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TANKER RECAPITALIZATION: LESSONS FROM THE PAST

By

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A paper submitted to the faculty of the Joint Advanced Warfighting School in partial satisfaction of the requirements of a Master of Science Degree in Joint Campaign Planning and Strategy. The contents of this paper reflect my own personal views and are not necessarily endorsed by the Joint Forces Staff College or the Department of Defense

This paper is entirely my own work except as documented in footnotes.

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1 April 2010

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ABSTRACT

The AF tanker recapitalization effort has been marred with controversy since it began in 1996. Since its onset, there has been much discussion, debate and research surrounding the tanker recapitalization acquisition effort and the failure therein. To date, there have been three separate and failed attempts at tanker recapitalization; a fourth is ongoing. Air refueling is a critical enabler for the joint warfighter. Air Mobility Command has it right, “our nation needs a new aerial refueling tanker now...we simply cannot afford to delay procurement any longer.”¹ Without it, US ability to conduct full spectrum operations globally is impossible. The thesis of this paper is that the AF must apply lessons learned from the failed tanker acquisitions of the past to prevent future tanker acquisition failure. That said, the acquisition has to be done right. As the AF heads into its fourth attempt to acquire a new tanker, it must ensure adequate oversight; that the analysis is comprehensive and complete; that the requirement is defined; that the process is transparent and guidance compliant and; that the effort is conducted with the utmost integrity. Nothing less will suffice. If the AF gets this wrong again it will strike a blow to that service from which it may never recover. The joint warfighter needs a new tanker.

¹ Department of the Air Force. Air Mobility Command. *The Imperative for a New Tanker Now*. [Scott Air Force Base, IL, Air Mobility Command August 2009], 1.

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INTRODUCTION

The Air Force (AF) tanker recapitalization effort has been marred with controversy since it began. Since its onset, there has been discussion and debate surrounding the tanker recapitalization acquisition effort and the failure therein. There have been three separate and failed attempts at recapitalization; a fourth is ongoing. The first was an effort to lease 100 KC-767s, then a combination of 20 leased and 80 purchased, and the last, which resulted in the contract award and subsequent cancellation of a purchase from Northrop Grumman. Either the Congress or the Secretary of Defense voided all three of the previous efforts after investigations found the AF process fraught with errors and, in the case of the initial lease, illegal activity. The thesis of this paper is that the AF must apply lessons learned from the failed tanker acquisitions of the past to prevent future tanker acquisition failure. It is the intent of this paper to present the reader with the previous acquisition attempts, focusing on the issues that have concerned of Congress, discredited the AF recapitalization effort, and then discuss solutions to eliminate these concerns for the next attempt.

It is critical to note KC-135 recapitalization is not exclusively an AF issue, rather this affects nearly every aspect of US military action. Accordingly, General Duncan J.

McNabb, Commander, United States Transportation Command, stated:

My number one recapitalization priority is replacing the fleet of 415 Eisenhower-era KC-135s with a new platform to preserve a unique asymmetric advantage for our nation. The KC-X...will address the significant risk we are currently carrying in air capacity and address further capability risks associated with an airframe that is almost 50 years old – and will be over 80 years old by the time we recapitalize all of them. The ability to carry cargo and operate forward with defensive systems will be a game changer when the aircraft is not needed as a tanker. Further delays in replacing this aircraft will add significant risk to our ability to rapidly project combat power to support

the nation and our allies. It is imperative to expedite a smart, steady reinvestment program.¹

Air refueling supports the National Military Strategy across the range of military operations. It permits air assets to respond rapidly to global trouble spots with less dependence on forward bases. Furthermore, air refueling significantly expands the options available to the joint warfighter by increasing the range, payload, loiter time, and flexibility of other aircraft. A brief review of recent conflicts underscores the importance of tanker aircraft. In both Iraq and Afghanistan, U.S. military aircraft projected power over long distances and in theaters with limited access to forward bases or neighboring airspace. A significant proportion of the AF's aerial refueling fleet, 149 KC-135s, and 33 KC-10s, participated in Operation Iraqi Freedom, flying over 6,000 sorties and offloading over 300 million pounds of fuel.²

According to the RAND Corporation's Analysis of Alternatives (AOA):

Recapitalization of the KC-135 aerial refueling tanker is vitally important for US national security and will have a significant impact on the US national budget. Aerial refueling tankers are a critical part of US military and national security strategy. Without tankers, air power cannot be deployed to overseas theaters in a timely way; it cannot be operated at militarily required distances from overseas bases; US-based strategic air forces cannot execute overseas missions; and homeland defense air patrols would lose substantial effectiveness.³

Accordingly, senior military leaders, the Defense Science Board and the RAND Corporation, all view air refueling as a critical capability.

¹ General Duncan J. McNabb. *Statement of General Duncan J. McNabb, USAF, Commander, United States Transportation Command, Before the House Armed Services Air & Land Forces and Seapower & Expeditionary Forces Subcommittees [Hearing] On the State of the Command*. Washington, DC, 25 February 2009, 6-7.

² Congressional Research Service Report for Congress. *Air Force Aerial Refueling*. RS 20941. Washington, DC, 20 March 2007, 2.

³ RAND Project Air Force. *Analysis of Alternatives for KC-135 Recapitalization*. [Santa Monica, CA: Rand Corporation. 2006], 3.

SCOPE

The scope of this paper is the KC-135 recapitalization effort to date; it will not address other air refueling capability. Nor will it discuss the viability of not replacing the KC-135, taking the statement of the AF Chief of Staff, General Norton Schwartz that, “the KC-X is the Air Force’s number one acquisition and recapitalization priority” as the AF way ahead.⁴ This work includes the first KC-767 lease effort, the lease/purchase authority designed to buy 80 and lease 20 KC-767s; then, the first Request for Proposal (RFP) the AF let that led to contract award, which was subsequently cancelled by the Secretary of Defense after a Government Accountability Office investigation upheld a Boeing bid protest.

The purpose of the paper is to review all three and glean the common mistakes made, and then, recommend a course of action designed to minimize the chance of repeat failure. The history of this effort has also recently resulted in Northrop Grumman’s withdrawal from the competition, which may cause a default to the KC-767 tanker. This research is timely in that it will provide an in-depth reference regarding the effort. This paper recommends what the AF should do to avoid the common pitfalls of the previous attempts. Doing so, should achieve a sound, defensible acquisition strategy for a new aircraft in accordance with regulatory requirements; that will meet the capabilities necessary to fulfill the needs, fill any gaps, and/or close any shortfalls in the joint warfighter requirements.

To do so, this paper will examine the issues regarding the tanker acquisition effort thus far. The review begins with the combined analysis of the first two failed efforts, the

⁴ Mark Voorhis. *Chief of Staff Addresses Key Mobility, Air Force Issues at Conference*. Scott Air Force Base, IL. Air Mobility Command Public Affairs. 19 November 2009, 1.

100 KC-767 lease, the lease/purchase, and causal factors for the failures. This analysis reviews issues and or concerns brought to the AF regarding the efforts. It also includes the illegal activity surrounding the lease contracting effort and the ramifications the AF is still trying to overcome because of it. Finally, it examines concerns regarding the 2007 RFP. The RFP ultimately led to contract award in 2008. Following award, the Boeing Company filed a Government Accountability Office (GAO) protest. As a result, Secretary Robert M. Gates voided the contract after the GAO found providence in seven of the protest items. Accordingly, Secretary Gates postponed the tanker recapitalization program so the AF could regroup and produce a “foolproof”⁵ solicitation for the next effort.

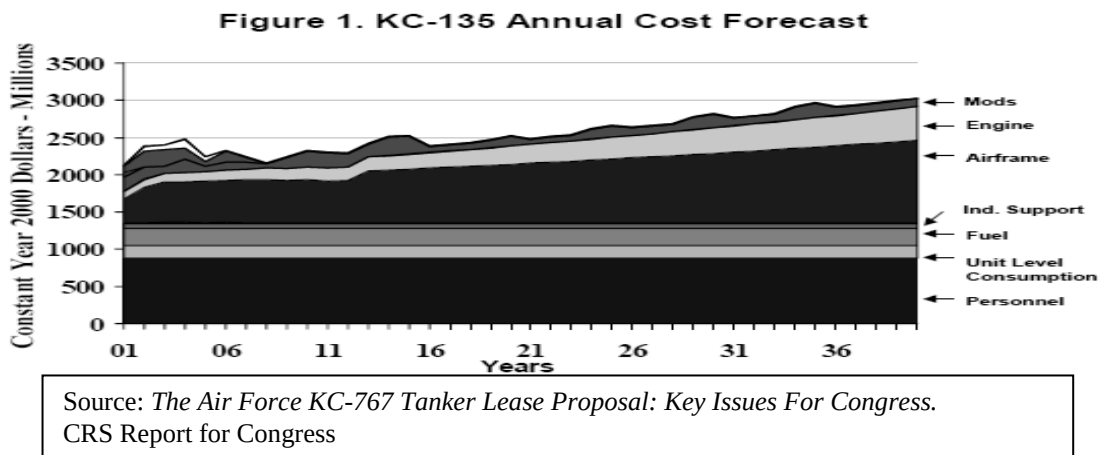
The methodology used to conduct this research paper was a chronological review of the data, which was then analyzed for compliance with the governing directives, process and sound management practice. The analysis found concerns common to all three attempts. It is the thesis of this author that it is paramount the AF learns from the failings of the past three attempts and designs the next effort in accordance with the governing directives. Doing so will achieve success and let the recapitalization begin. While this effort reviews KC-135 recapitalization specifically, the lessons learned in this research effort are likely applicable to all AF acquisition.

Prelude to the Tanker Acquisition Effort

KC-135 recapitalization has been a Department of Defense (DOD) issue and the AF for about 14 years beginning in 1996. In 1996 testimony, the GAO asserted the aging

⁵ John Bennett. “Schwartz Promises ‘Foolproof’ Tanker Solicitation,” *DefenseNews.Com* <http://ebird.osd.mil/cgi-bin/ebird/displaydata.pl?requested=/ebfiles/e20090916703268.html> [accessed September 18, 2009].

fleet of KC-135s would eventually need replacement and recommended the DOD start planning for the recapitalization. The DOD countered the fleet was sustainable for another 35 years since the KC-135 total airframe hours were low.⁶ In February 2001, the AF released its *KC-135 Economic Service Life Study* (ESLS), a study touted as the most comprehensive and authoritative ever conducted. Its purpose was to forecast KC-135 cost and availability through 2040. The ESLS findings reported that, “no economic crisis is on the horizon, and there appears to be no run-away cost-growth,” and “the fleet is structurally viable to 2040.”⁷ However, the KC-135 fleet would incur “significant cost increases” between 2001 and 2040 [See Figure 1⁸]



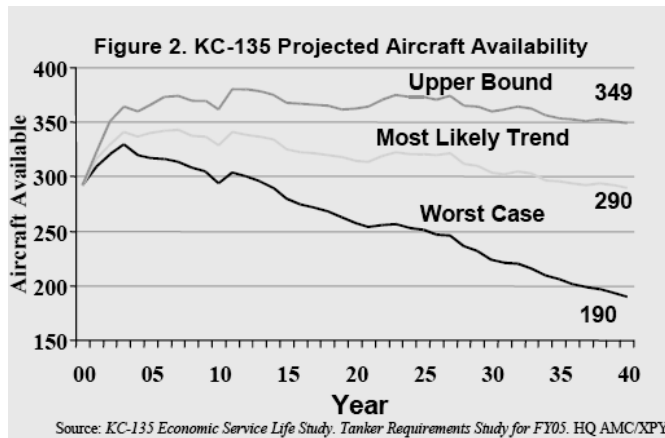
The ESLS also predicted aircraft availability; data indicates a gradual decline through the year 2040. In doing so, the study used three potential trend lines: most optimistic, most likely and worst case. [See Figure 2⁹]

⁶ Government Accounting Office. *U.S. Combat Air Power: Aging Refueling Aircraft Are Costly to Maintain and Operate*. GAO/NSIAD-96-160. [Washington, DC, 8 August 1996], 3.

⁷ Department of the Air Force, *KC-135 Economic Service Life Study*. [Washington, DC, February 2001], 6.

⁸ Congressional Research Service Report for Congress. *The Air Force KC-767 Tanker Lease Proposal: Key Issues For Congress*. RL32056. [Washington, DC 2 September 2003], 3.

⁹ Air Force, *KC-135 Economic Service Life Study*, 4.



The ESLS predicted availability between best 349 and 190 aircraft. Based on this, the AF planned to wait to recapitalize until 2013. Although the AF indicated it would wait, it stated it would conduct an Analysis of Alternatives (AOA) to define the capabilities required. After completion, the AF would determine the proper recapitalization strategy for the KC-135. By the AF's account recapitalization would not begin until FY 2013 and be capable of meeting the projected 2040 KC-135 retirement. This timeline was echoed again in the 6 June 2001 testimony of AF Chief of Staff General Michael Ryan. General Ryan asserted to the Senate Appropriation Committee that the AF "was looking out in about the next 15-year time frame to begin that replacement."¹⁰

As a result, Representative Norman Dicks (D-WA) planned to insert an amendment into the Defense Appropriations Bill to begin the AF's acquisition of the Boeing KC-767 tanker. Shortly thereafter, Secretary of the AF James Roche stated he supported leasing 100 KC-767s.¹¹ Thus the first recapitalization effort was born.

¹⁰ Congressional Research Service, *The Air Force KC-767 Tanker Lease Proposal: Key Issues For Congress*, 5.

¹¹ Vago Muradian. "Roche Seeks Speedy 767 Deal With Boeing to Renew Support Fleet at Low Cost," *Defense Daily International*. [12 October, 2001].

Chapter 1

The KC-767 Lease and Lease/Buy¹

The first congressional action authorizing the AF to pursue a leasing arrangement came in the 2002 Defense Appropriations Act.² According to the AF's Tanker Roadmap at the time, this lease effort would have the 100 KC-767s replace the oldest, least capable 133 KC-135Es. The first KC-767 delivery was scheduled in fiscal year (FY) 2006. The Roadmap called for the first 58 KC-135s to retire in FY 2004 - FY 2005 then 68 more between FY 2006 and FY 2008. This Roadmap also called for completion of the AOA the AF had previously stated it would conduct. Of note, and without explanation, this Roadmap was the AF's first formal written departure from its long-standing position that the AOA would be conducted prior to any effort to recapitalize the KC-135 fleet. This was also contrary to AF Instruction 63-101 guidance which mandates the completion of the AOA before any major acquisition. It also accelerated the start of the recapitalization effort. To determine the warfighter requirement, the Roadmap used the *Tanker Requirements Study-05* (TRS-05) to determine the requirement. The criteria TRS-05 used to determine the warfighter requirements was based on pre September 11, 2001 National Defense Strategy.

Based on TRS-05, the AF estimated the requirement between 500 – 600 KC-135R model equivalents to support the needs of warfighter. The study also concluded the AF was not capable of meeting the stated requirement due to maintenance issues that left a

¹ The 2004 Defense Authorization Act (P.L. 108-136, Sec. 135) forged a compromise between opponents and proponents of the KC-767 by giving the AF permission to lease 20 tanker aircraft and purchase no more than 80 aircraft. Issues surrounding the lease and the lease buy are the same.

² Specifically section 8159 of the Act (P.L. 107-117) authorized the AF to lease up to 100 Boeing KC-767 aircraft to replace the oldest KC-135Es. This lease would be for a period of not more than 10 years per aircraft.

portion of the 544 KC-135s and 59 KC-10s non-operational for any given time period. It is important to note that the TRS-05 was based on an outdated “two major wars” strategy that was set forth in the pre-September 11, 2001, National Military Strategy and, more importantly, the study was never formally completed due to concerns regarding the accuracy of the analysis. Therefore, the AF Roadmap did not have a current accurate assessment from which to base the tanker requirement.

Following the attacks on September 11, 2001, the President made a change in the National Defense Strategy which was articulated in the 2001 Quadrennial Defense Review. The strategy change shifted focus from “two major wars” based scenario to a “defend the homeland, deter aggression, swiftly defeat aggression in two overlapping major conflicts, and decisively defeat one of the two while fighting a global war on terror in what has been described as the 1-4-2-1 force planning construct. While this new strategy still had language of two overlapping wars similar the old “two major wars” language, the new strategy was viewed to be much more inclusive of non-traditional war participation. The previous strategy was much more focused on a more conventional threat. According to the DOD, this new strategy, the reassessment of operational concepts and the start of Operation Enduring Freedom, refueling support would be required at an undetermined level. Even if the TRS-05 had been completed, the change in National Defense Strategy would influence the tanker requirements in relation to the mission change if nothing else.³

³ Government Accounting Office. *Military Aircraft: DOD Needs to Determine Its Aerial Refueling Aircraft Requirements*. GAO-04-348, [Washington, DC, June 2004], 3.

Despite the lack of a current requirements study, in November 2001, the Joint Requirements Oversight Council (JROC) approved the AF Mission Needs requirement for tanker recapitalization based on the incomplete TRS-05 analysis.

The Congressional Concerns Begin

On 10 April 2002, Senators Carl Levin (D-MI), John Warner (R-VA) and John McCain (R-AZ) asked the GAO to assess the AF plan to lease the KC-767. In this request the GAO was tasked to assess tanker requirements, cost-effectiveness of different options, the policy for leasing major defense acquisitions, cost associated with infrastructure improvements and the depot maintenance backlog.⁴ According to the AF, the attacks on September 11, 2001, and the resultant projected loss of airline passenger travel would lead to reduced or cancelled aircraft orders, which presented a unique opportunity to accelerate tanker recapitalization and more quickly address the ever-increasing challenges of maintaining the KC-135. Due to the ongoing lease negotiations at that time, the GAO had a very short timeline to assess the questions and report back to the Senators.

Warfighter Requirements

Regarding the warfighter requirements, the GAO did recognize the AF's long-term need to replace the tanker. Recall that GAO testimony previously asserted the aging fleet of KC-135s would need replacement and recommended the DOD expeditiously start planning for the recapitalization. That said, the GAO did not understand the sudden urgency for this particular effort. It made its determination based on AF testimony that, between 1996 and 2001, had consistently stated the KC-135 would be a viable aircraft

⁴ Government Accounting Office. *Air Force Aircraft: Preliminary Information on Air Force Leasing*. GAO-02-724R. [Washington, DC, 15 May 2002], 1.

well into the 21st century and that it had not planned recapitalization until the FY 2009 - FY 2013 timeframe. Despite previous testimony, the AF told the GAO the lease would allow it to acquire new tankers three years earlier than through its procurement plan to buy a new tanker. The AF saw the necessity for doing this now based upon a 45 percent increase in flying since September 11, 2001. This increase would shorten the number of years the KC-135 could remain viable by consuming the airframe structural flying hour life at a greater than previously estimated. Despite this, the tanker was not a priority for recapitalization and again had been planned for 2009⁵ at the very earliest. Had the AF been concerned the increased flying rate would continue at the higher pace, it should have increased the priority of recapitalization. By not doing so, the AF devalued its position with regard to the urgency of the need. Lastly, the lease did not add capacity to fill the shortfall identified in the invalid TRS-05 analysis yet the AF used the identified shortfall as validation for the mission needs assessment to the JROC while advocating for the retirement of 133 of the KC-135 Es. This caused concern for Congress and the GAO as it sent a contrary message.

Cost Effectiveness of the Lease

The Office of Management and Budget (OMB) determined the lease cost estimate to be \$26 billion dollars. The lease would allow the AF accelerated savings on KC-135 maintenance costs by retiring the least capable KC-135s. On May 07, 2002, the Congressional Budget Office (CBO) provided Senator John McCain a preliminary report that stated the long-term lease of the aircraft would be significantly more expensive than an outright purchase. Furthermore, the GAO suggested the AF review other possible options to accelerate the recapitalization if the urgency demanded it. For example, the AF

⁵ Government Accounting Office, *Air Force Aircraft: Preliminary Information on Air Force Leasing*, 3

could retrofit the E model KC-135s with R model engines for a cost of approximately \$29 million per aircraft. AF maintenance data indicated doing so would increase mission capable rates of those aircraft to the 85% threshold and it would do so considerably faster than even the lease. In response, the AF dismissed the re-engine option because it did not address the overall age issue of the KC-135 even though it would bend the maintenance cost curve, achieve the desired mission capable rate and address the capability gap used to advocate for the lease at an even faster pace. Aircraft age was a valid AF concern; however, the argument for the rapid acquisition the lease would provide over a purchase was based on poor mission capable rates, lack of availability and the long-term expense of upkeep on the KC-135 E models. Re-engining the KC-135 Es would resolve the concerns of the AF and allow the service to complete a compliant acquisition strategy for the longer term. At the time, the KC-135 E models had about half the expected service life remaining. It would also allow an AOA to be completed and be a part of a cogent tanker acquisition strategy.

Leasing Major Defense Items

The GAO did not take a position regarding leasing major defense items. It did cite one possible lease advantage for the AF, which was that it appeared the lease was paid for from the operations and maintenance budget; hence, it did not have to compete for procurement funding with other DOD and AF priorities.

Infrastructure Improvement Cost and Depot Backlog

The GAO reported the infrastructure improvement cost estimates calculated by the OMB were onetime costs of \$1.7 billion dollars. This included infrastructure upgrades for things such as hangars, runway and taxiway modifications, simulators and

project management. The effect on infrastructure of each potential candidate aircraft has to be considered to adequately deduce the costs of infrastructure improvements, if any, required to support a specific airframe.

The depot backlog Congress referred to resulted in the AF Chief of Staff directing his staff and the Air Mobility Command to “fix the depot.”⁶ This fix effort resulted in a depot process improvement effort, hence the GAO was not able to adequately assess whether the changes would ultimately help resolve the previous backlog issues. Subsequent review proved the fix the depot effort a resounding success.

The Chairman Gets Involved

The next major event in the lease effort came on 11 March 2003 in a letter from General Richard Myers, Chairman of the Joint Chiefs of Staff to the Senate Armed Services Committee. In the letter, the Chairman supported the position of the AF that the tanker recapitalization needed to begin sooner rather than later. His rationale was predicated on three issues. The first was that the impact of the corrosion rate on operations and support cost was much greater than had been previously predicted in the 2001 ESLS. Secondly, the operations tempo driven by homeland defense and the Global War on Terrorism required a faster than originally anticipated replacement. Lastly, he expressed the combatant commander’s point of view that operational availability of the air refueling tanker and its recapitalization were among the highest joint acquisition priorities.⁷

The Air Force Re-Evaluates the Economic Service Life Study

⁶ Department of the Air Force. *KC-135 Business Case Analysis*. [Washington, DC, May 2003], 6.

⁷ Department of Defense Inspector General. *Assessment of DOD Leasing Actions*. Report D-2003-129.29. [Washington, DC, August, 2003], 13.

In May 2003, the AF re-evaluated the 2001 ESLS. This re-evaluation was driven by recent actual cost data regarding the KC-135. The data was higher than the 2001 projections and the AF had taken the stance that based on this data, the 2001 ESLS was “extremely optimistic.”⁸ The concern for the ESLS was concentrated on its assumptions and projections on some of the key operation and support costs drivers. For example, the cost of the depot level labor had increased from \$111 per hour in 2001 to \$160 per hour in 2002 and was forecast to hit \$210 per hour in 2003. Over that period, the strut repair costs for the KC-135 had tripled from \$1 million per aircraft to \$3 million per aircraft.⁹ The total cost estimate for the KC-135 operations and support cost was \$2.1 billion while the actual cost was \$2.26 billion, an 11.9 percent increase. In a letter from Chairman of the Joint Chiefs of Staff General Richard Myers to Senator John McCain, the Chairman stated this increase would likely result in maintenance cost of \$3.4 billion in 2040 versus the ESLS estimate of \$2.4 billion for 2040. This increase drove the AF to complete a review of the assumptions used in the ESLS. In the end, the AF accepted all previous assumptions except those used for depot level cost, aircraft modifications and military personnel costs. This new study resulted in the *KC-135 Business Case Analysis (BCA)*, 10 July 2003.

The AF review showed a significant increase in KC-135 maintenance costs, about 11.9% over the remaining aircraft lifespan. What the review lacked was the rationale for the change in assumptions other than to say they were based on extrapolations of the 2001 data. It also did not say the AF had recently gone through depot process improvement efforts designed to decrease both cost and the amount of time the KC-135s

⁸ Ibid, 28.

⁹ Congressional Research Service, *The Air Force KC-767 Tanker Lease Proposal: Key Issues For Congress*, 11.

were spending in depot level maintenance. The results, whether positive or negative, of that effort were not yet known. Additionally, the AF based this review and the resultant study on one years' worth of data. A year's worth of data does not amount to what would be a 39-year trend should the aircraft remain in the inventory to 2040. Moreover, the perceived need for a second study in a two-year period seemed to indicate to Congress, a lack of good analysis. While some could argue lack of good analysis, the AF felt it necessary to conduct the additional study because the operations tempo had, in fact, increased significantly since September 2001. At a minimum, one could argue the credibility of either.¹⁰

The Pitch to Congress

On June 24, 2003, AF Lieutenant General Michael Zettler, Deputy Chief of Staff, Installations and Logistics, Major General Paul Essex, Director, Plans and Programs headquarters, Air Mobility Command and Mr. Neil Curtain, Director of Defense Capabilities and Management, GAO, testified before the Projection of Forces Subcommittee on the Armed Services Committee, House of Representatives.

General Zettler's testimony dealt predominately with cost of several of the more major repairs that had taken place on the KC-135, as well as the increase in numbers of aircraft in the depot and the increase in time it took for each aircraft to complete a depot level maintenance cycle. Additionally, he testified regarding corrosion issues with the aircraft landing gear and its exterior skin. General Zettler presented cost data that showed KC-135 operating and support costs had risen faster than predicted in the 2001 ESLS. The ESLS predicted \$2.1 billion for the fleet and the actual cost was \$2.26 billion. Depot data also depicted an unacceptable mission capable rate for the oldest of the KC-135

¹⁰ Ibid, 11.

fleet. This testimony, while accurate for the data presented did not wholly account for the “fix the depot” process improvements effort. It did add in the cost of additional manpower and infrastructure change from the effort but not the perceived improvement in time or cost savings.

General Essex’s testimony focused on tanker requirements and as his source, he referred to the invalid TRS-05. He acknowledged TRS-05 was based on an outdated military strategy, and asserted that the new 1-4-2-1 strategy¹¹ would most likely drive a larger requirement. In effect, he agreed with the GAO’s assessment that the AF needed a complete, comprehensive tanker requirements study from which it could determine size and composition of the current and future fleet. Despite his belief, he testified in support of retiring the oldest 68 of the E model KC-135 while also asserting the TRS-05 shortfall and the assumed shortfall stemming from the change in National Military Strategy. Congress saw this as contradictory testimony. It is not quite that simple, by retiring the 68 oldest aircraft and reinvesting the cost savings in the rest of the KC-135 fleet, the AF could use the crew force from the retired fleet to more frequently fly the rest of the fleet. Doing so could arguably increase capacity of the KC-135 fleet.

Mr. Neil Curtain’s testimony acknowledged the age of the fleet and the potential age issues. However, he also pointed out that despite age, the aircraft had flown just over half its design life airframe hours and had undergone several significant modernization efforts. His testimony also included data depicting a better than 85 percent mission capable rate since September 11, 2001, though data previous to that date did show an rate of 70 to 76 percent.

¹¹ For further definition of the 1-4-2-1 strategy see the 2001 Quadrennial Defense Review, 2001.

During the testimony, Mr. Curtain and General Essex were asked to clarify a discrepancy between their official written submissions with regard to a valid tanker study from which the AF could determine requirements. In his submission, Mr. Curtain had asserted that the AF did not have a current validated study. General Essex's statement, on the contrary, led the congressmen to believe that the TRS-05 had been formally released. General Essex testified what had happened was a failure to communicate between Mr. Curtain and the AF. He further stated, "I believe that the TRS-05 was, in fact, released to Congress in the fall of 2001. And I believe that Mr. Curtain and I were over writing notes to each other because we noticed the discrepancies ourselves."¹² He went on to say it had been submitted to Congress and would see to it that the GAO received a copy of the completed study. Mr. Curtain did not agree; his testimony clearly indicated that the GAO had been shown some of the preliminary data but no completed study had been produced.

Congressman Roscoe Bartlett (R-MD) interjected in the study discussion by adding that what had been released was a three-page summary and that was the extent of what Congress had received. The GAO had received the same. General Essex's response again was that the study had been released along with a substantive briefing. Congressman Bartlett's response was simply, "well neither the GAO nor our staff has ever seen that. So it would be nice, if it got lost in the mail, if you could send another copy."¹³ The study had not been released and it never was. This line of testimony added another strike to the credibility of the AF and the KC-135 recapitalization effort.

More Congressional Concerns in September 2003

¹² House Armed Services Committee, *The U.S. Air Force's Air Refueling Tanker Requirements and Readiness Hearing*, 21.

¹³ *Ibid*, 22.

On 3 September 2003, the GAO testified before the Senate Committee on Commerce, Science and Transportation about the AF's plan to lease aerial refueling aircraft.¹⁴ The testimony was a result of congressional concern surrounding the KC-767 lease effort. As a result of this concern, the committee tasked the GAO to do three things. First, summarize the AF's recently released BCA for leasing the aircraft. Second, present its observations on the BCA and justification for the lease. Lastly, identify related issues and costs to assist the Congress as it considered the AF's proposal.

In its BCA, the AF cost data analysis depicted the lease cost was \$150 million more in net present value than a purchase.¹⁵ The AF counter was though the lease cost was higher, the accelerated aircraft delivery justified the additional cost. Leasing delivered the first aircraft three years earlier than if purchased. The BCA emphasized the urgency of the recapitalization due to aging and corrosion. Moreover, it introduced the concern and the risk of a catastrophic grounding event, which could render 90 percent of the refueling capability unable to perform. Additionally, AF cost data indicated the lease would cost the AF 89.9 percent of the fair market value of the aircraft – in compliance with the OMB's requirement that the lease cost not exceed 90 percent. However to meet the cost mandate, the data did not factor in construction financing cost which would add \$7.4 million dollars per aircraft, making the actual cost \$138.4 million each or 93.3 percent of the purchase cost. These construction costs drove the lease beyond the 90 percent threshold and should have resulted in either a renegotiated overall cost or termination of the entire effort. Lastly, GAO testimony indicated either the AF could return the aircraft to Boeing at the end of the lease or it could buy the aircraft at the

¹⁴ Government Accounting Office. *Military Aircraft: Observations on the Air Force's Plan to Lease Aerial Refueling Aircraft*. GAO-03-1143T. [Washington, DC, 18 June 2003], 1.

¹⁵ Ibid, 3.

residual value. If the AF returned the aircraft, it was responsible for the \$778 million dollar cost to reconfigure the 100 aircraft back to original pre-lease configuration; if the AF chose to purchase the aircraft, each would cost an additional \$44 million. In either case, the AF assumed the Congress would fund the selected path. More concerning was the actual lease cost analysis.

Cost analysis by the GAO found the lease could be as much as \$1.9 billion more costly than a purchase. While this analysis is based on estimate, if nothing else the staggering potential cost should have made all involved with this effort stop to re-evaluate the program. Even if the estimate was flawed, what was clear is that the AF lease cost was \$138.4 million per aircraft when the construction finance cost was included. Adding another \$44 million per aircraft at the end of the lease should the AF elect to purchase would result in a total cost of \$182.4 million each, vice the purchase cost of \$150 million. Additionally, Congress would have to allocate the additional \$44 million to purchase at the lease conclusion. Should the AF not elect to keep the aircraft at the end of the lease, it would cost \$7.78 million per aircraft to return them to pre-lease condition for a total of just over \$146 million each. If the AF elected not to buy the KC-767, it would then need to purchase replacement aircraft after spending 97.4 percent of the purchase price. Moreover, the AF cost data also did not include the associated maintenance costs for the term of lease; by including the maintenance cost estimates the cost of lease would very likely extend well past that of a purchase.

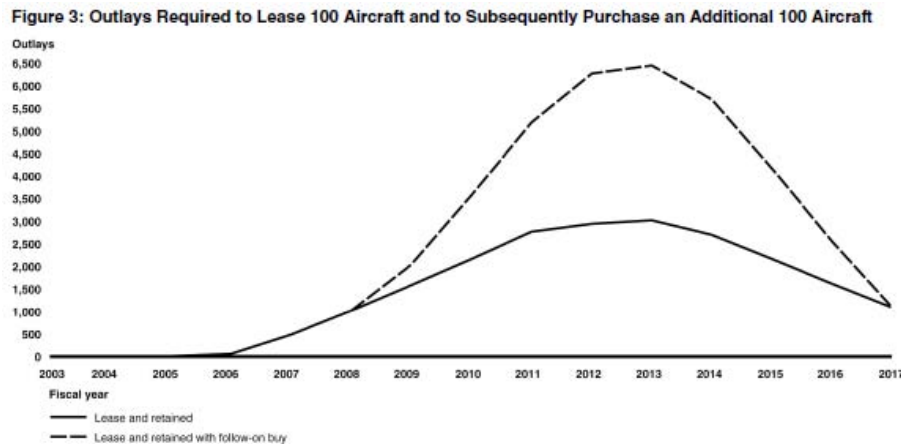
The GAO did not dispute the need to recapitalize. The concern of the GAO was why the sudden urgency of the situation when virtually nothing had been done between 1996 and 2002. The AF's own testimony touted the viability of the KC-135 fleet out to

about 2040. Until about 2002, the recapitalization of the fleet had not been a high enough priority to compete successfully for funding. Further, after reviewing a wide variety of AF data, the GAO found that neither the AF nor the DOD willing to make the decision to reallocate procurement funding from other programs to begin the tanker recapitalization effort. The first mention of a tanker recapitalization effort was in the AF's FY 2004 budget submission, but in view of affordability constraints, although mentioned, the program would not receive funding until FY 2006 and the first aircraft in FY 2009. Frankly, before the lease authority granted in the FY 2002 DOD Appropriations Act, there was no perception that the AF had any real concern regarding the viability of the KC-135. As such, its recapitalization did not compete well with other more urgent requirements. Quite contrary, through 2001, the AF repeatedly expressed belief that the KC-135 fleet was viable for several more decades.¹⁶ Based on the preponderance of evidence, the urgency of the concern appeared suspect to the GAO.

The GAO had additional lease concern over spending what would amount to more than 90 percent of purchase cost for six years use of an aircraft that conceivably had a 40-year lifespan. It was also concerned that the lease included contracted maintenance support from Boeing, which, according to the AF, cost an additional \$5 to 5.7 billion. This maintenance contract covered the lifespan of the lease. Based on a 100 aircraft lease, the maintenance contract added a yearly cost of \$6.4 million per KC-767 vice the \$4.4 million per KC-135 the AF was currently spending on its maintenance. With the concern the AF had regarding KC-135 maintenance cost, it did not seem logical to assume an

¹⁶ The AF had clearly articulated this position in its response to the 1996 GAO assertion that the AF should begin thinking about recapitalization sooner rather than later; in its 1997 *KC-135 Aircraft Sustainment Master Plan*, its *Air Mobility Strategic Plan for 2002*, the *Mission Needs Statement: Future Air Refueling Aircraft*, the 2001 *KC-135 Economic Service Life Study*, and several other formal documents.

additional \$2 million per aircraft cost for new KC-767s. Another concern was with the lease payment structure. The lease payment structure significantly increased lease payments in the out years from FY 2012 through FY 2017, which coincided with the AF's Roadmap planned effort to buy another 100 tankers. Figure 3¹⁷ below depicts the concern.



SOURCE: GAO -03-1143T, Military Aircraft: Observations on the Air Force's Plan to Lease Aerial Refueling Aircraft

The testimony also raised concern over the AF's statement regarding profit margin for Boeing. The AF data depicted a profit margin of 15 percent for the KC-767. In comparison, the profit margin, according to the Morgan Stanley investment firm, was about 6 percent for commercial 767s.¹⁸ The GAO's position was the AF could negotiate a lower profit margin for the preponderance of the purchase and only apply the 15 percent margin for the military specific portion. By doing so, the AF could expect to lower the cost of each aircraft by \$7 million.¹⁹

¹⁷ Government Accounting Office. *Military Aircraft: Observations on the Air Force's Plan to Lease Aerial Refueling Aircraft*, 20.

¹⁸ Heidi Wood, Aayush Sonthalia, and Myles A. Walton. *Does 767 Tanker Equate to 700+Commercial Orders?* [New York, NY: Morgan Stanley Research, 29 May 2003], 7.

¹⁹ Government Accounting Office, *Military Aircraft: Observations on the Air Force's Plan to Lease Aerial Refueling Aircraft*, 19

Department of Defense Lease Concerns

On 22 July 2003, Under Secretary of Defense, Acquisitions, Technology and Logistics, Mr. Michael W. Wynne asked the DOD Inspector General (DOD IG) to review the decision process concerning the lease. This request was preceded by a letter from the Chairman of the Joint Chiefs of Staff to Secretary of Defense Donald Rumsfeld suggesting he ask the DOD IG to do an independent review of the lease in light of an ongoing AF and Justice Department investigation of Boeing.

The investigation found the AF took full advantage of legislation to lease but made several observations that could have improved the effort. The first was that the AF conduct a formal AOA in accordance with directives. The acquisition directives are directive in nature and mandatory in compliance. The DOD IG also recommended the AF's BCA needed better documentation regarding alternative solutions and the needs of the new tanker aircraft. Furthermore, it also stated that leasing an aircraft for 90 percent of its purchase cost for a period of 6 years appeared to be an inefficient use of the money since the aircraft reasonably had a 40-year span. Additionally, the AF had no assurance the Congress would allocate the \$44 million per aircraft for purchase at the end of the lease. Hence, the AF should promptly develop the business case for that possible purchase. In addition, the AF also had no assurance the Congress would fund the lease for the 10 year period nor did it have any assurance the military construction money would be made available over that same period.²⁰

More Congressional Concerns

On September 2, 2003, the Congressional Research Service (CRS) sent its first of several tanker lease reports to Congress. This work took a thorough look at the entire

²⁰ DOD Inspector General, *Assessment of DOD Leasing Actions*, 9.

lease effort from its beginning through September 2003. The specific purpose for the review was to analyze potential oversight issues for Congress. In doing so, the research effort found several potential issues.

The first CRS issue was the AF's new draft Tanker Roadmap, dated 18 June 2003. The Roadmap called for the AF to begin the recapitalization by retiring 58 KC-135 between FY 2004 and FY 2005, then another 68 between FY 2006 and FY 2008. In the Roadmap, the lease would start the KC-135 replacement. It also called for conducting a new tanker requirements study and an AOA to determine current and future tanker requirements, and generate the tanker characteristics required to support the warfighter. Noteworthy was the Roadmap's departure from the longstanding AF plan to accomplish the acquisition guidance mandatory AOA prior to taking delivery of a new tanker aircraft. The Roadmap stated the recapitalization effort would begin before FY 2012. Before this draft Roadmap, the AF had been advocating for a FY 2009 recapitalization from a range of FY 2009 through FY 2013. The Roadmap implied the lease was assured; therefore, it was written into the document. In its effort, the CRS answered several Congressional questions.

Is There an Urgent Need to Replace the KC-135?

To date, much of the AF argument for the lease was based on a perceived urgent need to replace the oldest KC-135s because of high operations and support costs, low aircraft availability, the aircraft were wearing out prematurely due to a higher than anticipated operations tempo, and that it was vulnerable to a catastrophic grounding problem.²¹ The CRS offered four general arguments. First, new data and analysis showed

²¹ Department of the Air Force. *Report to the Congressional Defense Committee on KC-767A Air Refueling Aircraft Multi-year Lease Pilot Program*. [Washington, DC, 10 July 2002], 6.

that the KC-135 operations and support costs were rising faster than the 2001 ESLS had predicted. Second, the aircraft mission capable rate was too low and aircraft spent too much time in the depot for maintenance and repair, thus were not available to the warfighter. Next, the aircraft was vulnerable to a catastrophic grounding event that could render up to 90 percent of the tanker fleet unavailable for the repair period. No historical example was given to lend credibility to this. Rather the discussion was that since the KC-135 made up 90 percent of the fleet it was possible. While that is technically correct, the same could be said of the similarly aged aircraft such as the C-130 and the B-52. Lastly, the tanker requirements and assumptions about the KC-135 usage rates were pre-September 11, 2001. Since September 11, 2001, use had increased and that would most likely increase the tanker requirement over that derived from the invalid TRS-05. Each of these factors will be discussed below.

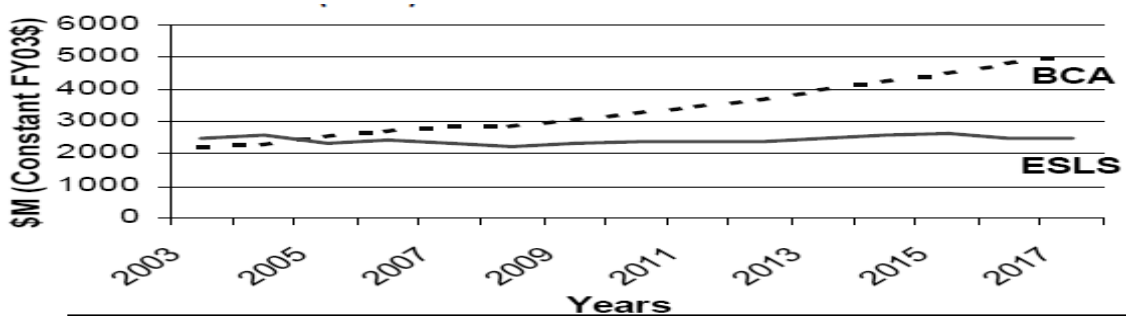
KC-135 operations and support costs

As previously noted, the AF had concern over depot labor cost increase from \$111 to \$160 per hours between 2001 and 2002. This increase over the ESLS predicted cost was \$250 million dollars. Based on this data, the AF now projected the revised operations and support cost at \$3.4 billion vice the ESLS prediction of \$2.26 billion in 2040. This new data formed the basis of the AF reassessment of the ESLS which resulted in the BCA as previously noted. There was no compelling evidence that the significant cost increase was or was not a short-term anomaly, the timeframe of the new analysis was insufficient to complete comprehensive analysis to make any assertion whether positive or negative. The AF also stated the ESLS cost projections were optimistic and conservative. For example, the Study identified a structural investment needed for the

KC-135, for example, a topcoat removal²² at a cost of \$500,000 per aircraft. Because of uncertainty surrounding the KC-135, the Study also figured another \$6 million per aircraft for maintenance concerns that may or may not happen.

While cost increases had been included, there was no assumption of cost savings gained through process improvement. By the time the CRS published its report, the depot engineers had devised a periodic inspection and associated maintenance procedure that significantly reduced cost and virtually eliminated the need for the \$500,000 topcoat removal. Figure 4²³ below depicts the difference between the two studies.

Figure 4: KC-135 Cost Projections from 2001 ESLS and 2003 BCA



Source: Congressional Research Service, *The Air Force KC-767 Tanker Lease Proposal: Key Issues For Congress*, 13.

Much like the GAO's earlier concern, the CRS also noted that two studies in a two year time period that produced such drastically different results diminished the credibility of either and could be used to question the accuracy of both studies. Should this occur, it would strike another blow to AF credibility regarding the tanker recapitalization effort.

KC-135 mission availability

²² Topcoat removal refers to the removal of the original fuel tank corrosion preventative topcoat material. This topcoat had begun to flake, thus caused fuel contamination. Previous to adopting the engineer's newly devised inspection, technicians averaged 2,870 man-hours per month removing the topcoat.

²³ Congressional Research Service, *The Air Force KC-767 Tanker Lease Proposal: Key Issues For Congress*, 13.

The AF testified the mission capable rate for the KC-135R averaged 78 percent while the KC-135E averaged 71.9 percent, well below the AF 85 percent mission capable rate goal.²⁴ That testimony roughly correlated to an AF 2002 study depicting the KC-135Rs just above 80 percent mission capable and the KC-135Es fluctuating between low 60 and high 70 percent for the period of 1997 through 2002. That study also stated the mission capable rates were holding steady, in contradiction of the recent AF position that the rates were getting worse. Previously, the GAO also testified that there had been no indication that the mission capable rate was falling. More specifically, the GAO asserted the rate for the active duty assigned KC-135Rs was generally above 85 percent. In a January 2003 AF study, the mission capable rate for both the KC-135E and R was 85 percent.²⁵ Coincidentally, the KC-135's mission capable rate for the Iraq war was 86.4 percent, better than that of the A-10, B-1B, B-2, B-52, E-3B, E-8C, F-117, all versions of the F-15 and F-16, KC-10, U-2, Predator and Global Hawk. The variations in the AF's mission capable data with regard to its January 2003 report, its Iraq war data and the testimony of General Essex in July 2003 are significant. This wide gap in the data arguably lends credence to congressional concern regarding the AF data. Additionally, aircraft availability had also been significantly improved between 2001 and 2003 because of the Chief's "fix the depot" effort. According to Congressman Duncan Hunter (R-CA), the process improvement had KC-135s spending 45 percent less time in depot than two years earlier.²⁶ The inconsistencies in the data and the lack of complete and

²⁴ U.S. Congress. House Armed Services Committee. *Statement by Major General Essex Director, Plans and Programs, Headquarters Air Mobility Command: Air Refueling Tanker Requirements and Status of the Tanker Fleet*. HASC Number 108-11. [24 June 2003].

²⁵ Department of the Air Force. Air Mobility Command. *White Paper on KC-767A. The Aircraft to Begin Our Tanker Recapitalization*. [Scott Air Force Base, IL, 10 January 2003], 5.

²⁶ House Armed Services Committee. *The U.S. Air Force's Air Refueling Tanker Requirements and Readiness Hearing*, 42.

comprehensive data analysis again caused harm to AF credibility and its effort to recapitalize the tanker.

Corrosion and fleet-wide grounding

The AF's BCA noted an urgent need to recapitalize the KC-135 due to its being prone to mechanical or structural problems that could result in a fleet-wide grounding event. Accordingly, former acquisition chief Pete Aldridge remarked, "we cannot continue to fly the KC-135s forever, and the longer you wait to recapitalize, the more you run the risk of a fleet of those aircraft being grounded for some reason."²⁷ Much of the AF concern was with corrosion for which the KC-135 was certainly susceptible. The AF argument was that it lacked the capacity to accurately predict the cost and extent of corrosion and that no models existed to adequately do so. In the ESLS merely two years earlier the AF position was that the aging related structural repairs due to corrosion would increase at a manageable rate.²⁸ The AF concern about a catastrophic grounding event as a recapitalization issue was relatively new. Before 2003, the AF had not mentioned any concern over a fleet-wide grounding event. This was despite the recent catastrophic loss of a KC-135 in 1999. The cause of the crash was a system failure in the aircraft's stabilizer trim actuator mechanism that caused 40 percent of the available fleet to be grounded from September 1999 to February 2000 – a period in which the AF executed Operation Allied Force, the largest air asset deployment since the 1991 Iraq War.

Post September 11, 2001 KC-135 usage and new military strategy

In its review, the CRS noted that flying hours for the KC-135 had increased more than anticipated in the pre September 11, 2001, estimates. The AF position in light of this

²⁷ John Tirpak. "100 Tankers" Air Force Magazine. August 2003, 2.

²⁸ Air Force, *KC-135 Economic Service Life Study*, vi.

significant increase in flying time was to argue for the urgency of the recapitalization. With the addition of the protecting the homeland and prosecuting the global war on terror, the AF had concerns about overstressing an under-resourced KC-135 fleet. Between 1995 and 2001, the KC-135 had averaged 300 flying hours per year and since September 11, 2001, that average increased to 435 hours. Thus, argued the AF, the KC-135 was wearing out faster. The AF inaccurately argued that the added flying time was linked to faster corrosion rates. This position was argued without the scientific data or the analytical rigor. Metal fatigue may become an issue with increased use but corrosion is generally linked to the manufacture of the metals and process used at the time, as well as inspection and control processes.

Post September 11, 2001, tanker requirements, according to the AF, had increased over those of the previous National Military Strategy. Accordingly, the AF argued the growth in mission would drive a greater need for more tankers than what the invalid TRS-05 study had determined in several scenarios. This perceived increase amplified the need for earlier recapitalization. However, acquisition directives require comprehensive mission analysis to determine requirements. General Essex amplified this in his 24 June 2003 Congressional testimony when he said:

Because we [a]re convinced that the requirement for air refueling is large and will continue to be very large. As we talked just a moment ago, the requirement is growing, actually, although I can't give you a specific number right here for how much it's grown, based on the new Defense Planning Guidance, yet. But we know it's growing, we know it [i]s going to continue to be very large.²⁹

Based on the changes he noted, determining the requirement needed thorough comprehensive analysis. Additionally, one could argue the validity of AF claims that it

²⁹ House Armed Services Committee, *Statement by Major General Essex Director, Plans and Programs, Headquarters Air Mobility Command: Air Refueling Tanker Requirements and Status of the Tanker Fleet*.

needs added capacity yet plans to retire 68 E models as stated in its BCA. The AF position was that the savings in operations and support cost for these 68 KC-135Es more than made up for the slight decrease in capability and the added risk associated with it.

Lease cost versus purchase

According to AF data, the lease cost was \$24.6 billion while the purchase cost was \$20.7 billion. The argument for the lease was it could fill the tanker shortfall identified in the invalid TRS-05 sooner. Therefore, the lease would solve the shortfall issue for the short term but it would also require the AF to acquire additional tankers later, most likely while it still had lease payments. Then, if the AF chose to purchase at the end of the lease, each aircraft would cost another \$44 million dollars. This purchase cost drives the overall program cost to \$29 billion. The AF Roadmap called for a new tanker acquisition beginning in FY 2012. That new acquisition would begin in FY 2012 as the first of the leased aircraft would be at the lease end. Recall the lease payment structure called for the higher lease payments to begin in FY 2012 through FY 2017. It is difficult to predict that Congress would be willing to fund the lease, the purchase and arguably another tanker acquisition effort to begin replacement of the next block of KC-135s concurrently.

The Demise of the Lease.

Because of aforementioned concerns and analysis, the proposed lease was debated in four congressional hearings, culminating with a pair of Senate hearings in September 2003. Subsequently, alleged and admitted ethical violations by government and industry representatives involved in the lease proposal added to the controversy. The 2004 Defense Authorization Act (P.L. 108-136, Sec. 135) forged a compromise between

opponents and proponents of the KC-767 by giving the AF permission to lease 20 tanker aircraft and purchase no more than 80. Conferees also mandated that the AF conduct an aerial refueling AOA and that an independent assessment be conducted on the condition of the KC-135E fleet.³⁰ Because of the history of the recapitalization effort to date, Congress had concern about the AF's ability to accurately depict the need and the situation, resulting in another blow to AF credibility.

Demise of the Lease/Buy

On February 1, 2004, Deputy Secretary of Defense Paul Wolfowitz requested the Defense Science Board conduct independent analysis of the KC-135E fleet. On February 24, 2004, acting Undersecretary of Defense for Acquisition Michael Wynne directed the AF conduct an aerial refueling AOA. Hence, the DOD deferred executing any recapitalization effort until the completion of the Defense Science Board report, the AOA and a DOD IG investigation. On April 20, 2004, the lead AF negotiator for the tanker lease program, pled guilty to a charge of criminal conspiracy and admitted to secretly negotiating a job with Boeing while overseeing the lease. Additionally, in February 2005, the DOD IG determined that then Secretary of the AF James Roche misused his office when he lobbied the OMB to support the KC-767 lease. The IG's final report also found four other senior DOD officials guilty of evading OMB and DOD acquisition regulations. The DOD IG found senior DOD officials had knowingly misrepresented the state of the KC-135 fleet and refueling requirements.³¹ Consequently, these findings ended the AF's lease and the lease/buy efforts.

³⁰ Congressional Research Service, *Air Force Aerial Refueling*, 3.

³¹ Congressional Research Service, *Air Force Aerial Refueling*, 3.

Chapter 2

Tanker Recapitalization Gets Serious

With the demise of the lease and the lease/buy, the Department of Defense (DOD) set out to begin a new effort to recapitalize the KC-135. This time the AF would work hard to ensure the acquisition guidance and all congressional mandates stemming from the failed lease and lease/buy attempts. Regardless of a renewed effort to be forthright and transparent, the credibility of the AF had been seriously tarnished by the tanker recapitalization thus far. Several key studies and analyses would be completed before the AF went before the JROC and then built its RFP to acquire a new tanker. This effort would begin with a Defense Science Board. For those unfamiliar, the Defense Science Board is a federal advisory committee established to provide independent advice to the Secretary of Defense.

New Tanker Recapitalization

In May 2004, the Defense Science Board Task Force released its report on aerial refueling requirements. The Task Force was directed to accomplish this effort by the Acting Under Secretary of Defense for Acquisition, Technology and Logistics. Specifically, the Task Force was tasked to assess issues pertaining to the KC-135 and its recapitalization. To accomplish the effort, the Task Force asked three questions. The first was whether age, corrosion, and/or cost growth problems with the KC-135 fleet were severe enough to change the recapitalization dynamics. Secondly, how many KC-135 replacements were necessary? Lastly, the Task Force was asked to recommend what they

thought made sense for the near term and used the data from the previous two questions to make the recommendation.¹

Corrosion, Age and Cost Growth

Regarding the effects of corrosion, the Task Force found no evidence that corrosion would cause an imminent threat to the KC-135 fleet's readiness. The determination was predicated on several factors. The study found evidence that AF maintenance was well equipped to deal with corrosion and other aging issues. Field level maintenance and inspection programs were found to be comprehensive. Despite the monumental maintenance effort, the study did recognize the recapitalization challenge could not be put off indefinitely.

However, the Task Force did find concern regarding airframe aging. The study determined that due to relatively low flying hours, a fleet-wide average of about 17,000 flying hours of the E model's 36,000 and the R model's 39,000 estimated total fatigue life, the aircraft should be available to 2040 based on current use estimates. These latest estimates factored in the increased usage since 2001. That said, high temperature operations and corrosive environments had taken toll on the aircraft struts. The struts on the KC-135 Es were at the end of the intended service life and would need replacement if kept in the inventory. This finding was consistent with the findings in the 2001 ESLS and the 2003 BCA. The Task Force report also found that annual maintenance cost had increased significantly from 1991 to 2003, but costs had recently leveled off. At the time of the Task Force report, the operations and support cost for the KC-135 fleet was approximately \$2.2 billion annually. Cost estimates from the 2001 ESLS estimated a one

¹ Department of Defense. Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. *Defense Science Board Task Force Report on Aerial refueling Requirements*. [Washington, DC, May 2004], 1.

percent cost growth annually for KC-135 operating and support while the 2003 BCA estimated the cost growth at 6.5 per year. Several issues drove the cost increase, such as the number of days an aircraft spent in the depot as well as the depot backlog of aircraft had increased significantly between 1998 and 2000. Because of the AF Chief of Staff's mandate to fix the depot, in 2000 and 2001, the number of aircraft sent to depot was reduced from the planned level, the workflow was reengineered and several process improvements were completed on the maintenance floor. Additionally, more labor was added and material support was improved. Collectively, these actions eliminated the backlog and cut the depot flow days to about half. The depot cost increase was linked to the added labor cost and other investments made to improve the overall process while billing for a smaller number of aircraft. The Task Force found, based on the results of depot process improvement efforts, that the AF should use a linear projection of cost data from 2000 through 2005, as it would provide a better estimate of future cost.² Doing so would significantly lessen the cost growth projections and, according to the Task Force, make those projections more accurate.

How Many KC-135s are Required?

To start, the Task Force reviewed several documents as well as future study guidance. The review included the TRS-05; Air Mobility Command's *Tanker Recapitalization: Aging Aircraft Challenges* 2003; Air Mobility Command's *Mission Need Statement 004-01 Future Air Refueling Aircraft*, 1 November 2001; Air Mobility Command's *Operational Requirements Document 004-01-B Air Refueling Program*, 22 October 2002; and the *Analysis of Alternatives Guidance for KC-135 Recapitalization* tasking 24 February 2004. Each of the aforementioned will now be discussed.

² Ibid, v.

As previously mentioned, the last major study on aerial refueling tankers was Air Mobility Command's TRS-05 completed in 2001, but it was never officially approved due to questions about the methodology. As previously discussed, the study was based on the outdated National Military Strategy two major wars that predated September 11, 2001. TRS-05 identified a requirement of approximately 500 – 600 KC-135R equivalents crewed by approximately 900 – 1000 aircrews. Of note, none of the scenarios identified excess tanker capability. On the contrary, several identified shortfalls for aircraft and crews as well as the methods available to mitigate some of the shortfalls. TRS-05 also identified tanker shortfalls, driven in large part by the high number of KC-135s in the depot, a situation that had been rectified by good management of the depot workloads at the Oklahoma City Air Logistics Center and the two commercial depots.³ This study was never formally completed nor validated though much of the AF tanker recapitalization effort to date had referred to it as the source for determining tanker requirements.

The next document the Task Force reviewed was Air Mobility Command's *Tanker Recapitalization: Aging Aircraft Challenges* paper from 2003. The document asserts that "[Air] M[obility] C[ommand] must begin recapitalization of its aging tanker fleet now ... that the average age of the KC-135s are 42+ [sic] years." It also expressed concern over the "unknown unknowns," that may occur with an old fleet. Additionally, the document expressed concern over increased depot costs and increased contractor costs. Also of concern was that replacing a 541-aircraft tanker fleet would take decades. As such, according to the paper, "operating 70+ year old fleet is unprecedented."⁴

³ Ibid, v.

⁴ Ibid, 30.

Next, the Task Force reviewed Air Mobility Command's *Mission Need Statement 004-01 Future Air Refueling Aircraft* which also used the invalid TRS-05 as its baseline. According to Air Mobility Command, this document was designed to support the 2002-2007 Defense Planning Guidance, the National Security Strategy, and the National Military Strategy. It asserts that "air refueling allows airpower forces to increase levels of mass, surprise, economy of force, flexibility, versatility, and maneuverability and can concentrate more assets for offensive operations."⁵ Further, it states that

the air refueling aircraft should have sufficient range and offload capability to support both inter- and intra-theater missions, be able to refuel the full range of receiver aircraft within a safe operation envelope, and be capable of carrying and offloading a fuel type other than the primary fuel used by the new aircraft. The aircraft should be capable of refueling receptacle and probe-equipped receiver aircraft on the same mission, as well as refueling multiple aircraft simultaneously.⁶

The Task Force also reviewed Air Mobility Command's *Operational Requirements Document 004-01-B, Air Refueling Aircraft Program*, 22 October 2002. This document states that the new tanker will support the Defense Planning Guidance 2003-2007. "The proposed replacement system is a specially modified, commercially available aircraft able to offload fuel via boom and drogue as well as on-load fuel from a boom-equipped tanker."⁷

As a part of its analysis, the Task Force reviewed the tasking from the acting Under Secretary of Defense for Acquisition, Technology and Logistics to the Secretary of the AF to conduct an AOA. The AOA was to define alternative tanker capabilities and

⁵ Ibid, 30.

⁶ Ibid, 31.

⁷ Ibid, 31.

critical parameters required to support the warfighter needs. Additionally, it further tasks the AF to consider a broad range of platform alternatives.⁸

The Task Force analysis of TRS-05 found the scenarios were based on the pre-September 11, 2001, National Military Strategy, and that the study was never officially approved. Therefore, the scenarios used to determine the requirement did not explore how the new strategy might impact the mission or requirements for the future. It also found the TRS-05 determination of 500-600 fleet size was inconsistent with the recent experience in Operation IRAQI FREEDOM. The number of aircraft in support of that operation peaked at 319 out of 379 fully mission capable aircraft. This led the Task Force to conclude that “one can envision major theater campaigns of greater scale and intensity than O[peration] I[RAQI] F[REEDOM],”⁹ that could significantly overstretch the 500 to 600 tanker fleet as determined by the TRS-05

Consequently, the Task Force did not find a comprehensive up-to-date study of current or future air refueling needs that accounted for the new National Military Strategy and changes in warfighting capability. Additionally, based on its review of the KC-135, the Task Force believed there was time for the DOD to accomplish a new study before undertaking a new major tanker recapitalization effort. At the time of the Task Force effort, the DOD was planning a new Mobility Capabilities Study (MCS) which, when released in spring 2005, should provide insight to the new requirement.

What to Do Next

The Task Force made several recommendations about what the AF ought to do next. They concluded the DOD could defer major tanker recapitalization until at least the

⁸ Ibid, 31.

⁹ Ibid, vii.

AOA and the MCS were completed. They made this determination based on their findings of manageable KC-135 operating and support cost growth, the absence of any evidence of an impending fleet-wide catastrophic failure and evidence of a sound corrosion control program well-suited to keep the fleet viable for the foreseeable future. That said, the Task Force also recommended the DOD must continue and expand aggressive maintenance and corrosion control programs for the fleet regardless of near-term recapitalization decisions.¹⁰

The Task Force also recommended a tanker fleet consisting of at least two different aircraft to hedge against a single unanticipated grounding event for a fleet made up of only one aircraft type. The study further suggested a mix of large tankers to support deployment and strategic missions and smaller tactical tankers for mission employment might be appropriate.¹¹ Next, it recommended re-engining some KC-135 Es if it was deemed necessary to offset some near-term capability lost with the retirement of the 61 E models. Additionally, the Task Force recommended use of contract air refueling similar to that used by the U.S. Navy. The Task Force felt the Homeland Defense mission was especially well suited for this type of service. Lastly, it recommended working with aircraft manufacturers to determine the potential to configure next generation commercial aircraft for the refueling mission. The concern was to not preclude future opportunity with a near-term rush to recapitalize.

Congressional Concerns

On 4 June 2004, the GAO formally responded to Representatives Duncan Hunter (R-CA), Chairman, Committee on Armed Services, and Joel Hefley (R-CO), Chairman,

¹⁰ Ibid, viii.

¹¹ Ibid, ix.

Subcommittee on Readiness, Committee on Armed Services in its report *Military Aircraft: DOD Needs to Determine Its Aerial Refueling Aircraft requirements*¹². The GAO had been asked to review the extent to which the current tanker fleet had met the requirement, the cost to operate and sustain, what the current refueling requirements were, and what options could potentially meet the future refueling requirements. The recommendations from this effort were that the Secretary of Defense conduct a study to determine the current and future requirements and that he also direct the ongoing AOA include a comprehensive study of all reasonable available options to include contracted air refueling service, new aircraft purchase, and used aircraft purchase and conversion.¹³

GAO analysis found that the current fleet had met the air refueling requirements of combat and mobility forces since at least 1991. Since 1991, the fleet had effectively supported several combat operations around the world (see figure 5¹⁴).

Figure 5: Air Force Aerial Refueling Statistics for Major Conflicts Since 1991

	Iraq (1991)	Kosovo (1999)	Afghanistan 2001-02	Iraq 2003
Number of refueling aircraft	306	175	80	185
Sorties	16,865	5,215	15,468	6,193
Flight hours	66,238	52,390	115,417	Not available
Average sortie length (hrs)	3.9	10.0	7.5	Not available
Receiver aircraft	51,696	23,095	50,585	28,899
Fuel off-loaded (lbs)	800.7M	253.8M	1,166M	376.4M
Avg. fuel per sortie (lbs)	47.5K	48.7K	75.4K	60.8K

Source: GAO *Military Aircraft: DOD Needs to Determine Its Aerial Refueling Aircraft requirements*

However, the fleet's operating and support cost had risen significantly particularly since 1996. In 1996, the operating and support cost per flying hour was \$8476 and in 2002, that same flying hours cost had risen to \$10,955, or a 29 percent increase (see figure 6¹⁵).

¹² Government Accounting Office. *Military Aircraft: DOD Needs to Determine Its Aerial Refueling Aircraft Requirements*. GAO-04-348, [Washington, DC, June 2004].

¹³ Ibid, 1-4.

¹⁴ Ibid, 10.

¹⁵ Ibid, 13.

Figure 6: KC-135 Operating and Support Costs (FY 1996-2002)

Constant fiscal year 2002 dollars in millions							
Cost category	1996	1997	1998	1999	2000	2001	2002
Mission personnel	\$693.6	\$671.3	\$641.1	\$792.9	\$780.2	\$793.0	\$778.2
Unit level consumption	475.4	473.9	514.8	525.7	388.1	485.0	633.8
Depot maintenance total	292.0	306.5	417.8	460.8	390.2	423.9	647.3
Contractor support total	6.0	4.6	8.3	10.8	5.8	13.3	4.2
Sustaining support total	30.1	18.8	23.1	22.9	24.5	24.5	38.4
Indirect support total	111.6	134.7	130.9	220.2	211.9	211.6	298.7
Total	1,608.7	1,609.8	1,736.0	2,033.3	1,800.7	1,951.3	2,400.6
Annual flying hours*	189,827	188,579	189,236	195,851	157,786	165,574	219,136
Cost per flying hour	8,476	8,536	9,173	10,382	11,412	11,785	10,955

Source: GAO *Military Aircraft: DOD Needs to Determine Its Aerial Refueling Aircraft requirements*

More troubling are the AF's 15 year cost projections that indicate continued significant cost growth out through 2017. The projection depicts an increase from \$2.2 billion in 2003 to \$5.1 billion in 2017. That is more than 130 percent cost growth for the period. Much of the cost growth was driven by a significant increase in the number of days each aircraft spent in the depot. In 1991, the average was about 150 depot days and in 1999 it had risen as high as about 350. As a result of the fix the depot effort, the number of aircraft in depot maintenance declined from 176 in September of 2000 to 89 in September of 2002. The depot improvement initiatives had effectively flattened the cost curve to a more manageable level though the age of the fleet will likely demand further increased effort to keep it flying safely.

With regard to the air refueling requirement, the GAO again found the Air Force's air refueling requirements were outdated. Specifically, the report states,

The Air Force plans to embark on a program to replace the KC-135 fleet without a current study to identify the number or type of aircraft needed for the future refueling mission. The most recent study is Tanker Requirements Study-05. However, it specifies the number of refueling aircraft needed for the outdated two-major-theater-war strategy, which was replaced by the 2001 Quadrennial Defense Review. Moreover, refueling requirements could change still more due to force transformation initiatives, projected changes in operational concepts, the advent of new

technologies such as unmanned aerial vehicles, and force structure changes. Finally, the Air Force also has not conducted a recommended analysis of alternatives to identify the approach best suited to meeting refueling mission requirements prior to committing to a specific approach. Consequently, the Air Force may embark on an expensive program to invest in new aircraft without knowing how many it needs and may miss an opportunity to meet its needs using the most cost-effective approach.¹⁶

The GAO made this determination after reviewing several aspects that might drive a change in the tanker requirement. Despite its concern for the validity of the TRS-05, the GAO did consider the data presented in the TRS-05. The GAO was concerned that new strategies and changes in operational concepts could have some effect on future requirements.

This change, argues the GAO, broadens the potential scope of operations and could result in an increased overall requirement. Coincidentally, the AF also believed this strategy change could drive a larger requirement. In addition to the strategy changes, the GAO also noted several other potential impacts to the overall refueling requirement to include changes in overseas basing rights, operational concepts, the extent of the use of precision guided weapons, joint operations and changes in technology.¹⁷ The impact of all or any of these could result in an increase or a decrease of the overall requirement. The analysis had to be completed to assess the tanker requirement, and to date it had not been accomplished.

Defense planning and regulatory guidance had also gone through significant changes since the TRS-05. For example, DOD Instruction 5000.2, *Operation of the Defense Acquisition System*, directed the AF must conduct analysis to identify the requirement to achieve the military objectives, identify any gaps or shortfalls, identify the

¹⁶ Ibid, 20.

¹⁷ Ibid, 20.

required capabilities and then identify potential solutions.¹⁸ The instruction also specified that an AOA be accomplished during the material solution analysis phase of an acquisition. According to the instruction, this phase of the process cannot end until the AOA is completed in addition to the other phase requirements.¹⁹ Congress also added this requirement to the language of the National Defense Act of 2004. Accordingly, the GAO found that the AF did not have a comprehensive assessment of the air refueling requirement nor did it have a completed AOA.

The report concluded by offering three options to meet the air refueling requirement. The three were acquiring a new aircraft, acquiring used aircraft then converting them to tankers, and use of contract air refueling for a portion of the requirement. The GAO did not select a preferred option, rather, it recommended the Secretary of Defense direct the team advising the pending AOA take a comprehensive look at all available options to include contracted air refueling support.

The GAO's conclusion was simply that if the AF was going to embark on a multi-billion dollar recapitalization, it had to have comprehensive analysis from which to determine the requirement. Therefore, in addition to the previously mentioned recommendation, the GAO recommended the Secretary of Defense accomplish a comprehensive requirements study to determine current and future air refueling requirements. On 20 May 2004, before the report was presented to Congress, the DOD concurred with both GAO recommendations. More specifically, the DOD reported that the MCS and the AOA were both underway and that the AOA would include a

¹⁸ For further acquisition information, see DOD Instruction 5000.02, *Operation of the Defense Acquisition System*. This instruction implements DOD Directive 5000.01, *The Defense Acquisition System*

¹⁹ Department of Defense Instruction Number 5000.02. *Operation of the Defense Acquisition System*. [Washington, DC, 8 December 2008], 15

comprehensive review of all air refueling options to include contract air refueling support.²⁰

Analysis of Alternatives

On February 24, 2004, Acting Under Secretary of Defense, Acquisition, Technology and Logistics, Mr. Michael W. Wynne, directed the Secretary of the AF to conduct an AOA for the recapitalization of the KC-135 aerial refueling tanker. He also directed that the study be conducted by a federally funded research and development center or other independent agency. RAND Project AIR FORCE²¹ was selected to conduct the AOA and the study was originally scheduled to be complete in December 2004.

RAND Project AIR FORCE submitted its AOA report to the Senior Steering Group in December 2004. After initial review, the Under Secretary of Defense for Acquisition, Technology and Logistics determined the study should be extended to December 2005 to allow additional analysis. To validate the AOA findings, two independent reviews were accomplished. In accordance with acquisition directives, the Office of the Secretary of Defense, Program Analysis and Evaluation Directorate conducted a sufficiency review. The second review, completed by the Institute for Defense Analyses, also a federally funded research and development center, validated objectivity and the methodology of the effort. The AOA met sufficiency standards and established criteria. It was also found objective and methodologically sound.

²⁰ Government Accounting Office, *Military Aircraft: DOD Needs to Determine Its Aerial Refueling Aircraft Requirements*, 29-34.

²¹ RAND Project AIR FORCE is an AF funded research and development center for studies and analysis. It provides the AF with independent analysis of policy alternatives affecting the development, employment, combat readiness, and support of current and future aerospace forces.

Consequently, “the Defense Department ha[d] high confidence that the results of this AOA [were] robust and [would] provide a sound basis for KC-135 recapitalization.”²²

The AOA was accomplished to address the cost effectiveness of a variety of alternatives for KC-135 recapitalization. Accordingly, the study defined cost effective as “the alternative whose effectiveness meets the military aerial refueling requirement at the lowest cost.”²³ The data used to determine the tanker requirements came from the 2005 MCS. The research team held comprehensive discussions with aircraft industry personnel. As a result of these discussions, industry experts proposed many of the alternatives the project analyzed. After initial data gathering, the analysis began. To begin the main effort of the project, the project team formulated its action plan and set out to answer two questions. First, “what is the most cost-effective alternative for recapitalizing the KC-135 fleet?”²⁴ Then, “when should the recapitalization begin?”²⁵

To assess the cost effectiveness of the alternatives, the study team analyzed a comprehensive list of alternatives.²⁶ Each of the potential candidates from this comprehensive list was measured against mission scenario requirements from the MCS. The scenarios used in this study supported all aspects of the then current post September 11, 2001, National Military Strategy²⁷. The cost analysis included life-cycle research and development, military construction, operations and support, modification and then disposal cost for the fleet. Additionally, while the cost effectiveness was assessed against the air refueling role, analysis did include aircraft configurations in which all or a portion

²² RAND Project Air Force. *Analysis of Alternatives for KC-135 Recapitalization*. [Santa Monica, CA, 2006], 2.

²³ Ibid, 3.

²⁴ Ibid, 7.

²⁵ Ibid, 7.

²⁶ For a detailed list of alternatives, see the RAND Project Air Force *Analysis of Alternatives for KC-135 Recapitalization*

²⁷ For further definition of the strategy, see the 2001 Quadrennial Defense review.

of the fleet had some cargo and passenger carrying capacity. In simplest terms, cargo and passenger capacity adds weight, decreases fuel capacity, which potentially requires more aircraft to meet the fuel requirements as well as adding additional cost to the purchase of each aircraft due to structural and systems considerations. The project team did not make a value judgment regarding cargo and passenger capacity; rather it deferred that judgment to senior decision makers. If the senior decision makers elected to add cargo and passenger capacity as part of the aircraft requirements, doing so would add approximately six percent²⁸ to the life cycle cost of each aircraft according to estimates.

To assess the timing of the recapitalization, the project team looked at various start dates in a range from 2011 through 2041. At the time of the project, the AF had a current fleet of 73 KC-135 Es and 417 KC-135 Rs. To help ensure project comprehensiveness, the cost effectiveness of sustaining the KC-135 was also assessed. To do so, the team analyzed all available evidence regarding maintenance and technical data to determine impact on availability for the current KC-135 fleet.²⁹

Analysis of Alternatives Findings

The analysis found that a fleet of new medium to large commercial derivatives was the most cost effective alternative for KC-135 recapitalization. Potential aircraft meeting this determination included tankers based on the Airbus 330, the Airbus 340, the Boeing 767, the Boeing 787, the Boeing 777, and the Boeing 747. The team also compared the cost effectiveness of a fleet consisting of two kinds of different aircraft to that of a fleet consisting of a single aircraft type. After completing the analysis, the team concluded there was no reason to exclude a mixed purchase. Analysis of the other

²⁸ RAND, *Analysis of Alternatives for KC-135 Recapitalization*, 14.

²⁹ Ibid, 11.

alternatives found that smaller or larger new commercial aircraft, used commercial aircraft, new-design tankers, unmanned tankers, stealthy tankers, and commercial sources of air refueling were less cost effective than a new medium to large commercial aircraft.³⁰

Regarding cost effectiveness, the project team made two additional recommendations for the recapitalization. First, with regard to the medium to large commercial aircraft recommended above, the parking space required can vary by approximately 30 percent and depending on the area of operation, therefore the final aircraft selection is a matter of military judgment. Secondly, regarding cargo and passenger capacity, a fleet of aircraft all having this capability would likely add six percent to the overall life cycle cost.³¹ Both of the value judgments have capacity to add cost to the overall recapitalization effort. The degree to which either or both do so is dependent on several variables. Once the field of potential aircraft was known, consideration for either or both had to be factored into the overall potential cost additive.

With regard to the timing of the recapitalization, the team found that if the KC-135 fleet met or exceeded the future aerial refueling requirement, the timing of the recapitalization did not significantly affect the present value of the combined cost of operating the KC-135s until they were retired and replacement aircraft had been acquired. In this case, the decision of when to recapitalize should be based on considerations other than cost. If additional tankers were necessary to meet the current and or future requirement, the present value of the cost of closing the gap would be greater the more

³⁰ Ibid, 12.

³¹ Ibid, 14.

rapidly new systems were acquired. The determination on how rapidly to close the gap was left as a matter of judgment for senior DOD decision makers.³²

The DOD Completes a New Requirements Study

The MCS, chartered in 2004, was a comprehensive effort led by the DOD Director, Program Analysis and Evaluation, and the Chairman of the Joint Chiefs of Staff. The objectives of the study were to identify and quantify how variations in mobility capabilities support the National Defense Strategy throughout the spectrum of operation. It was also designed to identify capability gaps, overlaps, or excesses, and also provide associated risk assessment and recommend mitigation where possible. Additionally, the study evaluated the effects of mobility capability alternatives caused by irregular, catastrophic or disruptive threats. It also identified new metrics for measuring and assessing mobility capabilities. The study focused on demands that could be expected in 2012 while also considering demands over the period from 2007 to 2013. Accordingly, the MCS was an end-to-end mobility analysis that had an overall objective to identify and/or quantify.³³

After lengthy analysis, the study found that the strategic airlift mobility system could continue to sustain the post September 11, 2001, operations tempo. It also found that no further augmentation was required assuming a strategic airlift fleet of 292 (180 C-17s and 112 C-5s), full reserve component mobilization and full Civil Reserve Air Fleet support. It also found that organic and host nation assets were sufficient to accomplish intra-theater airlift requirements for the scenarios evaluated. Since the findings did not

³² Ibid, 14.

³³ For detailed study objectives, refer to the Mobility Capabilities Study, 2005.

identify a capability gap or shortfall, there was no analytical basis from which to validate the cargo and/or passenger requirement for a new tanker aircraft.

Regarding the air refueling requirement, the study concluded a range from 540 to 620 tankers was necessary to support the planning construct used. Further, the study recommended the DOD consider tanker augmentation in a secondary mission role such as airlift when evaluating options for tanker recapitalization. The study team also recommended the AF identify and implement a plan to recapitalize the air refueling capabilities with multi-mission assets as appropriate based on the results of the AOA.³⁴ Based on the air refueling requirement determination of this study, the AF had a capacity gap. Thus in accordance with the guidance from the RAND AOA, the prudent path to take was one of a more expedient recapitalization effort.

Mobility Capabilities Study Concern from the Senate

Based on congressional concern, the Senate directed the GAO to monitor the DOD effort regarding the MCS. The Senate did so in a report that accompanied the FY 2005 Defense Authorization Act. In this report, the Senate tasked the GAO to monitor the MCS study and process for adequacy and completeness. Because of this effort, on September 14, 2005, the GAO sent a letter to Secretary of Defense Donald Rumsfeld detailing its preliminary concerns with certain aspects of the MCS. The intended purpose of the GAO preliminary letter was to afford the Secretary the opportunity to evaluate the potential methodology and credibility concerns observed by the GAO. Specifically, the concerns observed were with the process the MCS team³⁵ used to identify the modeling

³⁴ Department of Defense. *Mobility Capabilities Study*. [Washington, DC, 2004], 9.

³⁵ The MCS team includes members from the Office of the Secretary of Defense, Program Analysis and Evaluation and the office of the Director of Logistics, The Joint Chiefs, the military services, the combatant commands, and other applicable representatives.

capabilities, limitations and performance as they pertained to the events they intended to simulate.

In this preliminary letter, the GAO was concerned that it was unable to assess the adequacy of process used to verify, validate and accredit the nine models used during the MCS. This verify, validate and accredit process was required by DOD Instruction 5000.61, *DOD Modeling and Simulation (M&S) Verification, Validation, Accreditation (VVA)*. As it pertained to this MCS effort, the Office of Program Analysis and Evaluation believed the DOD guidance was not applicable because of the age of models, and therefore, they did not comply with the instruction. They believed these legacy models and the data associated had already undergone an equivalent verification, validation and accreditation that consisted of actual use over the lifespan of the models. This explanation could have been sufficient if the DOD had not been in the middle of validating one of the nine legacy models. The lack of consistency lends the situation to question and doubt. Of concern to the GAO was that while the department's position on these legacy models was one of no further verification, validation and accreditation was required, it was conducting the process on one of the nine legacy models. To the GAO, this sent a contrary and confusing message.

The preliminary findings lead to three recommendations

Because of its preliminary review, the GAO made three recommendations to Secretary Rumsfeld. The first was to develop documentation describing the equivalent verification, validation and accreditation process used for the mobility models and baseline data used to conduct the MCS. The second was to disclose in the published MCS report the equivalent verification, validation and accreditation process used on the models

and baseline data. The last was to work with the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics to evaluate the current verification, validation and accreditation guidance to determine its relevance for use with legacy models and to change the guidance if appropriate. In response to these recommendations, the DOD concurred with all three.³⁶ The concerns addressed in this preliminary report later became part of the GAO-06-938, *Report to Congressional Committees: Defense Transportation, Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capabilities Study and Report*, September 2006.³⁷

The Formal GAO Mobility Capabilities Study Concerns

The GAO-06-938 is the formal report to congress that encompasses the aforementioned preliminary letter to the Secretary of Defense as well as the rest of the work regarding the congressional tasking that accompanied the FY 2005 Defense Authorization Act. To conduct this effort, the GAO reviewed the MCS final report and applicable DOD policies and guidance. They conducted interviews with MCS participants and subject matter experts as well as identified generally accepted research standards for which to measure the MCS. This GAO effort was conducted from July 2004 through July 2006.³⁸ The report identified four areas of concern.

The first concern was that some aspects of the modeling and the data were inadequate because they could not simulate all aspects of the mission.³⁹ The inadequacy of the modeling and the data was identified in the MCS but the degree to which the

³⁶ Government Accountability Office. *Defense Transportation: Opportunities Exist to Enhance the Credibility of the Current and Future Mobility Capabilities Studies*. GAO-05-659R. [Washington, DC, 14 September 2005], 1-11.

³⁷ Government Accountability Office. *Defense transportation: Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capabilities Study*. GAO-06-938. [Washington, DC, 1 September 2006].

³⁸ Ibid, 2.

³⁹ Ibid, 7-10.

inadequacy could influence the results was not explained. For example, the homeland defense missions were modeled in the hypothetical rather than by using the well-defined and approved concept of operations for the mission. Additionally, flexible deterrent options/deployment order processing was not modeled due to lack of data, yet the MCS assumed a robust use of the process. There are more than 80 references for better modeling and another 12 calling for additional data in the MCS.⁴⁰ The GAO also had concern over the selection of the year 2012 to determine mobility capability for the years 2007 through 2013. The concern was that 2012 did not tax the mobility system to the degree other years in the aforementioned time span did, particularly in support of smaller, more frequent operations such as humanitarian relief. The MCS team selected 2012 because it thought it the “most likely” scenario to occur. Contrarily, the GAO felt that, by selecting another year in the applicable timeframe, the increased demand on mobility in support of smaller operations could potentially identify a capacity gap. Thus, the GAO determined that senior decision makers might not have adequate and complete information deemed necessary to make decisions regarding mobility capability and future requirements.⁴¹

The GAO’s second concern was that, while the MCS concluded the combined U.S and host nation intra-theater mobility assets were adequate when measured against warfighting metrics, the report did not provide a clear understanding of the direct relationship of the warfighting objectives to the mobility capabilities.⁴² The metrics for success measured whether a warfighting task was achieved. The MCS did not measure whether personnel, supplies and equipment were delivered to the required destination in

⁴⁰ Ibid, 3.

⁴¹ Ibid, 10.

⁴² Ibid, 10-11.

an adequate timeline to meet mission objectives. In other words, did the mobility system deliver the required stuff in time to meet the timing objectives set forth by the Joint Forces Commander? Since this was not measured, the GAO could not determine how the study concluded that planned mobility assets were adequate to meet the needs of the warfighter. Nor could they determine whether there were any capabilities gaps, shortfalls or excesses. This sort of information would be critical to developing a clear acquisition strategy designed to meet the needs of the warfighter. In previous studies, the DOD had used delivery of short tons of equipment per day to measure this requirement. As a result, the GAO recommended the study include both warfighting and mobility metrics to more accurately measure the success of the objectives. Doing so would identify whether the mobility system had enough capability to achieve the stated objectives as well as identify what capabilities were necessary, particularly as they pertain to a recapitalization effort such as the KC-135.

The third concern was that in some cases the results of the MCS were incomplete, unclear or required further study.⁴³ Therefore, this was counter to relevant research standards that require complete, accurate and relevant data. In its analysis, the GAO found several recommendations in the MCS for further study and assessment. At the time of the GAO report, there were five of the recommended additional studies underway. Of note, three involved intra-theater airlift, global presence and basing, and air refueling – all potentially applicable to the KC-135 recapitalization. The MCS did not address the potential impact of any of the further study nor, according to the DOD, were there any plans to report the effects of any on the MCS. The lack of completeness and clarity could lessen the usefulness of the MCS.

⁴³ Ibid, 11.

The fourth concern was the previously discussed verification, validation and accreditation process. Despite agreeing with the recommendations suggested in the GAO's September letter to Secretary Rumsfeld, there appeared to be no further effort to implement the recommendations before completion of the MCS other than to describe the equivalent verification, validation and accreditation process. The DOD could not provide any further documentation of the process used to verify and validate the process other than the description of said process in the MCS.

Furthermore, DOD officials were unable to provide documentation to support and verify key analytical and decision-making processes used by senior DOD leadership throughout the study...DOD officials told [the GAO] that the study's key analytical and decision-making processes were validated and approved by study participants during working group meetings and by senior leadership during General Officer Steering Committee meetings and Executive Committee meetings. Program Analysis and Evaluation officials could not produce documentation of these meetings because they said documentation did not exist. Nor could they produce other documents requested during the development of the MCS or following issuance of the report.⁴⁴

As such, the GAO felt the lack of documentation to support key analytical and decision-making processes used would undermine the credibility of the study.

These four concerns led to three recommendations for the Secretary of Defense. The first was to develop models and data that would account for all aspects of critical missions. The second was to include an explanation of how limits could potentially affect study results and include the potential affect of future studies on the results of the original study. Then lastly, the GAO recommended both warfighting and mobility metrics be used in capability determination. In its response, the DOD concurred with the first and third but said it did not understand the second. This resulted in a GAO refinement of

⁴⁴ Ibid, 12.

recommendation two to say, “when conducting future mobility studies, beginning with any study currently under way, include in study reports an explanation of how stated limitations might impact the study results and, at a minimum, describe how recommended future studies might be conducted to enhance the results of the original study.”⁴⁵ In its response, the DOD also stated that the GAO report contained misleading and factual errors. The GAO stood by their original findings.⁴⁶

Defining the Air Force’s Tanker Recapitalization

The AF post lease/lease buy KC-135 recapitalization effort started in 2004 with the previously mentioned studies, particularly the RAND AOA and the MCS. Based on those studies, in November of 2006, the AF presented via the Joint Capabilities Integration and Development System⁴⁷ its program to the JROC. This system uses analysis to identify and assess acquisition programs competing for scarce funding. Because of broad continuing congressional interest, the GAO, acting under the Comptroller General’s authority to conduct evaluations, reviewed the AOA for the KC-135 recapitalization. As a part of the effort, the GAO also reviewed the requirements determination process. In doing so, it had concerns regarding analysis used by the DOD that led to adding cargo and passenger capabilities to the requirements for the new tanker. Adding this requirement, according to the GAO, was done without the requisite gap or shortfall identification. The GAO’s *Defense Acquisitions: Air Force Decision to Include a Passenger and Cargo Capability in Its Replacement Refueling Aircraft Was Made*

⁴⁵ Ibid, 14.

⁴⁶ For further detailed information see Government Accountability Office. *Defense transportation: Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capabilities Study*. GAO-06-938. [Washington, DC, 1 September 2006], 22-28.

⁴⁷ For detailed information regarding the Joint Capabilities Integration and Development System see Chairman of the Joint Chiefs of Staff Instruction 3170.01G.

without Required Analysis Report, dated 6 March 2007, asserts that the AF did not comply with its own mandatory instructions when it added cargo and passenger capability to the requirement.⁴⁸ More specifically, the report says,

The Air Force proposal for a replacement refueling aircraft included a passenger and cargo capability without analyses identifying an associated gap, shortfall, or redundant capability. According to mandatory Air Force implementing guidance, analyses supporting the decision-making process should assess a capability based on the effects it seeks to generate and the associated operational risk of not having it. In this case, the supporting analyses determined neither need nor risk with regard to a passenger and cargo capability. Air Force officials could not provide supporting information sufficient to explain this discrepancy between the analyses and their proposal. Without sound analyses, the Air Force may be at risk of spending several billion dollars unnecessarily for a capability that may not be needed to meet a gap or shortfall.⁴⁹

From its analysis, the GAO recommended the Secretary of Defense direct the Secretary of the AF accomplish the analysis required to determine if there was a gap or shortfall, assess any risk associated and send the documentation to the JROC for validation. It also recommended that once the analysis was complete, the Chairman of the Joint Chiefs should formally notify the Under Secretary for Defense for Acquisition, Technology and Logistics so program certification could then take place in accordance with DOD guidance. The DOD disagreed with the GAO's first recommendation and concurred with the second.⁵⁰

In its response regarding the first recommendation, the DOD stated the AF did present analysis and rationale for adding the cargo and passenger capability to the JROC.

⁴⁸ For detailed review of this topic, see Air Force Instruction 10-604, Capabilities Based Planning, dated 10 May 2006 and Air Force Instruction 10-601, Capabilities Based Requirements Development, dated 31 July 2006. Both instructions state compliance with this publication is mandatory on the front cover.

⁴⁹ Government Accountability Office, *Defense Acquisitions: Air Force Decision to Include a Passenger and Cargo Capability in Its Replacement Refueling Was Made Without Required Analysis*, 3.

⁵⁰ *Ibid*, 3.

The JROC then concluded the analysis was sufficient and it then validated the requirement. In GAO interviews,

Joint Requirements Oversight Council officials told [the GAO] that no analysis identifying a need for a passenger and cargo capability was presented to the Council. Required analyses should establish an understanding of when and why a capability is needed and the risk of not having it. No such analysis was available to the Joint Requirements Oversight Council. Considering the requirement for analyses that separate needs from wants and the risk of unnecessary expenditures in this multi-year multi-billion dollar acquisition program, [the GAO] continued to believe... that the analyses required by mandatory guidance are necessary to inform the decision that begins the acquisition program.⁵¹

The GAO also referred to the recently completed MCS findings. The MCS found there was no shortage of strategic or intra-theater airlift capacity; both missions were adequately resourced to meet U.S. objectives within the acceptable levels of risk. The MCS did identify a refueling aircraft shortfall in all but one scenario and further concluded the number of aircraft needed to satisfy refueling needs ranged from 520 to 640 total aircraft, a range that exceeded the then current AF inventory of 590 refueling aircraft. Consequently, the GAO's assessment was that a "possible shortage of refueling aircraft under some circumstances raises questions about the ability to employ a refueling aircraft in a passenger and cargo role and underscores the importance of analyses to guide decision-makers concerning a refueling replacement aircraft."⁵² To replace more than 500 KC-135s and meet the requirements identified in the MCS, the AF expected to spend at least \$72 billion. Because of this and other analyses, the GAO was called to testify before Congress on 7 March 2007.

More Congressional Concern

⁵¹ Ibid, 8.

⁵² Ibid, 8.

On 7 March 2007, Mr. William Solis, Director Defense Capabilities and Management Issues and Mr. Michael Sullivan, Director Acquisition and Sourcing Management Issues testified before the House Committee on Armed Services, Air and Land Forces Subcommittee. The written submission is contained in GAO-07-566T, *Defense Acquisitions: Issues Concerning Airlift and Tanker Programs*. Specifically the testimony addressed the analysis supporting the DOD's MCS and requirements and actions they felt necessary to improve the outcome of weapon system acquisitions. According to Mr. Solis's statement and previous GAO work, he told the committee the DOD knew what to do to achieve more successful outcomes, but did not seem able to apply the necessary discipline, controls and accountability. In short, the DOD had not been employing a knowledge-based development approach and its business cases had not measured up as they should. A sound business case for an acquisition must contain defined requirements, mature technology, a knowledge-based strategy, realistic cost estimates and adequate funding. Persistent throughout the process were failure to identify needs versus wants, measures to limit cost growth, long schedule delays and quantity reductions.⁵³ Arguably, these shortcomings can be a result of a lack of adequately trained and proficient acquisition professionals as well as a lack of process integrity.

In his written submission, Mr. Solis detailed GAO findings regarding the MCS,⁵⁴ addition of cargo and passenger capability to the tanker requirements⁵⁵ and issues concerning four airlift programs. Testimony about the conduct of MCS reiterated

⁵³ Ibid, 1.

⁵⁴ The MCS issues were previously discussed in this paper and are found in GAO-06-938, *Report to Congressional Committees: Defense Transportation, Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capabilities Study and Report*, September 2006.

⁵⁵ The cargo passenger capability was previous discussed in this paper and are found in GAO-7-367R, *Defense Acquisitions: Air Force Decision to Include a Passenger and Cargo Capability in Its Replacement Refueling Aircraft Was Made without Required Analysis*, 6 March 2007.

previous GAO assertions that it was conducted with incomplete data, modeling and analysis. Based on this, the GAO felt the MCS did not fully measure the stress on the mobility system. The MCS had determined that mobility capabilities were adequate to achieve U.S. objectives within an acceptable level of risk; no airlift shortfall existed.

A portion of his testimony referred to the GAO's assertion that the AF added the cargo and passenger capability to the requirements without identifying a gap or shortfall as required by current AF instructions. The study used to make this sort of determination would have been the MCS. Hence, based on the MCS, it would appear there was no gap or shortfall from which to derive a need to add the cargo and passenger capability. The GAO asserted this was not the case, it recommended the AF conduct additional analysis to determine the requirement.

With regard to issues surrounding the four airlift acquisition activities, there is one overall program issue germane to this paper. The GAO assessment of the four concluded that a consistent problem plagued all the programs: there was an insufficient job of analyzing the requirement. In this area, the GAO found that the key to successful program development was based on solid business case analysis that identified the warfighter's requirement and then developed an acquisition strategy that met those requirements while remaining within existing resources. To that end, the GAO reiterated its assertion that the DOD still had trouble distinguishing between wants and needs. Hence, recommended Congress exercise caution when making tanker and airlift investment decisions.⁵⁶ This testimony hurt the credibility of the AF and the KC-135 recapitalization effort.

⁵⁶ Government Accountability Office. *Defense Acquisitions: Issues Concerning Airlift and Tanker Programs*. GAO-07-566T. [Washington, DC, 7 March 2007], 18.

Chapter 3

The First Attempt to Acquire the New Tanker

After the prerequisites were completed, specifically the RAND AOA and the MCS, the AF set forth to acquire its new tanker. As the AF began to finalize the first RFP in this new recapitalization effort, the Congress remained concerned, and as a result, it asked the CRS to complete a report on the AF's air refueling effort to date.

The Request for Proposal

The CRS Report for Congress entitled *Air Force Aerial Refueling* correctly noted that there had been significant media scrutiny surrounding the first draft of the KC-X RFP in FY 2007. Based on the history of the tanker recapitalization effort thus far, the close review of this RFP is understandable. Both Boeing and Northrop Grumman had voiced concern regarding the lack of clearly defined requirements and evaluation criteria of requirements. For instance, Northrop Grumman complained that the RFP did not adequately address how the candidate aircraft's airlift capability would be evaluated.¹ As such, it feared that the AF might not look upon the airlift capabilities of its aircraft, the larger of two most likely candidate aircraft, as favorably as it should. In the absence of detailed airlift evaluation information, Northrop could offer a smaller aircraft, such as the Airbus A300/A310 class. Similarly, if Boeing believed the AF desired a larger aircraft with more airlift capability, it could conceivably offer its 777 aircraft.² Past consolidation in the defense industry as well as a lesser demand for unique defense items often results in less competition available to compete for a given product. Often this drives a compromise between a warfighter's "perfect world" requirements and real world

¹ Congressional Research Service, *Air Force Aerial Refueling*, 3-4.

² Ibid, 4.

industrial capability. That said, the CRS determined there appeared to be nothing obvious in the RFP that would inherently bias the contract award in favor of any platform potentially offered by the two competitors. The RFP makes clear, however, that the aircraft's primary mission is refueling DOD and allied aircraft with the flying boom mechanism. Any passenger or cargo carrying capability was deemed a secondary mission.³ While identified as a secondary mission, there had still been no additional analysis to support the addition of the cargo and passenger requirement.

The CRS found it difficult to evaluate the recapitalization requirements because there was no clear tanker requirement study. The MCS reportedly recommended the acquisition of 520 - 640 KC-135R model equivalents but, as earlier stated, the GAO had significant concerns regarding the adequacy of the MCS. Because of the GAO concern that the MCS analysis was incomplete and therefore unable to provide insight into tanker and airlift requirements, for Congress there were significant requirements questions that remained unclear or unanswered. For example, how much airlift capability should the aerial refueling fleet provide?" Some senior DOD officials appeared to believe that the KC-X should provide more airlift capability.⁴ In April 2006, the Department's top military transportation commander expressed a strong preference for a multi-role tanker.

General Norton Schwartz, Commander U.S. Transportation Command testified that:

What we need is a multi-mission tanker that can do both boom and basket refueling, that can do passenger lift, some cargo lift, and have defensive systems that allow the airplane to go wherever we need to take it....if we [a]re going to war with Iran or Korea or over Taiwan or a major scenario, the first 15 to 30 days are going to be air refueling intensive. But what I [a]m talking about is the global war on terrorism, sir, for the next 15 or 20

³ Ibid, 3-4.

⁴ Ibid, 6-7.

or 25 years. That is not an air refueling intensive scenario and that [i]s why a multi-mission airplane to me makes sense.⁵

The amount of airlift that a passenger/cargo capable tanker could provide would likely have important implications on other air mobility programs. The selection of a larger KC-X aircraft could increase the percentage of airlift provided by the tanker fleet, and, therefore, might reduce the number of cargo aircraft required.⁶ At the same April 2006 hearing, General Schwartz testified to this trade-off when he said, “if I had an airplane that could carry passengers there with defensive systems, like a new tanker, I would use that instead, and we would be able to better manage the workload on the C-17 fleet and apply it against the things that it does exceptionally well, moving cargo.”⁷ The AF evaluated the concerns for merit, fixed the RFP where necessary and then set forth to conduct the analysis of the proposals from Northrop Grumman and Boeing.

Contract Award and Bid Protest

On February 29, 2008, the AF selected a consortium consisting of Northrop Grumman over Boeing to build the KC-X tankers. As a result, in March 2008, Boeing filed a bid protest with the GAO. The GAO is required to consider contract award protests based on the Competition in Contracting Act of 1984. As such, on June 18, 2008, the GAO sustained Boeing’s protest and, consistent with that decision, recommended that the AF reopen discussions with the both bidders, obtain revised proposals, re-evaluate the revised proposals, and then make a new source selection decision. In its investigation, the GAO found the AF had made numerous significant errors in the bidding process that

⁵ Congress. Senate Armed Services Subcommittee. “Senate Armed Services Subcommittee on Seapower Holds Hearing on FY2007 Budget: Transportation Command.” *CQ Congressional Transcripts*. [4 April 2006].

⁶ Congressional Research Service, *Air Force Aerial Refueling*, 6-7.

⁷ Senate Armed Services Subcommittee. “Senate Armed Services Subcommittee on Seapower Holds Hearing on FY2007 Budget: Transportation Command,” *CQ Congressional Transcripts*.

could have affected the outcome of the contract award. In its analysis, the GAO found the AF did not assess the relative merits of the proposals in accordance with the evaluation criteria as defined in the contract solicitation. It found the AF in violation of the solicitation's assertion that no consideration would be given to exceeding a key performance parameter. Additionally, the GAO found that the AF could not demonstrate that the Northrop Grumman aircraft could refuel all current AF fixed wing aircraft as was required by the solicitation. Moreover, in discussions between AF personnel and Boeing personnel, Boeing personnel were told their aircraft had satisfied the key performance parameter related to operational utility. Then, to the contrary, in the assessment of operational utility, the AF determined the aircraft was only partially able to meet the objective and it did not notify Boeing as such. The GAO also found the AF unreasonably determined that Northrop's refusal to agree to a specific solicitation requirement was an administrative oversight as opposed to a refusal. Additionally, it determined that AF evaluation of the military construction cost associated with the life cycle cost was unreasonable, an assertion the AF conceded during the protest. When corrected, it led to the Boeing aircraft as the selection with the lowest life cycle cost. Lastly, the GAO found the AF improperly increased Boeing's estimate of non-recurring engineering cost as part of the most probable life cycle cost. The AF had done this because of Boeing's failure to satisfactorily explain the basis for which it priced that particular cost element. Based on these portions of the bid protest, the GAO upheld the protest and recommended the AF reopen the discussion with the bidders, obtain revised proposals, re-evaluate, and then award a new contract.⁸ As such, Secretary of Defense stated there would be a new

⁸ Government Accountability Office. *The Boeing Company*. GAO-B-311344. [Washington, DC, 18 June 2008],1-3.

competition, this time executed by the Undersecretary of Defense for Acquisition, Technology, and Logistics. The credibility of the AF and the tanker recapitalization effort had been dealt a serious setback.

The Death of the New Competition

In July 2008, the Secretary of Defense stated that there would be a new solicitation requesting revised proposals from industry, and the Undersecretary of Defense for Acquisition, Technology and Logistics would replace the AF as the source selection authority. DOD expected to award the new contract by December 31, 2008. However, on September 10, 2008, the Secretary announced his decision to terminate the second competition noting there was not enough time for DOD to complete a competition that would be viewed as fair and competitive in such a highly-charged environment by January 2009, when the next administration would take office. He stated that rather than handing the next administration an incomplete and possibly contested process, the next team should review the military requirements objectively and construct a new acquisition strategy. Further, he added that DOD planned to continue funding the program in the fiscal year 2010 through 2015 budget. In addition, the Chief of Staff of the AF stated that a new KC-X competition could take the new administration between 8 months and 4 years to complete.⁹

Recent Thinking

In August 2009, Air Mobility Command produced a White Paper entitled, *The Imperative for a New Tanker Now*.¹⁰ In this White Paper, Air Mobility Command discussed many of the studies and analyses previously addressed in this research paper.

⁹ Government Accountability Office. *Defense Acquisitions: Assessments of Selected Weapon Programs*. GAO-09-326SP. [Washington, DC, March 2009], 156.

¹⁰ Air Mobility Command, *The Imperative for a New Tanker Now*.

The purpose of the White Paper was to inform readers of the issues regarding the KC-135 and tanker recapitalization. The command's main concern is its ability to provide a key enabler to the joint force. With a fleet that is 50 years old, there is serious concern regarding potential discovery of a

“major deficiency, such as skin fatigue and corrosion in an aircraft such as the KC-135 [that] 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 interests would be in jeopardy....”¹¹

This concern was discussed in this paper and in depth in the Defense Science Board Study and the RAND AOA and was found to be no more probable in the KC-135 than any other aircraft such as the C-130 or the B-52, both similarly old aircraft. There has been no more recent analysis conducted that would devalue the two aforementioned studies.

The command also discussed the new strategic environment in which this new tanker would operate. The new tanker, according to Air Mobility Command, should be a multi-role asset capable of air refueling, aeromedical evacuation and airlift. U.S. Northern Command and its homeland defense mission is a prime example of a new tanker requirement in the post-September 11, 2001 world. Its reliance on air refueling for E-3 and fighter combat air patrols to ensure the security of U.S. sovereignty is critical to its mission effectiveness. Another example in the paper refers to humanitarian effort in Mozambique in 2000. At that time, tankers made it possible for relief supplies to arrive within 72 hours of mission tasking.

¹¹ Ibid, 1.

Regarding fleet size, the White Paper referred to two studies, the TRS-05 and the 2005 MCS. The studies called for a tanker fleet of between at least 500 and up to 640 tanker aircraft. Of note, recall the Tanker Requirements Study – 2005 was never formally released and its use was a source of great concern by the GAO and Congress. The Mobility Capabilities Study was published but recall the GAO had concern that the study did not task the mobility fleet enough to truly determine the airlift need. Had this more thorough analysis been done, the AF may have identified a gap or shortfall in airlift capacity. That gap or shortfall could then provide the justification necessary to validate a cargo and passenger requirement for tanker recapitalization. Doing so would satisfy the regulatory guidance the GAO found at odds with the previous RFP and it would analytically validate a multi-role KC-X aircraft.

The 2009 Air Mobility Command White Paper appears to vocalize the merits of recapitalizing sooner rather than later based on several valid arguments. Some of the merits were previously mentioned in the RAND AOA and the 1996 GAO testimony before Congress. What the White Paper does not discuss is how to solve the issues that have plagued the tanker recapitalization and how the AF will resolve them.

Chapter 4

Recommendations

There are three broad overarching recommendations as a result of this in-depth review of the tanker recapitalization effort. First, when building an acquisition strategy, truthfulness and compliance with the overarching mandatory regulatory guidance is mandatory. Second, the capabilities deemed necessary to meet warfighter requirements have to be based on solid defensible consistent mission analysis. Finally, enhance acquisition oversight. Each will now be discussed.

Truthfulness and Following the Regulatory Guidance

Throughout this acquisition process, the AF, as determined by the GAO, the DOD IG and the congressional concern, misrepresented data and did not comply with mandatory guidance. In the simplest terms, the AF acquisition process, when defining capabilities necessary, is, by AF Instructions 10-604 and 10-601, required to identify a gap or a shortfall in capability before adding a requirement to an acquisition regarding the condition of the KC-135. There were several instances across the entire period of the tanker recapitalization effort that did not comply with mandatory guidance. Correcting this will be critical to successfully building an acquisition strategy that will withstand the scrutiny inherent in an effort this large. With regard to tanker recapitalization, the scrutiny will be magnified, as will the oversight, due to the effects of its troubled past. This scrutiny will transcend the tanker and reach across the entire spectrum of AF acquisition. Whether the members of Congress think about the AF adding a cargo and passenger requirement, or think back to pushing the lease before the AOA was done, or about the studies the AF used to determine the requirements, Congress arguably comes to

one conclusion. The AF has been less than forthright in building its case to recapitalize the KC-135. This author believes the AF needs recapitalization and should start the recapitalization sooner rather than later, an opinion also expressed in the Defense Science Board Report and the RAND AOA. That said, it has to be a tanker that is acquired through an acquisition strategy fully compliant with the guidance.

The AF brought discredit to its tanker recapitalization effort because of what Congress sees as untruthful representation or a disregard for its own mandatory guidance. Recall, the DOD IG found that senior officials had knowingly misrepresented the state of the KC-135 fleet and aerial refueling requirements. They also found that then Secretary of the AF James Roche misused his office when he lobbied the OMB to support the KC-767 lease effort. There is also the testimony of General Paul Essex regarding the use of the TRS-05 in which he told Congress the study had been completed when in fact it had not and never was. As a reminder, TRS-05 was used by the AF as validation for the tanker requirement and was used to varying degrees to defend the three previous and failed efforts. These few examples in combination with the others detailed in this paper are more than enough to seriously tarnish the reputation of a very noble service and, therefore, impede it regarding acquisition. An AF core value is the key to resolving this – integrity. The author agrees with Congress, the DOD IG and the GAO in that the AF has throughout this process, been less than forthcoming with its position regarding tanker recapitalization. There has to be integrity, at all levels, regarding the tanker recapitalization and all acquisition. In this case, integrity means dealing with deceitful activity.

More troubling, however is the continued absence of full compliance with the mandatory guidance. An example specifically discussed is the addition of a cargo and passenger capability requirement to the RFP. The GAO had concern that this capability was added to the tanker requirement without an identified gap or shortfall with regard to airlift requirements, and as required by AF instruction. The MCS clearly indicated no gap or shortfall in either strategic or intra-theater airlift. Moreover, the data, on the contrary, indicated some excess airlift capacity, both strategic and intra-theater. Thus when the DOD approved analysis is used to validate whether there is a gap or shortfall, the answer is no, there is not. Whether in Congressional testimony or after the 2005 MCS, the AF repeatedly stated that it had enough airlift capacity to meet the warfighter's requirements. This position was consistently repeated in testimony related to the size and capacity of the mobility fleet specifically with regard to C-17 procurement, C-5 modernization efforts, and arguably factored into C-130J and Joint Cargo Aircraft discussions as well. On the contrary, when discussing the capabilities required in a new tanker, cargo and passenger capability was a consistent additive, albeit as a secondary role. The GAO may have summed this up best when discussing interviews it held with the JROC members. In the interviews,

Joint Requirements Oversight Council officials told [the GAO] that no analysis identifying a need for a passenger and cargo capability was presented to the Council. Required analyses should establish an understanding of when and why a capability is needed and the risk of not having it. No such analysis was available to the Joint Requirements Oversight Council. Considering the requirement for analyses that separate needs from wants and the risk of unnecessary expenditures in this multi-year multi-billion dollar acquisition program, [the GAO] continued to believe... that the analyses required by mandatory guidance are necessary to inform the decision that begins the acquisition program.¹

¹ Government Accountability Office, *Defense Acquisitions: Air Force Decision to Include a Passenger and Cargo Capability in Its Replacement Refueling Was Made Without Required Analysis*, 8.

Cargo and passenger capability may make great sense with regard to aircraft flexibility and long term financial decisions for the AF but that does not alleviate the requirement to follow regulatory guidance. It is very difficult if not impossible to convince Congress or, in this case, the GAO, the AF is doing what is proper when it appears it is in direct violation of its own guidance and when there have been repeat issues regarding truthfulness. Secretary Gates summed it up best with, “We must also ensure that only essential systems are procured, particularly in a resource-constrained environment. We cannot afford everything we might desire; therefore, in the future, the Department must balance capability portfolios to better align with budget constraints and operational needs, based on priorities assigned to warfighter capabilities.”²

There are three basic paths to resolve the non-compliance perception. The AF could comply with the guidance and show analysis requiring added cargo and passenger capacity, or it could change the guidance to allow for senior decision makers to use experience and discretion when appropriate to make sound long-term acquisition decisions, or it could continue on the same path of the three previous efforts. This last choice is definitely not the right answer. Non-compliance with the regulatory guidance is unacceptable. Congress expects the AF to follow its own guidance and when an issue such as this arises, it undermines the credibility of the service. That credibility, once lost, is very difficult to regain if not impossible.

Option one is what the current regulatory guidance requires, base the capabilities for the new tanker on a gap or shortfall of said capabilities from the analysis. The analysis required for this acquisition was derived from the 2005 MCS. The analysis

² Department of Defense, *Quadrennial Defense Review*. [Washington, DC, 1 February 2010], 76.

indicated no further airlift capacity was necessary to meet the needs of the warfighter between 2007 and 2013, (the timeframe the study encompassed). Since the analysis determined the capacity of the fleet met the requirement, based on the MCS analysis, no cargo or passenger requirement exists. Again, this position was expressed by the GAO and has resulted in House and Senate Armed Services Committee concerns. Compliance with the applicable guidance would then mandate no cargo or passenger capability in the new tanker.

The last option to discuss is to change the guidance to allow for senior decision makers to use experience and discretion when appropriate to make sound long-term acquisition decisions. To do so requires change starting at the DOD with the applicable 5000 series, cascading down to the applicable AF instructions. Making this change would afford senior leaders the capacity to make judgment values based on experience as well as the analysis. A regulatory guidance change still has to ensure accountability in the acquisition process. With regard to the tanker recapitalization, this sort of change could allow for senior military and civilian leaders to add a cargo and passenger capability the new aircraft. Adding the capability, as depicted in this paper could increase the quantity of aircraft then required to meet the air refueling requirement. While this author has little doubt changing the regulatory guidance could lead to added flexibility, adopting an option like this, while possible, will most likely lead to questions of integrity and accusations of possible impropriety as seen in the tanker acquisition effort thus far. The risk of changing the regulatory guidance to allow for senior leader subjectivity with regard to acquisition is ultimately a decision that has to be made by the DOD and senior AF leaders, within the context of the National Defense Strategy.

Defining the Requirement

It is critical to ensure the analysis used to determine warfighter requirements is comprehensive and complete. The GAO, in its review of the 2005 MCS, argued the study did not adequately stress the mobility system, some inadequate modeling was used, and in several areas, the MCS was incomplete, unclear or needed further study. Recall the MCS itself had more than 80 references calling for better modeling and 12 calling for data. Based on its analysis, the GAO implied there may have been a higher airlift requirement than the study indicated. A different requirement in airlift might affect the tanker requirement with regard to a cargo and/or passenger airlift gap or shortfall. It could also impact the refueling requirement itself. The only means by which to find out is to complete a thorough, comprehensive study.

It is important to note, these studies are conducted by the Secretary of Defense and US Transportation Command, but the AF, specifically Air Mobility Command, lends great assistance with regard to the data analysis and modeling of airlift and air refueling requirements. As identified by the MCS itself, there are gaps in modeling and data. No doubt there has been significant DOD and AF effort to overcome these issues, but it is time to garner some expert assistance to achieve a better product. It is time to incorporate assistance from an independent government funded research institution whose expertise is in modeling and analysis, to assist in this process such as RAND. Doing so will garner added research expertise with access to the most current and comprehensive analytical tools as well as a resume of previous documented success. The DOD and AF community doing this work has done so admirably but many of the personnel integral to the effort are doing work outside their primary field of expertise. By adding an independent research

institute to future study efforts, the DOD and the AF capitalize on the most recent analytical tools and resources available, as well as garnering objective oversight and assistance from experts in research and data analysis. Doing so will result in a more comprehensive, complete study.

Enhance Acquisition Oversight

An underlying issue throughout the tanker acquisition effort has been lack of sufficient acquisition oversight. Therefore, the tanker recapitalization effort clearly indicates a gap in qualified and competent acquisition professionals. This is not to say, the acquisition community is incompetent or unprofessional, rather the community is seriously under manned and unable to afford the time and research necessary to ensure fully compliant and coherent acquisitions. This author is not alone in this belief.

According to Secretary Gates, “the Pentagon’s acquisition workforce has been allowed to atrophy, exacerbating a decline in the critical skills necessary for effective oversight. For example, over the past ten years, the Department’s contractual obligations have nearly tripled while our acquisition workforce fell by more than 10 percent. The Department also has great difficulty hiring qualified senior acquisition officials.”³ With regard to the AF, there is a 43 percent vacancy rate in the acquisition community, and there remains an urgent need for technically trained personnel—cost estimators, systems engineers, and acquisition managers—to conduct continuous effective oversight.⁴ With a shortfall this large, in spite of a herculean effort by the AF acquisition community, it is very difficult if not impossible to maintain adequate project oversight. The community simply has more work than it is capable of adequately accomplishing. Dr. Ashton Carter, Defense

³ Ibid, 76.

⁴ Ibid, 76.

Undersecretary for Acquisition, Technology and Logistics reaffirmed this condition in his 11 March, 2010 testimony to the Senate Armed Services committee saying, “in the last 10 or 15 years, and this has been widely reported and documented, the acquisition cadre in both the civilian side and the uniformed side has been allowed to dwindle away.”⁵ This lack of adequate expertise undoubtedly had impact on the tanker recapitalization effort thus far but the lack of expertise does not excuse the concerns particularly regarding a lack of integrity in the process.

Rebuilding the acquisition community is critical to AF success in developing a cogent, comprehensive acquisition strategy. Undoubtedly, this transcends the tanker recapitalization effort and reaches across the entire AF acquisition enterprise. This rebuilding endeavor has to be a comprehensive end-to-end effort from initial recruiting of personnel with the aptitude necessary, to retaining them once trained. To do so may require bonuses to join the career field, incentive pay to retain trained competent personnel, timely recurring professional and technical development, and ensure adequate promotion opportunity just to mention a few. Without the ability to recruit and maintain these critical personnel, the AF will find it very difficult, if not impossible, to achieve better acquisition effectiveness.

Both the DOD and the AF have recognized this and taken significant steps forward to rectify this situation. According to Dr. Carter it, “will take years to rebuild the acquisition cadre in the department so that they have all the engineering skills, and systems engineering skills, and the contracting officers, and pricers, and all the things that it takes to replicate what you rightly suggest in the private sector would be a matter of

⁵ Senate Armed Services Subcommittee. *Senate Armed Services Committee Holds Hearing on President Obama’s Fiscal 2011 Budget Request for the F-35 Joint Strike Fighter*. Washington, DC, 11 March 2010.

course.” This stark and telling testimony summarizes the grave situation the acquisition community is currently experiencing and gives an indicator of time to remedy, that being “years.” Subsequently he was asked to clarify what he meant by *rebuild* to which he responded,

on the civilian side we reduced the numbers about a decade ago without adequate care to preserving key skills and quality. We are trying to rebuild. Something similar happened in the armed services. What is important there is that a major or a colonel who has acquisition expertise—that is something they think they are pretty good at, and, you know, have an aspiration to become a general officer can see [path] that they can go up in the acquisition community.⁶

Dr. Carter’s statement strikes to the heart of one of the reforms this author suggests to further enable the acquisition community. It is clear to this author that the DOD has recognized the situation and has begun the path to rebuilding and recovery. That said, it is critical to maintain the effort and constantly re-evaluate programs put in place to ensure these programs meet the desired end state for the Department’s acquisition community. The hiring or in sourcing of the 20,000⁷ people to the acquisition community in the DOD appears to be a good start on the path to recovery.

The AF has also recognized its own shortcomings in the acquisition community and has taken some important first steps toward resolving the situation. According to its 2010 posture statement, the AF “hired over 2,000 personnel into the acquisition workforce and continued contractor-to-civilian conversions. Additionally, the AF has implemented or institutionalized several other key initiatives to demonstrate its commitment to restoring public trust in its ability to acquire warfighter needs at a competitive price. It is critical to do timely re-evaluation of these initiatives to ensure

⁶ Ibid

⁷ Ibid

each will meet its stated objective. In the end, this program cannot be left to atrophy and spending millions now will save billions later.

Conclusion

Air Mobility Command has it right, “our nation needs a new aerial refueling tanker now...we simply cannot afford to delay procurement any longer.”⁸ Without it, US ability to conduct full spectrum operations globally is impossible. That said, the acquisition has to be done right. Acquisition expertise and oversight are critical to this and all AF acquisition efforts. Without adequate oversight and expertise, the rigor required to ensure regulatory compliance and use of best practices all of which are integral to fully realize a compliant tanker recapitalization effort may be less than sufficient to alleviate congressional concern. In addition to adequate oversight, there has to be a coherent, defensible acquisition strategy built upon comprehensive and complete analysis of warfighter needs. By adding independent, objective expert analysis, the DOD and the AF can build the best analytical product; therefore, best define the warfighter requirement. The analysis should then define the requirement within an acceptable level of risk.

Once the requirements necessary to meet the needs of the warfighter are defined, the AF can assess capabilities necessary to fulfill the warfighter requirements and subsequently, build an effective acquisition strategy designed to acquire those capabilities. Doing so will lead to an acquisition based on defined defensible *needs*, vice what the GAO called *wants* and, just as importantly, it will be compliant with the regulatory guidance.

As the AF heads into its fourth attempt to acquire a new tanker, it must ensure

1. adequate oversight;
2. that the analysis is comprehensive and complete;

⁸ Air Mobility Command, *The Imperative for a New Tanker Now*, 1.

3. that the requirement is defined;
4. that the process is transparent and guidance compliant and;
5. that the effort is conducted with the utmost integrity.

If the AF gets this wrong again it will strike a blow to that service from which it may never recover.

Appendix

A Brief History of the Jet Tanker

Prior to addressing the tanker acquisition process thus far, it is critical to know some history behind the previous two strategic tankers, specifically the KC-135 and the KC-10. The venerable KC-135 Stratotanker provides the core aerial refueling capability for the AF and has excelled in this role for more than 50 years. This highly capable weapons system provides aerial refueling support to AF, Navy and Marine Corps, allied nation aircraft and enhances the AF's capability to accomplish its primary missions of Global Reach and Global Power. The KC-135 is also capable of transporting litter and ambulatory patients using patient support pallets during aeromedical evacuations. The aircraft has a maximum takeoff gross weight of 322,500 pounds, a maximum offload capacity of 200,000 pounds and a maximum cargo capacity of 83,000 pounds of cargo plus 37 passengers. The aircraft's maximum range, unrefueled, is about 11,000 miles. There are currently 415 KC-135s in the inventory.⁹

The KC-10 Extender is AMC's advanced tanker and cargo aircraft and it was designed to provide increased global mobility for U.S. armed forces. Though the KC-10's primary mission is aerial refueling, it can combine the tasks of a tanker and cargo aircraft by refueling fighters and simultaneously carry the fighter support personnel and equipment on overseas deployments. The KC-10 is also capable of transporting litter and ambulatory patients using patient support pallets during aeromedical evacuations. The aircraft has a maximum takeoff gross weight of 590,000 pounds, a maximum fuel

⁹ Department of the Air Force. *KC-135 Fact Sheet* current as of October 2009. <http://www.af.mil/information/factsheets/factsheet.asp?fsID=110> [accessed 12 September, 2009].

capacity of 356,000 pounds of which virtually all is available for offload, and a cargo capacity of 170,000 pounds to include up to 75 passengers. The KC-10 has a maximum unrefueled range of 11,500 miles without cargo and 4,400 miles with a full cargo load. Additionally the KC-10 is capable of being refueled by either other KC-10s or the KC-135.¹⁰

A Brief History of the Jet Tanker

The KC-135 owes its beginning to Strategic Air Command and the B-52 nuclear mission. The B-52 performance was such that the propeller driven KC-97 was no longer able to perform suitably to achieve mission accomplishment. It was obvious to AF leaders that the service needed a jet tanker. Boeing anticipated the AF jet-tanker requirement and developed an in house prototype before the AF made known its intention to acquire a jet tanker.¹¹ Because Boeing was ready, virtually immediately, to begin production it sealed the KC-135 deal. Boeing won the contract and eventually built 930 aircraft. The KC-135 Stratotanker was specifically built to meet the demands of supporting Strategic Air Command bombers in the event of nuclear war.¹² National war plans went through tremendous changes in the years following World War II. As new technologies matured and the geopolitical environment shifted, their impacts were accounted for, culminating in the “Single Integrated Operations Plan (SIOP) 62.”¹³ Effective 1 April 1961, under President Kennedy, the SIOP took great pains to match tankers with specific bomber missions in case of a nuclear exchange. These mated

¹⁰ Department of the Air Force. *KC-10 Fact Sheet* current as of September 2008. <http://www.af.mil/information/factsheets/factsheet.asp?fsID=109> [accessed 12 September, 2009].

¹¹ John E. Steiner. “Jet Aviation Development: A Company Perspective,” in *The Jet Age: Forty Years of Jet Aviation*, ed. Walter J. Boyne and Donald S. Lopez. [Washington, DC: Smithsonian Institution Press. 1979], 153.

¹² *KC-135 Fact Sheet* current as of October 2009.

¹³ Douglas Lawson. “Historical Summary of US War Plans,” *NationalWarPlansAndPolicies.xls*, CD-ROM, 15 January 2001. The SIOP is updated annually and remains a vital pillar of US national defense.

tankers sat alert alongside the bomber force, which had the unintended consequence of allowing the aircraft to weather the years remarkably well.¹⁴

Not all tankers sat near constant alert however. During the decade-long Vietnam conflict, KC-135s were employed in several ways. Much as the KB-29s had done in the Korea conflict, the KC-135 ferried fighter aircraft to the Vietnam Theater as well as supported them on combat missions from within the theater. Additionally, B-52s were used on Arc Light missions, which involved conventional bombing of suspected enemy strongholds.¹⁵ Arc Light missions, too, were refueled by KC-135s. In addition, Tactical Air Command modified seven KC-135s to act as airborne radio relay platforms. These KC-135 Combat Lightning aircraft were still available to meet emergency air refueling needs; however, their role was primarily to extend the radio range of the AF Tactical Air Control System.¹⁶ Although the KC-135 was originally intended to support refueling needs of the SIOP, some were extensively modified for other purposes and many others were employed in a major conventional conflict. Doctrinally, the Vietnam experience signaled a shift toward substantial support for tactical operations.¹⁷

October 1973 marked another major event in air refueling development. Egypt and Syria attacked Israel on 6 October that year, which happened to be the Jewish holiday Yom Kippur. Although caught off guard, Israel turned the tide by 10 October, prompting a Soviet airlift to both Cairo and Damascus. Again compelled by Cold War concerns, the

¹⁴ Thomas L. Gipson. *The Death of "Superman": The Case Against Specialized Tanker Aircraft in the USAF*. [Maxwell Air Force Base, AL. Air University Press. June 2002], 18.

¹⁵ George R. Fessler Jr. *Aerial Refueling in Southeast Asia, 1964 – 1970 Project Contemporary Historical Examination of Current Operations (CHECO) Report*. [Hickam Air Force Base, HI. Headquarters Pacific Air Force. 17 June 1971], 22.

¹⁶ Robert S. Hopkins III. *Boeing KC-135 Stratotanker: More Than Just a Tanker*. [Leicester, England: Midland Publishing Limited. 1997], 25.

¹⁷ Gipson, *The Death of "Superman,"* 19.

United States responded with an airlift operation of its own, Operation NICKEL GRASS. This airlift effort, flown predominately by the C-5 Galaxy, required multiple tankers for each mission flown to support the operation.¹⁸ The operation led the AF to seek a larger tanker better able to support the needs of large mobility aircraft.¹⁹

The Yom Kippur War may have highlighted the need for a larger, more capable tanker, but the need for an advanced tanker had actually been identified much earlier.²⁰ According to Lieutenant General William J. Evans, the requirement had been identified as early as 1967, but it had not been sufficiently high on the AF funding priorities relative to other programs. During the Evans testimony in 1974, Representative John J. Flynt clarified the intent of the Advanced Tanker/Cargo Aircraft acquisition with his statement that the “objectives of this program are (1) to enhance the Air Force’s strategic airlift capability by augmenting the current cargo/transport force, and (2) to assure adequate aerial refueling support for the AF airlift, Strategic and General Purpose Forces’ mission by eliminating the inherent deficiencies in the current tanker force.”²¹ As a result, the acquisition of the KC-10, a dual role airlift/tanker, was about to take shape. In 1981, the AF began to add 60 McDonnell-Douglas KC-10 Extender aircraft to the inventory. With a fuel capacity about double the KC-135 and ability to alternate between drogue and boom refueling on a single sortie, the KC-10 was destined to become a tanker of choice for many in the air refueling business. The AF saw definite advantages in purchasing an aircraft based on a commercial wide-body design rather than one specifically built to

¹⁸ Walter J Boyne. “NICKLE GRASS,” *Air Force Association* 81, no. 12 [December, 1998]. <http://www.afa.org/magazine/Dec1998/1298nickel.html>. [accessed September 9, 2009].

¹⁹ Ibid.

²⁰ Lieutenant General William J. Evans. *Testimony before the House of Representatives Committee on Appropriations, 29 April 1974. Department of Defense Appropriations for 1975*. [Washington DC, 1974], 884.

²¹ Ibid, 883.

military specifications. Primarily, the airplanes would be available quickly. It would have the higher payload required to support large mobility receivers. Moreover, a commercial derivative avoided developmental costs and exploited the worldwide logistics support system already in place. Finally, the KC-10 also has the airlift capacity to carry the necessary cargo required for fighter deployments.²²

The tanker acquisitions of the past supported specific capability gaps in the National Security Strategy as did the KC-135 with its role to refuel the nuclear bomber or the KC-10, designed for larger offload capability and a dual role function. The new tanker may or may not need to fill the same capability. To determine the capability necessary, it is imperative that the AF, with the input of the joint warfighter, define the air refueling requirements based on a capabilities based approach, and then design an acquisition strategy to succeed in its effort to recapitalize the KC-135. Doing anything less will most likely end in failure for the fourth attempt at this endeavor. It is the thesis of this author that it is paramount the AF learns from the failings of the past three attempts and designs the next effort in accordance with the governing directives.

²² Department of Defense. *Carter Presidential Transition Briefing. Tanker Requirements and the Advanced Tanker/Cargo Aircraft*. [Washington, DC, 1976], 7.

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