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Air Force KC-46A Pegasus Tanker Aircraft Program

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Summary

On February 24, 2011, the Department of Defense (DOD) announced the Boeing Company as the winner of a competition to build 179 new KC-46A aerial refueling tankers for the Air Force, a contract valued at roughly $35 billion. Prior to the announcement, the program had been known as KC-X. The first four KC-46s were delivered in January 2019.

The KC-46A acquisition program is a subject of congressional interest because of the dollar value of the contract, the number of jobs it would create, the importance of tanker aircraft to U.S. military operations, and because previous attempts to acquire a new tanker since 2001 had ultimately failed. It has also attracted attention due to cost growth, schedule delays, and other issues with program execution.

DOD's KC-46A acquisition strategy poses potential oversight issues for Congress, including

- What alternatives does the Air Force have to extend KC-135 service life or cope in other ways with the KC-46 delays?
- What are the effects of budget cuts on executability of the KC-46A program?
- Do contracts that place cost risk on contractors create positive incentives for performance?

FY2019 defense authorization bill: The report accompanying H.R. 5515 (H.Rept. 115-874) recommended $2.352 billion for the KC-46A program, $208.4 million less than the Administration's request. The bill also restricted expenditure of funds pending certification that the KC-46's type certifications had been received and the first aircraft delivered.

FY2019 defense appropriations bill: The Joint Explanatory Statement of the Committee of Conference on H.R. 6157 approved $2.291 billion for the KC-46A program, a decrease of $269 million from the Administration's request.

The FY2020 defense authorization and appropriations bills were in progress as of the date of this report.

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Introduction

Figure 1. KC-46A Pegasus

Source: U.S. Air Force photo by Master Sgt Michael Jackson.

Note: Shown with F-15E Strike Eagle above Edwards AFB, CA.

On February 24, 2011, the Department of Defense (DOD) announced the Boeing Company as the winner of a competition to build 179 new KC-46A aerial refueling tankers for the Air Force, a contract valued at roughly $35 billion.

These KC-46As, to be procured at a maximum rate of 15 aircraft per year, are to replace roughly one-third of the Air Force's aging fleet of KC-135 aerial refueling tankers. The Air Force and the U.S. Transportation Command state that replacing the KC-135s is their highest recapitalization priority.

The Administration's proposed FY2019 defense budget requested $2.56 billion in Air Force procurement funding to continue KC-46A acquisition and $83.2 million in Air Force research and development funding to continue development.

The KC-46A acquisition program is a subject of interest because of the dollar value of the contract, the number of jobs it may create, the importance of tanker aircraft to U.S. military operations, and because previous attempts by DOD to move ahead with a KC-X acquisition program over the last several years have led to controversy and ultimately failed. The history of those earlier attempts forms an important part of the context for DOD's KC-X competition, particularly in defining the required capabilities for the KC-46A and designing and conducting a fair and transparent competition. Further, the Air Force has recently changed its acquisition objective for the KC-46 program and its plan for the future composition of the tanker fleet.

Ongoing issues for Congress include whether to approve, reject, or modify the Air Force's request for KC-46A program funding, the revised tanker acquisition plan, and the effects of KC-46 program issues on the Air Force's ability to meet its mobility requirements. Congress's decision on these issues could affect DOD capabilities and funding requirements, Air Force force structure, and the aircraft manufacturing industrial base.

Recent Developments

Initial Deliveries

The first four KC-46 aircraft were delivered to McConnell AFB, KS, in January 2019.[1] As of October 8, 2019, 21 KC-46As had been delivered to the Air Force.[2] The formal initial operational test and evaluation process began on June 4, 2019.[3]

Ongoing Technical Issues

Load Floor

In September 2019, the Air Force discovered a problem in the system designed to restrain cargo in the KC-46 that could allow cargo to shift in flight, a condition that has led to aircraft losses in the past. The Air Force subsequently restricted the KC-46 from carrying passengers and cargo, a restriction that continues today.[4]

Foreign Debris Contamination

The Defense Contract Management Agency and the Air Force halted acceptance of KC-46s in March 2019, and again in April, 2019, following the discovery of debris in fuel tanks and other parts of the aircraft believed to remain from the manufacturing process.[5] Following an agreement on revised inspection procedures, deliveries resumed.[6]

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[1] U.S. Congress, Senate Committee on Armed Services, Subcommittee on Airland, *Air Force, Force Structure and Modernization Programs*, 116th Cong., 2nd sess., April 9, 2019, prepared testimony of Air Force witnesses.

[2] Boeing Company, "Boeing Reports Third-Quarter Deliveries," press release, October 9, 2019, https://boeing.mediaroom.com/2019-10-08-Boeing-Reports-Third-Quarter-Deliveries.

[3] U.S. Air Force, "First KC-46 IOT&E flight successful," press release, June 4, 2019, https://www.amc.af.mil/News/Article-Display/Article/1875479/first-kc-46-iote-flight-successful/.

[4] Valerie Insinna, "US Air Force restricts KC-46 from carrying cargo and passengers," *Defense News*, September 11, 2019, https://www.defensenews.com/breaking-news/2019/09/11/air-force-restricts-kc-46-from-carrying-cargo-and-personnel/.

[5] Colin Clark, "DCMA Orders Safety Halt To KC-46 Deliveries; Roper Promises Close Scrutiny," *Breaking Defense*, February 28, 2019, https://breakingdefense.com/2019/02/dcma-orders-safety-halt-to-kc-46-deliveries-roper-promises-close-scrutiny/. Stephen Losey, "Air Force again halts KC-46 deliveries after more debris found," *Defense News*, April 2, 2019, https://www.airforcetimes.com/news/your-air-force/2019/04/02/air-force-again-halts-kc-46-deliveries-after-more-debris-found/. Vivienne Machi, "Air Force Once Again Halts KC-46 Deliveries Due to Debris on Boeing Flight Line," *Defense Daily*, April 2, 2019, https://www.defensedaily.com/air-force-halts-kc-46-deliveries-due-debris-boeing-flight-line/air-force/.

[6] Valerie Insinna, "Air Force improves new inspection plan for KC-46s, paving the way for deliveries to restart," *Defense News*, April 9, 2019, https://www.defensenews.com/air/2019/04/09/air-force-improves-new-inspection-plan-for-kc-46s-paving-the-way-for-deliveries-to-restart/.

Refueling Boom and Remote Vision System

In previous tanker aircraft, the refueling boom operator was stationed at the rear of the plane, looking directly at the receiving aircraft. The KC-46A places the boom operator on the flight deck, viewing receivers through a camera-driven display called the Remote Vision System (RVS). Currently, "RVS presents imagery that is distorted in certain lighting conditions, posing difficulties for boom operators and leading to incidents of accidental scraping of the surface of receiver aircraft with the boom."[7] Boeing has presented a set of modifications to address the RVS issues, and the Air Force expects to begin testing the revised system before the end of 2019.[8]

Separately, the Air Force agreed to pay $55.5 million to redesign the refueling boom after the Air Force-provided specifications were found to be unsuitable for some receiver aircraft.[9]

Necessary modifications to the KC-46 fleet will take some time. According to Air Force acquisition chief Dr. William B. Roper, Jr. and Deputy Chief of Staff for Strategy, Integration and Requirements Lt. Gen. Timothy G. Fay,

> we have worked hard to accept the KC-46 while ensuring its major deficiencies—the Remote Visual System (RVS) and boom—are properly addressed without undue burden on taxpayers or warfighters. We initiated a subject matter expert team that derived critical performance parameters for both the RVS and boom and codified these parameters in a legally-binding agreement with the vendor. Due to the extensive nature of the fixes, especially the RVS, both actions will take 3-4 years to implement and retrofit fully across our fleet.[10]

Financial Consequences

Because the KC-46A is being acquired under a fixed-price contract, Boeing is responsible for expenses beyond the initial $4.9 billion award for development. As of August 2019, the company has paid more than $3.5 billion to fund corrections to ongoing technical issues.[11] "When it won the KC-46 contract in 2011, Boeing acknowledged underbidding what it thought the program would cost, saying it expected a long-term support and foreign sales market would more than make up for its initial losses on the program."[12]

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[7] Valerie Insinna, "AMC commander: Boeing has not made progress on KC-46," *Defense News*, September 18, 2019, https://www.defensenews.com/digital-show-dailies/air-force-association/2019/09/18/amc-commander-boeing-has-not-made-progress-on-kc-46/.

[8] Courtney Albon, "Air Force to review Boeing's new KC-46 RVS design in November," *Inside Defense*, October 9, 2019, https://insidedefense.com/daily-news/air-force-review-boeings-new-kc-46-rvs-design-november.

[9] Steve Trimble, "KC-46 Boom Actuator Redesign Cost Set At $55.5 Million," *Aerospace Daily and Defense Report*, August 5, 2019, https://aviationweek.com/defense/kc-46-boom-actuator-redesign-cost-set-555-million.

[10] U.S. Congress, House Committee on Armed Services, Subcommittee on Seapower and Projection Forces, *Air Force, Force Structure and Modernization*, 116th Cong., 2nd sess., March 14, 2019, statement of Air Force witnesses.

[11] "Boeing's tanker program records $2.31 billion in losses over 3 years," *Reuters*, February 8, 2019, https://www.reuters.com/article/us-boeing-tanker/boeings-tanker-program-records-2-31-billion-in-losses-over-3-years-idUSKCN1PX29B. Steve Trimble, "KC-46 Boom Actuator Redesign Cost Set At $55.5 Million," *Aerospace Daily and Defense Report*, August 5, 2019, https://aviationweek.com/defense/kc-46-boom-actuator-redesign-cost-set-555-million.

[12] John A. Tirpak, "Boeing's International KC-46 Sales Pitch: Let USAF Pay For R&D," *Air Force magazine*, March 21, 2019, http://airforcemag.com/Features/Pages/2019/May%202019/Boeings-International-KC-46-Sales-Pitch-Let-USAF-Pay-For-RD.aspx.

Background

Air Force Refueling Tankers

Roles and Missions

Aerial refueling aircraft—commonly called tankers—provide in-flight refueling services to bombers, fighters, airlifters, surveillance aircraft, and other types of aircraft flown by the U.S. military. Tankers enable other aircraft to deploy quickly to distant theaters of operation, and to remain in the air longer while operating in those theaters. Aerial refueling capability is a critical component of the U.S. military's ability to project power overseas and to operate military aircraft in theater with maximum effectiveness.

The Air Force operates the U.S. long-range tanker fleet, the subject of this report. The Navy and Marine Corps also operate shorter-range tankers in support of tactical missions.

Current Tanker Fleet

KC-135 Stratotanker

The Air Force's current fleet of large tankers consists of 396 KC-135 Stratotankers.[13] The first KC-135 entered the Air Force inventory in 1956, and the final one was delivered in 1964. Current KC-135s average 57 years of age.[14] The aircraft have received various upgrades and modifications over the years, including new engines.[15] DOD states that if new tankers are procured at a rate of 15 per year, the last KC-135R would be more than 80 years old at retirement. (For a discussion of the potential longevity of the KC-135 fleet, see **Appendix A.**)

A Government Accountability Office study reported that

> The cost of maintaining those KC-135 aircraft is estimated to be about $10.3 million per year per aircraft. Additionally, about $12 million per aircraft may also be needed, according

[13] U.S. Congress, House Committee on Armed Services, Subcommittee on Seapower and Projection Forces, *Air Force, Force Structure and Modernization*, 116th Cong., 2nd sess., March 14, 2019, statement of Air Force witnesses.

[14] U.S. Congress, Senate Committee on Armed Services, Subcommittee on Airland, *Air Force, Force Structure and Modernization Programs*, 116th Cong., 2nd sess., April 9, 2019, prepared testimony of Air Force witnesses.

[15] Air Force Fact sheet on the KC-135, available online at https://go.usa.gov/xVJur. The fact sheet was accessed by CRS on October 16, 2019, at which time it carried a date of May 14, 2018. The fact sheet states that:

> Of the original KC-135As, more than 417 were modified with new CFM-56 engines produced by CFM-International. The re-engined tanker, designated either the KC-135R or KC-135T, can offload 50 percent more fuel, is 25 percent more fuel efficient, costs 25 percent less to operate and is 96 percent quieter than the KC-135A.
>
> Under another modification program, a re-engined tanker with the TF-33-PW-102 engine was designated the KC-135E. In 2009, the last KC-135E retired from the inventory.
>
> Through the years, the KC-135 has been altered to do other jobs ranging from flying command post missions to reconnaissance. RC-135s are used for special reconnaissance and Air Force Materiel Command's NKC-135A's are flown in test programs. Air Combat Command operates the OC-135 as an observation platform in compliance with the Open Skies Treaty.
>
> The KC-135R and KC-135T aircraft continue to undergo life-cycle upgrades to expand their capabilities and improve reliability. Among these are improved communications, navigation, autopilot and surveillance equipment to meet future civil air traffic control needs.

> to [Air Mobility] Command officials, for depot maintenance activities that are scheduled every 5 years. Command officials stated that the number of depot events that are needed will depend on how quickly Boeing can deliver expected KC-46 aircraft.[16]

Figure 2. KC-135 Stratotanker

Source: U.S. Air Force photo by Senior Airman Mark Hybers.

KC-10 Extender

The Air Force's fleet of large tankers also includes 59 KC-10 Extender aerial refueling aircraft, the first of which entered service in 1981.[17] The KC-10 is a much larger aircraft than the KC-135 or the KC-46A, and is capable of offloading substantially more fuel.[18]

[16] U.S. Government Accountability Office, *KC-46 TANKER MODERNIZATION[:] Program Cost Is Stable, but Schedule May Be Further Delayed*, GAO-18-353, April 2018, p. 13, https://www.gao.gov/assets/700/691327.pdf.

[17] Air Force fact sheet on the KC-10, available online at https://go.usa.gov/xVJzt. The fact sheet was accessed by CRS on October 16, 2019, at which time it carried a date of October 1, 2003. The fact sheet states that the KC-10 can transport up to 75 people and nearly 170,000 pounds (76,560 kilograms) of cargo a distance of about 4,400 miles (7,040 kilometers) unrefueled.

[18] Stewart Welch and David Leroy, "The Case for a Three-Tanker Air Force," *War on the Rocks*, October 11, 2019, https://warontherocks.com/2019/10/the-case-for-a-three-tanker-air-force/.

Figure 3. KC-10 Extender

Source: U.S. Air Force photo.

In addition to KC-135s and KC-10s, the Air Force, Marine Corps, and Navy operate additional smaller refueling aircraft. The Air Force uses modified C-130s to refuel Air Force special operations and combat search and rescue helicopters. The Marine Corps uses modified C-130s to refuel Marine helicopters and fighters. Some Navy aircraft have been configured to give them a secondary capability to refuel other Navy or Marine Corps aircraft in flight. The Navy also provides some aerial refueling through a private fee-for-service vendor.

KC-46A Program Basics

Numbers of Aircraft

DOD originally envisaged replacing the KC-135 fleet in three stages. The 179 new KC-46As procured through the KC-X competition would replace roughly one-third of the KC-135 fleet. A further 179 tankers would be procured in a second competition called KC-Y (envisioned as a KC-46A continuation or follow-on.) A third program, KC-Z, was to be a probable replacement for the KC-10 fleet.

Subsequently, DOD dropped plans for the KC-Z, envisioning it instead as a third tranche of KC-46s.[19]

[19] CRS In Focus IF10999, *Defense's 30-Year Aircraft Plan Reveals New Details*.

Acquisition Cost

A May 2019 GAO report states that the procurement cost of 179 KC-46As could be about $31.5 billion,[20] or an average of about $226 million per aircraft.

Contract Structure

The KC-46A is being acquired using a fixed-price incentive development contract with firm-fixed and not-to-exceed pricing or production. This contract structure effectively limits the total cost borne by taxpayers, with most of the cost growth risk placed on the contractor. The target value is $4.4 billion, with government liability limited for costs over $4.9 billion.

> Boeing sources confirmed that arrangement on Wednesday, saying if the costs fall in the $3.9 billion to $4.9 billion "delta," the Air Force would pay 60 percent and Boeing 40 percent. That is the contract structure and cost arrangement accepted by the Air Force, the Boeing sources said, noting the service weighed this against cost projections for the same scenario offered by Airbus's EADS.[21]
>
> The tanker's estimated development costs are currently around $900 million higher than the February 2011 contract award value, but the USAF is liable for only about $500 million of this total. The remaining $400 million is Boeing's responsibility.[22]

Program Schedule

In 2011 testimony before the House Armed Services Committee Subcommittee on Seapower and Projection Forces, the then-Air Force acquisition executive stated:

> VAN BUREN: Well, the contract that we currently have runs through 2016 for EMD. We'll have a preliminary design review in 2012, critical design review in '13, build the aircraft, first flight of the 767-2C in 2014. And ...
>
> AKIN: So the first flight's 2014. OK. And then?
>
> VAN BUREN: Roughly three years from contract award. And then we'll have the full-up KC-46 first flight at the end of 2014.[23]

The first flight was accomplished on September 25, 2015.[24]

Under the EMD contract, Boeing was to deliver the first 18 KC-46As by August 2017.[25] A series of complications resulted in first delivery occurring in January 2019. Delivery of the 179 initial KC-46As is expected by 2028.[26]

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[20] U.S. Government Accountability Office, *WEAPON SYSTEMS ANNUAL ASSESSMENT[:] Limited Use of Knowledge-Based Practices Continues to Undercut DOD's Investments*, 19-336SP, May 2019, p. 155, https://www.gao.gov/assets/700/698933.pdf.

[21] John T. Bennett, "Boeing official says nothing's changed in Air Force tanker plans," *The Hill*, July 20, 2011.

[22] Dave Majumdar, "IN FOCUS: Boeing must deliver on KC-46, USAF says," *FlightGlobal.com*, April 23, 2012.

[23] Testimony of David Van Buren, Air Force Service Acquisition Executive, before the U.S. Congress, House Committee on Armed Services, Subcommittee on Seapower and Projection Forces, *Aerial Refueling Aircraft Programs*, 112th Cong., 2nd sess., October 13, 2011.

[24] U.S. Air Force, "KC-46A tanker completes successful first flight," press release, September 25, 2015, https://www.af.mil/News/Article-Display/Article/620629/kc-46a-tanker-completes-successful-first-flight/.

[25] U.S. Government Accountability Office, *KC-46 TANKER MODERNIZATION[:] Program Cost Is Stable, but Schedule May Be Further Delayed*, GAO-18-353, April 2018, https://www.gao.gov/assets/700/691327.pdf.

[26] U.S. Congress, House Committee on Armed Services, Subcommittee on Seapower and Projection Forces, *Air Force, Force Structure and Modernization*, 116th Cong., 2nd sess., March 14, 2019, statement of Air Force witnesses.

The Air Force is purchasing KC-46 in annual low-rate initial production (LRIP) lots.

Table 1. KC-46 LRIP Lots

(values include spares and support equipment)

Lot #	Awarded	# of aircraft	Value ($B)
1	August 18, 2016	7	2.5 (1 & 2)
2	August 18, 2016	12	
3	January 27, 2017	15	2.1
4	September 10, 2018	18	2.9
5	September 27, 2019	15	2.6
Total		67	10.1

Source: Compiled from various contract award announcements.

Basing

In January 2013, the Air Force announced the list of candidate bases to host the first tranche of KC-46As. Three bases were to be selected from the list: one to host training, and one base each from the active Air Force and Air National Guard to host operational KC-46s. "Ultimately, the Air Force will establish 10 main operating bases for the 179 tankers that it plans to buy."[27]

Altus AFB, OK, and McConnell AFB, KS, were candidate bases for the KC-46A training unit. Altus and McConnell were also candidates to be the first active-duty led KC-46A main operating base, as were Fairchild Air Force Base, WA, and Grand Forks Air Force Base, ND.

Forbes Air Guard Station, KS; Joint-Base McGuire-Dix-Lakehurst, NJ; Pease Air Guard Station, NH; Pittsburgh International Airport Air Guard Station, PA; and Rickenbacker Air Guard Station, OH, were candidates to be the first Air National Guard led KC-46A main operating base.[28]

In May 2013, the Air Force selected Altus as the main training base, McConnell as the initial operating base, and Pease and Forbes as the first National Guard operating bases.[29]

Foreign Interest in Acquiring KC-46As

Japan has ordered two KC-46As and budgeted for two more; sale of the first two was approved by the United States in September 2016.[30] The United Arab Emirates have reportedly issued a letter of request for three KC-46As.[31]

[27] Jeff Schogol, "Nine bases on final list to host KC-46 tanker," *AirForceTimes.com*, January 13, 2013.

[28] Department of Defense, "Air Force Announces KC-46A Candidate Bases," press release, January 9, 2013, http://www.defense.gov/releases/release.aspx?releaseid=15771.

[29] Air Mobility Command, "McConnell selected as KC-46A MOB," press release, May 23, 2013, https://www.amc.af.mil/News/Article-Display/Article/144263/mcconnell-selected-as-kc-46a-mob/.

[30] Mike Yeo, "Here's what Japan's Defense Ministry wants to do with $50.5 billion," *Defense News*, September 4, 2019, pp. https://www.defensenews.com/global/asia-pacific/2019/08/30/heres-what-japans-defense-ministry-wants-to-do-with-505-billion/. Valerie Insinna, "State Department Clears $1.9B Sale of KC-46A Tankers to Japan," *Defense News*, September 22, 2016, https://www.defensenews.com/air/2016/09/22/state-department-clears-1-9b-sale-of-kc-46a-tankers-to-japan/.

[31] Mike Yeo, "UAE issues formal request to buy KC-46A tanker, says Boeing," *Defense News*, May 31, 2019,

In September 2012, the government of Singapore submitted a request for information to begin evaluating the KC-46A as a possible replacement for Singapore's KC-135 tankers, but ultimately chose the Airbus A330 MRTT.[32] After evaluating the KC-46, South Korea also chose the A330.[33]

Statements on KC-X Priority

DOD stated that "with the average age of the [KC-135] inventory over 45 years old, a new Tanker has become an operational necessity as well as a financially prudent decision to meet refueling requirements."[34]

The Air Force testified in May 2013 that:

> Replacing one-third of the 50 year-old KC-135 aerial refueling tanker fleet with the KC-46A is our top Air Force acquisition priority. The KC-46A program will ensure that our Nation retains a tanker fleet able to provide crucial air refueling capacity worldwide for decades to come. In FY14, we programmed $1.6 billion dollars for the manufacture of four developmental aircraft. The initial flights of the KC46A test aircraft are scheduled to begin in FY14. The program is currently executing as planned, and we are on track to receive 18 operational aircraft by late FY17. Until the KC-46A reaches full operational capability, we are resourcing critical modernization of the KC-10 and KC-135 tanker fleets. [35]

Industrial Base

Asserted Employment Effects

Boeing's initial plan for the KC-46A called for 767s to be assembled at the Boeing plant in Everett, WA, and be converted into tankers at Boeing's plant in Wichita, KS. Boeing claimed that "nationwide, the NewGen Tanker program will support approximately 50,000 total U.S. jobs with Boeing and more than 800 suppliers in more than 40 states."[36] Subsequently, Boeing decided to close the Wichita facility and instead complete the tankers in Everett, WA.

With regard to the change, Major General Christopher Bogdan, then the KC-46A program manager, said:

> Without a doubt, closing Wichita is a change to the plan, and any change on a program like this is going to introduce some uncertainty and some risk... And so, quite frankly, we are going to hold them accountable to make sure that the risks don't manifest themselves. To

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https://www.defensenews.com/global/mideast-africa/2019/05/31/uae-issues-formal-request-to-buy-kc-46a-tanker-says-boeing/.

[32] Michael Hoffman, "Fixed-price tanker contract at risk," *DoDBuzz.com*, September 18, 2012. See also Andrea Shalal-Esa, "Air Force Says Vigilant On Boeing Tanker Program," *Reuters.com*, September 18, 2012, and Colin Clark, "Boeing Plows Through KC-46 Reserve Funding; Sequestration Would Be 'Near Catastrophic'," *AOL Defense*, September 18, 2012. Greg Waldron, "Singapore joins ranks of A330 MRTT operators," FlightGlobal, August 15, 2018, https://www.flightglobal.com/news/articles/singapore-joins-ranks-of-a330-mrtt-operators-451153/.

[33] Jeyup S. Kwaak and Robert Wall, "Airbus Beats Boeing in Contract for South Korean Refuel Tankers," *The Wall Street Journal*, June 30, 2015, https://www.wsj.com/articles/airbus-beats-boeing-in-contract-for-south-korean-refuel-tankers-1435656751.

[34] Department of Defense, *Fiscal Year 2010 Budget Request, Summary Justification*, May 2009, p. 1-50.

[35] Statement of Michael B. Donley, Secretary of the Air Force, and General Mark A. Welsh IIII, Chief of Staff, United States Air Force, Before the Senate Armed Services Committee [Hearing] May 7, 2013, pp 11-12.

[36] Boeing, "Boeing Statement on EADS' Decision to Enter KC-X Tanker Competition," press release, April 20, 2010, http://www.unitedstatestanker.com/media/Statement-20100420.

> do that I've got to make sure they have plans in place and we are involved in the oversight of that move … under the same cost structure, under the same schedule with the same requirements.[37]

Acquisition Strategy and Draft RFP

Several attempts were made to start a KC-135 replacement program.[38]

The FY2002 DOD Appropriations Act (P.L. 107-117), the FY2002 supplemental (P.L. 107-206), the FY2003 DOD Appropriations Act (P.L. 107-248), and the FY2003 DOD Authorization Act (P.L. 107-314) included statutory authority for the Air Force to lease 100 Boeing 767 tankers.[39] This legislation did not include a competition among candidate aircraft, and both that notion and the concept of leasing military aircraft proved controversial. Following disclosure of improper negotiations between Boeing and an Air Force procurement official involved in the lease, the lease authorization was repealed in Section 133 of the FY2005 Defense Authorization Act (P.L. 108-375.)

In January 2007, the Air Force published a request for proposals to acquire a "KC-X Refueling Tanker Aircraft."[40] KC-X was a competition between Boeing and a team of Northrop Grumman and EADS that resulted in DOD awarding a contract to Northrop/EADS in February 2008. Boeing protested that award, and in June 2008, the Government Accountability Office (GAO) sustained Boeing's protest, agreeing with Boeing that the competition was conducted in a flawed manner.[41] GAO's ruling prompted DOD to cancel the 2008 KC-X competition and temporarily take control of the KC-X acquisition away from the Air Force. The Bush Administration decided to defer the next attempt at a KC-X acquisition program to the Obama Administration.

The competition strategy for that next attempt was announced at a September 24, 2009, DOD news briefing. According to DOD, key features of the competition strategy included the following:

- The proposed KC-X competition strategy, known more formally as the Source Selection Strategy, was devised jointly by the Office of the Secretary of Defense (OSD) and the Air Force and was approved by the Secretary of Defense.
- The Air Force will be the Source Selection Authority (SSA) for the competition, as announced by the Secretary of Defense on September 16, 2009.
- DOD intends to select a sole winner for the KC-X competition; DOD does not intend to split the KC-X program between the two bidders.
- The competition will be evaluated on a best-value (rather than lowest-cost) basis that will take both price and non-price factors into account. The evaluation will include mandatory and non-mandatory/trade space capabilities, acquisition price, warfighting effectiveness, and day-to-day efficiency.

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[37] Amy Butler, "USAF Tanker Chief Sees Wichita Move Complicating Program," *Aerospace Daily*, April 3, 2012.

[38] A fuller discussion of the attempts to acquire a KC-135 replacement can be found in Shane Harris, "Own the Sky," *Washingtonian*, November 1, 2010, https://www.washingtonian.com/2010/11/01/own-the-sky/.

[39] CRS Report RL32056, *The Air Force KC-767 Lease Proposal*, by Christopher Bolkcom (nondistributable but available to congressional clients from the author).

[40] AF News, *Air Force posts KC-X request for proposals*, U.S. Air Force, January 31, 2007, https://go.usa.gov/xVJFQ. Solicitation Number FA8625-07-R-6470, https://go.usa.gov/xVJFv.

[41] For more on GAO bid protests generally, see CRS Report R45080, *Government Contract Bid Protests: Analysis of Legal Processes and Recent Developments*, by David H. Carpenter.

- The competition will differ in many details from the 2007-2008 competition and does not constitute a re-run of the 2007-2008 competition. DOD states that, among other things, the selection criteria to be used in the new competition are more precise and less subjective than those used in the 2007-2008 competition.
- The contracts to be awarded are to be fixed-price type contracts. The winning bidder will receive a fixed-price incentive fee contract with a ceiling for the Engineering and Manufacturing Development (EMD) phase of the program, which includes the first four aircraft. A firm fixed-price (FFP) contract will be used for the next 64 aircraft (production lots 1 through 5). A not-to-exceed contract will be used for the final 111 aircraft (lots 6 through 13). An FFP contract will be used for five years of initial contractor support.
- Following the release of the final RFP, bidders will have about 75 days to prepare and submit their bid. The government will evaluate the bids for about 120 days, and prepare a contract award over a subsequent period of about 30 days. DOD anticipates awarding the contract in the summer of 2010 (since revised to January 2011).
- The first KC-X is projected to be delivered in 2015, and Initial Operating Capability (IOC) for the KC-X is scheduled for 2017. Delivery of all 179 KC-Xs will occur over a period of more than 15 years. As KC-Xs are integrated into the fleet, the Air Force intends to begin evaluating its future tanker needs and begin work on the KC-Y program.

Response to the Draft RFP

On December 1, 2009, Wes Bush, the president and chief executive officer of Northrop Grumman, sent a letter to Under Secretary Carter stating that unless the draft RFP were substantially revised, Northrop Grumman would decline to bid in the KC-X competition. A press report that day stated:

> Northrop Grumman Corp., the third- largest U.S. defense company, said it won't bid for the $35 billion Air Force refueling tanker program unless the draft request for proposals is changed, citing "financial burdens."
>
> The Pentagon has declined to amend the request and didn't plan to "substantially" address Northrop's concerns, Chief Executive Officer Wes Bush wrote in a Dec. 1 letter to Pentagon acquisition chief Ashton Carter. "As a result, I must regrettably inform you that, absent a responsive set of changes in the final RFP, Northrop Grumman has determined that it cannot submit a bid," he wrote.
>
> Northrop and partner European Aeronautic Defence & Space Co. were vying against Boeing Co. to build the refueling tankers. The competition was restarted in September after Boeing successfully protested the award to Northrop and EADS last year.
>
> The Pentagon's request shows a "clear preference" for a smaller tanker than the modified Airbus A330 that Northrop plans to offer, and continuing to compete for the tankers would impose "contractual and financial burdens on the company that we simply cannot accept," Bush wrote in the letter.
>
> "The Department regrets that Northrop Grumman and Airbus have taken themselves out of the tanker competition and hope they will return when the final request for proposals is issued," Pentagon spokesman Bryan Whitman said in an e-mail. "The Department wants competition but cannot compel the two airplane makers to compete."…

> Both competitors "have suggested changes to the request for proposals that would favor their offering," Whitman wrote in the e-mail. "But the Department cannot and will not change the warfighter requirements for the tanker to give advantage to either competitor."[42]

Final RFP

The final KC-X RFP was issued on February 24, 2010. Overall, the final requirements for the KC-X aircraft appeared to have changed little from those in the draft RFP. One requirement was eliminated (bringing the total to 372), and none added. The financial structure of the proposed contract, however, changed substantially.

Table 2. Major Differences Between KC-X Draft RFP and Final Document

Issue	Draft RFP	Final RFP
Microwave Landing System	Required	Not required
Large Aircraft Infrared Countermeasures	Contractor to procure and include in price	Government will furnish
Contract type	Development phase: Fixed-price with incentive fee.	Development phase unchanged.
	Production lots 1-2: Firm fixed price.	Production lots 1-2 unchanged.
	Production lots 3-5: Firm fixed price, with 5% inflation trigger for price adjustment.	Production lots 3-5: Not to Exceed, with 2.5% inflation trigger.
	Production lots 6-13: Not to Exceed, with 5% trigger.	Production lots 6-13: Not to Exceed, with 1% trigger.
	Contractor support: Firm fixed price.	Contractor support unchanged.
Mission modeling	IFARA (Integrated Fleet Air Refueling Assessment) model used to determine operational suitability.	IFARA ground rules updated "to ensure they reflected current operational practices."[a]
Alert quick-start	Did not specify temperatures at which power carts were allowed for environmental control.	Established a range of temperatures for which power carts could be allowed for both heating and cooling the aircraft.
Fuel burn	Penalty if actual fuel use exceeds contractor's proposal.	Incentive if fuel use is less than contractor's proposal.
Proposal due date	60 days	75 days

Source: CRS analysis.

a. Briefing script of Dr. Ashton Carter, Undersecretary of Defense for Acquisition, Technology, & Logistics, obtained by CRS.

After evaluating the final RFP, on March 8, 2010, the Northrop/EADS team withdrew from the competition.[43]

[42] Gopal Ratnam and Alison Fitzgerald, "Northrop Declines Tanker Bid on 'Financial Burdens' (Update2)," *Bloomberg.com*, December 1, 2009.

[43] See, inter alia, Colin Clark, "Northrop Drops Tanker Bid," *DoD Buzz,* March 8, 2010 and John Reed, "Northrop Won't Bid on USAF Tanker," *DefenseNews.com,* March 8, 2010.

DOD then extended the bid deadline by 60 days, to July 9, 2010.[44] Subsequently, on April 20, 2010, EADS announced that its North American division would enter the competition on its own.[45]

On February 24, 2011, the DOD announced the Boeing Company as the winner of the KC-X competition.

Legislative Activity for 2020

FY2020 Funding Request

The Administration's proposed FY2020 defense budget requested $2,234.5 million in Air Force procurement funding to acquire 12 KC-46As and 59.6 million in Air Force research and development funds for further development.

FY2020 Defense Authorization Act (H.R. 2500/S. 1790)

House

The House Armed Services Committee, in its report accompanying H.R. 2500, recommended funding KC-46 procurement at $2,199.7 million, a reduction of $34.8 million from the requested amount designated as "early to need." The committee recommended the requested amount for R&D.

The House report also included the following provisions:

> *Tanker force structure and modernization*
>
> The committee notes that the Department of Defense Mobility Capability Requirement Study identified a tanker force structure inventory requirement of 479 aircraft. Integral to this capability is the delivery of mission capable KC-46A aircraft and the continued development of additional tanker aircraft after the expiration of the current KC-46A contract with lot 13 in 2027. The committee notes that the Secretary of the Air Force has completed a capability-based assessment and signed out the initial capability document for the requirements associated with the next-generation tanker, but has not started an analysis of alternatives. The committee believes that the Secretary of the Air Force has several viable options to ensure future tanker capability, to include acquiring a non-developmental commercial derivative tanker while "bridging" from the end of the KC-46A production to the new developmental tanker.
>
> Therefore, the committee directs the Secretary of the Air Force to submit a report to the congressional defense committees by September 30, 2020, on a 30-year vision for the tanker force structure. The report shall include the following:
>
> (1) the current KC-46A tanker acquisition timeline through lot 13;
>
> (2) future tanker production options to include an acquisition timeline comparison of a "bridging" non-developmental commercial derivative tanker and new tanker development; and

[44] Michael Bruno, "USAF KC-X Bid Deadline Extended 60 Days," *AviationWeek/Ares* blog, March 31, 2010.

[45] John Reed, "EADS Confident Its KC-45 Can Compete for USAF Tanker Bid," *DefenseNews.com,* April 20, 2010.

> (3) modernization options for the entire tanker force structure through the 30-year vision timeline.
>
> Additionally, the committee continues to support the fixed-price development and production of the KC-46A contract. The committee believes that there have been several lessons learned with unique fixed-price type contracts that were employed in this contract. Therefore, in accordance with a recommendation included in the Government Accountability Office (GAO) report entitled "KC-46 Tanker Modernization: Aircraft Delivery Has Begun, but Deficiencies Could Affect Operations and Will Take Time to Correct" (GAO-19-480), the committee directs the Secretary of the Air Force to submit a report to the congressional defense committees by March 1, 2020, on the lessons learned regarding the utilization of a fixed-price contract for development.
>
> Section 122—Modification of Limitation on Use of Funds for KC-46A Aircraft
>
> This section would amend section 146 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (P.L. 115-232), to limit the use of funds for KC-46A aircraft pending submittal of certification, to include a military flight release.

Senate

The Senate Armed Services Committee, in its report accompanying S. 1790, recommended funding KC-46 procurement at $2,705.5 million, an increase of $471 million, for 15 aircraft. The committee recommended the requested amount for R&D.

The report included the following language:

> **Limitation on use of funds regarding the basing of KC–46A aircraft outside the continental United States (sec. 352)**
>
> The committee recommends a provision that would limit Air Force funds until the Secretary of the Air Force submits to the Congress a report on the projected plan and timeline for strategic basing of the KC–46A aircraft outside the continental United States.

Final Action

Conference on the FY2020 National Defense Authorization Act was in progress as of this report.

FY2020 Defense Appropriations Act (H.R. 2968/S. 2474)

House

The House Appropriations Committee, in its report accompanying H.R. 2968, recommended funding KC-46A procurement at $2,198.5 million, a reduction of $36 million from the requested level, designated as "unit cost adjustment." The committee recommended the requested amount for R&D.

Senate

The Senate Appropriations Committee, in its report accompanying S. 2474, recommended funding KC-46A procurement at $2,127.8 million, $106.8 million below the requested level. $48 million of the reduction was designated as "Restoring acquisition accountability: Unit cost growth," $10.3 million as "Restoring acquisition accountability: WARP kits cost growth," and $48.5 million as "Restoring acquisition accountability: Excess depot standup funding due to delivery delays." The committee recommended $94.6 million in research and development funds,

$35 million above the requested amount, with the addition designated as "Program increase: Boom telescope actuator."

Final Action

Final action on FY2020 appropriations was pending as of this report.

Appendix A. Potential Longevity of KC-135 Fleet

2004 DSB Report and 2006 RAND Analysis

A 2004 Defense Science Board (DSB) task force report examined, among other things, the potential longevity of the KC-135 fleet.[46] The 2006 RAND Analysis of Alternatives (AOA) on aerial refueling also examined the technical condition of the KC-135 fleet.

The DSB report stated that airframe service life, corrosion, and maintenance costs factors would potentially determine the KC-135s operational life expectancy. Each of these factors is discussed briefly below.

Airframe Service Life

KC-135s, along with their associated B-52 bombers, were originally purchased to give the United States a strategic nuclear strike capability. As a result, both fleets of airplanes spent a significant amount of time during the Cold War on ground alert. Consequently, in 2004, the average KC-135 airframe had flown only about 17,000 hours of an estimated service life of 36,000 hours (KC-135E) or 39,000 hours (KC-135R). On this basis, the DSB report concluded that KC-135 airframes were viable until 2040 at "current usage rates."[47] The 2006 RAND AOA similarly concluded that the KC-135 fleet "can operate into the 2040s," but not without risks.[48]

Corrosion

The 2004 DSB report concluded that corrosion did not pose an "imminent catastrophic threat to the KC-135 fleet" and that the Air Force's maintenance practices were postured "to deal with corrosion and other aging problems,"[49] but also stated:

> However, because the KC-135s are true first generation turbojet aircraft designed only 50 years from the time man first began to fly, concerns regarding the ability to continue operating these aircraft indefinitely are intuitively well founded.[50]

Maintenance Costs

A 2004 GAO report stated that KC-135 flying hour costs increased in real (i.e., inflation-adjusted) terms by 29% between 1996 and 2002.[51] The DSB report agreed that KC-135 maintenance costs had increased significantly, but found that they had leveled off due to Air Force changes in KC-135 depot processes. The DSB report forecasted modest growth in maintenance costs in the future.[52]

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[46] *Defense Science Board Task Force Report on Aerial Refueling Requirements*, May 2004, p. iv.

[47] Ibid.

[48] Michael Kennedy et al., *Analysis of Alternatives (AoA) for KC-135 Recapitalization, Executive Summary*, RAND Corporation, 2006, pp. 15-16.

[49] *Defense Science Board Task Force Report on Aerial Refueling Requirements*, May 2004, p. iv.

[50] Ibid., p. 17.

[51] General Accounting Office, *Military Aircraft[:] DOD needs to Determine Its Aerial Refueling Requirements*, GAO-04-439, June 2004, p. 13.

[52] *Defense Science Board Task Force Report on Aerial Refueling Requirements*, May 2004, pp. iv-v.

Risks of Flying Older Aircraft

Some observers express about potential problems that may arise in flying 50- to 80-year-old tankers that could possibly ground the entire KC-135 fleet. The DSB report examined the issue and concluded that "although grounding is possible, the task force assesses the probability as no more likely than that of any other aircraft in the inventory of the Services."[53] The 2006 RAND analysis expressed a belief that it is possible that KC-135s will be able to operate into the 2040s, but the report expressed a lack of confidence that KC-135s could continue to be operated that long without risks of major maintenance cost increases, poor fleet availability, or possible fleet-wide grounding. The RAND analysis concluded that "the nation does not currently have sufficient knowledge about the state of the KC-135 fleet to project its technical condition over the next several decades with high confidence."[54] The analysis recommended more thorough scientific and technical study of the KC-135 to provide a more reliable basis for future assessments of the condition of the KC-135 fleet.[55]

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[53] Ibid., p. 18.

[54] Michael Kennedy et al., "Analysis of Alternatives (AoA) for KC-135 Recapitalization, Executive Summary," RAND Corporation, 2006, p. 16.

[55] Ibid.