACON of air refueling assets and associated support forces to geographic CINCs on a sortie-by-sortie basis. This is warranted when completion of the mission is dependent on localized TACON, enemy threat to aircraft or personnel requires localized TACON, or local C2 elements require TACON in order to synchronize missions.

AIR REFUELING SUPPORT AND AIR REFUELING FORCES

Air refueling support is given to combatant commanders through either a support relationship, or by transferring air refueling forces to the combatant commander. Typically, air refueling support for intertheater operations is established through a support relationship. For intratheater operations, air refueling forces are normally attached via an OPORD, to a combatant commander.

SUPPORT RELATIONSHIP

The appropriate OPORD designates a supporting CINC and a supported CINC. The designation of supporting relationships conveys priorities to commanders and staffs planning or executing joint operations. The NCA is responsible for establishing clear command relationships between supported and supporting CINCs. When the supporting CINC cannot fulfill the needs of the supported CINC, either the supporting or supported CINC will notify the NCA for resolution.

For air refueling, AMC assets normally support either a functional or geographic CINC. Certain operations, however, that primarily involve air mobility forces (e.g., humanitarian assistance, disaster relief, uncontested noncombatant evacuation operations, etc.) may require the AMC/CC to act as the supported CINC.

The establishing directive for a support relationship will normally grant authority to the supported CINC to exercise general direction over the support effort. General direction includes designating and prioritizing objectives, stipulating the timing and duration of the supporting action, and other instructions necessary for coordination and efficiency.

The supporting CINC:

✪ Normally retains OPCON of assigned air refueling assets and associated support forces.

✪ Determines the forces, tactics, methods, procedures, and communications that will be employed in providing this support.

✪ Advises and coordinates with the supported CINC on matters concerning employment and limitations of air refueling support.

✪ Assists in planning for the integration of air refueling support.

✪ Ensures that air refueling requirements are appropriately communicated to, and understood by, the supporting CINC's air component.

✪ Ascertains the air refueling needs of the supported force and takes action to fulfill them within existing capabilities, consistent with priorities and requirements of other tasks assigned by the NCA.

Force Provider

The second method of providing air refueling support to combatant commanders is through the NCA attaching supporting CINC forces to the supported CINC. This is accomplished by ***transferring*** forces to the supported CINC, and will be specified in the OPORD or other directive from the NCA. The supported CINC then exercises OPCON of these forces through the Commander, Air Force Forces (COMAFFOR), who integrates these forces into an Air and Space Expeditionary Task Force (ASETF).

Multinational Relationships

Air refueling forces must be prepared for multinational military operations, however, differences in allied doctrine, organization, and equipment must be taken into account. Air refueling forces participating in multinational operations will be attached to an ASETF under a numbered air force commander who will be the COMAFFOR. An ASETF commander may be designated the COMAFFOR for small scale operations. Coordination with allied or coalition partners normally occurs at the JFACC or at the commander, joint task force (CJTF) level. The President may place appropriate US forces under the operational control of a competent United Nations (UN) commander for specific UN operations authorized by the Security Council.

ASSIGNED FORCES

The term "assign" is used for units or personnel placed in an organization where such placement is relatively permanent, and/or where that organization controls and administers the units or personnel when performing their primary functions. Public law requires that all forces, with certain exceptions, be assigned to a combatant command. The majority of air refueling forces are assigned to USTRANSCOM, with the remainder assigned to geographic combatant commanders to facilitate rapid response to contingencies in their theaters, and to meet recurring training and operational requirements.

ATTACHED FORCES

Air refueling forces that deploy for temporary periods of time in support of an operation will normally be attached to an ASETF. When attached to an ASETF, air refueling forces will normally fall under the OPCON of the supported combatant commander, and exercised through the JFACC/COMAFFOR. *Attached forces* will remain under the COCOM of their originating CINC. All force transfers must be approved by the NCA.

PEACETIME CONTROL OF AIR REFUELING FORCES

During peacetime, air refueling forces are controlled by the unified CINC to which they are assigned, through the unified commander's functional or Service air component. The functional or Service air component commander normally delegates OPCON of air refueling forces to the commander of an appropriate command and control agency. Geographic combatant commanders exercise OPCON through the air component commander who normally delegates OPCON to the AMOCC/CC. Figure 3.1 illustrates peacetime command relationships for controlling air refueling forces.

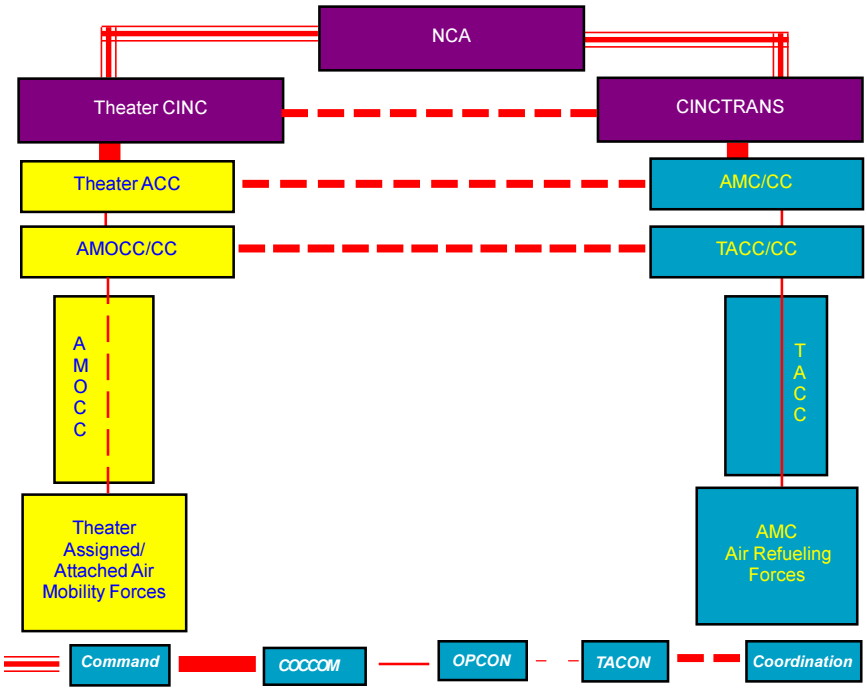

Figure 3.1. Peacetime Control of Air Refueling Forces

Air refueling requirements for training exercises or operational missions not associated with a contingency may exceed the capability of forces assigned to a geographic CINC. In these instances, the NCA may approve transfer of air refueling forces to the geographic commander for a specified period of time. These forces are typically attached to the existing air refueling wing structure and fall under the OPCON of the combatant command's functional or Service air component commander. If this augmentation occurs frequently, the supported geographic combatant commander should develop and maintain OPORDs to govern these situations.

Tanker/Airlift Control Center (TACC)

Air Mobility Command's primary command and control organization, the TACC is the central planning, scheduling, tasking, and execution agency for all operations involving AMC forces. The TACC provides the AMC Commander with the flexibility to quickly respond to time-sensitive requirements of United States forces and civilian agen-

TACC FUNCTIONS

- Plans and monitors air refueling missions to meet the requirements for National Command Authorities (NCA) Focal point for tanker special access required programs and airspace management.
- Primary responsibility for tasking units to support intertheater tanker requirements. Coordinates with AFRC and ANG on availability to support worldwide taskings.
- Sole source tasking agency for AMC air refueling augmentation to theater CINCs.
- Sources and directs employment of communications and computer assets for AMC air refueling mission support and theater augmentation.
- Directs the worldwide C2 of AMC and mobilized AMC-gained air refueling forces.
- Provides technical expertise to NCA and Joint Staff for air refueling support to unified commands and DOD agencies.
- Manages operational weather support for AMC operations.
- Provides logistics command and control for all missions in peacetime and contingencies.
- Directs 24-hour-a-day recovery support for not mission capable AMC aircraft away from home station.

Figure 3.2. TACC Functions

cies. The TACC is the single link between customers and operational air refueling units for AMC.

Air Mobility Operations Control Center (AMOCC)

Intratheater air refueling operations may be controlled by one of two command and control concepts. *The AMOCC is the theater air component commander's command and control layer for the planning, coordination, tasking, and execution of theater operations.* The air component commander will normally exercise OPCON of assigned or attached forces through the AMOCC. In theaters where an AMOCC is not established, the theater air component commander will establish an air refueling control organization to execute the required day-to-day duties.

TRANSITION TO CONTINGENCY OPERATIONS

In most instances, the combatant commander will convene his battle staff or crisis action team (CAT) to address the contingency. Once convened, the battle staff or CAT, along with augmenting Service and functional component commanders, formulate a course of action to the contingency based on the commander's guidance.

For USTRANSCOM, the TACC, along with HQ AMC's CAT, act as the key components to the supported combatant commander. These teams provide the supported combatant commander the vital air mobility information needed for him to make decisions during the formulation of a course of action. The TACC's role then becomes the executor and director of the supported CINC's intertheater air mobility plan. In addition to the course of action formulation, a JTF command structure starts to be formed. During this process, the CINC may designate a CJTF.

Commander, Air Force Forces (COMAFFOR) and Joint Force Air Component Commander (JFACC)

The most common organizational structure used for a JTF is the functional structure with component commanders appointed from each Service. The JFACC is responsible for all joint air and space forces/capabilities made available to him by the CJTF.

Regardless of the organizational structure used, the Air Force will always designate a senior Air Force officer within the JTF as the COMAFFOR with responsibility for managing all assigned and attached US Air Force

COMAFFOR/JFACC RESPONSIBILITIES

FOR AIR REFUELING

- **Organize a JFACC staff manned with personnel from each component to reflect the composition of air capabilities/forces controlled by the JFACC.**
- **Prepare an aerospace estimate of the Situation to support the JFC's estimate.**
- **Develop and recommend courses of action to the JFC.**
- **Develop a joint aerospace strategy and operations plan that states how the COMAFFOR/JFACC plans to exploit aerospace capabilities to support the JFC's objectives.**
- **Make air apportionment recommendations to the JFC.**
- **Task, plan, coordinate, and allocate the joint aerospace capabilities/forces made available to the JFACC by direction of the JFC.**
- **Control execution of current joint aerospace operations to include:**
  - **Strategic attack.**
  - **Intratheater air mobility.**
- **Coordinate:**
  - **Combat search and rescue.**
  - **USTRANSCOM air mobility support.**
  - **SOF operations with the joint special operations task force/joint force special operations component commander.**
- **Direct intratheater air mobility operations (airlift and air refueling) and coordinate them with intertheater air mobility operations.**
- **Function as the supported commander for strategic attack.**
- **Act as airspace control authority (ACA), if so designated.**
- **Act as area air defense commander (AADC), if so designated.**
- **Perform combat assessment of joint aerospace operations at the operational and tactical levels.**
- **Conduct joint training, including the training, as directed, of components of other Services in joint operations for which the COMAFFOR/JFACC has or may be assigned primary responsibility, or for which the Air Force component's facilities and capabilities are suitable.**

Figure 3.3. COMAFFOR/JFACC Responsibilities

assets. If the JTF is organized along Service lines, the COMAFFOR will command all Air Force forces. When organized along functional lines, the JFACC normally comes from the Service providing the preponderance of air and space assets and the means to control and direct their employment. If the JFACC comes from the Air Force, the COMAFFOR will normally be dual-hatted as the JFACC. **The COMAFFOR/JFACC will normally exercise OPCON of all air refueling forces attached to the JTF.** If another service provides the JFACC, the COMAFFOR will relinquish TACON of assigned forces to the JFACC, as directed by the CJTF. The JFACC has overall responsibility for the conduct of the air campaign and for integrating combat, combat support, and air mobility efforts in support of CJTF objectives. The JFACC is the final authority in resolving differences or conflicts between the combat, combat support, and air mobility efforts.

Aerospace Operations Center (AOC)

The COMAFFOR/JFACC requires a robust C2 organization to support the number and intensity of air operations associated with most contingencies. This organization, the AOC, is composed of divisions with core teams and numerous specialty teams who are responsible for the planning and execution of the JFACC's objective. Figure 3.4 shows the alignment of the AOC with regard to the JFC, the COMAFFOR/JFACC, and the forces attached to the theater. It is important to note that the COMAFFOR/JFACC controls combat and combat support forces through the AOC Director and the Strategy, Combat Plans, and Combat Operations Divisions. *The COMAFFOR/JFACC controls air mobility forces (air refueling and airlift) through the DIRMOBFOR and the Air Mobility Division.*

The AOC director provides direction to the AOC's Strategy, Combat Plans, and Combat Operations Divisions, and has overall responsibility for the aerospace assessment, planning, and execution process. ***The DIRMOBFOR provides direction to the Air Mobility Division (AMD) and is responsible for coordinating all air mobility functions and for integrating air mobility into the air and space assessment, planning, and execution process.*** The AOC director is responsible for producing the air tasking order (ATO) and airspace control order (ACO). As such, the AOC director establishes guidelines, processes and procedures required to produce these documents through the aerospace three phase process. The AOC director is also responsible for organizing the personnel and equipment that will be located on the AOC floor.

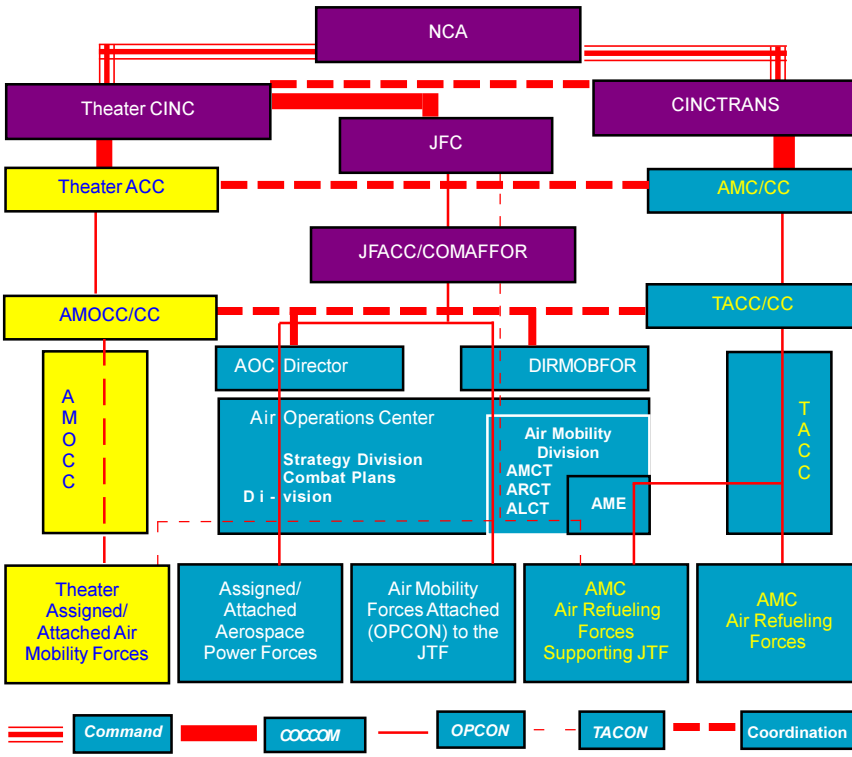

Figure 3.4. Command and Control for Air Refueling Forces Attached to the JTF

The DIRMOBFOR is responsible for providing air refueling inputs to ATO and ACO development. *The DIRMOBFOR must be an expert in the employment of both air refueling and airlift to ensure that air refueling forces are used effectively and efficiently.*

Director of Mobility Forces (DIRMOBFOR)

The DIRMOBFOR should be a senior officer familiar with the AOR and should have experience in both intratheater and intertheater air mobility operations. The DIRMOBFOR for a given operation is selected by the combatant commander, or his designated authority, and may be sourced by the theater Air Force component commander or nominated by the AMC Commander.

In this capacity, the DIRMOBFOR provides direction for intertheater air refueling missions within the deployed area of operations and is the primary interface for intertheater air refueling and intratheater opera-

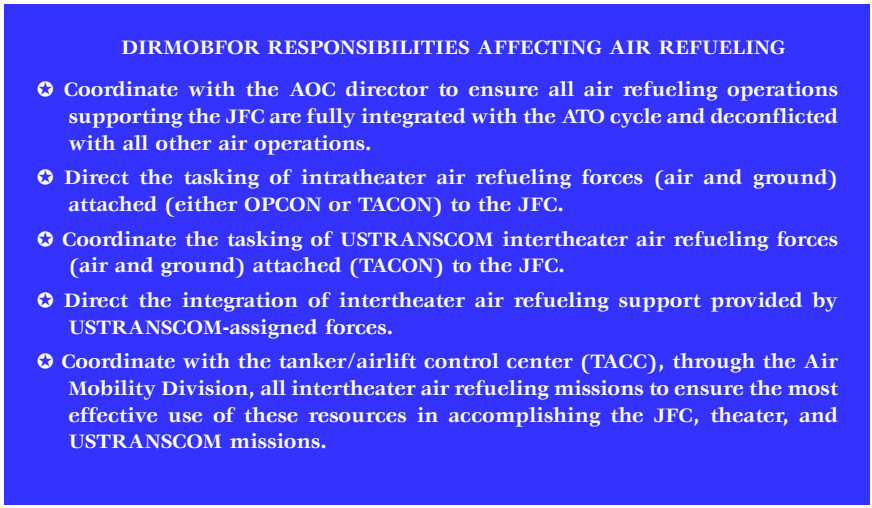

Figure 3.5. DIRMOBFOR Responsibilities Affecting Air Refueling

tions. The DIRMOBFOR is the JFACC's primary advisor for tanker allocation and apportionment decisions and for developing an air refueling CONOPs for the JFACC's air campaign plan. The DIRMOBFOR ensures that air refueling assets are used efficiently and effectively in support of both JFACC and JFC objectives.

In order to achieve unity of effort, the DIRMOBFOR must coordinate with the AOC director to ensure all air mobility operations supporting the JFC are fully integrated with the ATO cycle and deconflicted with other air operations. The DIRMOBFOR's primary agency for this process is the Air Mobility Division of the AOC.

Air Mobility Division (AMD)

The Air Mobility Division plans, coordinates, tasks, and executes the JTF's air mobility mission which includes air refueling operations. The AMD is one of the notional divisions of the AOC, and is directed by the DIRMOBFOR. The AOC director ensures the AMD integrates with the other divisions of the AOC in the air and space assessment, planning, and execution process. The AMD coordinates with the theater AMOCC, if established, and the AMC TACC as required to derive apportionment guidance, to compute allocation, and to collect requirements. As directed by the DIRMOBFOR, the AMD will task attached intratheater air refueling forces through wing and unit command posts when those forces operate from permanent bases or through wing operations centers if forward deployed.

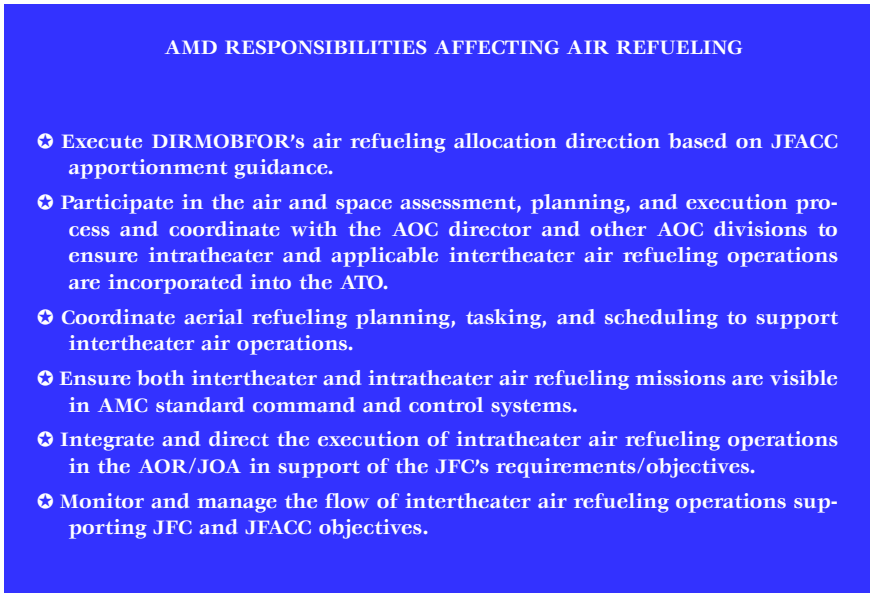

Figure 3.7. AMD Responsibilities Affecting Air Refueling

The AMD is normally divided into three teams and one element: Air Refueling Control Team (ARCT), Airlift Control Team (ALCT), Air Mobility Control Team (AMCT), and Air Mobility Element (AME). Together, the AMD conducts eighteen different functions associated with managing the air mobility mission for the JFACC. The DIRMOBFOR, in conjunction with the AOC director and JFACC, may adjust the AMD's organizational structure and distribution of functions to better interface with planning and execution functions in other AOC divisions in order to meet JFACC requirements.

Air Refueling Control Team (ARCT)

An ARCT within the AMD is responsible for planning, tasking, and executing all air refueling missions employing tankers attached to the JTF. As the DIRMOBFOR's primary advisor for air refueling operations; the ARCT chief is responsible for monitoring all AOC air refueling activity in order to provide the DIRMOBFOR visibility on the total tanker effort. The ARCT chief coordinates with tanker sections to monitor combat and combat support air refueling activity for the DIRMOBFOR and to jointly prepare the CONOPS for tanker utilization. The CONOPS include provisions for emergency air refueling.

Intertheater Air Refueling Operations. The ARCT reports to the AMD chief and the DIRMOBFOR. ***It develops all intertheater air refueling missions using JTF-attached aircraft and is responsible for integrating these missions into the ATO and the standard AMC command and control systems.*** These may include global attack, deployment support, and air bridge missions. If required, this section may also plan tanker missions supporting intratheater airlift requirements in close coordination with the Airlift Control Team. The AMCT then executes all ARCT-planned missions. If changes occur during the execution phase, this branch will coordinate with the combat operations division to divert tanker assets or generate standby capability to support new intertheater refueling requirements.

Tanker/airlift control element (TALCE) forces provide connectivity with the TACC.

Intratheater Air Refueling Operations. ***Intratheater air refueling requirements are derived within the combat plans division and executed by the combat operations division in accordance with JFACC guidance.*** An intratheater air refueling plans section collocated with the combat plans division develops combat support air refuelings within the ATO production process. An air refueling operations branch collocated with the combat operations division executes combat support air refueling missions published in the ATO. If changes occur during execution, this branch will divert tanker assets or generate standby capability to support new intratheater refueling requirements after coordination with the AMCT.

CONTINGENCY OPERATIONS

Special attention is needed to balance air refueling resources with national requirements and priorities. Normally, ***intratheater*** air refueling forces will be transferred to the JFC with OPCON or TACON delegated to the COMAFFOR/JFACC and executed through the DIRMOBFOR and the Air Mobility Division of the AOC. Air refueling forces performing ***intertheater*** operations will normally be executed through the TACC/CC. When coordination with the JTF is required to conduct intertheater air

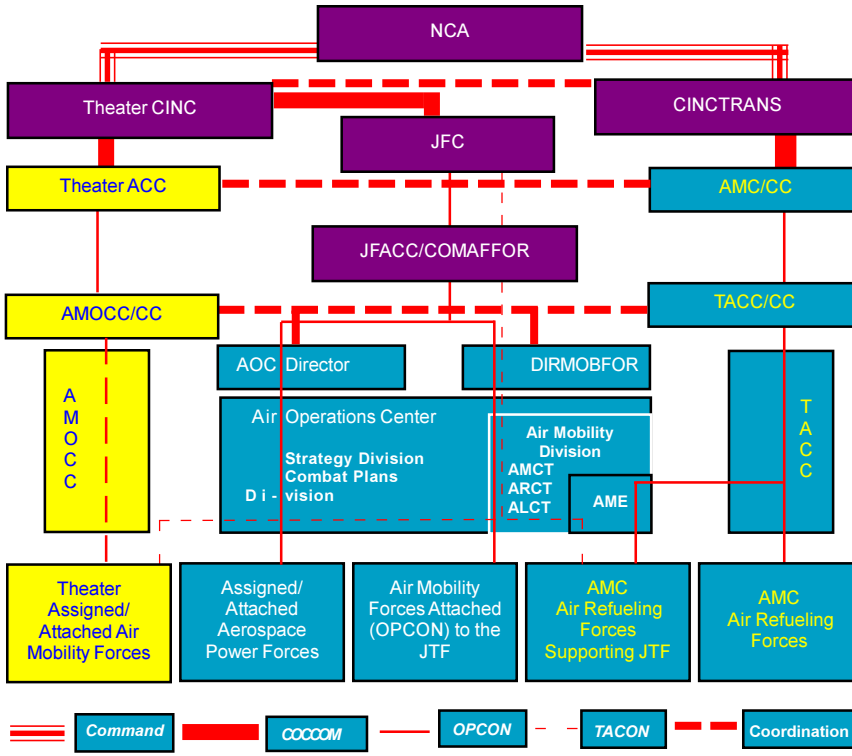

Figure 3.8. Control of Air Refueling Forces During a Contingency

refueling operations, the AME in the AMD acts as a forward extension of the TACC to affect all required coordination within the JTF. These relationships are depicted in Figure 3.8.

Once attached to an ASETF, air refueling forces will normally remain under the OPCON and TACON of the same ASETF for the duration of the contingency. However, a JTF mission will often require air refueling augmentation by AMC assets. In some circumstances, a very limited number of AMC air refueling assets may be transferred to the JFC on a short-term, per-sortie basis. The JFACC will exercise TACON over this force through the DIRMOBFOR and AOC. This procedure can also apply to theater-assigned air refueling forces not allocated to the JTF. Figure 3.9. illustrates the command relationships for this short-term transfer.

Intratheater Air Refueling Operations

All intratheater airpower operations are planned, tasked, and executed by the AOC through the aerospace assessment, planning, and execution process.

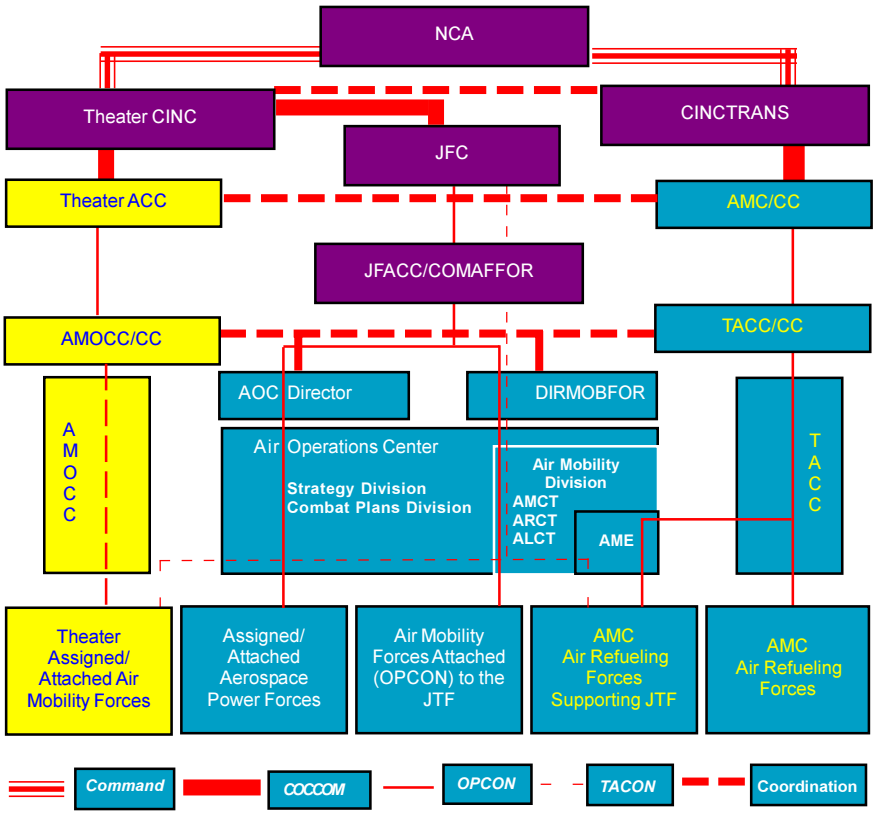

Figure 3.9. Tactical Control of Intertheater and Intratheater Air Refueling Forces Performing Intratheater Air Refueling Operations

This process relies on an integrated team concept, utilizing individuals from various areas of expertise. This concept breaks down information barriers between traditional AOC cells by placing experts in integrated teams to accomplish strategy development, operational-level assessment, detailed planning, ATO production, and execution functions. The process is not so rigid that it precludes making real-time changes as circumstances dictate, but rather it is flexible enough to react and respond in dynamic environments. A key advantage of the integrated team concept is that a single leader has oversight over the outputs and processes of each step in the assessment, planning, and execution process.

Assessment. *The assessment phase is where commanders conduct operational environment research and develop courses of action.* The ARCT and AMD chief should continually evaluate air refueling resource constraints,

tanker utilization efficiency, and the overall operational effectiveness of tanker usage. This assessment should provide the basis for further refinement or development of a revised air refueling CONOPS or for changes in tanker allocation between intratheater functions or between intratheater and intertheater priorities.

Planning. *This phase begins with the commander providing broad planning guidance and objectives and a vision of what will constitute military success in the given contingency.* The commander also defines the intent of the operation or campaign and sets priorities. The commander's guidance and objectives will identify broad categories of tasking priorities, planning guidance, procedures, appropriate maneuver and movement control, rules of engagement, AO boundaries, command relationships and supported/supporting roles between commanders. This guidance will also include the air refueling apportionment decision.

Planning is an interactive process. Tasks/targets are nominated to support the commander's objectives and priorities. All potential tasks/targets are developed by cross- functional planning teams, which identify, prioritize, and select specific tasks while considering available resources.

Detailed planning of air refueling assets against receiver requirements ensures the JFC's objectives are met.

In accordance with the commander's objectives and coalition or component requirements, the operations staff will develop the necessary plans to employ capabilities and forces. Air refueling assets are matched against receiver requirements to ensure all objectives can be met as planned. The final prioritized taskings and targets are then included in a Master Air Attack Plan (MAAP) which forms the foundation of the air tasking order. After the commander approves the MAAP, teams finalize the ATO, special instructions (SPINS), and the ACO. The end product of the planning phase is an ATO, an Air Defense Plan, and a prioritized list of tasks/targets with planned time of execution.

One of the most important considerations during the planning phase is the availability of air refueling. Tanker availability can have an important impact on allocations for deep strike missions and for the timing and tempo of all airpower operations. *When air refueling capability is limited, combat/combat support planners must work closely with air refueling planners to ensure accurate and realistic receiver fuel requirements are met, in order to meet the commander's priorities. It is imperative that air refueling planners provide the best match between tanker capabilities and receiver mission requirements in order to maximize overall mission accomplishment.*

Execution. *Component and supporting commanders are responsible for executing the ATO as tasked and for recommending changes, as appropriate, given emerging JFC and component requirements.* The JFACC will direct execution of the ATO and deconflict all aerospace forces and capabilities made available by the JFC. **During execution, the JFACC is the command authority for revising the tasking of joint air capabilities/forces, unless that authority is delegated to subordinate execution control elements.** The AOC is also charged with coordinating and deconflicting changes with the appropriate control agencies or components.

Aircraft or other capabilities/forces not apportioned for tasking, but included in the execute order for coordination purposes, such as intertheater air refueling and airlift sorties, will be redirected only with the approval of the respective component commander or designated senior liaison officer. It is essential, however, that all affected commanders and forces be notified of all redirected missions impacting their execution operations or planning.

The JFACC relies on the DIRMOBFOR and the AMD to provide coordination and deconfliction between intertheater air mobility missions and theater

employment missions. **The DIRMOBFOR must also ensure that aircrews performing intertheater air mobility missions are provided the most current copies of the theater SPINS and ACO.** Authority to redirect intratheater air refueling sorties should be delegated to the AOC director as these changes will normally be driven by changes in the receiver's mission. Authority to redirect intertheater air refueling sorties, however, should be delegated to the DIRMOBFOR who has the best visibility over the impact such changes will have. When redirecting intertheater missions executed by the TACC, the AME will obtain TACC approval prior to redirecting the sortie.

Intertheater Air Refueling Operations

Intertheater air refueling operations include operations from CONUS or fixed en route locations supporting intertheater movements that involve the air refueling of assets moving between theaters. Tankers can provide air refueling support for airlift aircraft moving along an air bridge, bombers engaged in intertheater global attack missions, or to other tankers escorting deploying fighters. During these operations, air refueling forces normally remain under the OPCON and TACON of AMC/CC, or geographic CINC. The TACC/CC normally has execution authority over AMC intertheater forces, while the AMOCC/CC or theater equivalent will normally execute their theater forces for these types of missions.

Air refueling operations that include tanker movement between theaters normally involve concurrent action by combat assets that are under the OPCON of the JTF commander, and air mobility forces under the OPCON of AMC/CC or theater CINC. During the transit between theaters, AMC/CC will normally exercise TACON over the mission until it reaches the boundaries of the JTF commander's JOA or the geographic commander's AOR. Upon entry into the JOA/AOR, the JFC will assume TACON of those forces in the flight that have been "chopped" to the JTF. In special circumstances, the JFACC can exercise TACON over intertheater air refueling assets entering the JOA/AOR when

KC-10 and B-52. Air refueling increases an aircraft's range and is crucial for global attack missions.

localized control is necessary to complete the mission, to synchronize tanker movements with theater operations, or when necessary to protect the air refueling force from enemy threats. TACON of intertheater air refueling assets will be exercised through the DIRMOBFOR with appropriate notification to (and approval, if time permits) the TACC/CC or AMOC/CC. The DIRMOBFOR will normally direct these forces through the ARCT of the AMD.

Operations Primarily Involving Air Mobility

Throughout the spectrum of operations involving aerospace power, some may only require air mobility assets to meet the commander's objectives. Three examples of this are humanitarian assistance, disaster relief, and noncombatant evacuation operations. Combat and combat support assets may only be needed in these operations as a guard against hostile actions, to provide covering fire, or to meet ISR requirements. In this instance, the combat/combat support assets act in a supporting role for the main air mobility effort. In operations primarily involving air mobility, there may be insufficient combat activity to warrant formation of a full AOC. In this case, the JFACC could be the senior air mobility officer and could dual-hatted as the DIRMOBFOR. The AOC would consist primarily of an AMD and sufficient other expertise to control all air mobility operations to produce an ATO and to manage the few required combat sorties.

This arrangement can also be used in a rapid reaction situation where forces are deployed to a theater prior to the formation of an AOC. The DIRMOBFOR will act as the COMAFFOR/AOC director to direct initial deployment actions until the designated COMAFFOR, AOC director and appropriate staff arrive. In operations where a JTF is not formed and combat/combat support assets are not required, a DIRMOBFOR and AME may be sufficient to handle the contingency.

COMMAND AND CONTROL FOR SPECIFIC AIR REFUELING MISSIONS

Each mission of air refueling operations introduces unique C2 relationships and problems. Tanker aircrews must be thoroughly versed in the nuances of each of these missions in order to operate effectively in a dynamic wartime environment.

SIOP Support

The Air Force is responsible for organizing, training, and equipping tanker and bomber forces for nuclear operations, major commands (MAJCOMs) and numbered air forces (NAFs) oversee the day-to-day operations of these forces. All of these forces have conventional missions supporting theater CINCs in addition to their nuclear role supporting USSTRATCOM. Task Force (TF) Tanker consists of command elements from Fifteenth Air Force and forces from various units in AMC, ANG and AFRC, while Task Force Bomber includes those organizations in the Eighth Air Force that are assigned a nuclear mission. Comparable task forces exist for the Air Force's intercontinental ballistic missiles (ICBMs) and operational support forces.

Because of their capability to conduct conventional missions, COCOM for tankers and bombers is given to USTRANSCOM and USACOM respectively. Day-to-day, these combatant commanders exercise OPCON through their respective Service force providers (AMC for tankers). ***When forces are tasked to prepare for nuclear operations, the NCA will transfer these forces to USCINCSTRAT who will normally exercise OPCON through the task force commanders.***

Global Attack Support

As the Air Force increases its reliance on CONUS-based forces, global attack capabilities and readiness will concurrently increase in importance. Combat and tanker assets may be under the operational control of one command and may fly through the AOR of another command, even though the mission will be conducted in the AOR of a third command. Because of this, command relationships and controlling C2 agencies for such missions must be thoroughly explained in the execute order for the mission.

Combat forces in the CONUS are under the OPCON of their assigned command, USACOM, during peacetime and may continue that relationship during a global attack mission. The NCA may, however, transfer these forces to the combatant commander responsible for a contingency, even though those forces remain in the CONUS. Known as "reachback", the JFC can utilize this concept to task assets not located within the theater to fly global attack missions in support of the theater.

For missions conducted at the outset of a contingency, or those conducted as a show of force prior to the outbreak of a contingency, tankers

TANKER ROLE IN B-52 AIR STRIKE DURING GULF WAR

On 16 Jan 1991, seven B-52s from Barksdale Air Force Base, LA took off to deliver 35 air-launched cruise missiles (ALCMs) against targets in Iraq. These B-52s delivered their payloads against strategic targets within Baghdad. The targets the B-52s went after were Iraqi communications, power generation and transmission facilities. These missions would not have been possible without the air refueling support of tanker aircraft.

The package of the seven B-52s flew over 14,000 miles, round trip between Barksdale Air Force Base, LA, and Southwest Asia in 35 hours. This was the longest combat air mission in history. Forward-located aircraft and aircrews in the US, the Azores, and Spain provided the air refueling support.

The tankers offloaded five million pounds of fuel both in pre-strike and post-strike air refuelings, which insured their operational success. This display of airpower showed the world the US. could project power anywhere at anytime. These types of global projections of airpower cannot be done without the force enabler and force multiplier concepts tanker aircraft provide, making them a vital operational tool.

must be forward deployed allowing enough time to land and reconstitute prior to supporting the global attack mission. Another option is to use theater assigned or attached tankers, under the control of the respective theater commander, to support the mission.

The greatest difficulty involved with global attack missions is in providing secure, positive control over the attack force during the intertheater transit portion of the mission. Due to the high profiles normally associated with these types of missions, the JFC must be given the ability to stop or divert a global attack mission at any point along the route of flight. Command and control during mission cancellations or diverts is especially important since political sensitivities associated with a conflict can seriously limit the number of countries the attack force can overfly or land at. For these reasons, the designated command and control agency must have a communications system capable of positive control over forces anywhere in the world. This system must be capable of providing secure communications to not give up the element of surprise. In addition, aircrews must thoroughly understand who will be exercising command and

control of the mission through every phase and the procedures that will be used to ensure positive control.

If tankers are used to escort the global attack force to the AOR (e.g. fighter-type aircraft), the lead tanker will normally be responsible for the flight and the AMC/CC will exercise TACON over the mission until it reaches the boundaries of the JFC's AO or the geographic commander's AOR. Upon entry into the JOA/AOR, the CJTF will normally assume TACON of forces in the flight that have previously been transferred to the JTF.

If the attack force does not require tanker escort (long-range bomber or airlift aircraft), the CJTF may exercise TACON over the entire mission provided the JTF has a communications system capable of ensuring connectivity with the NCA and the attack force for the duration of the flight. AMC can provide this capability if the CJTF has not yet been established or does not have the required communications system capability. Tankers providing en route air refueling support to the attacking force should be under the TACON of the same control authority as that exercising TACON over the attack force.

Air Bridge Support

Air refueling support along an air bridge is primarily provided to airlift aircraft. Command and control of AMC tankers is also exercised by USCINCTRANS through the TACC. Air mobility ground elements supporting the tankers must maintain constant coordination with the TACC to ensure tankers have the most current information on traversing airlift missions. They must ensure that air refueling airspace has been approved by appropriate air traffic control organizations. These ground elements provide crucial updates on airlift aircraft status to the AMD of the AOC. The AMD uses this information to integrate the intertheater airlift flow with intratheater operations.

Deployment Support

Deployment support can be complex due to the number of theater commands involved and the critical nature of wartime aerial deployments. To ensure expeditious deployment in such circumstances, command re-

Support of combat aircraft, such as these F–16s, is the primary mission of attached air refueling assets.

lationships, controlling agencies and coordination procedures must be clearly understood by all those involved in the deployment.

Since deployment support is essentially a mobility operation, control of the deployment missions should normally reside with the AMC TACC. For deployments of long range combat or combat support aircraft, control of those assets may remain with the theater air component of either the gaining or losing unified command. Airspace constraints, enemy threats, or synchronization of the local air traffic flow may make it more advantageous to transfer control of the deploying force and their accompanying tankers to the CJTF upon entry into the JTF's AO/AOR.

In the opening days of a contingency, getting combat and combat support forces deployed to the theater is one of the Air Force's top priorities. It is extremely important that all required agencies, organizations, and procedures are in place prior to the start of open conflict. Therefore, anticipated processes and procedures used in wartime should be the same as those used for the peacetime deployment of forces.

Theater Support

The salient principle with regard to command and control of air refueling forces supporting theater operations is that to be effective, airmen must control these assets. Whether limited by ramp space, air refueling airspace, or by sheer numbers, any major conflict will likely be limited in the number of tanker assets that can be utilized for theater support. The assets that are available must therefore be used as efficiently as possible. The addition of the AMD under the direction of the DIRMOBFOR in the AOC adds to this efficiency.

Special Operations Support

SOF missions are typically classified in order to prevent compromising the activity. C2 arrangements are also kept classified. US Special Operations Command (USSOCOM) maintains liaison officers at appropriate levels of command to ensure SOF missions are deconflicted with other friendly operations. Normally, a JTF will include a joint special operations component, which exercises OPCON over SOF forces assigned or attached to the theater. The joint force special operations component commander will provide a special operations liaison element to the JFACC to coordinate all SOF missions within the AOR.

OTHER MISSIONS OF AIR REFUELING

Emergency Air Refueling

The DIRMOBFOR, in support of the COMAFFOR/JFACC, should develop an emergency air refueling plan to be published in the SPINS and ACO. If available, an AWACS aircraft should be utilized to coordinate emergency air refuelings in time-critical situations.

Emergency air refuelings for intertheater operations are highly situation dependent. Time permitting, aircrews should attempt to contact an AMOCC if operating in either the USEUCOM or USPACOM AORs, or the AMC TACC if outside these AORs. In extreme emergencies, air refuelings can be arranged by unit command posts with the assistance of local air traffic control authorities. Tanker aircraft should always monitor GUARD frequency for emergency air refueling calls, especially during transoceanic flights.

EMERGENCY AIR REFUELING

While most emergency refuelings involved US Air Force fighters, there were some with US Navy aircraft. One such occasion, the Gulf of Tonkin turned into perhaps the most complex and spectacular refueling ever accomplished. It started during the routine refueling of two F-104s when the tanker received word to intercept two Navy aircraft almost out of fuel. Periodically refueling the two F-104s that went along to provide cover, the tanker successfully rendezvoused with the two Navy A-3 tankers, one with only 3 minutes of fuel (both had fuel aboard which they could transfer but couldn't use themselves). After taking on a small amount of fuel from the KC-135 the first Navy tanker pulled away and allowed the second A-3 to hook up. As this tanker took on fuel, two Navy F-8's came into the area for emergency refueling. One was so low on fuel that it could not wait for the A-3 tanker to complete its own refueling from the KC-135. Concurrently with this unprecedented trilevel refueling, the first A-3 serviced the second F-8 and then returned to the KC-135 for additional fuel.

In the midst of this emergency, the KC-135 was informed of two Navy F-4s with insufficient fuel to return to their carrier. After refueling the two F-104s again, the KC-135s own fuel supply was so low that it could not return to its home base and had to land at an alternate base in South Vietnam, but not before refueling the two F-4s. For this amazing series of life-saving refuelings, Major John H. Casteel and his crew received the 1967 Mackay Trophy, presented annually for the most meritorious USAF flight of the year.

US Air Force in Southeast Asia, 1961-1973,
an Illustrated Account

Airlift

Command and control of airlift forces is accomplished using the guidelines listed above. An exception to this occurs when tankers perform dual role missions. *When performing airlift and air refueling on the same sortie, the air refueling portion will normally take precedence since the airlift portion typically occurs as a result of the deployment support air refueling.*

Another exception occurs when tanker aircraft perform aeromedical evacuation airlift. ***Aeromedical evacuation sorties are controlled through***

the Global Patient Movement Requirements Center (GPMRC) and Theater Patient Movement Requirements Centers (TPMRC). These centers normally establish an Aeromedical Evacuation Control Center (AECC) within the AOC to coordinate airlift support for AE, and to integrate AE missions with other intratheater operations. For more information on airlift C2, see AFDD 2-6.1, *Airlift Operations.*

SUMMARY

Command relationships establish both a clear chain of command and a systematic means of controlling forces. A thorough understanding of these relationships is crucial to accomplishing the commander's objectives. Unity of command must be the foundation for C2 arrangements. Personnel performing command functions must possess professional mastery over the assets they are controlling. Because of its diverse missions, command and control of air refueling assets presents unique challenges to commanders and operators. All personnel having an impact on this important function must possess an accurate knowledge of the command and control processes and procedures for executing the air refueling mission.

CHAPTER FOUR

PLANNING AND SUPPORT CONSIDERATIONS

> ***To be prepared for war is one of the most effectual means of preserving peace.***
>
> **George Washington**

PRIMACY OF THE OBJECTIVES

The judicious use of tankers requires attention to several planning and support issues, which are fundamental to efficient and effective air refueling operations. Thoroughly addressing these issues will allow maximum utilization of air refueling assets and will minimize the number of unsupported user requests. These issues impact tanker employment all the way from the allocation and apportionment stage through final execution.

The objective is the first consideration in the use of any military asset. Directing military operations toward a defined and attainable objective contributes to strategic, operational, or tactical aims. In application, this principle refers to unity of effort. Success in military operations demands that all efforts be directed toward the achievement of common aims. A clear national military strategy provides focus for defining campaign or theater objectives. At the operational level, campaign or theater objectives determine military priorities. *Air refueling is tasked against missions supporting the entire spectrum of national, strategic military, and theater objectives.*

Tankers attached to a JTF and flying intratheater missions will primarily support JFC objectives. Tankers however, must be made available to support all objectives based on the highest priority. For example, commanders may have to pull tankers off intratheater missions to support intertheater missions of higher priority, or vice versa. Providing assets to support the different levels of objectives, strategic, operational, or tactical, is accomplished through allocation and apportionment. As the air mobility expert in the theater, and the "designated coordinating authority

for air mobility with all agencies both internal and external to the JTF" [AFDD 2, *Organization and Employment of Aerospace Power*], the DIRMOBFOR should be the JFACC's primary advisor for all apportionment and allocation decisions affecting air refueling.

FORCE APPORTIONMENT AND ALLOCATION

Apportioned Forces

Force apportionment refers to the distribution of resources for planning purposes. *Air apportionment refers to the determination and assignment of the total expected air effort by percentage and/or by priority that should be devoted to the various air operations and/or geographic areas for a given period of time.* During contingencies, the wide ranges of air refueling missions require different apportionment considerations at strategic and operational planning levels.

Peacetime Apportionment. During peacetime, air refueling support is apportioned to MAJCOMs based on tanker aircrew training requirements, receiver training requirements, and anticipated operational missions not associated with contingencies. Fiscal limitations force MAJCOM and unit planners to closely monitor tanker availability and aircrew training status to ensure training requirements are met. It also forces MAJCOM and unit schedulers to make maximum use of all air refueling support provided during peacetime.

Contingency Apportionment. Competing priorities can significantly limit the amount of air refueling support available. This competition occurs at the strategic level where other contingencies or conflicts also require air refueling forces and at the operational level where different airpower functions compete for limited tanker support.

The JFACC's apportionment decisions affect every level of conflict.

At the strategic level, the NCA apportions forces based on the advice of the Joint Chiefs of Staff and the combatant commander. ***In-***

cluded in this apportionment are the number of assets provided to the combatant commander for intratheater air refueling operations, as well as the percent of effort, or overall sorties, the supporting CINC will provide to the supported CINC for intertheater air refueling operations. Apportionment decisions are greatest when two or more contingencies compete for limited air refueling assets. The NCA must consider overall end-state objectives, status of each conflict, and the ability to swing tankers from one conflict to another. While the US Air Force's total air refueling capability is based on force apportionments that meet the requirements of two nearly simultaneous major theater wars, air refueling capability for lesser conflicts may be less when ANG and AFRC forces are not mobilized.

At the operational level, commanders must apportion air refueling sorties among the different airpower functions involved in a campaign. As in the case of DESERT STORM, intratheater air refueling capabilities did not meet all the requirements. In this case, apportionment provides general guidance to planners in the form of number or percentage of sorties that should be dedicated to specific functions. *Apportionment of air refueling sorties should roughly follow the apportionment of combat and combat support sorties.* As a campaign is fought, the JFACC will continually adjust sortie apportionment based on progress made toward the end-state objectives. The JFACC will also make adjustments to the apportionment based on advice from the AOC director and DIRMOBFOR on the best use of tanker assets.

Allocated Forces

Force allocation is the distribution of limited resources among competing requirements. *At the strategic level, it consists of providing a set level of effort through a support relationship, or transferring a given force to the supported combatant commander for attachment to a subordinate unified command or joint task force. At the operational level, it consists of translating the JFACC's air apportionment decision into total numbers of sorties, by aircraft type, available for each operation or task.* Just as in force apportionment, force allocation procedures differ between peacetime and contingencies, and at the strategic and operational levels.

Peacetime Allocation. The peacetime allocation of air refueling assets is based on force apportionment for training but is regulated by the Joint Chiefs of Staff (JCS) Priority System. Air refueling forces must be

equally responsive to all Service requirements. The JCS Priority System is a means of rank ordering all receiver requests for air refueling based on the receiver's mission priority.

Unified commands assign priority codes to all air refueling requests emanating from their assigned or attached forces and forward them to USTRANSCOM for validation. Validated requests are then passed to the AMC TACC for tasking. AMC will task its assigned or gained units to fill validated requests in the order specified by the JCS Priority List. AMC may ask theater air components with assigned or attached tankers to provide air refueling support to missions within the component's theater. Geographic commands delegate mission validation responsibility to the theater AMOCC, if established. Validated air refueling missions are then tasked to theater assigned or attached air refueling assets.

Contingency Allocation. *At the strategic level, contingency force allocation refers to the number of assets or missions actually provided to support operations, either through a support relationship or through force transfer. At the tactical level, allocation refers to the actual percentage of missions assigned against a specific airpower function.*

Tankers are devoted to a contingency based on commitments already made for air refueling support elsewhere. In the case of two major theater wars, the decision is extremely difficult because there will not be enough tankers in the US Air Force inventory to support a total air effort in both theaters for the entire length of a conflict. A solution to this dilemma is that most war plans call for tanker assets to "swing" from one theater to another based on the most pressing needs. Typically, air refueling requirements peak during the transition from the deployment/build-up stage to the sustainment/employment stage. As the first supported conflict transitions into the sustainment/employment phase, excess air refueling capabilities can swing to the other theater. While this concept is premised on two major theater wars, it is just as applicable whenever air refueling assets are limited, such as low intensity conflicts in which ANG and AFRC assets are not mobilized.

While the NCA must allocate forces to separate contingencies, they must also allocate forces within a contingency. Of the total air refueling capability allocated to a given contingency, a portion of that capability must be allocated to the deployment effort and another portion must be allocated to the employment effort. The portion allocated to the deployment effort will normally remain under the OPCON of AMC/CC to

provide air bridge and deployment support. The portion allocated to the employment effort will normally CHOP to the combatant command and be attached to the appropriate ASETF.

The final consideration in making allocation decisions is the number and type of assets to be used. This entails matching the right air refueling capabilities against accurately forecasted air refueling requirements.

Once receiver requirements are known, planners can match air refueling assets against those requirements. ***The most important consideration is to ensure that allocations are based on capabilities and not sheer numbers.*** Different tanker weapon systems possess different capabilities. Within a weapon system, modifications that may only be installed on a few aircraft may dictate a particular force mix, which includes that model airframe. Four key factors for planners to consider in this step are:

US Navy receiver aircraft using drogue air refueling procedures.

✪ **Boom verses Drogue.** If planned operations will include a significant number of receivers requiring probe-and-drogue type refueling intermixed with receivers requiring boom-type refueling, planners should consider using tankers capable of both types of refueling on the same mission.

✪ **Total Offload verses Booms in the Air.** Planners must consider whether planned operations will emphasize total offload capability for only a few receivers or a rapid refueling capability for multiple receivers. If total offload capability is more important (such as for heavy receivers), fewer numbers of tankers with larger fuel loads should be planned. *If the mission emphasis is on frequent, rapid refuelings to multiple receivers (such as multiple fighter strike packages), it is more effective to use a larger numbers of tankers maximizing the number of available 'booms in the air.'*

✪ **Utilization Rate (UTE) and Length of Activity.** Planned utilization, or UTE rate, and length of planned activity will impact both the number of aircraft allocated and crew ratio that must be used to accom-

plish the mission. Air refueling aircraft can support high UTE rates for short periods, but extended periods of high UTE rates should be avoided by adding aircraft and aircrews. High rates of activity for long periods drive the need for more aircraft and support personnel. Similarly, high UTE rates drive the need for higher crew-to-aircraft ratios; the additional aircrews allow time off for recuperation.

✪ **Special Operations.** If SOF activity is planned, air refueling planners must ensure aircraft capable of SOF operations, and crews trained in those operations, are available.

Daily Allocation. *At the operational level, force allocation consists of translating the JFACC's air apportionment decisions into total numbers of air refueling sorties, by aircraft type, available for each operation or task.* Air refueling assets are matched against receivers in the ATO based on the JFACC's apportionment guidance but tempered by changing conditions. At this level, the most important decisions are those that place tanker aircraft types against receiver requirements.

Air refueling capability can be increased without increasing the number or size of tanker aircraft by carefully matching tanker aircraft types against receiver mission requirements. This involves greater use of refuelable reliability tankers, assigning individual tankers to multiple receivers or receiver sets, and ensuring receiver air refueling requests accurately reflect their mission requirements. The considerations for daily allocation decisions are much the same as for contingency allocations as discussed above. When developing daily air refueling allocations, planners must consider boom versus drogue requirements, emphasis on total offload versus booms in the air, UTE rate, and SOF requirements.

GENERAL PLANNING AND SUPPORT CONSIDERATIONS

Planning and support for air refueling operations are largely dependent on the specific mode of operation tasked and any forecast ancillary missions. However, there are several general planning and support considerations that must be addressed for all tanker operations.

Basing

Normally, tankers will operate out of established military bases or mature civilian airfields. At these locations, operations may require some US Air Force augmentation for staff functions, command and control, air-

craft maintenance and servicing, base operating support, and force protection. At other times, however, military air refueling missions will operate out of austere forward locations. These austere locations will have minimal support personnel, facilities, and equipment, and will require significant US Air Force augmentation. Military air refueling airframes and equipment should be chosen for their ability to function in austere locations with large fuel loads.

When selecting an airfield for tanker deployments, there are four primary factors that must be considered: *maximum on the ground, ground threats and security (discussed under threat management, this chapter), location with respect to the enemy, and host-nation support.*

Maximum on the Ground (MOG). *MOG is defined as the highest number of aircraft being used in an operation, which will be allowed on the ground during a given span of time, based on simultaneous support.* The chart below lists some of the individual factors that can determine MOG. In theory, the most limiting factor on this chart becomes the determining factor for an airfield's MOG. Many of these limitations, however, can be overcome through augmentation by tanker airlift control elements (TALCEs) or by deploying units themselves through the ITUD concept.

FACTORS INFLUENCING MAXIMUM ON THE GROUND

· Parking Ramp	· Armory	· Fuel Trucks
· Runway	· Messing	· Fuel Transfer Sys
· Taxiway	· Ops Buildings	· Servicing Personnel
· Airfield Restrictions	· Medical	· Servicing Equipment
· Navaids/Approaches	· Force Protection	· POL
· Communications	· Classified Storage	· Aircraft Oxygen/Equip
· Diplomatic Clearance	· Fire Protection	· Maintenance Personnel
· Transportation	· Fuel Storage	· Maintenance Equipment
· Billeting	· Fuel Pits	· Spare Parts

Figure 4.1. Maximum on the Ground planning factors

Geographic Location. Planners must also consider enemy airborne threats when choosing tanker operating bases. Because of the tanker's extended range, they can often perform their mission even when based beyond the effective range of enemy aerospace forces. *When possible, tank-*

ers should be based outside this range, and should operate beyond the range of enemy fighters when friendly air superiority has not been established. This is especially important during the initial phase of a campaign.

Host-Nation Support. *Deployed air refueling operations will always rely, at least to a certain extent, on host-nation support.* The most important consideration is an assessment of what host-nation support can reasonably be expected. Shortfalls in host-nation support can be supplemented through the integral tanker unit deployment process. If this assessment is not done well, either the unit will not have adequate support to conduct operations when it arrives, or valuable lift space will be wasted on cargo already available at the deployed location.

Integral Tanker Unit Deployment (ITUD)

Air refueling forces should deploy as integral units. There are several advantages to integral unit deployments. Commanders are familiar with the capabilities, strengths, and weaknesses of deployed personnel. Personnel bring established working relationships and processes with them. Units are assured of having desired supplies, equipment, and personnel since they are all sourced from the same unit. And finally, integral unit moves relieve the airlift system, since tanker aircraft can carry most of their support with them when they deploy. ITUDs improve tanker utilization and provide more flexible and dependable response to global requirements.

Units. The core air refueling wing (ARW) is the basic organization for providing intertheater and intratheater air refueling resources. Air refueling employment concepts, however, may not be based on complete unit

ITUD SUPPORT CAPABILITIES

· Civil Engineering	· Transportation	· Services
· Historian	· Aircraft POL	· Public Affairs
· Intelligence	· Personnel	· Communications
· Chaplain	· Staff Judge Advocate	· Contracting
· Airfield Operations	· Weather	· Financial Mgmt
· Information Mgmt	· Security and Force Protection	

Figure 4.2. ITUD Support Capabilities

deployments. Therefore, air refueling wings must be able to deploy small support units or augmentation assets, to support US military forces during periods of increased activity. As defined here, a unit could be as small as a flight with its flight commander. Units will normally deploy with a command element and squadron commander, operations officer, or flight commander.

Tasking. Wing taskings are accomplished using standard unit type codes (UTC) with appropriate paring and tailoring. ARWs must be able to provide their full complement of aircraft to meet tasked operational requirements and to deploy designated air refueling forces to support air refueling operations worldwide.

Airspace and Air Traffic Control

The requirement to provide air refueling services worldwide means tanker crews must be thoroughly trained in International Civil Aviation Organization (ICAO) procedures and capable of operating under host nation air traffic control rules. **Many countries have specific restrictions on air refueling operations conducted within their sovereign airspace.** Air refueling airframes must be equipped with communications and other avionics capabilities required by national and international air traffic control regulations. The need for properly equipped aircraft will gain even greater significance as civil authorities implement new separation standards and air traffic management procedures associated with the communication, navigation, surveillance/air traffic management (CNS/ATM) concept. Failure to properly equip aircraft could result in significant mission impacts due to exclusion from airspace.

Operations in International Airspace/Territorial Airspace. US military aircraft entering another nation to conduct US government business must have the approval of the foreign government to enter their airspace, except when exercising the right of transit passage or archipelagic sea lanes passage. Failure to obtain appropriate clearances can result in the aircraft being denied access, which can preclude successful mission accomplishment. Of even greater consequence, failure to obtain proper clearances can result in international incidents extremely embarrassing to the United States.

Air refuelers should be concerned with two types of airspace: international airspace and territorial airspace. International airspace includes all airspace seaward of a coastal state's territorial seas. International air-

space is open to aircraft of all nations, although only civil aircraft may be subject to ICAO controls and procedures. State aircraft (which include military aircraft and other state operated aircraft) may operate in such areas free of interference or control by the coastal state. Territorial airspace includes airspace above territorial seas, archipelagic waters, inland waters, and land territory, subject to rights of transit passage and archipelagic sea lanes passage. Consistent with international law, the US recognizes territorial sea claims up to a maximum distance of 12nm from coastal states' baselines drawn in accordance with international law. Territorial airspace is sovereign airspace and consent of the coastal state is required for flights within territorial airspace by state aircraft, except when transiting over international straits or exercising the right of archipelagic sea lanes passage. Because of this, it is imperative that sufficient information be provided and reviewed far enough in advance to allow compliance with Foreign Clearance Guide.

Altitude Reservation (ALTRV). ***Most intertheater air refueling operations require an ALTRV to reserve air refueling airspace***. ALTRVs must be submitted in accordance with rules of the ICAO in international airspace and with the ICAO and the host nation rules when conducted over territorial airspace. Aircrews must ensure that ALTRV approval is received prior to conducting air refueling operations. ALTRVs do not relieve aircrews of the requirement to obtain diplomatic clearances or to file flight plans.

Air Refueling Airspace. Most intratheater air refueling is conducted in airspace specifically designated for air refueling. For peacetime operations, air refueling airspace is published in flight information publications with boundaries, altitudes, and communications frequencies agreed to by the air traffic control authorities. During a contingency, air refueling airspace close to the enemy will change frequently, and its altitudes and communications frequencies will be classified to avoid predictability. Routing to and from the air refueling airspace will also change in response to changes in the air campaign and enemy threats to friendly forces. This information will be published in the daily and weekly SPINS and ACO, and must be followed carefully to avoid conflicts with other intratheater operations.

Communications Capabilities and Emissions Control

Air refueling operations are highly dependent on both air-to-air and air-to-ground communications. Throughout air refueling operations, tankers must be able to communicate with their receivers, AWACS controllers, local air traffic control, and other tankers in formation and maintain at least a listening watch on designated high frequency (HF) channels. Mission requirements normally dictate that tankers maintain positive contact on most all of these frequencies simultaneously.

Combat or politically sensitive missions will often require both the tanker and receiver to exercise emissions control (EMCON) procedures. These procedures minimize an aircraft's transmission of electronic signals (communication and navigation) in order to reduce the amount of information other forces can gather. Use of EMCON entails bringing two aircraft together, in the same airspace, while using what is essentially a degraded communication and navigation capability. To be successful in refueling under EMCON conditions, standardized procedures are developed, the procedures must be regularly exercised, and both tanker and receiver aircrews must be thoroughly briefed on the procedures to be used prior to each mission.

Conditions

Air refueling forces and their receivers must be capable of conducting air refueling operations during periods of darkness and under adverse weather conditions. Depending upon the operation, this may require precision navigation equipment and night-vision capability.

Operations in a Nuclear, Biological, or Chemical (NBC) Environment

Air refueling aircraft and crews must be capable of operating in an environment contaminated by NBC weapons. This requires specialized aircraft equipment plus intensive aircrew and ground crew training. ***Planners at all levels of command must account for the possibility of operations in an NBC environment.*** Aircrews are most likely to be exposed to biological or chemical weapons effects when transiting or operating out of bases within the theater of operations. Exposure to nuclear effects (radioactive contamination, blast effects, electro-magnetic pulse, flashblindness, heat, and nuclear dust clouds) is likely to occur during SIOP missions.

FORCE MANAGEMENT

Scheduling

Tanker units have a low aircrew-to-aircraft ratio. Because of this, aircrew availability rather than aircraft availability most often limit mission scheduling, though both must be accounted for in the scheduling process.

Aircraft. *Aircraft scheduling is a function of utilization rates, which drive required maintenance schedules, and indirectly impact reliability rates.* While tanker aircraft can be regenerated in a relatively short period of time, high utilization rates will require more frequent periodic maintenance. Reliability rates for tankers are typically very good, but decrease over time with high UTE rates. Another consideration for scheduling aircraft is the requirement for unique equipment for special operations or simultaneous boom- and drogue-type refueling.

Aircrew. Tanker units are currently manned at 1.17 –1.36 crews per aircraft, but may deploy with 1.00 –1.50 crew ratio depending on the nature of the operation. Aircrews are normally scheduled as integral crews but staff members make up shortfalls when available due to aircrew illness. Aircrew scheduling is also driven by the amount of mission preparation that must be done by the crew, sortie duration, crew composition and crew specialization requirements. At high operating tempos, aircrew members can also face monthly flying hour maximums, which will further limit their availability.

AIRCRAFT AND AIRCREW UTILIZATION

INTERTHEATER AIR REFUELING

- **An aircraft flown continuously on intertheater air refueling missions averaging 12 hours per sortie, can fly 9.9 missions in a week.**
- **With a 1.27 crew ratio, the aircrew assigned to that aircraft can fly 7.6 sorties.**
- **Aircrew capabilities equal aircraft capabilities at a 1.65 crew ratio.**

INTRATHEATER AIR REFUELING

- **An aircraft flown continuously on intratheater air refueling missions, averaging 4 hours per sortie, can fly 19.4 missions in a week.**
- **With a 1.27 crew ratio, the aircrew assigned to that aircraft can fly 15.2 sorties.**
- **Aircrew capabilities equal aircraft capabilities at a 1.62 crew ratio.**

Figure 4.3. Aircraft and Aircrew Utilization

Spare Concept. When scheduling aircraft and aircrews, planners must also consider the concept of operations for providing spares to the daily flying schedule. Using the rolling spare concept (each aircrew and aircraft sparing the sortie immediately ahead of it in the schedule), no additional aircraft or crews are required, but the additional time required to accomplish this will decrease the number of sorties each aircraft and crew can fly in a given period of time. With a dedicated spare, only one aircraft and crew are used at a time, but they cannot be used for any other duty. Receiver requirements may dictate the need for multiple spare aircraft and aircrews.

Sortie/Mission Generation

Generating air refueling sorties and missions requires a cooperative effort on the part of both operations and maintenance personnel. Operations planners must be kept continually aware of aircraft status, especially when an aircraft will be non-mission capable for extended periods of time. Likewise, maintenance planners must be kept continually aware of forecast OPTEMPO changes and must work with operations planners to determine optimum times for periodic aircraft maintenance.

Execution

Commanders must exercise positive control over all air refueling assets whenever they are airborne to avoid wasting air refueling capacity. *Because of their extended loiter capacity, airborne tankers can be redirected in flight whenever their primary mission is canceled or changed.* To accomplish this, ground elements must maintain accurate flight following of air refueling aircraft and be able to contact those aircraft anywhere along their route of flight. This can normally be accomplished by the AMD, though mission requirements may dictate that an AWACS or ground control intercept facility control the tanker during the air refueling portion of the mission. EMCON requirements may complicate this positive control. Control requirements, procedures, and frequencies must be thoroughly explained in the SPINS portion of the ATO to ensure coordination between aircrews and ground control personnel.

Departure and Recovery

Aircraft are most vulnerable to enemy action when transitioning to and from their base. Procedures must provide varied and indirect departures and approaches to the airfield to minimize susceptibility to ground-

launched weapons. At the same time, these procedures must provide rapid launch and recovery for large numbers of aircraft while still allowing adequate air traffic separation. Operations planners, tactics experts, and air traffic control personnel must work in close concert to develop launch and recovery procedures that meet these important requirements.

AIR REFUELING IN GULF WAR

Air refueling facilitated two different aspects of the Gulf War: the speedy deployment of large air forces to the region, and the use of those forces in large and complex air combat operations. Five countries using twelve different types of aircraft provided this refueling capability. Participating aircraft included nearly three hundred US Air Force KC-10s and KC-135s—almost half the US Air Force fleet. All were needed because so many air defense fighters and airborne control aircraft remained aloft for extended periods, and numerous attack aircraft needed to refuel both en route to the targets and on the return leg to their bases because of the distances involved. The tanker aircraft proved a critical resource, but a heavier commitment of the US fleet would not have helped; the limitation was airspace, not numbers. With a daily average of 360 tanker sorties, the refueling tracks saturated the available airspace. US Air Force tankers alone refueled an average of 1,433 aircraft a day. Some 60 percent of all attack sorties required air refueling. Of the total number of DESERT STORM sorties by category, air refueling ranked third behind airlift.

Air refueling capability enabled fighter squadrons and bombers to deploy—even loaded with armaments—nonstop from the United States to the Southwest Asia theater. More than one thousand US aircraft deployed in this way. It took nearly one hundred tankers operating out of en route bases to create an Atlantic air refueling bridge and a less frequently used bridge across the Pacific. Fighter aircraft deployments from the United States to the theater traversed sixty-nine hundred nautical miles, took 15 to 16 hours' flying time, and required from 7 (for F-15Es) to 15 (for F-4Gs) refuelings en route. The ability to fly nonstop enabled F-15Cs to be on alert in Saudi Arabia within a day after notification to deploy and five US Air Force fighter squadrons to arrive in the region within five days. Similarly, air refueling not only extended the range of attack aircraft, it allowed massive concentrations of strikes and continuous airborne control and surveillance of battle areas.

Revolution in Warfare? Air Power in the Persian Gulf

OPERATIONAL PLANNING AND SUPPORT CONSIDERATIONS

Commanders must make every effort to minimize aircraft and aircrew losses. One of the most effective means of doing this is by controlling the risks crews must face in accomplishing the mission. One technique for risk management is the use of the Operational Risk Management (ORM), a logic-based, common sense approach to making calculated decisions on human, materiel, and environmental factors before, during, and after Air Force operations. It enables commanders to maximize operational capabilities and minimize risks by applying a simple, systematic process appropriate for *all personnel* and Air Force functions. ORM should be viewed as a process or philosophy to help commanders at all levels assess risk and control measures in order to optimize decisions.

Mission Development

All successful air operations begin with thoughtful and careful planning on the ground. Capitalizing on airpower's distinct attributes is meaningless without an overall strategy, combined with strict attention to detail during mission development.

Intertheater Operations. Mission development for intertheater operations will vary for each mode of operation. Planning considerations for global attack will vary for every attack option. *Close coordination between tanker and receiver planners during mission development is critical to the success of intertheater air refueling operations.*

AIRLIFT FORCE MULTIPLICATION

CENTRAZBAT '97 saw the longest airdrop in aviation history. Eight C-17's flew over 8,000 miles from Fort Bragg, NC, to the plains of Kazakhstan to drop 500 Army troops from the 18th Airborne Corps. This set the record for the most distance covered in an airdrop mission. Air refueling was the key enabling factor, as each C-17 required three refuelings to complete the nonstop, 20-hour flight. Twenty tanker aircraft were used for this history-making event, offloading approximately 2 million pounds of fuel. The previous longest airdrop occurred in 1968 when 45 C-141s, participating in an exercise called DEEP FURROW, flew from the United States for an airdrop of troops in Turkey. During the DEEP FURROW mission, all aircraft were required to stop in Italy for fuel, maintenance and crew changes to successfully complete the flight.

Intratheater Operations. Mission development for intratheater operations is much more predictable due to its cyclical and deliberate nature. Once the MAAP is approved by the JFACC, the Combat Plans section of the AOC continue detailed preparations for the AOC on the ATO, SPINS and the ACO. Air refueling airspace will be posted in the ACO while frequencies and procedures will be posted in the SPINS. These two items allow AMD air refueling personnel to plan and execute all air refueling missions tasked in the ATO. The ATO, ACO, and SPINS provide operational and tactical direction at appropriate levels of detail. The level of detail should be explicit when forces operate from different bases, or when joint or multinational missions are tasked. Less detail is required when missions are tasked to a single Service component or base.

Receiver Requirements

Receiver requirements dictate how much fuel will be offloaded, where the refueling will take place, and when the rendezvous will occur. *The receiver aircraft's performance characteristics will dictate air refueling speed, altitude, and allowable maneuvering during the refueling.* The receiver's mission may also dictate special tactics, EMCON requirements, or specialized equipment to achieve desired effects. Whenever possible, the tanker aircrew must ascertain the receiver's requirements prior to takeoff to preclude distracting and unsafe conditions in the air.

THREAT MANAGEMENT

Friendly and enemy forces view air refueling platforms as a high value asset. When tankers are lost, the ability to strike deeper into enemy territory with overwhelming force can be significantly degraded. Air refueling forces can become a prime target for both ground and airborne attack systems.

Ground Threats and Force Protection

The post-cold war period has been characterized by a significant shift in the mission of the Air Force and an increased exposure of its resources to the worldwide terrorist/enemy threat. Incidents such as the Khobar Towers bombing of billets in Saudi Arabia have shown that potential opponents are more unpredictable and United States assets are more at risk to terrorist/enemy attack. Additionally, there has been an increase in the availability of high technology weapons and weapons of mass destruction. Together, these factors have multiplied the threat to forces on the

ground and brought to light the need for enhanced force protection measures. Expeditionary air refueling forces that are poised to respond to global taskings require protection capable of accompanying them with equal speed.

Supplemental force protection should be on every commander's program. Commanders are responsible for protecting their people and the warfighting resources necessary to win any type of conflict. Force protection includes Security Forces providing safe and secure operating locations for personnel and resources, and the Air Force Office of Special Investigations (AFOSI) performing criminal investigative services.

To protect weapon systems and airfields, Security Forces must be able to detect and respond to a wide variety of threats ranging from unauthorized entry to an overt attack. Security forces must maintain rapidly deployable force modules to support contingency operations at all tanker deployment locations.

AFOSI identifies, investigates, and neutralizes espionage, terrorism, fraud, and other major criminal activities targeting air mobility resources. Threat information provides commanders with threat assessments, which enables them to develop countermeasures in deployed areas and adjust operations accordingly. Therefore, AFOSI advisors should arrive with the initial deployment of tanker personnel.

Threats While Airborne

The primary threat to tanker flight operations is surface-to-air threats during the ingress and egress phase. Beddown locations for operations should be closely scrutinized when developing basing priorities. Planners need to formulate considerations based on threat analysis, airfield environment, national cultures, and OPTEMPO at each base. Locations should be chosen to allow security forces the capability to easily defend approach and departure corridors.

At altitude, air refueling assets may be vulnerable to enemy aircraft, surface-to-air missiles, and anti-aircraft fire. Their best defense against these threats is always avoidance. Air refueling tracks should be positioned outside the effective range of enemy aerospace forces. Operational considerations may dictate that tankers operate within this range, but defensive tactics must be pre-planned, along with preferred escape routes and safe areas. Close coordination with AWACS and other surface and

DESERT STRIKE

Let's look at an example from last year: Two Air Combat Command B-52s flew 14,000 miles—that's 34 hours nonstop—to launch 13 conventional air-launched cruise missiles against targets in Iraq. This longest bombing mission in history demonstrated our national resolve in no uncertain terms, and cemented US air superiority in the no-fly zones, by putting weapons on targets. Once again, the tanker portion of the operation was absolutely critical. Fourteen tankers—KC-10s and KC-135s—supplied 760,000 pounds of fuel for the deploying bombers, and 15 tankers offloaded 1,360,000 pounds of gas for the airstrike. Two bombers and 29 tankers! Air refueling made Global Engagement possible. And, once again, our tanker crews displayed heroics. A KC-10 out of Guam lost an engine prior to completing the pre-strike refueling, so another KC-10 offloaded extra fuel and then diverted into U-Taphao. Another KC-10 at Diego Garcia performed a pre-strike refueling on extremely short notice, offloading the extra gas the bombers needed and recovering with minimum fuel into Diego. As soon as they landed, the crew was tapped to do the post-strike refueling. In just one hour, the crew took off again and performed the post-strike refueling. DESERT STRIKE was a success because the tanker crews did just what they do best—think fast on their feet, doing what needs to be done for the mission to succeed. This time the tankers got the medals, and quickly too—on landing in CONUS.

airborne threat sensors will provide crews with real time changes in threat status and threat warnings.

Tanker Threat Warning and Defensive Capabilities

US air refueling forces are increasingly tasked to perform missions in hazardous situations, both in war and most recently during military operations other than war (MOOTW). Given the varied regional contingencies tankers will be involved in, and the wide range of anti-aircraft weapons tankers will be exposed to, planners cannot guarantee air refuelers will not operate in high threat environments. In Operation DESERT STORM, US tankers regularly operated over Iraqi territory without air supremacy.

Tankers have not been equipped with threat warning or self-defense equipment. Instead, planners attempted to reduce the risk through threat-avoidance tactics, combat air patrol by fighter aircraft, and suppression of enemy air defense systems by ground attack aircraft. In many cases, especially during certain types of MOOTW, it may not be politically viable to have fighter protection. The lack of defensive countermeasures therefore, may restrict air refueling aircraft to only permissive environments. This restriction can significantly inhibit air refueling forces' force enablement and force multiplication roles and reduce their flexibility to support national policy across the range of military operations.

SUMMARY

Detailed planning and support considerations can become extremely complex. For any given contingency, commanders and planners must consider planning and support factors, operational factors, possible alternate operational modes and ancillary missions. Flexibility, combined with careful planning, is critical to ensuring optimal utilization of air refueling assets in support of strategic objectives.

At the Heart of Warfare Lies Doctrine.....

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GLOSSARY

Abbreviations and Acronyms

AADC	area air defense commander
ABCCC	airborne battlefield command and control center
ACA	airspace control authority
ACO	airspace control order
AE	aeromedical evacuation
AECC	aeromedical evacuation control center
AEF	aerospace expeditionary force
AFB	Air Force Base
AFDD	Air Force Doctrine Document
AFOSI	Air Force Office of Special Investigations
AFRC	Air Force Reserve Command
ALCM	air-launched cruise missile
ALCT	airlift control team
ALTRV	altitude reservation
AMC	Air Mobility Command
AMCT	air mobility control team
AMD	Air Mobility Division
AMOCC	Air Mobility Operations Control Center
ANG	Air National Guard
AO	area of operations
AOC	aerospace operations center
AOR	area of responsibility
AR	air refueling
ARCT	air refueling control team
ARW	air refueling wing
ASETF	Aerospace Expeditionary Task Force
ATM	air traffic management
ATO	air tasking order
AWACS	Airborne Warning and Control System
C2	command and control
C4I	command, control, communications, computers, and intelligence
CAT	crisis action team
CC	commander
CHOP	change of operational control
CINC	commander in chief
CINCUSTRANS	Commander in Chief, US Transportation Command

CJCS	Chairman, Joint Chiefs of Staff
CJTF	Commander, Joint Task Force
CNS	communication, navigation, surveillance
COCOM	combatant command (command authority)
COMAFFOR	Commander, Air Force Forces
CONOPS	concept of operations
CONUS	continental United States
CSAF	Chief of Staff of the Air Force
CSAR	combat search and rescue
DIRMOBFOR	Director of Mobility Forces
DOD	Department of Defense
EMCON	emissions control
FOL	forward operating location
GPMRC	Global Patient Movement Requirements Center
HF	high frequency
ICAO	International Civil Aviation Organization
ICBM	intercontinental ballistic missiles
ISR	intelligence, surveillance, and reconnaissance
ITUD	Integral Tanker Unit Deployment
JCS	Joint Chiefs of Staff
JFACC	joint force air component commander
JFC	joint force commander
JOA	joint operating area
JSTARS	joint surveillance, target attack radar system
JTF	joint task force
MAAP	Master Air Attack Plan
MAJCOM	major command (USAF)
MOG	maximum (aircraft) on the ground
MOOTW	military operations other than war
NAF	numbered air force
NATO	North Atlantic Treaty Organization
NAVAIDS	navigational aids
NBC	nuclear, biological, and chemical

NCA	National Command Authorities
OPCON	operational control
OPLAN	operation plan
OPORD	operation order
OPTEMPO	operating tempo
ORM	Operational Risk Management
POL	petroleum, oils, and lubricant
SAC	Strategic Air Command
SAR	search and rescue
SIOP	Single Integrated Operation Plan
SOF	special operations forces
SPINS	special instructions
TAC	Tactical Air Command
TACC	tanker/airlift control center
TACON	tactical control
TALCE	tanker/airlift control element
TF	task force
TPMRC	Theater Patient Movement Requirements Centers
UN	United Nations
USACOM	United States Atlantic Command
USAF	United States Air Force
USCINCSTRAT	Commander in Chief, United States Strategic Command
USCINCTRANS	Commander in Chief, United States Transportation Command
USEUCOM	United States European Command
USPACOM	United States Pacific Command
USSOCOM	United States Special Operations Command
USSTRATCOM	United States Strategic Command
USTRANSCOM	United States Transportation Command
UTC	unit type code
UTE	utilization rate

Definitions

aerospace power. The use of lethal and nonlethal means by aerospace forces to achieve strategic, operational, and tactical objectives. (AFDD 2)

aeromedical evacuation. The movement of patients under medical supervision to and between medical treatment facilities by air transportation. (Joint Pub 1-02)

air bridge. An airborne line of communication linking the CONUS and a theater, or multiple theaters.

air campaign. A connected series of operations conducted by air forces to achieve joint force objectives within a given time and area. (AFDD 1)

air interdiction. Air operations conducted to destroy, neutralize, or delay the enemy's military potential before it can be brought to bear effectively against friendly forces at such distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required. (Joint Pub 1-02)

airlift. Operations to transport and deliver forces and materiel through the air in support of strategic, operational, or tactical objectives. (AFDD 1)

air refueling. The capability to refuel aircraft in flight, which extends presence, increases range, and allows air forces to bypass areas of potential trouble. (AFDD 1)

air superiority. That degree of dominance in the air battle of one force over another which permits the conduct of operations by the former and its related land, sea and air forces at a given time and place without prohibitive interference by the opposing force. (Joint Pub 1-02)

air supremacy. That degree of air superiority wherein the opposing air force is incapable of effective interference. (Joint Pub 1-02)

area of responsibility. 1. The geographical area associated with a combatant command within which a combatant commander has authority to plan and conduct operations. Also called AOR. (Joint Pub 1-02)

assign. 1. To place units or personnel in an organization where such placement is relatively permanent, and/or where such organization controls and administers the units or personnel for the primary function, or greater portion of the functions, of the unit or personnel. 2. To detail individuals to specific duties or functions where such duties or functions are primary and/or relatively permanent. See also **attach.** (Joint Pub 1-02)

attach. 1. The placement of units or personnel in an organization where such placement is relatively temporary. 2. The detailing of individuals to specific functions where such functions are secondary or relatively temporary, e.g., attached for quarters and rations; attached for flying duty. See also **assign.** (Joint Pub 1-02)

combatant command (command authority). The nontransferable command authority established by title 10, ("Armed Forces") United States Code, section 164, exercised only by commanders of unified or specified combatant commands unless otherwise directed by the President or the Secretary of Defense. Combatant command (command authority) cannot be delegated and is the authority of a combatant commander to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations, joint training, and logistics necessary to accomplish the missions assigned to the command. Combatant command (command authority) should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Combatant command (command authority) provides full authority to organize and employ commands and forces as the combatant commander considers necessary to accomplish assigned missions. Operational control is inherent in combatant command (command authority). Also called **COCOM**. (Joint Pub 1-02)

command and control. The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. Also called **C2**. (Joint Pub 1-02)

core competency. The basic areas of expertise or the specialties that the Air Force brings to any activity across the spectrum of military operations whether as a single Service or in conjunction with the core competencies of other Services in joint operations. Core competencies represent both aerospace power application theory and physical capability represented in a well-trained and equipped air force. (AFDD 1)

coronet. Movements of airpower forces in support of force rotations, exercises, or aircraft movements for logistics purposes.

doctrine. Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application. (Joint Pub 1-02)

dual role tanker. Tankers perform the dual role function when they accomplish both airlift and air refueling on the same mission.

force enablement. Air refueling giving an aircraft the needed range, payload, and loiter time.

force extension. Force extension is the refueling of one tanker by another tanker.

force multiplier. (DOD) A capability that, when added to and employed by a combat force, significantly increases the combat potential of that force and thus enhances the probability of successful mission accomplishment. (Joint Pub 1-02)

information. 1. Facts, data, or instructions in any medium or form. 2. The meaning that a human assigns to data by means of the known conventions used in their representation. (Joint Pub 1-02)

information superiority. (DOD) The capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same. See also **information.** (Joint Pub 1-02)

[That degree of dominance in the information domain that allows friendly forces the ability to collect, control, exploit, and defend information without effective opposition.] {Italicized definition in brackets applies only to the Air Force and is offered for clarity.} (AFDD 2)

intelligence. 1) The product resulting from the collection, processing, integration, analysis, evaluation, and interpretation of available information concerning foreign countries or areas. 2) Information and knowledge about an adversary obtained through observation, investigation, analysis, or understanding. (Joint Pub 1-02)

intertheater. Between theaters or between the continental United States and theaters. (Joint Pub 1-02)

intertheater airlift. Airlift that operates between the continental United States and a theater or between theaters. *[Formerly called strategic airlift]* (AFDD 2)

in-transit visibility. The ability to track the identity, status, and location of Department of Defense units, and non-unit cargo (excluding bulk petroleum, oil and lubricants) and passengers; medical patients; and personal property from origin to consignee or destination across the range of military operations. Also called **ITV.**

intratheater. Within a theater. (Joint Pub 1-02)

intratheater airlift. The common-user air transportation and delivery of personnel and equipment within a CINC's AOR. *[Formerly called theater airlift]* (AFDD 2)

joint doctrine. Fundamental principles that guide the employment of forces of two or more Services in coordinated action toward a common objective. It will be promulgated by the Chairman of the Joint Chiefs of Staff, in coordination with the combatant commands, Services, and Joint Staff. See also **doctrine.** (Joint Pub 1-02)

joint force. A general term applied to a force composed of significant elements, assigned or attached, of two or more Military Departments, operating under a single joint force commander. See also **joint force commander.** (Joint Pub 1-02)

joint force air component commander. The joint force air component commander derives authority from the joint force commander who has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. The joint force commander will normally designate a joint force air compo-

nent commander. The joint force air component commander's responsibilities will be assigned by the joint force commander (normally these would include, but not be limited to, planning, coordination, allocation, and tasking based on the joint force commander's apportionment decision). Using the joint force commander's guidance and authority, and in coordination with other Service component commanders and other assigned or supporting commanders, the joint force air component commander will recommend to the joint force commander apportionment of air sorties to various missions or geographic areas. Also called **JFACC.** See also **joint force commander.** (Joint Pub 1-02)

joint force commander. A general term applied to a combatant commander, subunified commander, or joint task force commander authorized to exercise combatant command (command authority) or operational control over a joint force. Also called **JFC.** See also **joint force.** (Joint Pub 1-02)

joint task force. A joint force that is constituted and so designated by the Secretary of Defense, a combatant commander, a subunified commander, or an existing joint task force commander. Also called **JTF.** (Joint Pub 1-02)

logistics. The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations which deal with: a. design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel; b. movement, evacuation, and hospitalization of personnel; c. acquisition or construction, maintenance, operation, and disposition of facilities; and d. acquisition or furnishing of services. (Joint Pub 1-02)

military strategy. The art and science of employing the armed forces of a nation to secure the objectives of national policy by the application of force or the threat of force. (Joint Pub 1-02)

National Command Authorities. The President and the Secretary of Defense or their duly deputized alternates or successors. Also called **NCA.** (Joint Pub 1-02)

national strategy. The art and science of developing and using the political, economic, and psychological powers of a nation, together with its

armed forces, during peace and war, to secure national objectives. (Joint Pub 1-02)

operational control. Transferable command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in combatant command (command authority). Operational control may be delegated and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions. Operational control does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training. Also called **OPCON.** (Joint Pub 1-02)

operational level of war. The level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations. Activities at this level link tactics and strategy by establishing operational objectives needed to accomplish the strategic objectives, sequencing events to achieve the operational objectives, initiating actions, and applying resources to bring about and sustain these events. These activities imply a broader dimension of time or space than do tactics; they ensure the logistic and administrative support of tactical forces, and provide the means by which tactical successes are exploited to achieve strategic objectives. (Joint pub 1-02)

reconnaissance. A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. (Joint pub 1-02)

reliability orbit. Normal air refueling anchor areas dedicated for emergency air refueling with specific assigned altitudes and procedures for both tankers and receivers.

special operations. Operations conducted by specially organized, trained, and equipped military and paramilitary forces to achieve military, political, economic, or informational objectives by unconventional military means in hostile, denied, or politically sensitive areas. These operations are conducted during peacetime competition, conflict, and war, independently or in coordination with operations of conventional, nonspecial operations forces. Political-military considerations frequently shape special operations, requiring clandestine, covert, or low visibility techniques, and oversight at the national level. Special operations differ from conventional operations in degree of physical and political risk, operational techniques, mode of employment, independence from friendly support, and dependence on detailed operational intelligence and indigenous assets. Also called **SO.** (Joint pub 1-02)

strategic attack. Military action carried out against an enemy's center(s) of gravity or other vital target sets, including command elements, war-production assets, and key supporting infrastructure in order to effect a level of destruction and disintegration of the enemy's military capacity to the point where the enemy no longer retains the ability or will to wage war or carry out aggressive activity. (AFDD 1)

strategic level of war. The level of war at which a nation, often as a member of a group of nations, determines national or multinational (alliance or coalition) security objectives and guidance, and develops and uses national resources to accomplish those objectives. Activities at this level establish national and multinational military objectives; sequence initiatives; define limits and assess risks for the use of military and other instruments of national power; develop global plans or theater war plans to achieve these objectives; and provide military forces and other capabilities in accordance with strategic plans. (Joint Pub 1-02)

strategy. The art and science of developing and using political, economic, psychological, and military forces as necessary during peace and war, to afford the maximum support to policies, in order to increase the probabilities and favorable consequences of victory and to lessen the chances of defeat. (Joint Pub 1-02)

support. 1. The action of a force which aids, protects, complements, or sustains another force in accordance with a directive requiring such action. 2. A unit which helps another unit in battle. Aviation, artillery, or naval gunfire may be used as a support for infantry. 3. A part of any unit held back at the beginning of an attack as a reserve. 4. An element of a command which assists, protects, or supplies other forces in combat. See also close support; direct support; general support; interdepartmental/agency support; international logistic support; inter-Service support; mutual support. (Joint Pub 1-02)

supported commander. The commander having primary responsibility for all aspects of a task assigned by the Joint Strategic Capabilities Plan or other joint operation planning authority. In the context of joint operation planning, this term refers to the commander who prepares operation plans or operation orders in response to requirements of the Chairman of the Joint Chiefs of Staff. See also joint operation planning. (Joint Pub 1-02)

supporting commander. A commander who provides augmentation forces or other support to a supported commander or who develops a supporting plan. Includes the designated combatant commands and Defense agencies as appropriate. See also supported commander; supporting plan. (Joint Pub 1-02)

sustainment. The provision of personnel, logistic, and other support required to maintain and prolong operations or combat until successful accomplishment or revision of the mission or of the national objective. (Joint Pub 1-02)

surveillance. The systematic observation of aerospace, surface or subsurface areas, places, persons, or things, by visual, aural, electronic, photographic, or other means. (Joint Pub 1-02)

tactical control. Command authority over assigned or attached forces or commands, or military capability or forces made available for tasking, that is limited to the detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned. Tactical control is inherent in operational control. Tactical control may be delegated to, and exercised at any level at or below the level of combatant command. Also called **TACON.** (Joint Pub 1-02)

tactical level of war. The level of war at which battles and engagements are planned and executed to accomplish military objectives assigned to tactical units or task forces. Activities at this level focus on the ordered arrangement and maneuver of combat elements in relation to each other and to the enemy to achieve combat objectives. (Joint Pub 1-02)

tactics. 1. The employment of units in combat. 2. The ordered arrangement and maneuver of units in relation to each other and/or to the enemy in order to use their full potentialities. (Joint Pub 1-02)

Tanker Airlift Control Center. The Air Mobility Command direct reporting unit responsible for tasking and controlling operational missions for all activities involving forces supporting US Transportation Command's global air mobility mission. The Tanker Airlift Control Center is comprised of functions: current operations, command and control, logistics operations, aerial port operations, aeromedical evacuation, flight planning, diplomatic clearances, weather, and intelligence. Also called **TACC**. See also **Tanker Airlift Control Element.** (Joint Pub 1-02)

Tanker Airlift Control Element. A mobile command and control organization deployed to support strategic and theater air mobility operations at fixed, en route, and deployed locations where air mobility operational support in nonexistent or insufficient. The Tanker Airlift Control Element provides on-site management of air mobility airfield operations to include command and control, communications, aerial port services, maintenance, security, transportation, weather, intelligence, and other support functions, as necessary. The Tanker Airlift Control Element is composed of mission support elements from various units and deploys in support of peacetime, contingency, and emergency relief operations on both planned and "no-notice" basis. Also, called **TALCE.** (Joint Pub 1-02)

tankering fuel. Putting more fuel in a tanker than is required to complete the mission.

theater. The geographical area outside the continental United States for which a commander of a combatant command has been assigned responsibility. (Joint Pub 1-02)

war. Open and often prolonged conflict between nations (or organized groups within nations) to achieve national objectives. (AFDD 1)