



The Imperative for a New Tanker Now

White Paper

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Contents

Introduction.....	1
New Strategic Environment.....	2
Age of the KC-135 Fleet.....	3
Importance of Strategic Air Refueling.....	4
Views of Others	6
Current Tanker Presence and Employment Strategy	8
Impact of Grounded Tankers	9
Opportunity Costs of Delayed Procurement.....	16
KC-X Multi Role Capability.....	17
Air Refueler Role.....	18
Airlifter Role.....	19
AE Role.....	20
Enhanced Defensive Systems/C2	21
Conclusion	21

Introduction

Our nation needs a new aerial refueling tanker now. With tankers that are approaching 50 years old, we simply cannot afford to delay procurement any longer. Since tankers are the key “enablers” of our joint global force, without a viable tanker fleet, the United States military is not global. This capability allows US fighters, bombers, transports and reconnaissance aircraft to fly farther, longer, and reach destinations and targets that otherwise would be unreachable. Without the tankers, much of our current and future military operations would come to a halt, and our nuclear deterrence capability would be in jeopardy. Tankers allow our aircraft, troops and supplies to quickly arrive anywhere in the world, and once there, sustains operations. They are “force multipliers” that greatly increase our ability to mass force. Furthermore, tankers are critical enablers that give us an asymmetric advantage over our adversaries by providing flexibility and options to combatant commanders. They truly add the global dimension to the Air Force’s vision of Global Vigilance, Global Reach, and Global Power in order to ensure our nation is secure. Without a fleet of viable tankers, the security of the United States is at increased risk. This is why it is imperative that we procure a new tanker now.

With the aging KC-135 fleet, a variety of potentially catastrophic maintenance problems loom on the horizon. A vast number of specialized aircraft inspections are conducted during routine depot maintenance. Theoretically, the discovery of a major deficiency, such as skin fatigue and corrosion in an aircraft such as the KC-135, could result in grounding of an entire fleet of aircraft as a precautionary measure. Several months or even years of engineering analysis and depot maintenance would be required before the fleet could be repaired and deemed airworthy again. During that time, America’s national security interests would be in jeopardy if a contingency or national emergency required quick deployment of our military forces overseas, or aerial protection of our homeland. This would not be the time to wish we had taken steps earlier to procure a new tanker.

Our nation’s ability to project humanitarian, logistical and combat power relies upon tankers. The consequences of losing air refueling capability are dire as the basic missions of air refueling capabilities would be severely hindered. These capabilities include: Deployment Support Air Refueling A/R (called CORONET missions), Air Bridge A/R, Global Attack A/R, Theater Support A/R (both Combat Air Forces and Mobility Air Forces), Aeromedical Evacuation (AE), Nuclear Missions Support, and Homeland Defense Support. These are the major missions that tankers support and contribute to air power, but are not all-inclusive. If we lose even a few of these missions, the U.S. and coalition airpower will significantly decline. In effect, we will lose a phenomenal national asymmetric advantage for peace and wartime operations.

New Strategic Environment

The need for a strategic tanker can be traced back to the beginnings of the Cold War. The threat from the Soviet Union provided the impetus to develop a credible nuclear deterrence force structure. One leg of the nuclear triad defense strategy relied heavily on US-based bombers with intercontinental strike capability. Because of the distances involved, this mission could only be accomplished through the use of in-flight refueling provided by tanker aircraft. This new mission, brought about by a new strategic environment, resulted in the Air Force making the development of bombers and aerial refueling capability its number one priority.

Today, the Air Force's number one acquisition priority is once again a new tanker, not just because it's a new strategic concept that fills a narrow role in deterrence, but also for the increased risk our country would be in without them to perform critical missions required by our joint combat commanders. Because of its multi-role mission, our global force posture simply cannot operate without a reliable tanker force. We simply cannot meet our national security obligations as spelled out in our national security strategy without them.

With the help of dedicated maintainers and crews, the vintage KC-135 is still performing its mission well, but it's important to remember that it was intended for a narrowly-defined mission. Back in 1952, it was designed as a single-role aircraft with a primary mission to refuel strategic bombers during long-range strikes in the event of a nuclear war. This tanker blueprint worked well for the Cold War, but the current state of world affairs is different requiring a new approach.

Today, we face a much more complex security environment. Confronted with multifaceted threats that require a global presence through global reach, the new tanker's role is more important than ever. It will not be utilized for nuclear deterrence alone. Rather, the new tanker will be fulfilling multiple roles from aerial refueling to airlift to aeromedical evacuation. Without a new tanker, many critical military operations would have to be put on hold or cease entirely. General Norton Schwartz, Air Force Chief of Staff, made this point clear in a speech to the Air Force Association on 16 September 2008, "Try to think of a mission where a tanker is not needed...now, take it a step further. Answer the question—what if the KC-135 fleet was grounded during a crisis? That thought should make your heart stop, because our worldwide presence and operations would...stop! Without tankers we're not global...our joint force would face immediate paralysis and long-term degradation. Our nation, our collective security, cannot wait for the moment of crisis to wake up and realize the urgency of tanker recapitalization." Therefore, it should be no surprise that recapitalizing today's tanker fleet is the Air Force's number one acquisition priority.

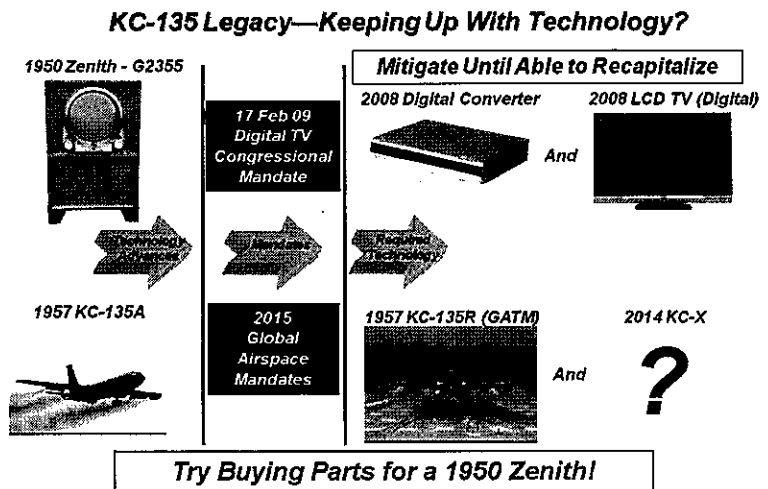
Age of the KC-135 Fleet

When the Air Force received its first KC-135 Stratotanker in 1957, Dwight Eisenhower was President of the United States and President Obama was not yet born.



President Dwight Eisenhower

The Zenith television was a modern piece of technology. While the Zenith has been replaced by today's modern flat screen TVs, the KC-135 has not kept up with technological advancement. Instead, while most airplanes produced during this period are either in the "bone yard," museum, or in the hands of a vintage collector, remarkably, the revered KC-135 is still flying, supporting operations in all corners of the globe. Since the time when the Wright brothers discovered flight in 1903 up until 2009, the KC-135 has been flying for almost half this period. Try buying parts for a 1950s era Zenith, and the challenges of keeping dated KC-135's flying become evident.



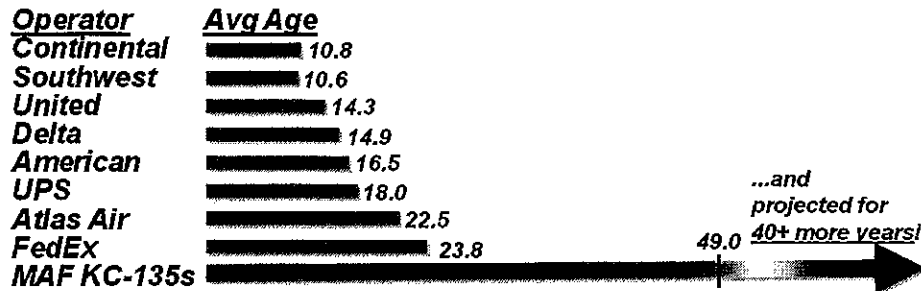
The current average age of the KC-135 tanker fleet is 49 years old. Even if we start to procure the new KC-X tomorrow, due to annual production and delivery limitations, the last KC-135 flying will be close to 90 years old. This is unprecedented and dangerous territory, as no Air Force has any experience or history operating aircraft this old.

Today, the US Air Force operates 415 KC-135's, and we are depending on them as the backbone of our air refueling fleet. The KC-135 is essentially a military variant of the venerable Boeing 707, which was a great aircraft when Eisenhower was President. Now, there are only four Boeing 707's still in operation within the entire US commercial industry. Comparing the age of our KC-135 fleet to the average fleet-age in the US airline industry reveals a telling story—the Air Force operates the oldest "heavy" airframes in the US.

The majority of airlines operate aircraft that average 10-20 years old with only a few exceptions. None of the airlines come close to the average age of our KC-135 fleet at 49.0 years, and we expect to operate our KC-135's for another 40 years! In comparison, the entire C-54 fleet used during the Berlin Airlift was only six years old.

Strategic Trends (Fleet Age and Wear & Tear)

- **MAF operates 415 KC-135's (military variant of Boeing 707)**
- **Only four civilian Boeing 707's are left in operation in the US**
- **US Air Force operates the oldest "heavy" airframes in the US**



***What if the KC-135 fleet were grounded during a crisis?
...without tankers we're not global***

Not only do we have pilots and boom operators in our KC-135 tankers whose parents were not even born when that aircraft rolled off the assembly line, but also those same KC-135's will still be flying when the current crew members' grandchildren are born. The situation of the aircraft's age is even more urgent considering the fact that we are flying our aircraft at rates that far exceed their anticipated usage. When these two factors (age and wear & tear) are combined, we are faced with significant issues.

This is why the KC-X is the Air Force's number one acquisition priority. It is imperative that we take swift, decisive action, and we must ensure fair and open competition as we move through the final stages of selecting a vendor.

The Importance of Strategic Air Refueling

Since September 11, 2001, US Air Force aerial refueling tankers have transferred more than 1.5 billion gallons of fuel to joint aircraft. That's equivalent to the amount of water that goes over Niagara Falls in nearly 32 minutes.



***1.5 Billion Gallons of JP-8 Off-Loaded Equates to
32 Minutes of Water Running Over Niagara Falls***

Tankers have flown over 400,000 sorties transporting more than 288,000 passengers and 71,000 short tons of cargo since September 11, 2001. They also conducted over 6,200

aeromedical evacuation sorties during this period. As previously stated, tankers are a critical “enabler” of the nation’s ability to project power and reach. The effects of this force multiplier are not confined to just the Air Force. The joint community also relies heavily on Air Force tanker support to provide extended “reach” for its aircraft as well. Air Force testimony before the House Armed Services committee in July, 2003 stated:

Air refueling tankers enable our entire force to protect our homeland, conduct combat operations, and provide humanitarian relief around the world. They enable other Air Force, Navy, Marine Corps and allied aircraft to fly farther, stay airborne longer, and carry more weapons, equipment, and supplies. As we just experienced in Operation Enduring Freedom and Operation Iraqi Freedom, the Air Force tanker was a critical force enabler and force multiplier that allowed our coalition force to operate with impunity over a distant battlefield. Without a robust and reliable air refueling fleet, no existing war plan, humanitarian mission, or extended special air mission can be flown without the permission and concurrence of other sovereign nations for landing rights to refuel. Air refueling tankers ensure our nation has the global reach to respond quickly and decisively anywhere in the world. In short, our National Security Strategy is unexecutable without air refueling tankers.

Our joint combatant commanders rely heavily on the support they receive from aerial refueling tankers. They trust the Air Force to provide them with this support. The only way the Air Force can ensure it continues to meet this obligation, is through procuring a modern and reliable air refueling tanker.

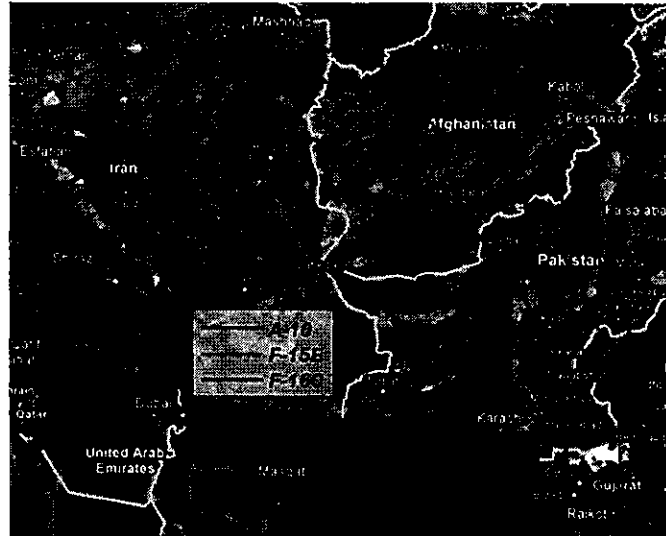
NORTHCOM is particularly reliant upon tankers to accomplish its homeland defense mission. Without tankers to refuel fighters and AWACs aircraft conducting combat air patrol missions, NORTHCOM’s effectiveness would be crippled. The eyes and ears of reconnaissance aircraft, both nationally and internationally, would also be hampered. STRATCOM’s ability to conduct deterrence and rapid global strike missions would also be severely strained without tanker support. TRANSCOM would not be able to quickly deploy CONUS-based personnel and equipment to anywhere in the world with precision and velocity. Overall, Combatant Commanders would be hindered in executing their missions.

Because the United States has the most tankers in the world, the international community also relies on us for assistance. During a humanitarian relief operation in Mozambique in 2000, when supplies started to arrive within 72 hours of notification, the local commanding general was awed by the USAF’s quick response enabled by tankers. He summed up this awesome capability in a comment to the USAF commander, “It’s no wonder that no one wants to fight you.” Without tankers, due to the distances involved

and limited number of suitable airfields, this operation not only would have been delayed by several days, but also may not have been possible to execute at all.

Finally, Combat Air Force (CAF) air power would also be negatively impacted without aerial refueling. Not only would it take them longer to deploy to the conflict area, but also they would need more planes to accomplish the mission once there. Their effective combat range would also be limited. "Range rings" around bases would be smaller, and the CAF would need to establish more vulnerable bases closer to the conflict area in order to maintain combat effectiveness.

Combat Ranges in AOR (w/o A/R)



Views of Others

A 2006 RAND Corp. study, the Analysis of Alternatives (AoA) for KC-135 Recapitalization, proposed that medium to large commercial derivative jets provide the most cost-effective basis for a fleet of replacement tankers. The study looked at, among other options, building a new military tanker from scratch, using small or jumbo commercial jets, and the potential of unmanned tankers. It also considered converting used airplanes or leasing commercial refueling services. According to the AoA, none of these options was as cost-effective as buying commercial derivative tankers based on medium to large jets.

The Rand study acknowledged that the Air Force could keep the KC-135 flying beyond its intended lifespan by continuing to invest large amounts of capital and resources. However, to do so, the Air Force would need to spend more and more every year while getting less and less capability in return. Domestic air carriers recapitalize their fleets on a regular basis because it saves money and makes good business sense. The economic business case to recapitalize the tanker fleet also makes sense and saves dollars for America.

While the RAND AoA did not result in one concrete recommendation, it identified three "good arguments" to expedite tanker recapitalization. First, it noted that the average KC-135 age is 46 years (now 49 years), and the challenges of maintaining such an aged fleet cannot be predicted. It suggested the Air Force do full-scale fatigue testing and a

teardown analysis of representative aircraft to get a better idea of what problems lie ahead for keeping the fleet viable. The Air Force is addressing this issue through its fleet viability board and comparisons to C-5 and C-130 depot results.

Secondly, it noted, if financial considerations require spreading tanker recapitalization out over a long period of time—as seems to be the case, judging by the 2007 Pentagon budget request—then starting earlier will help reduce the expense in any one year. Opportunity costs due to delays are discussed in more detail in the next section.

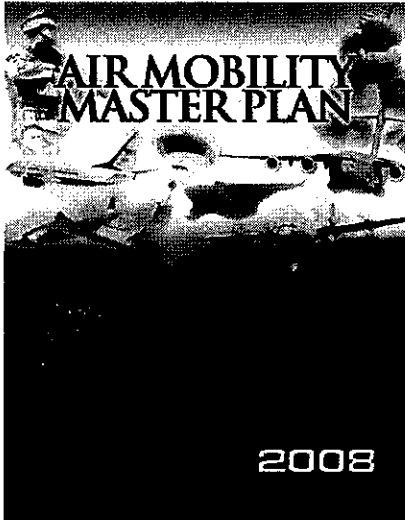
Finally, the KC-135 does not have many of the additional capabilities expected in a replacement aircraft which are required to keep it operationally viable. These capabilities include, but are not limited to, simultaneous boom and drogue refueling, the ability to be refueled themselves, and improved survivability against missile threats. The cost effectiveness of these capabilities was not determined in this study, but the military advantage of such advancements must be considered.

The RAND AoA also stated, “The average age of the fleet in 2006 is 46 years [now 49 years], and continued operation to 2050 would result in a 90-year-old fleet. A fleet of this age and size is unprecedented in aviation history.” Furthermore it stated, “The nation does not currently have sufficient knowledge about the state of the KC-135 fleet to project its technical condition over the next several decades with high confidence.”

The Air Force’s 2005 Tanker Requirement Study called for an air refueling fleet of at least 500 aircraft. Independent analysis concluded that purchasing new, commercial off-the-shelf aircraft to recapitalize DOD’s tanker fleet is the least expensive option for recapitalizing the KC-135 fleet from a life-cycle cost perspective. According to the unclassified executive summary of the 2005 MCS, the study assessed the capabilities of the current and projected force by providing a range of potential resource requirements for intertheater (strategic) airlift, intra-theater (tactical) airlift, and air refueling fleets. The MCS identified a need for between 520 and 640 air refueling aircraft to provide sufficient capability with acceptable risk, with anything below 520 translating into unacceptable risk.

The 2009 National Defense Authorization Act (NDAA) requires a report on KC-X requirements to Congress to include an examination of original requirements for the KC-X, a summary of commercial derivative or commercial off-the-shelf aircraft available as potential aerial refueling platforms, and to reassess the requirements for aerial refueling.

Current Tanker Presence and Employment Strategy



The Air Force clearly provides the foundation upon which to exploit airpower through the availability of air refueling aircraft at nearly all locations around the world where our own service, sister services, and coalition partners position forces. According to the 2008 AMC Air Mobility Master Plan (AMMP), “air refueling provides the flexible ‘air bridge’ concept, substantially enhancing our nation’s force projection capability. It functions as a ‘force multiplier’ by accelerating the deployment cycle and reducing dependency on forward staging bases and host-nation support.”

The 415 KC-135 and 59 KC-10 tanker aircraft in the U.S. Air Force inventory provide daily refueling to nearly all aircraft in the joint air fleet, extending the range and expanding the flexibility of our air power assets. In addition, aerial tankers provide airlift enhancement of the mobility system hauling cargo, passengers, and other requirements to all points on the earth.

On a typical day, tankers provide refueling capability, cargo hauling support, aeromedical evacuation support, and various other taskings worldwide. For example, on a recent day the KC-10 flew 21 sorties offloading over 2 million pounds of fuel, supporting almost 130 receiver aircraft and augmenting the cargo and passenger system with its airlift capability. On the same day, KC-135’s flew 113 sorties directed by the Tanker Airlift Control Center (TACC) offloading nearly 3 million pounds of fuel to over 325 receivers.

The map below shows all of the bases where TACC-controlled KC-135’s and KC-10’s departed en route to their missions on a recent random day.



Obviously, the mark left by the utilization of both the KC-10 and KC-135 is astonishing. The combined tanker fleets flew almost 135 sorties offloading over 5 million pounds of fuel, the equivalent of 16 Olympic-sized swimming pools or 385 two-thousand gallon 18-wheeler tanker trucks, to 455 receivers. This joint combat capability cannot be duplicated by any alternative means. Worldwide fighter movements (CORONETS) would require multiple en route stops, and some would be almost impossible (e.g., Pacific Ocean transits). Theater combat sorties become short, limited-duration missions with very little loiter time to provide air superiority or close air support to troops in trouble on the ground. And in many cases, the mission would be exceedingly difficult to execute without air refueling. Contingency mobility missions would also require multiple en route stops at locations around the globe, overtaxing the already busy airfields upon which we rely to provide needed support on planned non-refueled missions. Air refueling training sorties, necessary for proficiency of both tanker and receiver aircrews would stop, degrading the skills needed for operational missions. Finally, aeromedical evacuation missions scheduled on KC-135's would have to quickly find alternate means of transportation for the injured having critical medical needs. The phenomenal combat survival rates we have seen in recent years have been, in part, due to the speed with which we have been able to get our injured servicemembers returned to CONUS through the AE System. Loss of air refueling capability would negatively impact casualty transit times and would add to the physiologic stress of our injured servicemembers as they endured multiple aircraft refueling stops and transloads during their trip back to CONUS.

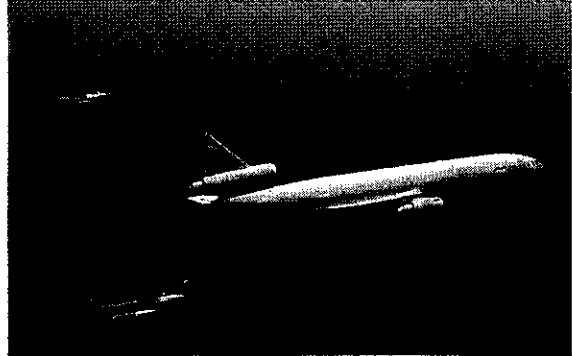
Impact of Grounded Tankers

With the loss of KC-135's and KC-10's across the globe, the many missions our tankers support would be significantly hindered. Considering the joint requirement that global air power incorporates the tanker into almost every battle and/or military movement plan, the consequences of the lost tanker capability must be highlighted. We have witnessed catastrophic tanker accidents and incidents in the past having temporarily put limitations on the use of our tankers and demonstrating the vulnerability of the tanker fleet. Three specific examples including the 1989 Loring AFB fuel tank explosion, the 1993 Milwaukee Air National Guard KC-135 ground explosion, and the 1999 Geilenkirchen AB, Germany stabilizer trim malfunction crash illustrate how quickly an unknown, inherent flaw in an aircraft structure could instantly affect the operations of all tankers worldwide.

The following are the major areas affected (in which the tankers are utilized every day) which if lost, would seriously degrade our global power, presence, and flexibility.

Deployment Air Refueling (CORONET):

In the early days of any conflict, one of the most critical functions of the tanker is the delivery of fighter units to the area of responsibility. Tankers accompany formations of fighters across the ocean or over long stretches of land, providing fuel along the way through multiple refuelings. Frequently, the tankers also carry cargo and

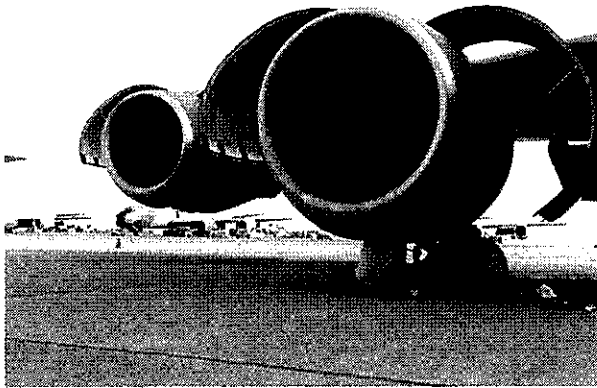


personnel to support the fighter unit at the forward location. The capability of air assets to fly nonstop to a theater may eliminate the need to obtain landing or overflight rights from foreign countries who may want to remain neutral in a given operation or conflict.

Without air refueling capability, the task of delivering fighters to global positions would be eroded and in many cases impossible due to limited range of fighters and the distances needed to travel without suitable landing sites. For example, consider the need to fly a set of fighters to the Southwest Asia AOR from the CONUS. Without the air refueling component, multiple ground stops for aircraft and crew support dictates the route of flight to northern Canada, and Iceland, then hopping across the European continent. Short-notice diplomatic clearances complicate this route of flight as many of these clearances are difficult to obtain, require long lead times, and are time-limited. In addition, during periods of force deployment or rotation, many bases needed for ground refueling and turnaround are already full with a maximum-on-the ground (MOG). It is apparent that only a few, if any, long range fighter movements would happen in this scenario. For example, the movement of 10 F-16C's from Tulsa, Oklahoma to the Iraq AOR was conducted from 16-18 Sep 08. This movement utilized 2 KC-10's and 5 KC-135's transiting through Moron AB, Spain as the only en route stop. Losing these tankers, the fighters (which unrefueled have only about 2 hour legs) would have to hopscotch their way to the AOR, requiring at least an additional two days transit time.

A notional non-A/R fighter movement scenario begins with F-16's at Langley AFB deploying to Kuwait. The first leg spans from Langley to a stop at Goose Bay, Canada. After a two hour fuel and crew rest stop, the mission continues to Sondstrom, Greenland, requiring another 2-hour refuel stop. The fighters move on to Keflavik AB, Iceland, where they full stop and crew rest for 13 hours. The next day the fighters takeoff for RAF Lakenheath, England, where they regenerate their aircraft again, and fly to Aviano AB, Italy for fuel and food. From there they proceed to Incirlik AB, Turkey for another full stop crew rest. The mission flies out of Incirlik with the last leg through Iraq to Kuwait. Total duration en route is more than three days.

This scenario does not take into account maintenance problems that usually accompany multiple stops (7) of multiple airplanes versus only 2 stops with refueling. In addition, the



crew is required to fly over 12 hours more, with much more ground time than the CORONET. Also, this routing is dramatically affected by weather (winds, seasons, etc.) and, as previously described, the capability of en route base support. Finally, diplomatic clearances are needed for the countries of France, Greece, and Turkey. At present, such clearances are not difficult to obtain from

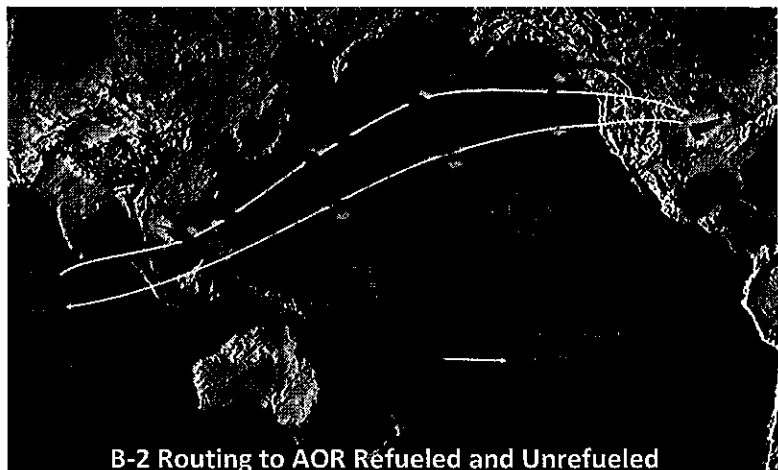
friendly countries; however internal politics and difficulties in obtaining clearance approval from non-allied nations could delay the movement by several days.

Air Bridge Air Refueling: The ability to extend the legs of many cargo aircraft (C-5 and C-17) over long distances is a crucial function of our Air Mobility planning. For example, a fully loaded C-5 needs a large in-flight fuel onload over the Black Sea to make it from its departure in Spain to its cargo offload destination in Afghanistan. This prevents the otherwise necessary drop-in to an otherwise already overextended base such as Souda Bay, Greece or Incirlik AB, Turkey. Additionally, legs from the CONUS to Europe or to the Far East for these large cargo haulers are greatly enhanced via en route A/R to avoid stops at already overused and full bases like RAF Mildenhall, England or Elmendorf AFB, Alaska. In this scenario, the Air Bridge is no longer possible requiring all cargo planes to stop en route for fuel and service as in the Deployment A/R scenario. Planes of all varieties will begin to saturate available ramp space along the route of flight, taxing all ground support capabilities and causing many bases to refuse further arrivals due to inadequate capacity. As the scenario progresses, fewer and fewer bases become available and aircraft are no longer able to fly their planned missions simply because there are no longer any viable en route stop bases. Our Operational Plans (OPLANs) are critically tied to tanker utilization, especially in the beginning stages. Without the use of tankers, the OPLANs (and our whole U.S. strategy in major wars) would not be executable. This could have dire consequences for the U.S. Instead of a rapid response to influence an opponent's calculus, we would be forced toward a timeline that allows others to solidify their positions. With delay, the costs in time, treasure and lives escalate.

Global Strike Air Refueling: Fundamental to our nation's military credibility is the ability to strike anywhere on the globe. The possibility of rapidly delivering our strategic bombing force to destinations is dissolved with the loss of the tanker fleet. As with the previous situations, our strategic strike aircraft would have to hop-scotch their way to

targets or sacrifice days to forward deploy to perimeter locations. Air refueling provides strike platforms the ability to reach any target globally without relying on intermediate basing locations or international diplomatic support. The ability to swiftly and directly strike targets in distant locations and safely recover to non-hostile areas, especially for missions originating and terminating in the U.S., is effectively eliminated in this scenario. Without tanker support, global strike assets require time to deploy, diplomatic clearance for overflight and basing, and forward maintenance and operational support as these plans may call for action with little or no warning. The premise of Global Strike is a rapid response in a crisis situation. If a response is possible, it won't be rapid. And given the time to execute, decision makers do not have the luxury of waiting to initiate a military movement. As with the example of fighter aircraft, multiple stops also elevate the risk of maintenance problems requiring additional spare aircraft to go forward. However, this forward-deployment strategy takes extensive planning with immediate action necessary as crises may occur at any time.

Let's take a look at a B-2 attempting to move to the forward theater area without tanker assistance. The routing map shows the difference between a continuous refueled B-2 to the Forward Operating Area (FOA) and back to home base versus unrefueled legs, stop times, and final stop at



the Forward Operating Base (FOB). As is evident, the B-2 will eventually make it to the FOB at the earliest on Day 3. The Strike missions, however, will not be able to be executed until at least Day 4. This must be tempered, however with the staging of multiple aircrews, maintenance support, and the possibility of broken airplanes at en route locations. Once at the FOB, the B-2 must accomplish stage operations from there to the FOA until the theater combat operation is complete. With refueling, the B-2 is able to put bombs on target in less than 1 day and return to its home base after a day and a half. Plainly, the strategic expediency of this weapon system, a core function of the B-2, is lost without tanker support.

Theater Support to Combat Air Forces (CAF): Tankers play an essential role in the employment of combat aircraft within the theater AOR. This tanker support is essential not only to the U.S. Air Force aircraft, but also to those of the U.S. Navy, and coalition partners. Intra-theater air refueling enables combat and combat support aircraft to increase their range, endurance, persistence, and flexibility. Inflight refueling allows

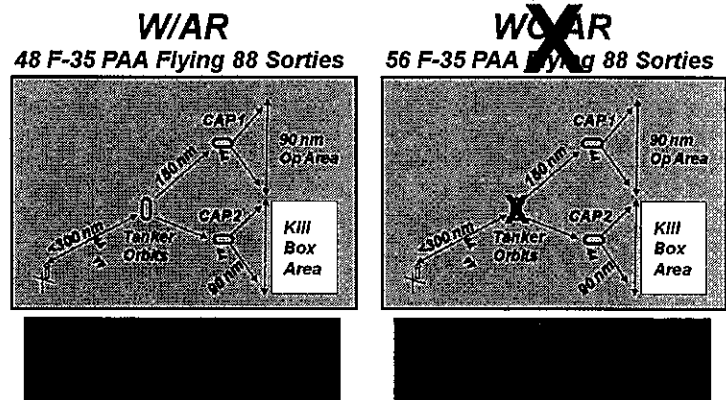
them to carry a larger payload on initial takeoff by decreasing the amount of initial fuel required, thereby multiplying their combat force and combat efficiency, essential to carrier-based aircraft. Theater-based air refueling assets also enhance the security of combat and combat-support air assets by allowing them to be based beyond the range of adversary threats.

Air Superiority with A/R vs Without A/R

Day-to-day operations in a combat area provide an outstanding example of the critical nature of refueling support. Tankers are a major influence within a typical AOR. For example, the depictions in this figure show fighters flying Combat Air Patrol (CAP) and Close Air Support (CAS) in the AOR with and without air refueled capability. In the CAP scenario, 12 F-22s are required to fly 24 A/R sorties (in a 24-hour period) with 4 hours of loiter time, then RTB to FOB. Each loiter block provides the flexibility to reach out within a 500 NM threat zone and accomplish its mission. Without A/R capability, the F-22 must fly 96 aircraft to fly 192 sorties (and must include quick turns at the FOB) with loiter time shrinking down to 30 minutes on station, almost negating its effectiveness against enemy aircraft. The F-22 could possibly accomplish a very limited counterattack capability in the 30 minutes of loiter (equating to slightly less than 240NM of threat zone range). However, after this time, it must tag-team with its replacement F-22 entering into the loiter area to accomplish sustained presence or military capability.

In the CAS scenario, 48 F-35s are required to fly 88 air refueling sorties allowing two 45-minute loiters (within orbit area) and/or strike time (kill box area) with an A/R in between. Take away the A/R, and the F-35 will need to fly 56 aircraft to maintain the required 88 sorties. This will only enable the F-35 to achieve 5 minutes of loiter time, but not enough time to proceed to kill area and accomplish its objectives. The F-35 will not be able to accomplish its mission of reaching the kill box and successfully return to base. Thus, in either case, without A/R, the mission will fail to accomplish its objectives. And the additional force requires additional aircrew and ground personnel, additional basing infrastructure, and additional funding to support.

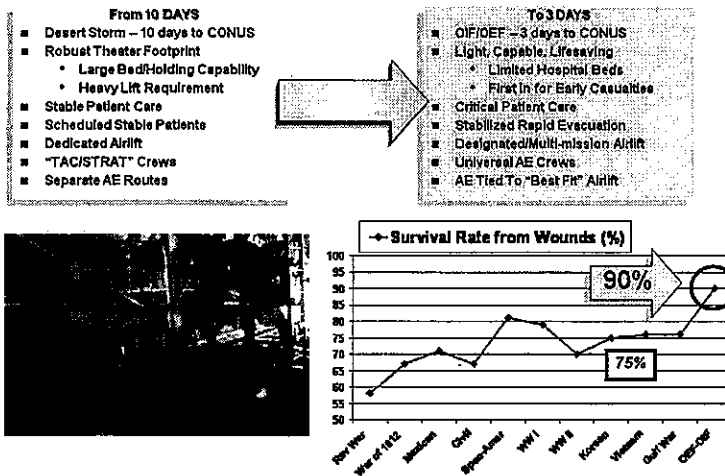
Employment: Close Air Support



Theater Support to Mobility Air Forces (MAF): Air refueling within the theater area of responsibility greatly extends the C-17 and C-5 ranges, giving these mobility assets much greater flexibility, capability, and range to deliver their needed cargo. By providing inflight fuel, these giant cargo haulers no longer need to stop at mid-range locations. Depending on the needs of the Combatant Commander, these assets can adjust their destination or divert locations, accelerating the delivery of time critical people and cargo. Mid-mission stops for fueling require three to four hours apiece. Each en route air refueling accelerates delivery by that same amount. Without the tanker fleet, there needs to be more airlifters in the system to accomplish the same velocity and capacity of cargo delivery. With the burgeoning global air traffic, the increases are not easy to accommodate in the increasingly crowded international airspace.

Aeromedical Evacuation (AE): KC-135's play an important role in the aeromedical evacuation mission across the globe. In previous conflicts, dedicated aircraft provided aeromedical evacuation. The trip from the combat zone was a time consuming series of hops and stops resulting in repeated pressurization cycles which were difficult for critical patients to endure. In contrast, current operations have abandoned dedicated aircraft in favor of rapidly transforming any airlifter or tanker into an AE platform. The range and receiver capabilities of these platforms make a direct delivery to the CONUS from the combat front possible. This direct delivery not only speeds care, it minimizes the footprint of the medical force required to deploy forward.

Saving Lives



The aeromedical evacuation mission has shown an extensive improvement not only in patient transport time from the theater to CONUS, but how integrated the aeromedical evacuation has become within the mobility airlift system. For example, in 1990-91, it took up to 10 days to transport a patient from Southwest Asia back to the CONUS, whereas today, it is usually three days. There is

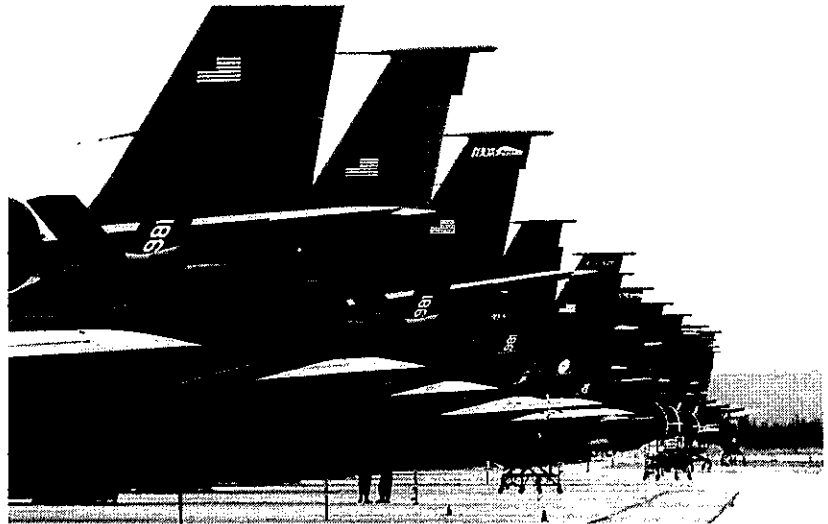
a decreased requirement for hospital beds in theatre due to the increased medical capability aboard AE aircraft (Critical Care Air Transport Teams), the improvement in AE support equipment, and the increased patient throughput capability resulting from both regularly scheduled and In-System-Select designated AE aircraft. All of these factors are greatly synergized by the availability to refuel MAF inflight. AMC-wide

crews are trained in the aeromedical evacuation mission now as opposed to the limited aircraft and aircrews devoted to the mission in the past. We now have greater flexibility and ability to accomplish the mission resulting in more lives saved.

The tanker is an integral piece in this lifesaving system in its own right, complementing the C-17's and C-130's, sometimes comprising up to 30 percent or more of the aircraft dedicated to total AE airframe utilization. The increased flexibility tankers provide MAF aircraft, greatly increases our nation's ability to provide timely, lifesaving aeromedical evacuation.

Strategic Nuclear Mission: The object of the strategic nuclear mission is to deter adversaries who have the ability and capability to utilize weapons of mass destruction against us and to respond as necessary to their aggression. The tanker's role is to refuel the bombers that are tasked against strategic targets to fulfill this mission. This mission, as part of our nuclear triad, has a very important role in our nation's defense posture and is the original reason for developing AR capability. Without tankers, this mission would be so severely degraded that our nuclear deterrence posture would not be as credible. The strategic aircraft flying these nuclear missions are heavily dependent on tanker support to accomplish their objectives. Work-arounds are basically non-existent and extensive replanning with no tanker support may only accomplish limited objectives. We would reduce our deterrent and our strike capability.

Homeland Defense: Our nation demands the capability to defend the nation and support government and civilian agencies in the event of a national emergency or disaster. This mission requires the ability to enforce air sovereignty with airborne radar and interceptors and the ability to rapidly deliver cargo



and passengers to and from the troubled locations. Tankers refuel air defense aircraft, thereby extending their on-station times and allowing larger cargo loads for CONUS-operating airlift aircraft. These are regional CONUS support missions with some tankers supporting and additional tankers on alpha alert in preparation for a quick-response launch for the Air Defense of the United States. Without tankers, Homeland Defense missions will be significantly impacted as fighter and Command, Control, Intelligence,

Surveillance & Reconnaissance (C2ISR) aircraft will no longer be afforded extended loiter time in their respective orbit areas. For example, 1 November 2008 was a typical day in the homeland defense mission. There were 21 air sovereignty fighters flying combat air patrol, 10 tankers refueling those fighters, and 1 tanker on alert ready to launch in an emergency. In an increased security situation, the lack of in-flight refueling resources will hamstring the very critical Homeland Defense mission as fighter and ISR aircraft have to continuously land and refuel their aircraft leaving large vulnerabilities in the assigned areas.

Opportunity Costs of Delayed Procurement

It is difficult to accurately predict how long the metals used in the production of the KC-135 fleet—the skin, airframe, or the nuts and bolts holding it together will last. The designers in the 1950's never envisioned using metals this long or the effects of corrosion on the lifespan of our tanker fleet. While Air Mobility Command (AMC) will retain the KC-135 as long as needed, delaying its replacement has sustainment costs and costs to overcome corrosion issues.

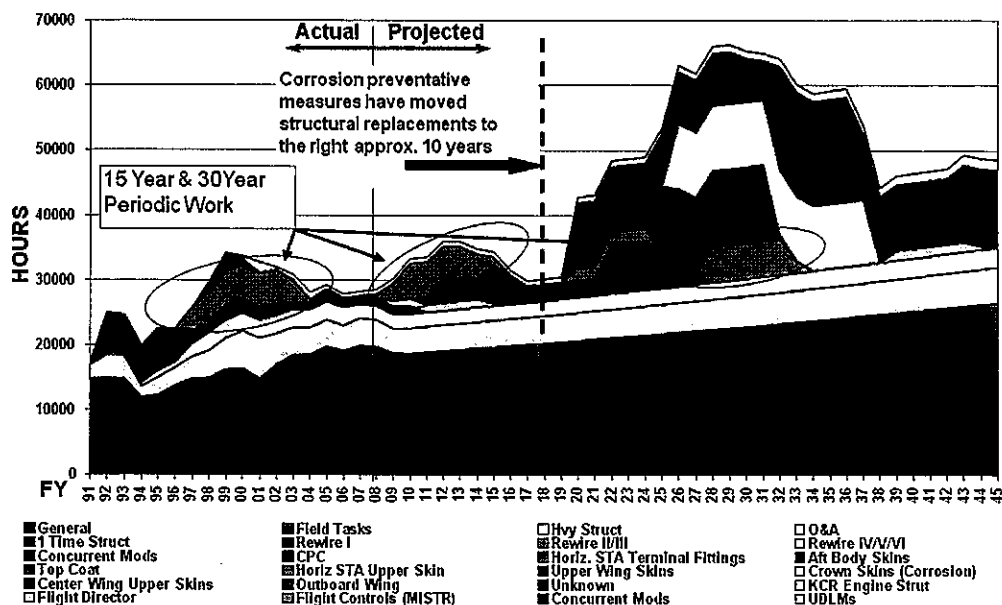
Data compiled by Air Mobility Command analysts shows that the opportunity cost of delaying recapitalization is approximately \$55 million for each year of delay. Their study compared the present value of the projected operations, maintenance and modification costs for the KC-135 in the 2008-2040 timeframe. It assumes that with no delay, the first KC-X will be delivered to the Air Force by 2013, and the first KC-135 can be retired in 2016. The analysts then compared these data to what the Air Force would face with a five year delay in procurement. Over time, the projected costs of maintaining the KC-135 will continue to increase. Retiring them sooner will help offset these rising costs, since there will be fewer to maintain. Given the costs of maintaining the KC-135 fleet, the AMC commander says, “We would rather invest to put tails in the air than to maintain tails on the ground.”



Delay = \$55M/Yr Opportunity Cost

The following “Wall of Doom” chart visually depicts the large increase in depot maintenance hours per aircraft that will be required in the future to keep the KC-135 operational. While the manpower needs and costs to keep the KC-135 flying are going up, the overall manpower of the Air Force has gone down from 685K personnel in the 1980s to 330K today. This will not be sustainable over the long term.

KC-135 Depot Maintenance Hours Per Aircraft



Retiring operationally cost-prohibitive and less capable aircraft allows the Air Force to focus on recapitalization and invest in transformational capabilities much like the airlines do. The KC-X replacing the KC-135 will revolutionize the way the Air Force does business, providing much greater flexibility to the combatant commander. The KC-X will be able to multi-point refuel joint and coalition aircraft, carry cargo and/or passengers, conduct aeromedical evacuation, and self-deploy.

KC-X Multi-Role Capability

Aircraft today are usually not designed to fulfill a single mission or capability. Future tanker aircraft must be able to fulfill multiple missions. This is not a new concept. Both the KC-10 and KC-135 have air refueling and airlift capabilities, but neither aircraft was designed to do both missions well. The KC-X must take this multi-role mission to the next level. By including defensive systems, stronger floors and larger cargo doors, the KC-X will not just augment airlift and aeromedical evacuation--it will significantly enhance their capabilities.

In addition to its core air refueling tasks, the KC-X will provide cargo and passenger airlift capability. Passengers and cargo will be carried in a self-deployment role as well as in support of other airlift operations when air refueling requirements allow. Airlift missions can be dual-tasked with air refueling missions. The unique combination of cargo payload, receiver capability, and defensive systems makes the KC-X an exceptionally capable weapon for rapidly delivering forces anywhere in the world. The KC-135 was initially a single purpose aircraft designed to transport a maximum quantity of fuel in support of bombers in the event of nuclear war. While it was not initially

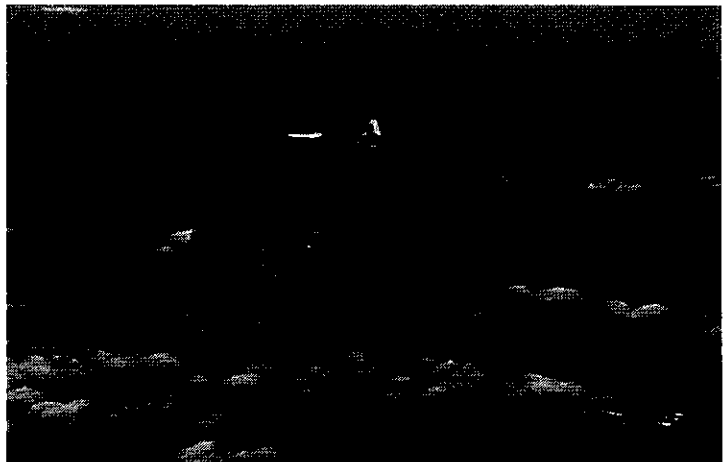
designed to carry cargo and passengers, this limited capability was added later as the Air Force migrated to expeditionary operations which required tankers to be able to self deploy. The original KC-135 had a plywood floor which did not easily accommodate bulk cargo. Innovative airmen later added metal rollers and reinforced floors to satisfy increasing mission requirements to self deploy. Aircrews became very creative exploiting the KC-135's six pallet and 36,000 pound cargo capability to carry their own support equipment and personnel. Since future tankers will be required to self deploy, the new KC-X will be designed to be capable of self deployment, with a robust airlift capability for palletized bulk cargo and passengers that fits seamlessly into the Defense Transportation System.

The new tanker could be used in the humanitarian aid and disaster relief role saving lives by using the KC-X to extend America's outstretched hand of hope to our nation's friends in need around the world. A significant second-order effect of humanitarian aid and disaster relief is the effect it has on the civilian population receiving that aid -- defusing tensions and/or positively shaping post-conflict outcomes from a diplomatic, informational and economic perspective.

The dual role advantage of the KC-X is evident in a self deployment scenario. For example, approximately one third of the tankers tasked as employment assets can self deploy. The remaining two thirds could go into a fighter base, upload cargo and pax, and each tanker could escort up to six fighters. This new capability could reduce the number of tankers required for an air bridge and reduce the need for C-17 airlift. Overall, this reduces tanker air bridge requirements by an additional ten percent.

Air Refueler Role

Air-to-air refueling provides the global facet of the Air Force's vision "Global Vigilance, Reach and Power." The Air Force must be able to extend the range of bombers enroute to a preemptive attack on enemies anywhere in the world. It must be able to provide an airbridge that enables cargo aircraft to deliver troops



and supplies directly to the conflict. It must be able to extend the combat time of fighter aircraft to establish air superiority. All of these capabilities are possible with air refueling. The KC-X will excel at this core mission. It will integrate both boom and drogue methods of refueling. This will allow it to refuel the full range of receiver aircraft

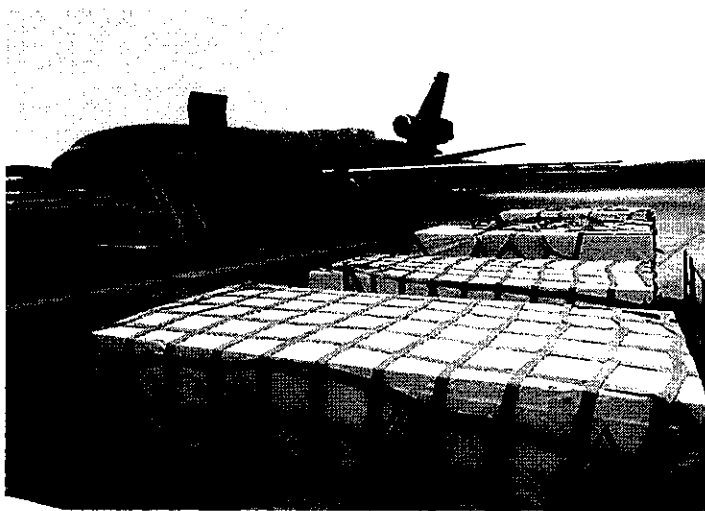
on the same flight. It will be air-to-air refuelable itself, which will extend its reach and expand the fuel we can position forward for receivers. Wingtip drogues will enable it to refuel two aircraft simultaneously. This all adds up to increased capabilities for the joint warfighter.

Integrated defensive systems will greatly enhance the air refueling mission as well. They will allow the KC-X to get closer to hostile environments. This will mean receiver aircraft involved in the fight will have less distance to travel to get fuel, thus increasing their combat effectiveness. Defensive systems also allow special operations refueling missions to be conducted closer to the objective area.

Since the KC-X will be equipped with its own refueling receptacle, it can also be used as a fuel consolidation platform in the theater of operations. When a tanker finishes its mission, it can offload the rest of its remaining unused fuel to another tanker so it does not have to return to its home base with extra fuel. This allows for unused fuel to remain in constant orbit close to the battle area, and saves money since less fuel is carried between the tanker base and the orbit area.

Airlifter Role

While the KC-X must be a tanker first, it will also be a capable airlifter. The capability to self deploy also means it can fit seamlessly into the Defense Transportation System. Using tankers to fly bulk cargo, or bulk cargo and passengers will reduce reliance on overburdened airlift assets, potentially extend the service life of the airlift fleet, and free up C-5's and C-17's to move oversize and outsize cargo. The KC-X will have stronger



floors to accommodate a wider variety of heavy cargo that the KC-10 and KC-135 floors are not stressed to carry. It will also have a larger cargo door that will allow for increased cargo heights. It will be able perform a dual role mission. For example, it can refuel deploying fighter aircraft while also carrying their cargo and support personnel to the deployment location.

Defensive Systems (DS) will allow the KC-X to deliver cargo to higher threat airfields. Therefore, the cargo it carries will not need to be transloaded to another aircraft that is equipped with defense systems. Or, it can support transloading from the CRAF when

operating into a high threat environment when not required for air refueling work. This capability will ease the burden on defensive system equipped aircraft such as the C-17. It will also increase the flexibility of Combatant Commanders as they determine the best way to employ mobility assets.

AE Role

A special category of passenger movement is aeromedical evacuation, and in this role the KC-X will be a star performer. To be able to accomplish this critical mission, the KC-X must have key capabilities inherent in its design: power, lighting oxygen supply capable of supporting patient and equipment needs, environmental temperature controls, ability to mount litter stanchions, ample cargo space and access doors to facilitate patient and equipment loading. The KC-X will be able to



move patients from dangerous, austere locations and carry them long distances to advanced medical facilities without any additional landings/take-offs along the way. This is important in today's aeromedical evacuation system in which patients are moved as soon as they are stabilized, as opposed to previous conflicts when patients were not moved until they were stable. The difference between "stable" and "stabilized" is significant; a stable patient might wait for several days to be evacuated, whereas a stabilized patient is often airborne just a few hours after reaching the theater hospital.



During an aerial refueling mission, the KC-X can be retasked in-flight to pick up battlefield casualties in a medium threat environment (due to its advanced defensive systems) and transport victims directly out of the theater to a major medical facility.

It provides planners with more options to get our valuable wounded warriors to the proper care as expeditiously as possible. The range and speed of the KC-X will make it an ideal platform when the required care is far away and time is of the essence.

Enhanced Defensive Systems/C2

Compared to the KC-135 it will replace, the KC-X's range and payload will allow it to operate more effectively from bases farther away from objective areas while its defensive systems and night vision goggle capabilities will allow it to operate in higher threat areas currently denied to KC-135's and KC-10's. This combination produces options currently unavailable--i.e. significantly increasing the number of available bed-down locations in the event that national interests require immediate response before coalition building can make airfields closer to the target objective available.

To perform its worldwide mission across the spectrum of environments, the KC-X must be capable of operating despite threats including radar and infrared (IR) surface-to-air-missiles, man-portable air defense systems (MANPADS), anti-aircraft artillery, and small arms fire.

Based upon the worldwide proliferation of anti-access systems, tankers are no longer able to simply avoid hostile environments. As a result, tankers have operated increasingly closer to threats and even within missile engagement zones, especially when tasked as a communications relay or as the on-scene commander during Combat Search and Rescue (CSAR) missions. The KC-X's combination of improved situational awareness, automatic infrared countermeasures, radar warning receiver systems, and aircrew and critical flight system armor will allow it to operate in moderate threat areas off-limits to the KC-135.

The KC-X will also be the first tanker aircraft to fulfill Network-Centric mandates, with all the necessary measures of information assurance worldwide. This capability not only links the tanker with ground and other resources, but also becomes a network enabler linking intelligence sources directly with decision makers in the Command and Control (C2) agencies, combatant battlespace controllers, and nearly every friendly asset in between. This on-board capability gives the KC-X crew voice, data, and video intelligence updates as they emerge, and relays this information to friendly C2 forces (e.g. shared awareness of friendly and hostile forces, changes in mission tasking while en route, etc).

Conclusion

Throughout airpower's history, the tanker has proven to be the critical enabler for global combat power. Across the entire spectrum of conflict, the tanker has, and will continue, to play a significant role in providing our nation with an asymmetric advantage for its defense. Throughout the Cold War and after it, the tanker has proven to be a critical part of the Air Force and its joint partners in providing deterrence and executing military operations. In the strategic uncertainty of this century, the flexibility and versatility of

multi-role weapon systems will be the driving factor in their utility and, consequently, their longevity as an active weapon system. The new tanker must fill that role perfectly, and it will finally begin the decades-long process of recapitalizing our aging Eisenhower-era KC-135 fleet.

The KC-X represents a new era in strategic air mobility capabilities. Its multi-role tanker air refueling capability, defensive systems, ability to be air refueled, and its robust cargo, passenger and aeromedical evacuation capability provide enhanced air mobility options through the entire spectrum of operations, from training to contingencies to nuclear operations. In addition to conducting all of the traditional AR missions currently performed by such workhorses as the KC-135 and KC-10, the KC-X's advanced capabilities will be called upon to provide more options for planners and commanders at all levels and in all scenarios.

Sixty years after the Air Force made tankers its number one priority, we have come full circle and find ourselves in the same position where the tanker is again the Air Force's number one acquisition priority. While age and wear and tear are concerns, the new tanker is less about putting new aircraft on the ramp, and more about defining a new era of strategic air mobility capabilities to enhance the options we provide to our national command authorities.

With the grounding of one or both tanker airframes, our use of U.S. air refueling capability drastically changes our air power strategy. Our reliance on these tankers for forward deployment, theater enhancement, aeromedical evacuation, global strike and other important missions illustrates the key component our tankers play every day in the prosecution of our air strategy. If the tanker is unavailable, even for just one day, our air strategy unravels, and we lose crucial asymmetric advantages. As seen in the snapshot of one typical day of tanker support, we would lose 5 million pounds of offload capability to 455 receivers. Currently, the only alternative for these receivers would be to land, refuel, and resume their missions. However, that scenario would significantly limit the range, capability, and flexibility these combat aircraft provide. En route support stations would be overtaxed and have to turn aircraft away, causing aircraft to divert to other non-optimal locations, and others would need to delay take off or completely reconsider their mission viability. In addition, the deployment and redeployment of aircraft, personnel and cargo would be exponentially negatively affected as backlogs occur with transfer to other aircraft. This prospect is most concerning and must be avoided.

Without a modern tanker capable of flexible and versatile response, our nation's ability to respond to the full spectrum of conflict, including humanitarian assistance, disaster response and irregular warfare is in jeopardy, and our nation's ability to respond to future challenges will be in doubt. Without tankers, we are not global. As a multi-role state-of-

the-art tanker, the new KC-X is a much needed flexible and versatile weapon system for defending our nation and its national interests. It is a strategic imperative for our nation that we procure a new tanker now.

