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THE TANKER IMPERATIVE

By Rebecca Grant

Mitchell Paper 2



Brig. Gen. Billy Mitchell

On September 12, 1918 at St. Mihiel in France, Col. William Mitchell became the first person ever to command a major force of allied aircraft in a combined-arms operation. This battle was the debut of the US Army fighting under a single American commander on European soil. Under Mitchell's control, more than 1,100 allied aircraft worked in unison with ground forces in a broad offensive—one encompassing not only the advance of ground troops but also direct air attacks on enemy strategic targets, aircraft, communications, logistics, and forces beyond the front lines.



Mitchell was promoted to Brigadier General by order of Gen. John J. Pershing, commander of the American Expeditionary Force, in recognition of his command accomplishments during the St. Mihiel offensive and the subsequent Meuse-Argonne offensive.

After World War I, General Mitchell served in Washington and then became Commander, First Provisional Air Brigade, in 1921. That summer, he led joint Army and Navy demonstration attacks as bombs delivered from aircraft sank several captured German vessels, including the SS *Ostfriesland*.

His determination to speak the truth about airpower and its importance to America led to a court-martial trial in 1925. Mitchell was convicted, and resigned from the service in February 1926.

Mitchell, through personal example and through his writing, inspired and encouraged a cadre of younger airmen. These included future General of the Air Force Henry H. Arnold, who led the two million-man Army Air Forces in World War II; Gen. Ira Eaker, who commanded the first bomber forces in Europe in 1942; and Gen. Carl Spaatz, who became the first Chief of Staff of the United States Air Force upon its charter of independence in 1947.

Mitchell died in 1936. One of the pallbearers at his funeral in Wisconsin was George Catlett Marshall, who was the chief ground-force planner for the St. Mihiel offensive.

ABOUT THE MITCHELL INSTITUTE: The General Billy Mitchell Institute for Airpower Studies, founded by the Air Force Association, seeks to honor the leadership of Brig. Gen. William Mitchell through timely and high-quality research and writing on airpower and its role in the security of this nation.

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PLAYING WITH FIRE

Buying a new aerial refueling tanker is priority No. 1 for the United States Air Force. Gen. Arthur J. Lichte, commander, Air Mobility Command, summed up the situation about as succinctly as possible: “Tankers are the lifeline for our command and for the Air Force. We are flying the airplanes hard.”¹

The Air Force in late 2001 first considered plans to accelerate the tanker buy. Since then, the term “KC-X” has become synonymous with scandal, venom, and missed opportunities. In fact, one could make the argument that the KC-X is more crucial to airpower and joint operations than any other single platform. Decades of taking tankers for granted have obscured the extent to which the tanker force has reshaped the modern air campaign.

Without tankers, air campaigns of the type we have come to know and appreciate in recent decades would not be possible. The power to deliver fuel in the air, rapidly and reliably, makes possible the swift initiation of an air campaign anywhere on the globe. The members of the Joint force—ground forces calling air strikes in Afghanistan, bomber pilots on alert in the Pacific, Navy carrier pilots patrolling the Gulf—all depend on air refueling for endurance.

In US Central Command’s theater alone, the statistics are nothing short of compelling. The average day in 2009 sees some 45 to 50 KC-135 tankers in operation. Those same tankers pass along fuel to as many as 250 receivers of all types.² And that is just in one area of the world. In a crisis, the tankers might be required in two or possibly even three different areas.

When the US takes risks with this capability—as it has done for the past decade—it is playing with fire.

THE IMPERATIVE

Picture the scene in the cockpit of a combat aircraft on a long mission with its fuel margins dropping. It may be an F-15E strike fighter over Afghanistan trying to refuel to get back to a joint terminal attack controller who has been watching insurgents under cover for hours. It may be an F/A-18C fighter, flown by a Marine Corps or Navy aviator pushing to make the assigned time at the marshalling stack and set up for landing before the carrier switches to launch operations.

It may be an A-10 whose pilot has just expended 1,000 rounds of the airplane’s 30 mm gun to help coalition troops in contact in Afghanistan, and still has time to spend on the mission, if only there was more gas. It may be a B-2 out of Guam heading for a tanker rendezvous over the Pacific, or a C-17 transport ferrying MRAPs to ground forces in Afghanistan, or a C-130, loaded with humanitarian relief supplies, making its way from bases in Europe to remote outposts in Africa.

In each case, what the aircrew wants to see is the dark gray speck on the horizon growing, slowly, into the comforting shape of a refueling tanker, boom or basket extended.

The fuel figuratively gushing through the boom at thousands of pounds per minute translates into two extremely important pieces of airpower capital: range and persistence. Tankers have been providing it since the first operational tanker fleets were developed in the early 1950s. US airpower would never have become a dominant force without tankers to get assets to the fight and back again.

Today's large, highly capable tanker force can be considered a gift of the Cold War, but its time is running short. The youngest KC-135 aircraft are 42 years old; the eldest are near 50. In Lichte's view, "It's unconscionable that we're asking people to fly in combat in 50-year-old airplanes."³

By failing to get started on the replacement KC-X program, the Department of Defense as a whole has run the risk that the joint force may get burned.

The most recent conflagration came in 2008. Legal protests overturned a tanker award made in February of that year. The USAF Chief of Staff, Gen. Norton A. Schwartz, said there had been "a lot of heat and smoke" as the acquisition plan failed.⁴ Robert Gates, the Secretary of Defense, found the problem too hot to touch. In September 2008, he put off any new decision, citing the "highly charged environment" and the onrushing presidential election, only to find himself still on the job and still without a tanker plan.⁵

The tanker controversy "has not been a healthy one for the [Defense] Department, the Air Force, or the contractors," summed up Secretary of the Air Force Michael B. Donley.⁶

The tanker crisis of today has been brewing for a decade. Deep concern first emerged in 1999 during Operation Allied Force, the 78-day NATO air campaign over what used to be Yugoslavia. Air tankers were heavily used to support thousands of strikes, most of them in poor Balkan springtime weather.

The campaign was a big wake-up call. Mission-capable rates for the tankers were lower than they had been during Operation Desert Storm in 1991. Newer KC-10s kept an 88 percent mission-capable rate, but older KC-135s could sustain only a 78 percent mission-capable rate.⁷ Herculean efforts by maintenance crews could not completely compensate for the fact that their KC-135s were on average nearly 40 years old and had begun to break in new and unexpected ways.

Since then, the Air Force has been given more vivid warnings, most of them emanating from the Oklahoma City Air Logistics Center depot at Tinker AFB, Okla., where the Stratotankers go for periodic maintenance. In February 2003, then Air Force Chief of Staff Gen. John P. Jumper pointed out: "The KC-135s, when you visit them on depot line at Tinker Air Force Base, you can peel the skin layers apart and powder comes out the middle. Corrosion

is overtaking these airplanes, and fatigue cracks them in ways that we have never been able to anticipate.”⁸

Operating costs for the oldest KC-135Es started to grow at a rate of 10 to 15 percent per year.⁹

An “analysis of alternatives,” directed by Congress and carried out by RAND for senior Pentagon managers, was completed in March 2006. That report said, “There is considerable uncertainty about the future technical condition and sustainment cost of the KC-135.”¹⁰ In RAND’s view, the early replacement of the fleet would be “a hedging strategy against this uncertainty.”

The KC-135s are, in a word, ancient. Although these aircraft have new engines and updated avionics, they are in danger of sudden and impossible-to-predict failure. The KC-135Rs average almost 49 years of age. “They were built before the current President was born,” said Lichte.¹¹ As for the younger KC-10s, they are not at risk—yet—though they, too, are nearly a quarter of a century old.

The trends are definitely not good. Lichte noted that average time in depot for the KC-135 has climbed recently from 180 days to 240 days. One particular KC-135 has been at the depot for more than 500 days. “That’s because every time they open the airplanes up they are finding more problems,” Lichte said.¹²

Two known factors are enough to give anyone pause. First, the KC-135s eventually will have to be “re-skinned.” As Lichte explained, it was a skin failure that led to the 1988 incident where a commercial airliner over the Hawaiian Islands lost the top of its fuselage, killing one crew member on board. The situation with the tanker is analogous. Second, corroded wires likely were contributing, if not primary, factors in the explosion that took down the TWA flight off Long Island Sound in 1996. This risk could soon affect the safety of the KC-135 fleet.

It is not really possible to anticipate when the KC-135 fleet will be forced to depart the scene as a result of becoming too dangerous to fly. It may be years from now, or it may be quite a bit sooner than that.

According to Lichte, the window of danger will begin to open long before USAF can complete a new tanker buy. “I feel very confident that they have the ability to continue to fight tonight, but I start worrying about what happens 10, 20, 30 years down the road. Unfortunately, the answer still comes up that we’re going to be using KC-135s.”¹³

The DOD plan for the KC-X program has included annual buys that range from 12 to 15 aircraft.¹⁴ It will take decades fully to replace the 454 KC-135s now flying. This is why the tanker replacement program must start immediately, so as to bring on new tankers before a catastrophic event grounds the KC-135 fleet. The Air Force’s C-141 airlifter, several years younger than the KC-135, hit the wall in the 1990s and was briskly retired out of the active

fleet. Luckily, the newer C-17 was there to pick up the mission from the faltering C-141. If the same thing were to happen today to the tanker fleet, there would be no real way to compensate.

Unfortunately, the lurking problem is that no one really knows exactly when the KC-135 warhorse will be too old to do its job. When the fleet goes down, it will probably happen because of irreversible corrosion of the airframe.

An Air Force general testified in 2003 that stress corrosion cracking can be predicted only by cutting into the airframe—not an option for a busy fleet. “These types of failures are largely unpredictable and as the aircraft ages, the number of material failures will also be unpredictable,” he said.”¹⁵

What happens if, suddenly, the tanker isn’t there? That is an enormous strategic question. Fearing the consequences of such an emergency, all the top US Air Force combat leaders have put the spotlight on the potential risk of the tanker force.

“I don’t know any other theater that’s more dependent on the tanker force than the Pacific,” said Gen. Carroll H. Chandler, Commander of Pacific Air Forces.¹⁶ “Today it takes about seven hours on the ground for maintenance for every hour in the air if you look at what we’re doing in the Pacific. So I would tell you that the new tanker is at the top of our priority list as well,” Chandler said.

There’s no better way to understand the gravity of the tanker imperative than to look back at how air refueling has transformed the Air Force—and American military power.

QUEST FOR ENDURANCE

Gen. Curtis E. LeMay was said by some who knew him to be reticent, even awkward, in everyday life. Few recall that the air refueling tanker was one of his obsessions. It was LeMay who took air refueling out of the realm of air shows and experiments and gave it the military rigor needed for combat missions. “People think of LeMay as buying bombers,” said Lichte, “but it was really LeMay who built up the tanker force.”¹⁷

Before LeMay, endurance was limited to the gas each airplane could carry in internal or external tanks.

In an official report that he wrote in 1918, Maj. George E. A. Reinburg, commanding officer of the 2nd Day Bombardment Group in World War I, had this to say: “To bomb behind the range of present day artillery and to reach strategic rail-heads, not less than four hours of fuel should be carried by each plane. The present Renault Breguet carries five hours fuel in addition to its capacity of bombs.”¹⁸ Reinburg admired the Breguet’s divided fuel tanks, the lower of which “can easily be dropped in case of fire.”

The problem was that no combat aircraft could ever carry quite enough fuel on board.

Famous experiments in the 1920s pursued ways to transfer fuel in the air. The year 1923 saw the first small successes. In January 1929, the flight of the *Question Mark*—bearing Carl Spaatz, Ira Eaker, and Pete Quesada, among others—kept an Army Air Corps crew aloft for seven days. These refueling attempts all relied on the “dangling hose” method where the “tanker” plane hoisted a hose over the side and someone in the other plane caught it and plugged it in. Spaatz was soaked through with gasoline during one of *Question Mark*’s refuelings and narrowly avoided bad burns.

This improvised refueling technology was not suited for combat operations. The development of efficient piston engines gave new, bigger bombers longer ranges for theater operations. Fighters extended their range with auxiliary drop tanks—a crucial step in gaining air superiority over Europe. Ferry routes crisscrossed the Pacific and the Atlantic.

After World War II came the enormous B-36 bomber. It was renowned mainly for being the only airplane in the inventory able to fly from the US to targets in the Soviet Union without refueling.

Strategic Air Command’s first leaders—Gen. George C. Kenney and his successor LeMay—wanted more of that range and endurance.

Both were highly experienced combat veterans who knew that American airpower’s role in the Cold War would depend in part on bringing in-flight refueling up to combat standards. Both had served in the Pacific. The generals saw how the comparatively longer ranges of the P-38 and the B-29 delivered vital operational advantages in the air campaign.

Now, their job was to build a global bomber force, and they could not do it without more endurance. Credible war plans and deterrence required a capability to strike the Soviet Union from bases in the United States. Designs for new bombers such as the B-52 called for fuel-gulping jet engines. That made it imperative to find an operational solution.

STARTING OUT

Aerial tanking developed rather quickly, as these things go, and the journey led straight to a bomber named *Lucky Lady II*. “I don’t know any project that is more important than the refueling project right now,” Kenney declared in 1948.¹⁹ Strategic Air Command reviewed its postwar options for getting bombers to targets. Among them were aerial towing, one-way missions, disposable landing gear, or setting down at Arctic airfields to refuel.²⁰

On the other hand, the British had a much better idea: a gravity-loop refueling hose that could transfer up to 100 gallons per minute.

SAC's serious interest led in short order to sound operational experiments with refueling for fighters and bombers. By June 1948, USAF had its first two tanker units: the 43rd Air Refueling Squadron at Davis-Monthan AFB, Ariz., and the 509th at Walker Field in Roswell, N.M. That fall, as the Berlin crisis loomed, Boeing developed a refueling boom able to transfer fuel under pressure at the rate of 700 gallons per minute.²¹

In March 1949, LeMay oversaw the first non-stop first round the world flight supported by aerial refueling. *Lucky Lady II* was a B-50 bomber from Carswell AFB, Tex. The bomber's crew completed a global mission in 94 hours with four refuelings from tankers positioned at the Azores, Saudi Arabia, and the Philippines.²² LeMay announced that America now had the capability to deliver an atomic bomb anywhere in the world.²³

By the end of 1950, LeMay had 120 KB-29Ms under his command and SAC had passed another milestone with the first refueling of a jet bomber—the B-45. War plan DARKHORSE staged tankers out of Labrador as part of SAC's plans for an all-out nuclear offensive circa 1951.²⁴ This was the first of many operational plans that fed SAC's requirements for tankers.

Fighters joined in with a non-stop air refueling flight of F-84Es equipped with wingtip fuel tanks from England to America in September 1950.²⁵ One of the fighters managed to complete the 10-hour flight with three refuelings from three different aircraft along the route; one ditched after damaging its probe during the second refueling over Iceland.

Tactical Air Command continued to test refueling for fighter combat in Korea. Although it abandoned refueling plans for the F-86 which had to carry drop tanks outside a pilot's peripheral vision, it employed wing tanks on both the F-80 and F-84 straight wing fighters. However, it took three hook-ups to refuel. First, the pilot filled one tank halfway, then broke off to completely fill up the other tank, before returning to top off the first. That was the only way to avoid instability from the sudden addition of a half ton of fuel in each tank.

On July 6, 1951, three RF-80 reconnaissance fighters on a mission off the shore of North Korea carried out the first combat air refueling in history.²⁶ Almost a year after the first combat mission, 60 of SAC's F-84Gs flew from Georgia to California non-stop courtesy of the fuel they got in a mass rendezvous with two dozen KB-29s over Texas.²⁷

The age of the air bridge was born. Deployments across the Atlantic or Pacific that once took days now took hours. Three squadrons of American fighters hopped from the US to Japan in the summer of 1952.²⁸ In a 1953 exercise, F-84Gs sortied from Georgia to French Morocco with three refuelings along the way from new KC-97 tankers.²⁹

From the early 1950s on, all future air warfare concepts depended on air refueling. "As of today, the tail is wagging the dog," commented one of LeMay's commanders.³⁰

EXPANDING COMBAT VALUE

Tanker numbers soared. SAC tankers hit their peak strength in 1961 with 1,095 in the fleet.³¹ They were a mix of 651 KC-97s and 444 brand new KC-135s. Looking ahead, SAC laid out a requirement that year for 640 KC-135 tankers—thereby completing the fleet still in service today.³² “The KC-135s were bought in seven years at well over 100 per year,” said Lichte.³³

These tanker fleets were purchased to support the nuclear deterrent force. However, it was their use in regional conflicts that reshaped the role of the air campaign in American military thinking and operations.

During the Vietnam War of the 1960s and 1970s, the whole concept of the air campaign came to depend on tankers. They were needed to extend an aircraft’s time over the target, open basing options, and rush aircraft continent to continent when needed.

Vietnam was an air war fought at a distance. Many fighters and reconnaissance aircraft were based in central Thailand, nearly 500 miles from Hanoi. B-52s launched from Guam, about 2,600 miles from the active war zone. Navy carriers were on station in the South China Sea. All aircraft needed refueling, so tankers staged from Okinawa, the Philippines, Thailand, and even Taiwan.

Having tankers available also gave commanders more choices about where to place air bases. The November 1964 attack on the airfield at Bien Hoa by Viet Cong guerillas destroyed five B-57 bombers and damaged another 13. “The Bien Hoa episode inspired the Air Force to base large, conspicuous, and expensive airplanes elsewhere,” noted historian Richard Smith.³⁴

Technology also supplied part of the impetus. Fighters had to be fast and agile to survive. Only jet engines could do the job, but their weight and poor fuel efficiency cut range and endurance. For example, the P-38 Lightning of World War II boasted up to a 1,000-mile combat radius with 45 minutes in the target area. The basic combat radius of the F-4C/D Phantom II was 288 miles.³⁵ In Vietnam, pre-strike and post-strike refueling from airborne tankers became an essential part of the routine.

Take the case of the F-105—a supersonic fighter-bomber that could carry some 12,000 to 14,000 pounds of ordnance. External fuel tanks gave it a theoretical combat radius of slightly more than 800 miles. However, supersonic flight, evasion of missiles, and air combat led to increased fuel consumption and erased much of that range.

The result was that F-105s flying out of Thailand to targets in North Vietnam ran out of gas. Smith, the historian, wrote that they “had to be refueled simply to return to base, and, after taking evasive action in the target area, going to after-burner for too many minutes, fighting MiG interceptors, getting holes shot in the fuel tanks, post-strike refuelings were also necessary.”³⁶

Soon, the tankers were on their way to becoming a joint asset. Navy fighters in Vietnam days refueled from their own carrier-based KA-3s and KA-6s. There were, however, dramatic exceptions such as the case of one KC-135 crew that pulled off a triple-layer aerial refueling over the Gulf of Tonkin in April 1967. It featured the first multiple air refueling between a KC-135 aircraft and an A-3 Navy tanker, which simultaneously refueled a Navy F-8 Crusader under emergency fuel shortages and combat condition. The crew was awarded the Mackay Trophy for the year's most meritorious flight.³⁷

This KC-135 offloaded so much fuel for so long that it ran short itself and had to make a strictly forbidden emergency landing in Da Nang.

Feats such as this one highlighted the complete dependence of joint, expeditionary airpower on tankers. All the pieces were in place. Tankers could enable aircraft to move land forces quickly by air. They made it possible to wield flexible, conventional might at any point on the globe. It was this ability more than any one single factor that made airpower a tool of deterrence and diplomacy.

The vision of Kenney and LeMay was more than fulfilled.

EARLY AIR CAMPAIGNS

Over the past two decades, tankers have again reshaped tactics and concepts for air operations. First, tankers made possible the rapid deployment of aircraft and the unleashing of persistent strikes, as first seen in 1990-91 during Operation Desert Shield and Operation Desert Storm. Then, after 2001, tankers enabled the transition to on-call intelligence-surveillance-reconnaissance and precision attack and tactical information flows that are central to joint warfare in Afghanistan and Iraq.

■ Desert Shield. Saddam Hussein's brazen decision to send invading Iraqi forces into Kuwait on Aug. 2, 1990 was a hinge event. This generated a massive response from the US and a broad coalition. The initial, pre-war phase, Operation Desert Shield, extended from the day of the invasion to Jan. 16, 1991.

The first objective was to get some forces to the region to forestall further southward movement by Iraqi forces. Such a move would threaten the oil fields of Saudi Arabia. Tankers exercising with the air force of a certain Gulf state turned out to be the first US land-based aircraft in the area. With help from tankers, US forces placed five fighter squadrons, an E-3 AWACS detachment, and the lead element of the 82nd Airborne in Saudi Arabia in just five days. The F-15s deploying from Langley AFB, Va. required seven refuelings to make the trip.³⁸ Over the months, tankers played a major role in the buildup of a mighty land and air force, poised to eject Iraqi forces from Kuwait.

American tankers—still under SAC control—flew 4,967 sorties during this

build-up and preparation phase.³⁹ Air Force tankers provided the main support for an air bridge over the Atlantic, providing the means for deploying fighters and airlifters from US bases to Saudi Arabia and other theater installations.

■ Desert Storm. The active combat phase, Operation Desert Storm, began on the night of Jan. 17, 1991. During the ensuing 43 days of war, tankers logged 12,181 sorties—most of them before the ground forces ever set foot across the border into Kuwait and Iraq. USAF KC-135s contributed 9,559 of those sorties, and the KC-10s another 1,465.⁴⁰

A total of 262 USAF KC-135s and 46 KC-10s went to war.⁴¹ That was more than the 230 aircraft identified in Joint Staff plans as needed for regional contingency operations, the Pentagon pointed out in its report after the war.⁴² Coalition forces also sent their tankers—British VC-10s and French C-135s, for example, procured in the early 1960s to support national nuclear forces.⁴³

Desert Storm was an airpower revolution that happened one refueling at a time. “There was more gas in the sky over Saudi than in the ground below,” joshed one pilot.⁴⁴ Strike aircraft were hungry for fuel. Sorties were long, and planners had to set up a total of 122 air refueling tracks to cover the battle space.⁴⁵ Planners first built tanker tracks for each mission and gave them code-names like Railroad and Weasel.

One mission, flown on the third day of the war, had two tanker tracks, each using five to eight tankers. (The number of tankers would vary as some left the scene and others joined up.) “The lead tanker would be the low man in the cell; succeeding tankers would stack up (offset to the right) with one mile separation distances and each 500 feet higher in altitude,” as the Air Force’s postwar report described it.⁴⁶ “Mission commanders would plot out the times required to join up with tankers and determine their launch times on that basis.”

Under this system of tanker allocation, the air war might have ground to a halt just a few days after it began. Confusion over tanker timing was one factor in the loss of two F-16s early in the war. Officers in the theater’s Combined Air Operations Center quickly put together a new plan that gave certain assets their own dedicated refueling tracks. Gas would be available for F-15Es, for example, on a constant basis; no longer would the tankers assemble only for narrow mission windows. The Pentagon’s official report found the crucial limiting factor was airspace. It took a combination of “air refueling tracks and anchors ... to maximize tanker availability.”⁴⁷

Even so, there were dramatic moments as crews hustled to get their post-mission tanking. On one mission, an F-4 Wild Weasel crew from the 35th Provisional Fighter Wing could not find its designated tanker. “I [don’t] know if you would call it skill or luck,” said the crew member later, adding: “But I locked onto the biggest contact I had on the radar and it happened to be a tanker. He had no other aircraft on board. He wasn’t our tanker, but he

had his boom down and was ready—so we topped off with gas and made it home.”⁴⁸

Few noticed at the time, but tankers such as the KC-10 were frequently pressed into service for cargo missions during this conflict.⁴⁹ The trend toward reassigning tankers to carry cargo would grow in years to come.

CHANGING OPERATIONAL CONCEPTS

■ After Desert Storm. After the quick victory in Desert Storm, USAF's tankers kept flying and have never really stood down. So-called “no-fly zone” enforcement work—Operation Northern Watch and Operation Southern Watch—began in the summer of 1991 and continued for 12 years. In 1995, USAF tankers played a major role in Operation Deliberate Force—the bombing of renegade Serb forces in Bosnia-Herzegovina. Another Balkan war, Operation Allied Force over Serbia in 1999, required a huge tanker support operation. The skies over America were filled with tankers as well as fighters on Sept. 11, 2001, and tankers continue to keep air sovereignty patrols airborne. Operation Enduring Freedom in Afghanistan, which began in October 2001, and Operation Iraqi Freedom, launched in March 2003, both have exacted a constant demand on the fleet that continues to this day.

Through these years of activity, tanking operational concepts underwent significant change. All three major combat operations—over Serbia, Afghanistan, and Iraq—put a premium on precision and strike effectiveness. Strike aircraft were not just hustling in and out of the battle space. Now, the air component planners wanted to pick and choose where to strike, when to strike, and when to back off. Often, there was a long wait for emerging targets. The result was an expanding concept of expeditionary air warfare that counted more than ever on tankers.

In early 1999, Slobodan Milosevic's Serbian army and police units stepped up a rampage that compelled more than 600,000 refugees to flee Kosovo to neighboring Albania. NATO was willing to go to war but only in the air. In March 1999, NATO began Operation Allied Force. The alliance started out with a plan for three days of air strikes, and then retooled for a 78-day air war that gradually ground down Serbian army and infrastructure targets. The air campaign put pressure on Milosevic and demonstrated to the world that NATO was resolved to end the Kosovo crisis only on the alliance's terms.

NATO's first air war quickly turned into a stress test for the tanker force. At the peak of operations, fully 40 percent of the Air Force's tankers were in use—and a staggering 80 percent of the tanker crews were called to action.⁵⁰ The sudden decision to expand the air war after it had been underway for a few days posed unique challenges for United States Air Forces in Europe. One of these was the requirement to cope with foul Balkan weather. Another was to find suitable tanker bed-down locations in a hurry and in sufficient numbers.

Fortunately, it was a NATO war, and so US tankers faced few political hurdles. The KC-135s and KC-10s ultimately were bedded down at a dozen bases, from Britain and Eastern Europe to the Mediterranean. However, the large number of deployed tankers used up some 90 percent of available basing capacity.⁵¹ Even at large bases, the tanker presence approached the maximum-on-ground (MOG) number allowable. RAF Mildenhall in Britain took 34 tankers. Moron Air Base in Spain, accepted 38. In each case, the Air Force was within one tanker of reaching the MOG limit.⁵²

Operation Allied Force illustrated the need to deploy a force large enough to ensure the tankers could indefinitely sustain the air war. Lt. Gen. William Begert was USAFE's deputy commander at the time. Begert wrote: "Unlike airlift, which must maximize efficiency because requirements often exceed available resources, combat-support air refueling places a premium on effectiveness."⁵³

Begert went on to explain:

"The Allied Force tanker plan had built-in redundancy, which ultimately enabled the air campaign to achieve its desired effects. For example, fully fueled KC-10s manned a reliability orbit for the duration of the air war with few or no scheduled receivers. While inefficient, these reliability tankers repeatedly saved the day—salvaging refuelings after scheduled tankers broke, recovering fighters that burned extra fuel to engage enemy aircraft, and providing unplanned fuel to permit in-flight target changes. Similarly, ground-alert tankers, while not efficient, saved countless missions as well, especially when bad weather demanded increased flexibility in refueling times and off-loads. Without the reliability KC-10s and ground-alert KC-135s, rescue efforts for two US pilots downed over Serbia would have been delayed by hours or even days, if not lost completely."

As the campaign expanded, Italy opened up numerous bases, as did other NATO nations. This was fortunate, because the NATO air war had complex requirements, including the beginnings of collateral damage estimations, en-route retargeting of bombers and fighters, and pursuit of time-sensitive targets. Air war requirements were beginning to supersede and move away from pure sortie efficiency, and the tankers had to be there to cope with whatever the politics of the air war demanded.

NOBLE EAGLE

No emergency was more shocking and unexpected than that which befell the United States on Sept. 11, 2001, when al Qaeda-trained hijackers seized four airliners and used them for suicide air missions aimed at the World Trade Center Towers in New York and the Pentagon and another unknown site in Washington, D.C.

Intercept alert fighters rushed to both cities that morning. Over New York,

F-15 pilots saw the second tower crumple in ash below them. Over Washington, D.C., three F-16s inbound from Langley AFB, Va. spotted smoke billowing from the Pentagon. America was under attack and the first response was an instant air campaign. North American Aerospace Defense Command ordered fighters to set up Combat Air Patrols—and CAPs meant tankers.

A KC-135 from Bangor, Maine was on a scheduled training mission near New York City when it was called to help. The crew set up an orbit over Kennedy Airport at 20,000 feet to help the two F-15s.⁵⁴ With the tanker in place, one F-15 would take on fuel while the other stayed on station or pursued unknown aircraft over New York City. More F-15s arrived shortly after noon and they, too, used the KC-135's refueling track. Later, a KC-10 from McGuire AFB, N.J. replaced the Bangor crew.⁵⁵

All over America tankers were scrambling. "If you're going to fly CAPS for 24 hours, they need a lot of tanking," one general later remarked.⁵⁶ In addition to active-duty tankers, 18 ANG tanker wings mustered 78 tankers—generated, ready and flying—all on a volunteer basis.⁵⁷

Tankers delivered fuel to keep fighters airborne, but they also acted as vital communications relays between fighters and control centers running down the remnants of commercial air traffic and unknown bogies. "At one point, we had 21 unaccounted for aircraft that weren't talking to FAA centers, not on a flight plan or otherwise accounted for," said Col. Robert Marr, then-commander of Northeast Air Defense Sector, in a 2002 interview.⁵⁸

Remote areas in the western United States lacked radar and communications coverage but they did have tankers. For example, Alaska's air defense command center picked up the track of an inbound Korean airliner squawking a hijack code. Four fighters scrambled to intercept and track the jet until it could land at White Horse, in Canada's Yukon territory. Tankers with call signs Arctic 61 and Arctic 64 took off to support the fighters and an AWACS. Arctic 61 followed the fighters and airliner on a parallel heading so the fighters could talk to the airliner on VHF via the tanker. But soon the fighters were "getting too far away from our radios for us to maintain communication with them," said Capt. Steven J. Thomas, who, along with MSgt. David G. Rafferty, served then in the Alaskan Air Defense Sector center.⁵⁹

Rafferty suggested Arctic 64 hold and act as radio relay with the fighters. "That worked great and we had a radio relay all the way to White Horse with them," Rafferty said. "We were quite relieved to have KAL 85 land, learn it had not been hijacked and no one was harmed," Thomas added.

Tanker activity on Sept. 11 was just the beginning. Soon, tanker crews were pulling duty both for Operation Noble Eagle and for Operation Enduring Freedom in Afghanistan. "Within 10 days, we deployed folks not knowing where they were going or how long they would be there, but they knew they were going out to fight for freedom," said Col. Keye Sabol, wing commander of the 319th Air Refueling Wing at Grand Forks AFB, N.D. in a 2003 interview.⁶⁰ Some pilots in the 319th racked up 150 flight hours in just 25 days during

that busy fall. Normally, it would have taken six months to accumulate that many hours.⁶¹

Tankers flew 6,175 sorties in Operation Noble Eagle during its first year.⁶² “I remember after 9/11 I thought it was the greatest thing in the world that I could do something about it,” said Capt. Jim Pantleo, then assistant director of operations for the 912th Air Refueling Squadron at Grand Forks.⁶³

The need for homeland security in time generated a new tanker mission. In 2002, authorities phased in a graduated alert posture. The minimum posture tasked about 35 fighters and eight refueling tankers to be constantly on alert.⁶⁴ Higher alert postures called for considerably more. Once again, the tanker fleet was a linchpin for a national security mission no one foresaw.

AFGHANISTAN

The post-Sept. 11, 2001 tanker upsurge in American skies was just the beginning. Many tanker crews were going to the skies over Afghanistan. The opening days of Enduring Freedom illustrated the dependence of American military power on long-range tankers as never before. Tankers were vital to four tasks: gaining quick air supremacy; supporting special operations and airdrop missions; sustaining fighters and bombers on station; and delivering supplies and fuel for forces on the ground.

For the tankers, USAF was not the only customer. After the Sept. 11 attacks, carriers USS *Enterprise* and USS *Carl Vinson* quickly positioned themselves to conduct strikes against al Qaeda targets in Afghanistan. Plans for Enduring Freedom called for helicopters, tankers, and transports to operate in Afghan airspace. Even a lucky shot from Taliban-controlled missiles or MiG-21s would carry unacceptable risks.

Explained Rear Adm. John D. Stufflebeem, then deputy director for plans on the Joint Staff, in a 2004 interview: “Initially, there was a big fear about the Afghans flying to try to shoot us down. And so everything would have to go with fighter cover.”⁶⁵

The carrier decks held enough F-14s and F/A-18s to guarantee air superiority—if they could stay on station. Enter the tankers. From a handful of theater bases, tankers set up orbits to support Navy fighters and Air Force bombers that opened the campaign. Tankers enabled C-17s to fly from Germany to drop relief supplies on night one. Tankers kept E-3 AWACS aircraft on station. They were there to meet inbound Navy fighters heading north on six-hour missions. Soon, tankers were also gassing up F-15Es and F-16s to make long, long flights to strike key targets.

New coalition partners found it easy to host tankers, often avoiding the political debates associated with granting access to bombers or fighters. SAC’s Cold War planners had long envisioned the tanker as the way to extend

range, but who among them could have imagined that, in OEF, tankers would operate from locations such as Karshi Kanabad, in Uzbekistan, and Manas Air Base, Kyrgyzstan, both formerly part of the Soviet Union.

The unusual basing of tankers wasn't the only new twist. Afghanistan's air war demanded tanker support for long missions, but it also employed tankers to increase on-station times. After the first few days, the number of pre-planned targets diminished. Ground controllers and the air operations center cued strike aircraft with new targets while airborne. Frequently, fighters and bombers were sent to different areas to await targets or even assigned multiple emerging targets. The only way to provide on-call firepower was with frequent, dependable refueling.

Air strikes hit Taliban strong-points as they were identified. In late November, two F-15Es flying out of Kuwait had been working in other areas of Afghanistan for several hours and their mission time was almost over. Then an AWACS director called them with a new target—a Taliban headquarters building—in Tarin Kowt. The F-15Es could take out the target with laser-guided bombs, but it would leave them critical on fuel. How did they make the strike work? AWACS dispatched them not one, but two tankers, to guarantee quick, post-strike refueling. The F-15Es attacked the Tarin Kowt target and made it back home after a 13-hour mission.⁶⁶

Sometimes the tanker crews were very close to the action. In one case, a KC-135 was spotted by a truck armed with an anti-aircraft gun. As the truck pulled off the side of the road to take a shot, the tanker called for help. Fortunately, two Navy F/A-18 fighters quickly arrived on scene and took out the enemy.⁶⁷

All told, tanker aircraft flew more than 5,000 sorties in Enduring Freedom's peak phase from October 2001 through February 2002.⁶⁸ For persistence and endurance, this was a new high water mark. Aided by tankers, a USAF F-15E set a record for the longest fighter combat mission at 15.5 hours. A B-2 crew set a record with a 44-hour combat mission. Retired US Navy Adm. Archie Clemins wrote: "In Afghanistan, Air Force tankers provided more than 80 percent of the 'gas in the air' for our carrier fighter pilots, many of whom refueled more than six times during combat missions routinely lasting seven to 10 hours. This is exactly how a joint force must operate."⁶⁹

For all aircraft, refueling tracks guaranteed mission effectiveness. "There's nothing more satisfying than working a 12-hour shift on an aircraft and then watching that plane take off on time at the end of the day," said SrA. Mike Senay, a KC-135 crew chief in theater for OEF.⁷⁰

Ground forces appreciated it, too. "Airpower from all the services—intelligence-surveillance-reconnaissance assets, mobility aircraft, close air support, and space systems—have given ground forces in Afghanistan the ability to operate in smaller units and respond quicker with more accurate weaponry than at any other point in history," said Army Lt. Gen. David Barno in late 2004.⁷¹ "While it takes boots on the ground to win a counter-insurgency

fight,” he added, “it takes airpower to move, supply, and protect those boots on the ground in a country like Afghanistan.”

IRAQ

In March 2003, Gen. Tommy Franks, commander of US Central Command, was ready to unleash US forces to carry out what became known as Operation Iraqi Freedom. Franks had a plan for Iraq that called on airpower to be ready with maximum firepower and flexibility.

Pre-war planning highlighted how important tankers would be to the success of Franks’ battle plans. Those plans called for the air component to conduct five air wars across Iraq all at the same time. Air operations would comprise support of American Special Operations Forces engagements in the west of Iraq, combined SOF and Kurdish attacks in the north, Army V Corps’ thrust toward Baghdad, the 1st Marine Expeditionary Force’s parallel march to Baghdad, and a campaign of strategic air attacks across the length and breadth of Iraq. Col. Cathy Clothier, then 401st Air Expeditionary Operations Group commander, explained, “Not a single bomb gets dropped, not a single air-to-air engagement happens, or missile is fired unless tankers make it happen.”⁷²

Unfortunately, CENTCOM was scrambling to find tanker basing locations. This was nothing like Desert Storm. Host nation basing and ground fuel supplies were limited. Eventually the tankers would be spread over more than 15 major bases from the Mediterranean to the Persian Gulf and beyond.

Tanker availability was a major variable in the maneuver of the Joint force. Case in point: refueling tracks for aircraft hitting Northern Iraq targets. Turkey initially denied basing and overflight permission to the coalition. With Turkey out of the picture, carrier aircraft would have to fly a long, circuitous route to hit northern targets. “And we didn’t have enough tankers to do that,” commented Rear Adm. David Nichols, then the deputy Combined Forces Air Component Commander (CFACC).⁷³ The tanker shortage caused by suboptimal basing “was a significant limiting factor early in the fight,” Nichols said.

Statistics from the first week showed how critical the gas was. On the first week’s Air Tasking Order, priority went to enablers: suppression and destruction of enemy air defenses, defensive counter air operations, counter-Scud operations, ISR flights. These missions took 65 percent of the tanker fuel offloads in that week.⁷⁴ Making do with only 35 percent of the fuel was everything else, including strategic attack, air interdiction, and close air support.

Fighter pilots grew hot under the collar; they were hoping for more tanker support so they could fly more sorties against Iraqi targets. “For a fighter pilot, there’s never enough gas airborne,” then Vice Adm. Timothy Keating, who was coalition Maritime Component Commander, said in April 2003.⁷⁵ Navy pilots weren’t the only ones getting a fresh perspective on how much

they depended on tankers. "I've gotten just as many e-mails from frustrated Air Force F-15 or A-10 guys, who thought they were getting gypped out of gas, too," said Brig. Gen. Kurt Cichowski, who was serving as deputy director of Mobility Forces at the Combined Air Operations Center (CAOC).⁷⁶

Soon the coalition's aerial refueling capacity grew. "We increased the number of tankers [and] also brought out some spare crews," Nichols said.⁷⁷ A total of 149 KC-135s and 33 KC-10s deployed for OIF. Clothier ended up basing her 30 tankers at a British base on an island in the Mediterranean. The pace of operations kept tanker crews busy. KC-135 pilot Capt. Richard Peterson at the 321st Air Expeditionary Wing described OIF as a nonstop cycle of "fly, crew rest, and time to go again."⁷⁸

"At least a third to a half of our aircraft are in the air at any give time, and as the operations tempo increases, so will the number of sorties we fly," said Lt. Col. James Vechery in April 2003 as commander of the 340th Expeditionary Air Refueling Squadron in the Gulf region.⁷⁹ He added: "We are a force extender. By bringing fuel to the fight, we are allowing other planes with more extensive combat power to complete their missions."

Tanker crews continually encountered the unexpected. "We had several 'we-need-gas-right-now' situations," said RAF Flight Lt. Rick Skene, of 216 Squadron, in a 2004 interview.⁸⁰ The RAF Tristar tankers saw plenty of action, underscoring the need for flexible allocation which proved so important in previous conflicts. Skene recalled: "One guy was so desperate for fuel, he jettisoned his weapons. We had to leave the refueling track and go find him. Another time, we were over the western desert in Iraq when we encountered a receiver who had blown his seals. Fuel was streaming out of his aircraft. He stayed on the hose for more than an hour before we could get him back to safety."

Air component commander Lt. Gen. T. Michael "Buzz" Moseley soon pushed tanker crews right up to the battle's edge. Plans assigned fighters and bombers to hit what planners called "killbox interdiction/close air support targets." Eventually these accounted for nearly 79 percent of all targets struck.⁸¹ Hitting those targets called for sticking close to where the ground forces were operating.

"The success of the ground forces has gotten them out in front of the tanker situation; we've had to move the tankers forward," said Navy Capt. David Rogers, then deputy operations officer at the CAOC.⁸² What the joint force needed was for tankers to come closer to cut the time fighters spent returning to refueling tracks. "By the third day of the war, we were operating 60 miles out of Baghdad," said Wing Commander R.A.D. Greene, of RAF 216 Squadron, in a 2004 interview.⁸³

Forward tankers rarely flew set orbits. "We're not able to do that from a threat perspective," Rogers explained. Threats of mobile missiles and anti-aircraft fire lingered, particularly in the north.⁸⁴ Guided SAM shots had nearly stopped; unguided SAM shots continued, going on to total 2,884.⁸⁵ The

CAOC compensated for the threat by setting up more tanking stations and changing them often. “It may be harder to find your tanker,” noted Rogers. “And the tankers are more liable to break off their fueling if they feel like they’re getting shot at,” he added.

On one memorable occasion Capt. Tricia Paulson piloted her KC-135 over Kirkuk, where notable air defense threats remained, to supply fuel for rescue forces attempting to locate the crew of a downed F-15E.⁸⁶ “When one of our F-15s crashed, a tanker went deep into Northern Iraq with the rescue crews,” Gen. Hal Hornburg, then commander, Air Combat Command, said of the incident. “Not for glory, not for fame, but seeking to save a fellow warrior,” he said.⁸⁷

US Air Force tankers racked up 6,193 sorties during the main phase of Iraqi Freedom and off-loaded 376,391,000 pounds of fuel.⁸⁸ However, their job was not over.

STABILITY OPERATIONS

The end of major combat operations did not bring an end to the wars in Iraq and Afghanistan. The air campaigns continued with airpower mastering new tactics in close air support, responsive ISR, tactical airdrops, and theater cargo movement.

Lichte described how tankers integrated with stability operations. “In the CENTCOM AOR [area of responsibility], when the fight’s going on and you have troops in contact, and the F-16s and F-15s are down helping protect the Army, if they have a tanker right overhead they just pop up, they hit it, and they go right back,” he said.⁸⁹ “If that tanker has the capability of staying on station a very long time, either because it can carry more fuel or because another tanker can come and dump the fuel into it, that gas station stays right over the fight.”

The major peaks and valleys of close air support sorties were reflected in the overall tanker scheduling for the theater. While other factors affected tanker sorties, the main driver was keeping fighters in position to cover ground forces and main supply routes.

Data on tanker usage conclusively demonstrates that stability operations put a high demand on refuelers. March 7, 2009 was a typical day. Tanker crews for the coalition flew 48 sorties and off-loaded approximately 3.4 million pounds of fuel to 256 receiving aircraft across the Central Command theater of operations.⁹⁰ On March 18, they refueled 277 receivers.⁹¹

Air Force tankers also excelled at jobs for which they weren’t designed. This included stepping in as pinch hitters for aeromedical evacuation. For example, a KC-135 crew from the 931st Air Refueling Group at McConnell, AFB, Kan. flew a 12-day stint in spring 2009 ferrying wounded personnel from

Bagram Air Base in Afghanistan back to hospitals in the rear.⁹² For a KC-135, aeromedical evacuation is feasible but challenging due to limits on cabin pressurization and electrical power. However, as Lichte pointed out, the KC-135 helps because being able to use any available aircraft in the system for aeromedical evacuation helps speed response times of all other aircraft.⁹³ The rapid availability of aircraft to move patients to Bagram and then on to Germany and the United States has greatly increased battle survival.

CURRENT WARFARE

The work of today's tanker force amplifies the mission set seen in past air campaigns. Current operations in Iraq and Afghanistan have placed a premium on what fighter and bomber crews call loiter time. In past campaigns, most strike aircraft made their way to the target and back again as fast as possible. With fighters and bombers providing ISR and ferreting out insurgent targets, keeping them in the air as long as possible pays major dividends. "They are there when you need them for troops in contact," said Lichte in his March interview.

The role of the tanker during intensive close air support is twofold. First, it provides fuel to keep strike aircraft available. On numerous occasions, firefights called "troops in contact" events may go on for several hours. If a ground force team is inserted by helicopter and encounters resistance, fighters and bombers may have to be overhead most of the day to provide direct air strikes and cover extractions. The controllers on the ground benefit from working with the same strike aircrews as long as possible. Tankers are crucial to keeping the ammunition coming.

"Having a tanker up there gives you more loiter time on fighters and bombers," said Lichte. Take away tankers, and the air component commander would need "quadruple the number of fighters to cover the same time period," Lichte explained.

The operational flexibility extends to fighter and bomber payloads. Missions in Iraq and Afghanistan have demanded a very wide range of ordnance from gun rounds and flares to heavier bombs suitable for caves and other buried targets. As a result, commanders load up a mix of munitions. Bombers are designed to bear up under the weight, but fighters sometimes need extra help. "You can load it up with all kinds of weapons and hit the tanker as you burn down gas," Lichte noted. This "gives you the option of putting more weapons on the plane."

Today's tankers have also become valuable conduits of information, especially in Central Command's far-flung theaters of operation.

The idea of a "smart" tanker got its start in the late 1990s with a secret program known as Warrior Gateway.⁹⁴ Tankers would be modified to act as communications gateways and network managers in their part of the battle

space. Work accelerated after experiences in Afghanistan pointed out the limitations of line-of-sight communications.

Step one for the smart tanker was installing Link 16 antennae to form a beyond-line-of-sight radio relay from the tanker to other aircraft and onwards to air operations centers. The smart tanker package for the KC-135 consisted of antennae for GPS satellite navigation and for Link 16 joint tactical information display systems (JTIDS). On the ground, crews added a roll-on pallet weighing 140 pounds with the AN/ARC-210 satellite communications radio, JTIDS, the gateway manager (a laptop computer), a display, a keyboard, and associated cabling. Once in flight, the communications node functioned automatically. When the first KC-135 equipped with the Roll-on Beyond Line of Sight Enhancement (ROBE) was ready in October 2002, it led Maj. Gen. Bob Behler, commander of the Air Force Command and Control ISR Center, to say: “We now have network-centric connectivity for our warfighters.”⁹⁵

Years later the “smart” tanker had become essential for air operations. “It’s like instant text messaging for war—with pics,” said Lt. Col. Pamela Free-land, a KC-135 pilot deployed from the 97th Training Squadron at Altus AFB, Okla., as chief of standardization and evaluation at the 376th Expeditionary Air Wing at Manas.⁹⁶ She said: “The pilots have a knee board computer that displays a common operating picture of all of Afghanistan that gives us a better understanding of what’s going on in the battle space we’re supporting. Even the boom operators like how easy it is to use the system.”

The CENTCOM air boss, USAF Lt. Gen. Gary North, said, “ROBE ensures I have the total air picture available.”⁹⁷ He added: “To have a synchronized communications capability overhead on our tanker fleet that can reach down into the valleys in Afghanistan is very critical. This is a big difference between where we are in the joint fight today and where we were five or 10 years ago.”

One F-15E crew and the ground forces they were helping found out just how much help the tankers could be during a mission in July 2008. A tanker aircrew overheard radio chatter between an F-15E pilot and a joint terminal attack controller on the ground, said Col. Chris Bence, who was the 376th AEW commander. A forward operating base deep in a valley was under attack and in danger of being overrun. He said: “We could tell the F-15E pilot was struggling to identify and strike the targets without causing collateral damage or friendly casualties. We turned on ROBE and within minutes, we knew the system was a success by a comment made by the F-15 pilot: ‘I don’t know where the picture [target imagery] is coming from, but I got it [the target] now. Thanks.’”⁹⁸

KC-X REQUIREMENT

Given their record in recent US air campaigns, it’s easy to see why tankers are important to joint warfighting requirements. In February 2009, the KC-X

was revalidated by the Joint Requirements Oversight Council, a body of service vice chiefs of staff headed by the JCS vice chairman and charged with blessing requirements for all major acquisition programs.⁹⁹ However, the requirement is also documented in war plans.

At the top of the official statements is the Mobility Capabilities Study (MCS). This exhaustive study matches regional and global war plans with force structure to mandate the acceptable range for airlift and for tankers. Lichte described it as sizing capacity for multiple regional contingencies, creating an air bridge for time phased deployments of ground forces, and positioning tankers to enable the air tasking order for commanders in theater.¹⁰⁰ It assumes refueling of Air Force, Navy, and Marine Corps strike aircraft.

MCS 2006 called for the Air Force to maintain 520 to 640 aerial refueling platforms.¹⁰¹ By that standard, the tanker fleet is already below the minimum. Necessary retirement of older KC-135Es (which were already grounded for safety of flight reasons) will leave a total of just 476 tankers in the fleet—417 KC-135R/Ts and 59 KC-10s. That's 44 aircraft short of the number deemed to be the minimum requirement.

To address the shortfall, Air Mobility Command has divided its tanker replacement plans into three discrete sections. KC-X would be a medium-size tanker replacing 179 aircraft. KC-Y would begin the next phase, also replacing about 179 aircraft. KC-Z might be a different aircraft, perhaps a replacement for the much larger and younger KC-10 tankers.

The Air Force expects KC-X to go far beyond the capabilities of the KC-135R. Air Force Chief of Staff Schwartz laid out the case when he was commander of US Transportation Command. The “exact dimensions” are “not the thing that I worry about,” he said.¹⁰² “I establish requirements, and that is that it needs to be multi-mission—it cannot be a single-mission—airplane.”

Lessons from Iraq and Afghanistan have greatly clarified requirements for the next tanker. First comes more fuel, more room for passengers, and more cargo. No one questions that the No. 1 job for tankers is to refuel receivers. However, mobility commanders over the past several years have come to depend on tankers for many different roles. With KC-X, they are looking for a platform to give them more capability for these additional missions. Cargo is a prime example. AMC wants a tanker capable of moving significantly more 463L pallets.¹⁰³

Another lesson has been to build in a capability to deal with increased threats. Tankers aren't invulnerable. An AMC study found that, during 2006, US tankers were fired upon 19 times in the CENTCOM region.¹⁰⁴ The paper went on to state: “The threat is real and the requirement for our aircraft to operate in those areas is well documented. Aircraft operating in this environment must possess onboard, aircraft self-protection systems to ensure safe and effective mobility operations.”

Advanced defensive systems in the KC-X will make them better partners for

the combat air forces. Following trends from 2003 onward, improved situation awareness through tactical data links with other assets and better defensive countermeasures will enable commanders to pull tanker orbits closer to locations where fighters and bombers are supporting troops in contact.

MEETING WARTIME REQUIREMENTS

One final question is this: Why does the tanker fleet need to be so big to meet wartime requirements? Was not the current inventory a Cold War fleet? Is it possible that the US would need something that large for the indefinite future? While the 2006 mobility study made the detailed case, it is worth reiterating the logic of this requirement to underscore why prompt action on KC-X is appropriate.

Simply put, the fleet is sized for global operations and for wartime surge in many types of missions. The case for a KC-X demonstrates why tanker fleets must be so big to meet war plan requirements. It shows that, above all, the tanker must pass along the gas to receivers during the crunch point of an air campaign. The metric of choice here would be number of receivers per hour that are refueled.

Receivers per hour consists of the number of joint fighters you expect to refuel during the peak hour of combat operations. Tankers will be refueling bombers, ISR aircraft, and other air vehicles, of course, but these larger aircraft typically have tanker tracks allocated specifically for them. In campaign planning, it is the fighters—with their high refueling requirements, immediate close air support tasking, and exposure to danger—that set the peak receiver demand.

Scheduled tasking for fighters contributes to the requirement, but the second half of the equation is the potential demand for close support from the ground component. This regulates the number of fighters that must be scheduled to cover ground forces. War plans take into account some very large scenarios.

The crunch point comes in major operations across a theater when air forces attack numerous targets and support ground forces. Any intensive interdiction activity or close air support to ground forces dramatically elevates receiver requirements. The peak number of strike sorties during Operation Iraqi Freedom came when the air component was working to strike deep at Republican Guard targets and to provide responsive close air support.¹⁰⁵ That means putting lots of fighters and bombers over target areas at the same time.

Future requirements in high-intensity operations could easily exceed what was needed in 2003. In that year, the number of receiver aircraft supported two divisions—the Army's 3rd Infantry Division and a Marine Expeditionary

Force—in the major combat operations phase of OIF. If Turkey had agreed, the Army’s 4th Infantry Division would have attacked from the north, increasing deep strike and CAS requirements. Take another example. In 1991, six coalition divisions were engaged in Operation Desert Storm to cover the full line of engaged forces. A future conflict might put brigade combat teams in a noncontiguous battle space, where they would need air-delivered firepower more than ever. Nor are these “heavy force” requirements only. Irregular warfare still relies on air-delivered fires to dispersed, small teams—again potentially creating high peak demand.

Based on those data, the table below estimates a maximum number of tankers per hour to surge air support for ground forces. Column one totals the strike sorties for each operation. (Operation Iraqi Freedom data from the major combat operations (MCO) phase.) Column two depicts the 16 hours of daytime surge operations—the most common period for high-intensity operations, and for enemy attacks, since enemy forces often do not operate as effectively at night. If each sortie takes two refuelings, then the maximum demand per hour for a multi-division fight may be around 112 refuelings per hour. That would require 16 tanker booms per hour (assuming each tanker refuels about seven aircraft per hour.)

Ground Operations and Air Component Surge Requirements

	Average Strike Sorties/Day	Daytime Sorties	2 Refuelings per Sortie	Refuelings per hour	Tankers per hour (7 receivers per hour)
Desert Storm	1,340	898	1,796	112	16
OIF MCO	620	434	868	54	7.7

Source: Gulf War Air Power Survey, 1992; OIF By the Numbers, 2003

No wonder the KC-135 has been so efficient for years. The KC-X will carry more gas and cargo, but to preserve operational flexibility, it won’t be a tanker in the KC-10 class. “Too small a tank and it lacks the gas our forces need,” summed up retired Gen. Walter Kross, former TRANSCOM boss, in a 2002 op-ed, and added, “Too big a plane and it clogs runways, and slows down the primary mission flow.”¹⁰⁶

Beyond this, planners prudently schedule more tankers to keep the campaign flowing smoothly. Many commanders in the past have chosen to set up dedicated refueling tracks, airborne spares, ground alert spares, and more so that gas can be delivered when the fog and friction of war hits.

There is no reason to believe that fewer tankers will be needed in future. An August 2006 report from the Congressional Research Service said, “The need for aerial refueling could grow in the future” beyond the 600 tankers envisioned by the Air Force.¹⁰⁷

Of course, tomorrow's manned KC-X may not be refueling only manned aircraft. Or if it does have aircrew aboard, the plane may be guided to the refueling link-up by computer. Great progress is being made with autonomous air refueling, enough to imagine that computers may do all the work on the boom in the future, even for manned aircraft. On Aug. 30, 2006, a NASA F/A-18 completed the first autonomous probe-and-drogue airborne refueling operation in a Defense Advanced Research Projects Agency test over Edwards Air Force Base in California.¹⁰⁸ "This flight is a significant milestone—it demonstrates that autonomous systems can employ the benefits of air-refueling that have proven so valuable to military aviation," Air Force Lt. Col. Jim McCormick, the DARPA program manager, said at the time.¹⁰⁹

Pilots later hinted autonomous refueling could out-do that hard-acquired human skill. "The end-game movement of the autonomous system had none of the last-second, high-gain stabs at the basket that we often see with human pilots," noted NASA test pilot Dick Ewers, who flew the mission.¹¹⁰

As yet no one has invented an unmanned tanker. But the potential for other unmanned (and manned aircraft) to link up to the tanker crew is apparent. A force mix moving to more unmanned systems cannot be said categorically to reduce the long-range demand for tankers even though the endurance of many unmanned craft is high. Trades for weight, range, and endurance will continue to keep aerial tanking in the mix.

A robust fleet of tankers therefore forms the essential core of wartime tanker surge operations for the future. If a joint force commander does not have enough tankers, the whole panorama of air operations and joint operations shifts. Limits on tankers may impact everything from high-value targeting to how generous commanders can be with close air support.

CONCLUSION

"When Curt LeMay and the people at SAC built that tanker they never expected it to be flying out until it's 50 years old, let alone how we plan to fly it all the way out to 80 years old," said Lichte.¹¹¹ It's not just the Air Force that needs new tankers to replace the "children of SAC." No joint warfighting concepts of the future can get by without tankers, either.

There will also be homeland security missions laying claim to tankers. With a major share of tankers in the Air Reserve Components, state units may be called on for diverse missions to respond to crises or natural disasters.

Their cargo capacity has come in handy in theaters of war and at home. Hurricane Katrina proved the point. Sen. Maria Cantwell (D-Wash.) noted in a 2005 statement that, in emergency situations, Washington State's tankers, based at Fairchild Air Force Base, serve as cargo aircraft and move people and supplies around the state or, when needed, to other parts of the country. "In response to Hurricane Katrina," she noted, "Fairchild's Air National Guard

tankers, under the command of the Governor, have flown 43 missions carrying 50 tons of cargo and more than 550 personnel to the Gulf Coast.”¹¹²

Continued air sovereignty missions over US airspace also mean ongoing demand for dedicated tanker support to the alert sites, which currently number 18. “Any time they launch [a fighter], a tanker is in the air to make sure that fighter has fuel for its mission,” said Lichte.¹¹³

Be it local or global, the reach, endurance, capacity, and information flow of the strategic tanker is a foundation of airpower and joint operations. Try to imagine fighter forces without reliable tankers. Limited by drop-tank ranges, the airpower map of the world would scarcely be different from what it was in the 1940s. Navy carrier-based aircraft could buddy-refuel from other fighters, such as the F/A-18EF, but the Navy’s access mission would stop close to the water’s edge.

Operational trends over the last 40 years have shown that airpower today depends completely on tankers. Without a reliable fleet of them, the Air Force’s expeditionary operations would be curtailed. Forward air bases would have to be near battle areas. Humanitarian relief missions would take days longer. The ability to operate in multiple theaters at the same time would wither.

Were the United States forced to stand down the KC-135R fleet, America would lose its rapid global reach. “Everything comes to a grinding halt,” said Lichte.

In the late 1940s, Kenney and LeMay saw that their young Air Force could not become a global power without the addition of aerial refueling. In a similar vein, today’s senior leaders recognize that the tanker is a linchpin of the way airmen will fight in the future. In the words of Lichte: “Sign me up for a tanker as quickly as possible.” ■

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