Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-387

KC-46A Tanker Modernization (KC-46A)

As of FY 2017 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

Table of Contents

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost

PB - President’s Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

Program Information

Program Name

KC-46A Tanker Modernization (KC-46A)

DoD Component

Air Force

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References

SAR Baseline (Development Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated August 24, 2011

Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated August 24, 2011

Mission and Description

The KC-46A Tanker Modernization (KC-46A) will replace the U.S. Air Force's aging fleet of Tankers which have been the primary refueling aircraft for more than 50 years. The KC-46A will have enhanced refueling capabilities with greater capacity, and both cargo and aeromedical evacuation with improved efficiency and increased capabilities. The KC-46A will provide aerial refueling support to the United States Air Force, Navy, and Marine Corps, as well as allied nation coalition aircraft.

The KC-46A will have the ability to refuel any fixed-wing receiver capable aircraft on any mission. The KC-46A will be equipped with a modernized KC-10 refueling boom integrated with a fly-by-wire control system, and will be capable of delivering a fuel offload rate required for large aircraft. Furthermore, a hose and drogue system will add additional mission capability which will be independently operable from the refueling boom system. The centerline drogue and wing aerial refueling pods (WARPs) will be used to refuel aircraft fitted with probes. All KC-46A aircraft will be configured for the installation of a Multi-Point Refueling System capable of refueling two receiver aircraft simultaneously from the WARPs mounted under the wings. One Aerial Refueling Operator will control the boom, centerline drogue, and WARPs during refueling operations. Panoramic displays will provide the Aerial Refueling Operator with wing-tip to wing-tip situational awareness.

A cargo deck above the refueling system will accommodate a mixed load of passengers, patients, and cargo. The KC-46A will carry up to eighteen 463L cargo pallets. Seat tracks and the onboard cargo handling system will make it possible to simultaneously carry palletized cargo, seats, and patient support pallets in a variety of combinations. The KC-46A will offer significantly increased cargo and aeromedical evacuation capabilities compared to the KC-135R.

The aircrew compartment will include 15 permanent seats for aircrew, which will include permanent seating for the Aerial Refueling Operators and an optional Aerial Refueling Instructor.

Two high-bypass turbofans, mounted under 34-degree swept wings, will power the KC-46A to take off at gross weights up to 415,000 pounds.

Executive Summary

Program Highlights Since Last Report

Due to schedule delays, the program is estimating several APB schedule date changes beyond the six-month SAR Current Estimate (CE) dates reported in December 2014. The CE changes for Milestone C (MS C), Initial Operational Test & Evaluation (IOT&E), and the FRP Decision milestones require a schedule update for this December 2015 SAR cycle.

The Engineering and Manufacturing Development (EMD) contract is 76.3% complete. Government funding has been stable with no Government-driven engineering changes to the design. In July 2015, Boeing self-identified a fuel contamination incident during fuel dock testing, affecting several fuel system components on EMD-2. Boeing conducted a Root Cause and Corrective Action review and outbriefed the Program Office on August 6, 2015. On August 25, 2015, EMD-2 was returned to complete fuel dock testing. Despite the offset, EMD-2 completed a successful first flight on September 25, 2015. Boeing continues to assess they can apply the necessary resources needed to achieve an on-time Required Assets Available (RAA) date. Delays and schedule pressures notwithstanding, the KC-46A program and strategy remain strong. Government's maximum liability on the EMD contract with Boeing remains capped at the ceiling price of $4.9B. The following paragraphs of this Executive Summary provide additional historical details and Calendar Year (CY) 2015 accomplishments.

Boeing's inability to meet internal program milestones has deteriorated all schedule margin to the contractual Required Assets Available (RAA) date of August 2017. Milestone C (MS C) is planned for April 2016, with four months of schedule pressure to the August 2017 contractual RAA date. The Program Office is working with Boeing to implement a program schedule re-baseline (hereafter referred to as "KCR-0700"), in addition to tracking performance against the new baseline. The Program Office continues to work with Boeing on schedule mitigation efforts.

The KCR-0700 schedule rebaseline was incorporated into the October 2015 month-end Integrated Master Schedule, which was delivered in November 2015. The Program Office, Boeing, and the Defense Contract Management Agency conducted an Integrated Risk Assessment (IRA) January 11 – 12, 2016 and Schedule Risk Assessment (SRA) January 26 – 28, 2016 to assess additional cost and schedule risks. SRA analysis/validation is on-going and results will be briefed to senior Air Force leadership in March 2016.

Boeing implemented an Over Target Baseline to the KC-46A Earned Value Management data. Regular reporting resumed with the October 2015 Contract Performance Report received in November 2015.

Summer and fall of 2015 saw a number of program accomplishments. EMD-1 began constant flight operations at the end of May 2015 and started initial flight testing, completing Flutter, Aero Stability and Control, and Auto-Pilot validation flights before going into a planned non-flying status period at the end of November 2015 through February 2016 to bring the fuel system up to a type design configuration. EMD-2 moved to the Boeing Finishing Center, after originally planned, to complete aircraft electrical build and military component installations to become the first KC-46A aircraft. In October and November 2015, EMD-2 completed initial airworthiness flights to support Federal Aviation Administration (FAA) certification as well as boom and drogue free air stability flights to support the use of the boom and both drogue systems in MS C refueling contact demonstrations. EMD-2 entered Fuel Dock 2 in late November 2015 in preparation for refueling contact demonstrations for MS C. In early January 2016, EMD-2 completed free air stability prerequisite flight tests in order to begin MS C in-flight aerial refueling demonstrations. At the end of January 2016, EMD-2 successfully completed in-flight rendezvous, contact, and fuel transfer demonstrations with the F-16C. Successful fuel transfer was then conducted with the F/A-18, and finally with the KC-46A as a receiver behind a KC-10, both in mid-February 2016. The KC-46A test team plans to conduct the remainder of the required MS C in-flight rendezvous, contact, and fuel transfer demonstrations with the C-17A, A-10C, and AV-8B in late February 2016. The test team is also focused on completing required actions to conduct EMD-4's first flight in late February or early March 2016.

Phase I Lab Verification Testing started November 24, 2014 and completed in June 2015. Phase 2 testing began January

14, 2015, and has completed 42 of 48 tests, with overall completion estimated for May 2016.

On September 15, 2015, the team successfully completed the ground mobility demonstration, proving the ability to accommodate various combinations of 463L pallets, aero-medical patient support pallets, and passenger pallets. The ability to use material handling equipment and processes employed by Air Mobility Command (AMC) on other airlift aircraft was also demonstrated. With only minor issues encountered, KC-46A meets its cargo handling and interior configuration requirements for MS C.

To date, 10 of 10 Live Fire Test & Evaluation (LFT&E) ballistic test series are complete. The final phase of the tenth ballistic test series completed on December 21, 2015 at China Lake, CA. The combat damage flight simulation exercises for score were completed on December 10, 2015 to support the overall survivability analysis of the KC-46A which will be captured in the LFT&E Consolidated Final Report.

As of February 22, 2016, the build status for EMD-3 and EMD-4 are 96% and 99%, respectively. EMD-4 has completed fuel dock testing and 98% of the functional testing. Currently, EMD-4 is performing pre-flight and classified testing in preparation for first flight. EMD-3 continues to make progress, completing 99% of the electrical connections and 90% of the functional testing. Additionally, EMD-3 was rolled to paint on February 21, 2016.

The Maintenance Training System Source Selection Plan was signed on April 10, 2015, and the Request For Proposal was finalized and released on April 10, 2015. Proposals were received on June 8, 2015, and source selection is ongoing.

The Aircrew Training System (ATS) team continues device engineering and manufacturing development. The ATS Program Office and FlightSafety Services Corporation conducted a Critical Design Review (CDR) Technical Interchange Meeting to define initial Increment 1 system Ready-For-Training (RFT) criteria. Progress continues on entry criteria for Increment 1 System CDR (projected mid-2016) and RFT (projected mid-2017). In addition, the first ATS production option was exercised to help mitigate predicted student production/throughput constraints in support of AMC's Initial Operational Capability declaration.

The final report of the Product Support Business Case Analysis (BCA) was delivered in August 2015. The Independent Logistics Assessment (ILA) was completed in February 2015 and the last of five minor findings was closed on May 7, 2015; there were no major findings. Both the BCA and ILA will be incorporated into the Life Cycle Sustainment Plan in time to support MS C.

The Program Office has four CY 2016 focus areas: (1) completing all MS C entrance criteria and initiating Low Rate Initial Production, (2) continuing specification verification testing, (3) continuing FAA qualification and certification testing, and (4) initiating the implementation of the long-term sustainment strategy. Additionally, the KC-46A Program Office will continue to focus attention on maintaining program stability and returning margin back into the schedule for an on-time RAA declaration. Program execution will be carefully managed to ensure Boeing delivers what is required by the contract and the Government maintains the competitively-negotiated program cost, schedule, and performance baselines.

There are no significant software-related issues with this program at this time.

History of Significant Developments Since Program Initiation

General

February 23, 2011: The Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) conducted a successful Milestone B (MS B) Defense Acquisition Board (DAB).

February 24, 2011: The USD(AT&L) signed the Acquisition Program Baseline (APB) reflecting the MS B approval.

February 24, 2011: The Boeing Company was awarded the KC-46A contract. The Fixed-Price Incentive Firm (FPIF) contract was awarded for the Engineering and Manufacturing Development program phase, with Firm-Fixed-Price contract options for Low Rate Initial Production Lots 1 and 2, and Not-to-Exceed contract options with Economic Price Adjustment

for Full Rate Production Lots 3 through 13.

August 24, 2011: The KC-46A Program Office and Boeing successfully concluded a comprehensive Integrated Baseline Review (IBR). The IBR approved a well-understood contract technical, cost, and schedule baseline from which the Government can measure and closely manage Boeing's progress during contract execution.

November 2011: The KC-46A Program Office and Boeing successfully concluded the System Functional Review (SFR). The KC-46A SFR assessed the allocation and traceability of all program requirements from the System Specification to lower-level hardware and software requirements.

December 2011: Boeing conducted a non-contractual KC-46A Firm Configuration review—an internal Boeing commercial best practice. The KC-46A Firm Configuration validated that the aircraft configuration is sufficiently mature and stable to initiate detailed design of the militarized KC-46A tanker.

April 27, 2012: The KC-46A Preliminary Design Review (PDR) was successfully completed. The Government and Boeing successfully completed the first step of a two-step PDR process on March 21 -22, 2012, which consisted of a detailed review of the 89 contractual entrance criteria to PDR. The second step, conducted April 23 - 27 2012, consisted of a detailed review of the eight exit criteria and completion of all subsystem PDRs to Government satisfaction.

May 28, 2012: The Program Executive Officer (PEO) signed the Post-PDR Report.

June 20, 2012: Deputy Assistant Secretary of Defense, Systems Engineering (DASD/SE) validated successful completion of PDR.

May 1, 2013: The KC-46A Aircrew Training System (ATS) contract was awarded to FlightSafety Services Corporation.

June 26 - 28, 2013: The KC-46A ATS Program conducted a Program Startup Workshop with the assistance from Defense Acquisition University at Wright-Patterson Air Force Base, Ohio.

July 8 - 10, 2013: The KC-46A Program successfully completed the planned Weapon System Critical Design Review (CDR) at Boeing's Harbour Pointe facility. Overall design maturity was demonstrated to be at a high level, consistent with the commercial derivative nature of the design approach. All action items were complete, and the Weapon System CDR was officially closed on August 21, 2013, one month ahead of the contractual requirement of September 24, 2013.

June 11, 2013: The KC-46A Operational Assessment-1 (OA-1) report was published, culminating a 7.5 month effort to assess the current weapon system design for CDR and IOT&E for readiness. The Air Force Operational Test and Evaluation Center assessment of the KC-46A confirmed that the program was on track to meet effectiveness, suitability, and mission capability requirements.

June 26, 2013: The EMD-1 aircraft began assembly, followed by EMD-2 on August 19, 2013, EMD-3 on October 17, 2013, and EMD-4 on January 16, 2014.

September 23 - 27, 2013: The KC-46A ATS conducted a System Requirement Review and SFR.

February 24, 2014: The KC-46A Program Office received confirmation that the Senate Committee on Appropriations approved a below threshold reprogramming request in the amount of $8.6M to purchase land necessary for the Tinker Air Force Base, Oklahoma weapon system support efforts. This request resulted in FY 2012 MILCON (3300) funds being reprogrammed into the KC-46A funding profile.

December 17, 2014: KC-46A Production Spares, Support Equipment, and Interim Contractor Support efforts awarded.

December 28, 2014: Successful first flight of the EMD-1 aircraft. This significant event started the flight test phase of the KC -46A program.

September 25, 2015: EMD-2 completed a major milestone, KC-46A First Flight.

November 8 - 9, 2015: EMD-2 deployed the boom and both drogue systems in flight for the first time.

January 24, 2016: EMD-2 completed the first KC-46A aerial refueling by offloading 1,600 pounds of fuel to an F-16C.

February 10, 2016: EMD-2 completed fuel transfer with F/A-18 aircraft.

February 13, 2016: EMD-2 completed KC-10 fuel transfer conducted with KC-46A as a receiver.

Threshold Breaches

APB Breaches		
Schedule		☐
Performance		☐
Cost	RDT&E	☐
	Procurement	☐
	MILCON	☐
	Acq O&M	☐
O&S Cost		☑
Unit Cost	PAUC	☐
	APUC	☐

Nunn-McCurdy Breaches		
Current UCR Baseline		
	PAUC	None
	APUC	None
Original UCR Baseline		
	PAUC	None
	APUC	None

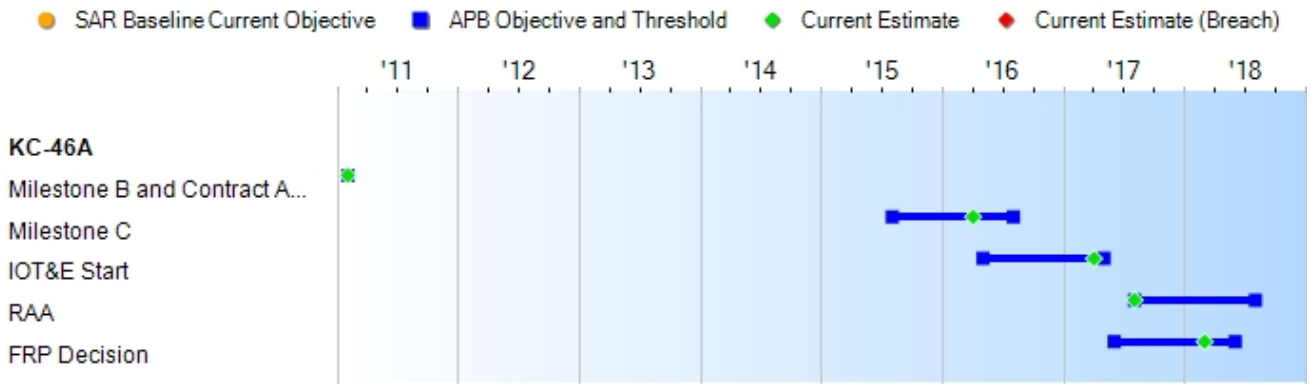
Explanation of Breach

The KC-46A previously reported an O&S cost growth breach in the December 2012 SAR. The breach was the result of Air Mobility Command's desire to maximize the benefits of the KC-46A capabilities and leverage that capability across the total force through increased flight hours and increased crew ratios.

The Program will continue to carry this O&S cost growth until the next Milestone is reached and a new APB is established. The Air Force has committed to staying within Total Obligation Authority during the transition from the KC-135 to the KC-46A aircraft.

On January 7, 2015 a Program Deviation Report outlining the above was submitted.

Schedule



Schedule Events					
Events	**SAR Baseline Development Estimate**	**Current APB Development Objective/Threshold**		**Current Estimate**	
Milestone B and Contract Award	Feb 2011	Feb 2011	Feb 2011	Feb 2011	
Milestone C	Aug 2015	Aug 2015	Aug 2016	Apr 2016	(Ch-1)
IOT&E Start	May 2016	May 2016	May 2017	Apr 2017	(Ch-2)
RAA	Aug 2017	Aug 2017	Aug 2018	Aug 2017	
FRP Decision	Jun 2017	Jun 2017	Jun 2018	Mar 2018	(Ch-3)

Change Explanations

(Ch-1) The current estimate for Milestone C has changed from September 2015 to April 2016 due to schedule rebaseline.
(Ch-2) The current estimate for IOT&E Start has changed from October 2016 to April 2017 due to schedule rebaseline.
(Ch-3) The current estimate for FRP Decision has changed from September 2017 to March 2018 due to schedule rebaseline.

Notes

IOT&E start represents the beginning of dedicated IOT&E, which will commence upon OSD approval of the Operational Test Readiness Review.

The Boeing contractual RAA date is directed to be no later than 78 months after contract award.

Acronyms and Abbreviations

IOT&E - Initial Operational Test and Evaluation
RAA - Required Assets Available

Performance

Performance Characteristics				
SAR Baseline Development Estimate	**Current APB Development Objective/Threshold**		**Demonstrated Performance**	**Current Estimate**
Tanker Air Refueling Capability				
The aircraft should be capable of accomplish-ing air refueling of all current and programmed tilt rotor receiver aircraft in accordance with technical guidance and STANAGs using current procedures and refueling airspeeds with no modification to existing receiver air refueling equipment and no restrictions to the refueling envelope at its maximum inflight gross weight. While engaged, the KC-X should be capable of maneuvering throughout the entire refueling envelope, in accordance with applicable air refueling manuals and standard agreements, of any compatible current and programmed tilt rotor receiver aircraft.	The aircraft should be capable of accomplish-ing air refueling of all current and programmed tilt rotor receiver aircraft in accordance with technical guidance and STANAGs using current procedures and refueling airspeeds with no modification to existing receiver air refueling equipment and no restrictions to the refueling envelope at its maximum inflight gross weight. While engaged, the KC-X should be capable of maneuvering throughout the entire refueling envelope, in accordance with applicable air refueling manuals and standard agreements, of any compatible current and programmed tilt rotor receiver aircraft.	The aircraft shall be capable of accomplish -ing air refueling of all current and programmed fixed-wing receiver aircraft in accordance with technical guidance and STANAGs using current procedures and refueling airspeeds with no modification to existing receiver air refueling equipment and no restrictions to the refueling envelope. The aircraft shall be able to effectively conduct (non-simultan -eously) both boom and drogue air refuelings on the same mission. While engaged, the KC-X shall be capable of maneuvering throughout the entire refueling envelope, in accordance with applicable air refueling manuals and standard agreements, of any compatible current and programmed fixed wing receiver aircraft.	TBD	Will meet or exceed Current APB Threshold. The aircraft shall be capable of accomplish-ing air refueling of all current and programmed fixed -wing receiver aircraft in accordance with technical guidance and STANAGs using current procedures and refueling airspeeds with no modification to existing receiver air refueling equipment and no restrictions to the refueling envelope. The aircraft shall be able to effectively conduct (non-simultan -eously) both boom and drogue air refuelings on the same mission. While engaged, the KC-X shall be capable of maneuvering throughout the entire refueling envelope, in accordance with applicable air refueling manuals and standard agreements, of any compatible current and programmed fixed wing receiver aircraft.
Fuel Offload versus Radius				
The aircraft should be capable of exceeding the offload versus radius as depicted in	The aircraft should be capable of exceeding the offload versus radius as depicted in	The aircraft shall be capable, as a minimum, of an offload versus radius	TBD	Will meet or exceed Current APB Objective. The aircraft should be capable of

Figure 6.1.	Figure 6.1.	as depicted in Figure 6.1.		exceeding the offload versus radius as depicted in Figure 6.1.
Civil/Military CNS/ATM				
Aircraft shall be capable of worldwide flight operations at all times in all civil and military airspace at time of aircraft delivery, including known future CNS/ATM require-ments, with redundant systems. Capability to inhibit CNS/ATM emissions and prohibit transmission of CNS/ATM-related data accumulated during the inhibited portion of the mission. Civil ATC data link media for LOS and BLOS communica-tions.	Aircraft shall be capable of worldwide flight operations at all times in all civil and military airspace at time of aircraft delivery, including known future CNS/ATM require-ments, with redundant systems. Capability to inhibit CNS/ATM emissions and prohibit transmission of CNS/ATM-related data accumulated during the inhibited portion of the mission. Civil ATC data link media for LOS and BLOS communica-tions.	Aircraft shall be capable of worldwide flight operations at all times in all civil and military airspace at time of aircraft delivery, including known future CNS/ATM require-ments, with redundant systems. Capability to inhibit CNS/ATM emissions and prohibit transmission of CNS/ATM-related data accumulated during the inhibited portion of the mission. Civil ATC data link media for LOS and BLOS communica-tions.	TBD	Will meet or exceed Current APB Objective. Aircraft shall be capable of worldwide flight operations at all times in all civil and military airspace at time of aircraft delivery, including known future CNS/ATM require-ments, with redundant systems. Capability to inhibit CNS/ATM emissions and prohibit transmission of CNS/ATM-related data accumulated during the inhibited portion of the mission. Civil ATC data link media for LOS and BLOS communica-tions.
Airlift Capability				
The aircraft shall be capable of efficiently transporting equipment and personnel and fit seamlessly into the Defense Transporta-tion System. The aircraft’s entire main cargo deck must be convertible to an all cargo configuration that accommo-dates 463L pallets, an all passenger configuration (plus baggage) (or equivalent AE capability to include ambulatory and/or patient support pallets), and must optimize a full range of palletized cargo, passengers, and AE configurat-ions that fully and efficiently	The aircraft shall be capable of efficiently transporting equipment and personnel and fit seamlessly into the Defense Transporta-tion System. The aircraft’s entire main cargo deck must be convertible to an all cargo configurat-ion that accommo-dates 463L pallets, an all passenger configuration (plus baggage) (or equivalent AE capability to include ambulatory and/or patient support pallets), and must optimize a full range of palletized cargo,	The aircraft shall be capable of efficiently transporting equipment and personnel and fit seamlessly into the Defense Transporta-tion System. The aircraft’s entire main cargo deck must be convertible to an all cargo configurat-ion that accommo-dates 463L pallets, an all passenger configuration (plus baggage) (or equivalent AE capability to include ambulatory and/or patient support pallets), and must optimize a full range of palletized cargo,	Completed the ground mobility demonstration, proving the ability to accommodate various configurations of 463L pallets, aero-medical patient support pallets, and passenger pallets. The ability to use material handling equipment and processes employed by AMC on other airlift aircraft was also completed. With only minor issues encountered, KC-46A meets its cargo handling and interior	Will meet or exceed Current APB Objective. The aircraft shall be capable of efficiently transporting equipment and personnel and fit seamlessly into the Defense Transporta-tion System. The aircraft’s entire main cargo deck must be convertible to an all cargo configura-tion that accommo-dates 463L pallets, an all passenger configuration (plus baggage) (or equivalent AE capability to include ambulatory and /or patient support pallets), and must

utilize all available main deck space.	passengers, and AE configurat-ions that fully and efficiently utilize all available main deck space.	passengers, and AE configurat-ions that fully and efficiently utilize all available main deck space.	configuration requirements for MS C. Demonstrated ability to use material handling equipment and processes employed by AMC on other airlift aircraft.	optimize a full range of palletized cargo, passengers, and AE configura-tions that fully and efficiently utilize all available main deck space.
Receiver Air Refueling Capability				
The aircraft must be capable of receiver air refueling (IAW current technical directives) to its maximum inflight gross weight from any compatible tanker aircraft using current air refueling procedures.	The aircraft must be capable of receiver air refueling (IAW current technical directives) to its maximum inflight gross weight from any compatible tanker aircraft using current air refueling procedures.	The aircraft must be capable of receiver air refueling (IAW current technical directives) from any compatible tanker aircraft using current air refueling procedures.	TBD	Will meet or exceed Current APB Objective. The aircraft must be capable of receiver air refueling (IAW current technical directives) to its maximum inflight gross weight from any compatible tanker aircraft using current air refueling procedures.
Force Protection				
Aircraft shall be able to operate in chemical and biological environments	Aircraft shall be able to operate in chemical and biological environments	Aircraft shall be able to operate in chemical and biological environments	TBD	Will meet or exceed Current APB Objective. Aircraft shall be able to operate in chemical and biological environments
Net-Ready				
The system must fully support execution of all operational activities identified in the applicable joint and system integrated architectures and the system must satisfy the technical requirements for Net-Centric military operations to include: 1) DISR-mandated GIG IT standards and profiles identified in the TV-1, 2) DISR-mandated GIG KIPs identified in the KIP	The system must fully support execution of all operational activities identified in the applicable joint and system integrated architectures and the system must satisfy the technical requirements for Net-Centric military operations to include: 1) DISR-mandated GIG IT standards and profiles identified in the TV-1, 2) DISR-mandated GIG KIPs identified in the KIP	The system must fully support execution of joint critical operational activities identified in the applicable joint and system integrated architectures and the system must satisfy the technical requirements for transition to Net-Centric military operations to include: 1) DISR-mandated GIG IT standards and profiles identified in the TV-1, 2) DISR	TBD	Will meet or exceed Current APB Objective. The system must fully support execution of all operational activities identified in the applicable joint and system integrated architectures and the system must satisfy the technical requirements for Net-Centric military operations to include: 1) DISR-mandated GIG IT standards and profiles identified in the

declaration table, 3) NCOW RM Enterprise Services, 4) IA requirements including availability, integrity, authenticat-ion, confidential-ity, and non-repudiation, and issuance of an ATO by the DAA, and 5) Operationally effective information exchanges; and mission critical performance and IA attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views.	declaration table, 3) NCOW RM Enterprise Services, 4) IA requirements including availability, integrity, authenticat-ion, confidential-ity, and non-repudiation, and issuance of an ATO by the DAA, and 5) Operationally effective information exchanges; and mission critical performance and IA attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views.	mandated GIG KIPs identified in the KIP declaration table, 3) NCOW RM Enterprise Services, 4) IA requirements including availability, integrity, authenticat-ion, confidential-ity, and non-repudiation, and issuance of an IATO by the DAA, and 5) Operationally effective information exchanges; and mission critical performance and IA attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views.		TV-1, 2) DISR-mandated GIG KIPs identified in the KIP declaration table, 3) NCOW RM Enterprise Services, 4) IA requirements including availability, integrity, authentica-tion, confidentia-lity, and non-repudiation, and issuance of an ATO by the DAA, and 5) Operationally effective information exchanges; and mission critical performance and IA attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views.
Survivability				
Aircraft SPM. Tanker aircraft shall be able to operate in hostile environments as discussed in Section 4 and AFTTP 3-3.22B. SPM shall provide automated protection against IR threats as described in AMC Annex to LAIRCM ORD 314-92 dated January 25, 2001. SPM shall provide automated protection against RF threats as described in the ASACM CDD, May 22, 2006, with the exception of Reduction in Lethality values in Table 28. The aircraft system shall support use of existing night vision devices and laser eye protection devices. The aircraft	Aircraft SPM. Tanker aircraft shall be able to operate in hostile environments as discussed in Section 4 and AFTTP 3-3.22B. SPM shall provide automated protection against IR threats as described in AMC Annex to LAIRCM ORD 314-92 dated January 25, 2001. SPM shall provide automated protection against RF threats as described in the ASACM CDD, May 22, 2006, with the exception of Reduction in Lethality values in Table 28. The aircraft system shall support use of existing night vision devices and laser eye	Aircraft SPM. Tanker aircraft shall be able to operate in hostile environments as discussed in Section 4 and AFTTP 3-3.22B. SPM shall provide automated protection against IR threats as described in AMC Annex to LAIRCM ORD 314-92 dated January 25, 2001. SPM shall provide automated protection against RF threats as described in the ASACM CDD, May 22, 2006, with the exception of Reduction in Lethality values in Table 28. The aircraft system shall support use of existing night vision devices and laser eye	TBD	Will meet or exceed Current APB Threshold. Aircraft SPM. Tanker aircraft shall be able to operate in hostile environments as discussed in Section 4 and AFTTP 3-3.22B. SPM shall provide automated protection against IR threats as described in AMC Annex to LAIRCM ORD 314-92 dated January 25, 2001. SPM shall provide automated protection against RF threats as described in the ASACM CDD, May 22, 2006, with the exception of Reduction in Lethality values in Table 28. The aircraft system shall support

shall be capable of takeoff, landing, and air refueling, as a tanker and receiver in an NVIS environment. KC-X must be capable of flying tanker tactical profiles as specified in MCM 3-1, Vol 22, AF Tactics, Training, Procedures, June 2003. Aircraft shall have the capability to receive off-board situational awareness data, correlate this data with on-board sensor data, display battle-space information to provide situational awareness, and assist in using counter-measures and defensive systems to avoid potential threats as discussed in the ASACM CDD. EMP protection for all mission components.	protection devices. The aircraft shall be capable of takeoff, landing, and air refueling, as a tanker and receiver in an NVIS environment. KC -X must be capable of flying tanker tactical profiles as specified in MCM 3-1, Vol 22, AF Tactics, Training, Procedures, June 2003. Aircraft shall have the capability to receive off-board situational awareness data, correlate this data with on-board sensor data, display battle-space information to provide situational awareness, and assist in using counter-measures and defensive systems to avoid potential threats as discussed in the ASACM CDD. EMP protection for all mission components.	protection devices. The aircraft shall be capable of takeoff, landing, and air refueling, as a tanker and receiver in an NVIS environment. KC -X must be capable of flying tanker tactical profiles as specified in MCM 3-1, Vol 22, AF Tactics, Training, Procedures, June 2003. Aircraft shall have the capability to receive off-board situational awareness data, correlate this data with on-board sensor data, display battle-space information to provide situational awareness, and assist in using counter-measures and defensive systems to avoid potential threats as discussed in the ASACM CDD. The KC -X fleet shall have EMP protection for flight-critical aircraft systems.		use of existing night vision devices and laser eye protection devices. The aircraft shall be capable of takeoff, landing, and air refueling, as a tanker and receiver in an NVIS environment. KC -X must be capable of flying tanker tactical profiles as specified in MCM 3-1, Vol 22, AF Tactics, Training, Procedures, June 2003. Aircraft shall have the capability to receive off-board situational awareness data, correlate this data with on-board sensor data, display battle-space information to provide situational awareness, and assist in using counter-measures and defensive systems to avoid potential threats as discussed in the ASACM CDD. The KC -X fleet shall have EMP protection for flight-critical aircraft systems.
Simultaneous Multi-Point Refuelings				
The aircraft shall be provisioned (including structural modificat-ions, plumbing, electrical, etc.) for simultaneous multi-point drogue refueling.	The aircraft shall be provisioned (including structural modificat-ions, plumbing, electrical, etc.) for simultaneous multi-point drogue refueling.	The aircraft shall be provisioned (including structural modificat-ions, plumbing, electrical, etc.) for simultaneous multi-point drogue refueling.	TBD	Will meet or exceed Current APB Objective. The aircraft shall be provisioned (including structural modifica-tions, plumbing, electrical, etc.) for simultaneous multi-point drogue refueling.
Operational Availability				
Operational availability shall be not less than 89%.	Operational availability shall be not less than 89%.	Operational availability shall be not less than 80%.	TBD	Will meet or exceed APB Objective. Operational availability shall be not less than 89%.

Mission Reliability				
Break Rate shall be equal to or better than the 2006 KC-10 Six Sigma mean BR of 1.3 (breaks per 100 sorties).	Break Rate shall be equal to or better than the 2006 KC-10 Six Sigma mean BR of 1.3 (breaks per 100 sorties).	Break Rate shall be equal to or better than the 2006 KC-10 Six Sigma mean BR of 1.3 (breaks per 100 sorties).	TBD	Will meet or exceed Current APB Objective. Break Rate shall be equal to or better than the 2006 KC-10 Six Sigma mean BR of 1.3 (breaks per 100 sorties).

Requirements Reference

Capability Development Document (CDD) Version 7.0 dated December 27, 2006

Change Explanations

None

Notes

Tanker Air Refueling Capability: The KPP objective includes the KPP threshold requirement. Therefore, the KPP objective requires air refueling of all current and programmed fixed-wing receiver aircraft and air refueling of all current and programmed tilt rotor receiver aircraft. The ability to refuel at maximum inflight gross weight portion of this KPP objective was not included as one of the contractually-required 372 mandatory requirements. Therefore, the KC-46A EMD contract does not require the contractor to meet this portion of the objective.

Fuel Offload versus Radius: Figure 6.1, as referenced in the objective and threshold values, is located in the KC-X CDD.

Survivability: Section 4, as referenced in the objective and threshold values, is located in the KC-X CDD. The Electromagnetic Pulse protection for all mission components portion of this KPP objective was not included as one of the contractually-required 372 mandatory requirements. Therefore, the KC-46A EMD contract does not require the contractor to meet this portion of the objective.

OA: OA equals the TAI less the number of depot possessed aircraft (including programmed depot maintenance and unscheduled depot maintenance) less the number of aircraft that are not mission capable divided by TAI. OA as stated in the CDD is equivalent to and meets the requirement for Materiel Availability as required by the Manual for the Operation of the JCIDS.

Mission Reliability: BR is defined in Air Force Instruction 21-101 and is the percentage of aircraft that land in “Code-3,” or “Alpha-3” for Mobility AF, status. BR (%) equals number of sorties that land in “Code-3” divided by total sorties flown times 100. Mission Reliability as stated in the CDD meets the requirement for Materiel Reliability as required by the Manual for the Operation of JCIDS.

Acronyms and Abbreviations

AE - Aeromedical Evacuation
AF - Air Force
AFTTP - Air Force Tactics, Techniques, and Procedures
AMC - Air Mobility Command
APB - Acquistion Program Baseline
ASACM - Advanced Situational Awareness and Countermeasures
ATC - Air Traffic Control
ATO - Approval to Operate
BLOS - Beyond Line of Sight
BR - Break Rate
CDD - Capability Development Document
CNS/ATM - Communication Navigation Surveillance/Air Traffic Management
DAA - Designated Approval Authority
DISR - DoD IT Standards Registry
EMD - Engineering and Manufacturing Development
EMP - Electromagnetic Pulse
GIG - Global Information Grid
IA - Information Assurance
IATO - Interim Authority to Operate
IAW - In Accordance With
IR - Infrared
IT - Information Technology
JCIDS - Joint Capabilities Integration and Development System
KIP - Key Interface Profile
KPP - Key Performance Parameter
LAIRCM - Large Aircraft Infrared Countermeasures
LOS - Line of Sight
MCM - Multi-Command Manual
NCOW RM - Net Centric Operations Warfare Reference Model
NVIS - Night Vision and Imaging Systems
OA - Operational Availability
ORD - Operational Requirements Document
RF - Radio Frequency
SPM - Self-Protection Measures
STANAGs - Standard Agreements
TAI - Total Aircraft in the Inventory
TBD - To Be Determined
TV - Technical View
Vol - Volume

Track to Budget

RDT&E

Appn	BA	PE
Air Force	3600	07	0401221F

Project	Name	
674927	KC-135 Replacement Tanker	(Sunk)

Appn	BA	PE
Air Force	3600	05	0605221F

Project	Name
655271	KC-46 RDT&E

Procurement

Appn	BA	PE
Air Force	3010	06	0401221F

Line Item	Name
000999	Initial Spares

Appn	BA	PE
Air Force	3010	02	0401221F

Line Item	Name
KC046A	KC-46A Tanker

Notes

In the FY 2016 PB, Procurement funds were realigned from BA 02 to BA 06. A new funding line for BA 06 was added to the Track to Budget.

MILCON

Appn	BA	PE
Air Force	3300	01	0401221F

Project	Name
VARIOUS	KC-46, MILCON

Appn	BA	PE
Air Force	3730	01	0501221F

Project	Name
VARIOUS	KC-46A Air Force Reserve (AFR) MILCON

Appn	BA	PE
Air Force	3730	01	0502576F

Project	Name	
VARIOUS	Facilities Restoration and Modernization - AFR	(Shared)

Appn	BA	PE
Air Force	3830	01	0501413F

Project	Name
VARIOUS	KC-46, Air National Guard (ANG), MILCON

Notes

FY 2017 and FY 2018 Air Force Reserve MILCON for the KC46A program is contained within PE 050221F in the FY 2017 FYDP database, but is incorrectly associated with PE 0502576F in the PB17 budget exhibit.

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2011 $M			BY 2011 $M	TY $M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	6804.2	6804.2	7484.6	5979.4	7149.6	7149.6	6259.6
Procurement	33040.3	33040.3	36344.3	31371.0	40236.0	40236.0	38764.9
Flyaway	--	--	--	27214.7	--	--	33723.3
Recurring	--	--	--	27214.7	--	--	33723.3
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	4156.3	--	--	5041.6
Other Support	--	--	--	3139.9	--	--	3819.8
Initial Spares	--	--	--	1016.4	--	--	1221.8
MILCON	3673.7	3673.7	4041.1	2589.7	4314.6	4314.6	3187.5
Acq O&M	0.0	0.0	--	0.0	0.0	0.0	0.0
Total	43518.2	43518.2	N/A	39940.1	51700.2	51700.2	48212.0

Confidence Level

Confidence Level of cost estimate for current APB: 55%

The Air Force Service Cost Position (SCP) for the KC-46A is at the mean of the cost estimate distribution (in this case the 55 percent confidence level). It takes into consideration all relevant program risks, providing sufficient resources to execute the program under normal conditions encountering average levels of technical, schedule, and programmatic risk and external influence.

Total Quantity			
Quantity	SAR Baseline Development Estimate	Current APB Development	Current Estimate
RDT&E	4	4	4
Procurement	175	175	175
Total	179	179	179

Cost and Funding

Funding Summary

Appropriation Summary									
FY 2017 President's Budget / December 2015 SAR (TY$ M)									
Appropriation	Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	To Complete	Total
RDT&E	5380.0	592.4	261.7	21.2	4.3	0.0	0.0	0.0	6259.6
Procurement	1465.6	2403.6	3056.8	3150.8	3216.1	3233.1	3292.7	18946.2	38764.9
MILCON	415.3	54.5	136.7	248.7	401.5	25.1	446.5	1459.2	3187.5
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2017 Total	7260.9	3050.5	3455.2	3420.7	3621.9	3258.2	3739.2	20405.4	48212.0
PB 2016 Total	7649.0	3062.6	3582.5	3511.0	3671.4	3292.6	3758.1	20382.3	48909.5
Delta	-388.1	-12.1	-127.3	-90.3	-49.5	-34.4	-18.9	23.1	-697.5

Funding Notes

The final production for the KC-46A Program is 179 aircraft. Four of these aircraft are funded with RDT&E dollars and the quantities are identified in FY 2011 in the table below, as this is where the contract was awarded. The remaining aircraft are to be purchased using Procurement funds.

Quantity Summary										
FY 2017 President's Budget / December 2015 SAR (TY$ M)										
Quantity	Undistributed	Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	To Complete	Total
Development	4	0	0	0	0	0	0	0	0	4
Production	0	7	12	15	15	15	15	15	81	175
PB 2017 Total	4	7	12	15	15	15	15	15	81	179
PB 2016 Total	4	7	12	15	15	15	15	15	81	179
Delta	0	0	0	0	0	0	0	0	0	0

Cost and Funding

Annual Funding By Appropriation

Annual Funding 3600 | RDT&E | Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2005	--	--	--	--	--	--	10.2
2006	--	--	--	--	--	--	10.1
2007	--	--	--	--	--	--	67.8
2008	--	--	--	--	--	--	16.7
2009	--	--	--	--	--	--	17.8
2010	--	--	--	--	--	--	305.1
2011	--	--	--	--	--	--	538.9
2012	--	--	--	--	--	--	818.9
2013	--	--	--	--	--	--	1550.3
2014	--	--	--	--	--	--	1496.0
2015	--	--	--	--	--	--	548.2
2016	--	--	--	--	--	--	592.4
2017	--	--	--	--	--	--	261.7
2018	--	--	--	--	--	--	21.2
2019	--	--	--	--	--	--	4.3
Subtotal	4	--	--	--	--	--	6259.6

Annual Funding 3600 | RDT&E | Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	BY 2011 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2005	--	--	--	--	--	--	11.4
2006	--	--	--	--	--	--	10.9
2007	--	--	--	--	--	--	71.6
2008	--	--	--	--	--	--	17.3
2009	--	--	--	--	--	--	18.2
2010	--	--	--	--	--	--	307.8
2011	--	--	--	--	--	--	533.5
2012	--	--	--	--	--	--	796.8
2013	--	--	--	--	--	--	1483.5
2014	--	--	--	--	--	--	1411.8
2015	--	--	--	--	--	--	512.2
2016	--	--	--	--	--	--	545.3
2017	--	--	--	--	--	--	236.6
2018	--	--	--	--	--	--	18.8
2019	--	--	--	--	--	--	3.7
Subtotal	4	--	--	--	--	--	5979.4

Annual Funding 3010 | Procurement | Aircraft Procurement, Air Force							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2014	--	--	--	--	--	9.5	9.5
2015	7	1138.0	--	--	1138.0	318.1	1456.1
2016	12	2070.4	--	--	2070.4	333.2	2403.6
2017	15	2553.3	--	--	2553.3	503.5	3056.8
2018	15	2692.9	--	--	2692.9	457.9	3150.8
2019	15	2639.8	--	--	2639.8	576.3	3216.1
2020	15	2643.4	--	--	2643.4	589.7	3233.1
2021	15	2824.2	--	--	2824.2	468.5	3292.7
2022	15	2987.0	--	--	2987.0	348.2	3335.2
2023	15	3008.1	--	--	3008.1	395.4	3403.5
2024	15	3060.1	--	--	3060.1	386.1	3446.2
2025	15	3190.1	--	--	3190.1	332.1	3522.2
2026	15	3310.5	--	--	3310.5	279.1	3589.6
2027	6	1605.5	--	--	1605.5	44.0	1649.5
Subtotal	175	33723.3	--	--	33723.3	5041.6	38764.9

Annual Funding 3010 | Procurement | Aircraft Procurement, Air Force							
Fiscal Year	Quantity	BY 2011 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2014	--	--	--	--	--	8.8	8.8
2015	7	1037.8	--	--	1037.8	290.1	1327.9
2016	12	1854.1	--	--	1854.1	298.4	2152.5
2017	15	2243.3	--	--	2243.3	442.3	2685.6
2018	15	2319.8	--	--	2319.8	394.5	2714.3
2019	15	2229.5	--	--	2229.5	486.7	2716.2
2020	15	2188.8	--	--	2188.8	488.2	2677.0
2021	15	2292.6	--	--	2292.6	380.3	2672.9
2022	15	2377.2	--	--	2377.2	277.1	2654.3
2023	15	2347.1	--	--	2347.1	308.5	2655.6
2024	15	2340.8	--	--	2340.8	295.4	2636.2
2025	15	2392.4	--	--	2392.4	249.1	2641.5
2026	15	2434.0	--	--	2434.0	205.2	2639.2
2027	6	1157.3	--	--	1157.3	31.7	1189.0
Subtotal	175	27214.7	--	--	27214.7	4156.3	31371.0

Cost Quantity Information 3010 | Procurement | Aircraft Procurement, Air Force		
Fiscal Year	**Quantity**	**End Item Recurring Flyaway (Aligned With Quantity) BY 2011 $M**
2014	--	--
2015	7	1037.8
2016	12	1854.1
2017	15	2243.2
2018	15	2319.8
2019	15	2229.5
2020	15	2188.8
2021	15	2292.6
2022	15	2377.2
2023	15	2347.1
2024	15	2340.9
2025	15	2392.4
2026	15	2434.0
2027	6	1157.3
Subtotal	175	27214.7

Annual Funding 3300 | MILCON | Military Construction, Air Force	
Fiscal Year	**TY $M** **Total Program**
2010	1.6
2011	2.6
2012	8.8
2013	--
2014	215.0
2015	145.4
2016	51.7
2017	37.2
2018	242.3
2019	401.5
2020	25.1
2021	446.5
2022	279.4
2023	368.2
2024	386.3
2025	273.4
2026	103.7
2027	37.3
2028	10.9
Subtotal	3036.9

Annual Funding 3300 | MILCON | Military Construction, Air Force	
Fiscal Year	**BY 2011 $M**
	Total Program
2010	1.6
2011	2.5
2012	8.4
2013	--
2014	197.8
2015	131.6
2016	45.9
2017	32.4
2018	207.1
2019	336.4
2020	20.6
2021	359.6
2022	220.6
2023	285.0
2024	293.1
2025	203.4
2026	75.6
2027	26.7
2028	7.6
Subtotal	2455.9

Annual Funding 3830 | MILCON | Military Construction, Air National Guard	
Fiscal Year	**TY $M**
	Total Program
2015	41.9
2016	2.8
2017	1.5
Subtotal	46.2

Annual Funding 3830 | MILCON | Military Construction, Air National Guard	
Fiscal Year	**BY 2011 $M**
	Total Program
2015	38.3
2016	2.5
2017	1.3
Subtotal	42.1

Annual Funding 3730 | MILCON | Military Construction, Air Force Reserve	
Fiscal Year	**TY $M** **Total Program**
2017	98.0
2018	6.4
Subtotal	104.4

Annual Funding 3730 | MILCON | Military Construction, Air Force Reserve	
Fiscal Year	**BY 2011 $M**
	Total Program
2017	86.2
2018	5.5
Subtotal	91.7

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	2/24/2011	4/30/2015
Approved Quantity	19	34
Reference	Milestone B ADM	DAE Brief
Start Year	2015	2015
End Year	2016	2017

The Current Total LRIP Quantity is more than 10% of the total production quantity and has been increased above the Milestone B ADM approved LRIP quantity of 19 aircraft because a greater quantity is now necessary to achieve a smooth production ramp and avoid production breaks/delays on the way to FRP.

The DAE verbally supported the increase of the approved LRIP quantity from 19 to 34 aircraft. This increase is the result of changing Lot 3 (15 aircraft) from an FRP lot to a LRIP lot.

Foreign Military Sales

Notes

Japan: On October 23, 2015, Japan announced its plan to purchase three KC-46A tankers. Japan's FY 2016 program budget of $185M was approved on December 23, 2015. The KC-46A Program Office anticipates the Letter of Request for case manpower and exportable configuration development in March 2016.

Israel: Israel submitted a request for Pricing and Availability (P&A) for four, six, or eight KC-46A aircraft; initial spares; support equipment; technical orders; mission planning system; and training on September 23, 2015. KC-46A Program Office forwarded P&A information to the Air Force Security Assistance and Cooperation Directorate on December 1, 2015. The Office of Deputy Under Secretary of the Air Force for International Affairs forwarded the response to Israel on December 19, 2015.

Korea: Extension of the October 29, 2014 P&A was provided on January 27, 2015 to facilitate continuation of the Republic of Korea Air Force source selection. On June 30, 2015, Korea selected the Airbus 330 Multi-Role Tanker Transport.

Nuclear Costs

None

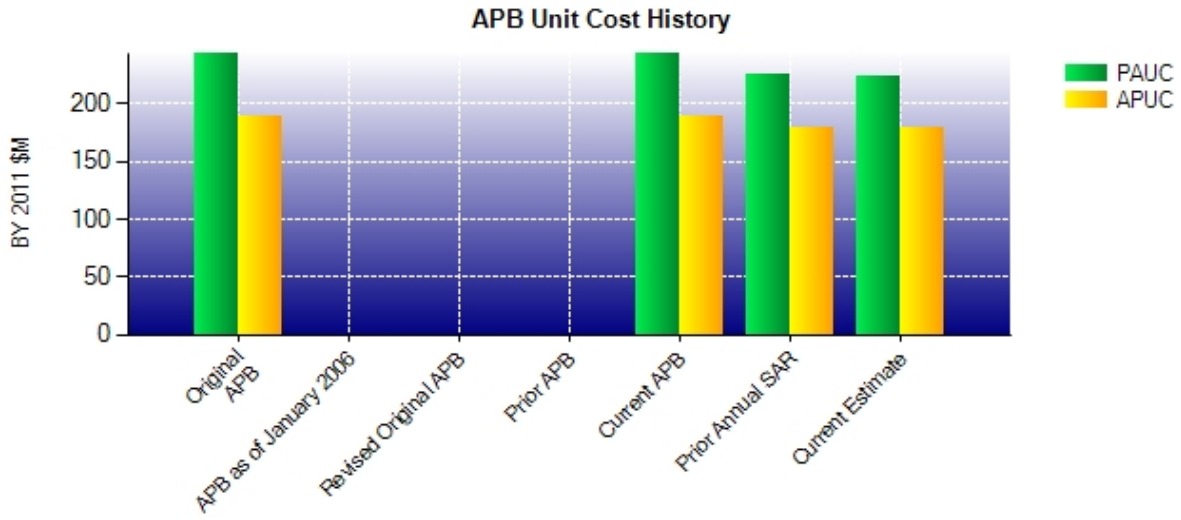
Unit Cost

Unit Cost Report

Item	BY 2011 $M Current UCR Baseline (Aug 2011 APB)	BY 2011 $M Current Estimate (Dec 2015 SAR)	% Change
Program Acquisition Unit Cost			
Cost	43518.2	39940.1	
Quantity	179	179	
Unit Cost	243.118	223.129	-8.22
Average Procurement Unit Cost			
Cost	33040.3	31371.0	
Quantity	175	175	
Unit Cost	188.802	179.263	-5.05

Item	BY 2011 $M Original UCR Baseline (Aug 2011 APB)	BY 2011 $M Current Estimate (Dec 2015 SAR)	% Change
Program Acquisition Unit Cost			
Cost	43518.2	39940.1	
Quantity	179	179	
Unit Cost	243.118	223.129	-8.22
Average Procurement Unit Cost			
Cost	33040.3	31371.0	
Quantity	175	175	
Unit Cost	188.802	179.263	-5.05

Unit Cost History



Item	Date	BY 2011 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	Aug 2011	243.118	188.802	288.828	229.920
APB as of January 2006	N/A	N/A	N/A	N/A	N/A
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	N/A	N/A	N/A	N/A	N/A
Current APB	Aug 2011	243.118	188.802	288.828	229.920
Prior Annual SAR	Dec 2014	225.075	179.057	273.237	222.882
Current Estimate	Dec 2015	223.129	179.263	269.341	221.514

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY $M)									
Initial PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
288.828	3.866	0.000	-0.009	0.000	-14.838	0.000	-8.506	-19.487	269.341

Current SAR Baseline to Current Estimate (TY $M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
229.920	3.339	0.000	-0.010	0.000	-3.063	0.000	-8.672	-8.406	221.514

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone A	N/A	N/A	N/A	N/A
Milestone B	N/A	Feb 2011	N/A	Feb 2011
Milestone C	N/A	Aug 2015	N/A	Apr 2016
RAA	N/A	Aug 2017	N/A	Aug 2017
Total Cost (TY $M)	N/A	51700.2	N/A	48212.0
Total Quantity	N/A	179	N/A	179
PAUC	N/A	288.828	N/A	269.341

Cost Variance

Summary TY $M				
Item	**RDT&E**	**Procurement**	**MILCON**	**Total**
SAR Baseline (Development Estimate)	7149.6	40236.0	4314.6	51700.2
Previous Changes				
Economic	+22.4	+888.2	+126.0	+1036.6
Quantity	--	--	--	--
Schedule	--	-1.7	--	-1.7
Engineering	--	--	--	--
Estimating	-595.7	+262.5	-1105.7	-1438.9
Other	--	--	--	--
Support	-6.1	-2380.6	--	-2386.7
Subtotal	-579.4	-1231.6	-979.7	-2790.7
Current Changes				
Economic	-15.2	-303.9	-25.4	-344.5
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-296.6	-798.6	-122.0	-1217.2
Other	--	--	--	--
Support	+1.2	+863.0	--	+864.2
Subtotal	-310.6	-239.5	-147.4	-697.5
Total Changes	-890.0	-1471.1	-1127.1	-3488.2
CE - Cost Variance	6259.6	38764.9	3187.5	48212.0
CE - Cost & Funding	6259.6	38764.9	3187.5	48212.0

Summary BY 2011 $M				
Item	**RDT&E**	**Procurement**	**MILCON**	**Total**
SAR Baseline (Development Estimate)	6804.2	33040.3	3673.7	43518.2
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	+0.3	--	-53.4	-53.1
Engineering	--	--	--	--
Estimating	-542.3	+172.0	-920.6	-1290.9
Other	--	--	--	--
Support	-8.3	-1877.4	--	-1885.7
Subtotal	-550.3	-1705.4	-974.0	-3229.7
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-275.3	-647.7	-110.0	-1033.0
Other	--	--	--	--
Support	+0.8	+683.8	--	+684.6
Subtotal	-274.5	+36.1	-110.0	-348.4
Total Changes	-824.8	-1669.3	-1084.0	-3578.1
CE - Cost Variance	5979.4	31371.0	2589.7	39940.1
CE - Cost & Funding	5979.4	31371.0	2589.7	39940.1

Previous Estimate: December 2014

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-15.2
Decrease in FY 2014 funding due to Above Threshold Reprogramming to KC-46A Procurement. (Estimating)	-8.9	-9.5
Revised Aircrew Training Systems estimate to reflect updated execution plan. (Estimating)	-7.6	-8.1
Decrease in FY 2015 and FY 2016 due to Congressional reduction and efficiency cut. (Estimating)	-210.0	-225.0
Increase in Government test costs based on updates to the execution strategy. (Estimating)	+230.3	+252.4
Decrease in FY 2015 funding due to Small Business Innovation Research. (Estimating)	-21.7	-23.2
Decrease in FY 2017 - FY 2019 as a result of DoD budgetary adjustments. (Estimating)	-2.6	-2.8
Revised FY 2017 estimate as a result of risk reduction given the program's stable execution to date. (Estimating)	-45.2	-50.0
Revised estimate for Maintenance Training Systems to reflect latest execution plan. (Estimating)	-13.1	-15.2
Revised POE to reflect program realignments resulting from execution changes. (Estimating)	-227.6	-248.9
Revised estimate for Program Management Administration to reflect updates to execution plan and program schedule. (Estimating)	+16.9	+18.5
Adjustment for current and prior escalation. (Estimating)	+11.9	+12.7
Revised estimate to reflect the application of new outyear escalation indices. (Estimating)	+2.3	+2.5
Revised estimate for Direct Mission Support based on updates to program schedule. (Support)	+0.8	+1.2
RDT&E Subtotal	-274.5	-310.6

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-303.9
Decrease in FY 2017 - FY 2021 as a result of DoD budgetary adjustments. (Estimating)	-104.2	-123.2
Congressional reduction in FY 2015. (Estimating)	-106.9	-117.1
Revised POE to reflect program realignments resulting from execution changes. (Estimating)	-655.2	-829.4
Adjustment for current and prior escalation. (Estimating)	+22.1	+24.4
Revised estimate to reflect the application of new outyear escalation indices. (Estimating)	+196.5	+246.7
Adjustment for current and prior escalation. (Support)	+4.1	+4.7
Increase in Other Support due to increases in Interim Contractor Support, Depot Standup, and decreases in Aircrew Training Systems, Operational Site Activation, Support Equipment, Program Management Administration, and Mission Support Costs. (Support)	+600.4	+770.9
Increase in Initial Spares due to DoD budgetary adjustments and an increase in the estimated spares requirement. (Support)	+79.3	+87.4
Procurement Subtotal	+36.1	-239.5

MILCON	$M

Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-25.4
Increase in FY 2011 - FY 2012 funding as a result of reprogramming efforts. (Estimating)	+2.1	+2.2
Decrease in FY 2014 funding as a result of reprogramming efforts. (Estimating)	-32.2	-35.0
Increase in FY 2017 and FY 2021 funding as a result of Main Operating Base #1 and Flight Training Unit projects. (Estimating)	+7.7	+9.3
Decrease in FY 2017 - FY 2020 funding as a result of selection of Main Operating Base #3 and associated site survey. (Air Force Reserve Command). (Estimating)	-106.1	-123.9
Adjustment for current and prior escalation. (Estimating)	+3.0	+3.2
Revised estimate to reflect the application of new outyear escalation indices. (Estimating)	+120.8	+144.3
Revised estimate to reflect the application of new outyear escalation indices. (Estimating)	-105.3	-122.1
MILCON Subtotal	-110.0	-147.4

Contracts

Contract Identification

Appropriation: RDT&E

Contract Name: KC-46A Engineering and Manufacturing Development

Contractor: The Boeing Company

Contractor Location: 7755 E Marginal Way S
Seattle, WA 98108-4002

Contract Number: FA8625-11-C-6600

Contract Type: Fixed Price Incentive(Firm Target) (FPIF)

Award Date: February 24, 2011

Definitization Date: February 24, 2011

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
4327.3	4831.0	4	4321.4	4824.5	4	4824.5	4824.5

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to a contractual modification (P00033) signed by the Program Office and the Contractor on March 31, 2014. This contractual modification reduced the target price by $5.9M and reduced the ceiling price by $6.5M, due to the removal of certain Live Fire Test Assets. This contractual modification was updated in the Earned Value data and reduced the ceiling price of the FPIF contract from $4,831M to $4,824.5M.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (1/28/2016)	-23.2	-123.4
Previous Cumulative Variances	-320.6	-802.0
Net Change	+297.4	+678.6

Cost and Schedule Variance Explanations

The favorable net change in the cost variance is due to implementation of an Over Target Baseline (OTB) to the program.

The favorable net change in the schedule variance is due to implementation of an Over Target Baseline (OTB) to the program. The 767-2C Boeing Commercial cumulative schedule variance was due to the delayed completion of 4 internal milestones.

Notes

The Contractor's current Estimated Price at Completion reflects the existing contract scope.

Contract Identification

Appropriation: RDT&E

Contract Name: KC-46A Engineering and Manufacturing Development

Contractor: The Boeing Company

Contractor Location: 7755 E Marginal Way S
Seattle, WA 98108-4002

Contract Number: FA8625-11-C-6600/1

Contract Type: Firm Fixed Price (FFP)

Award Date: February 24, 2011

Definitization Date: February 24, 2011

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
66.6	N/A	N/A	80.3	N/A	N/A	80.3	80.3

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to some contract modifications for studies, and support equipment.

On January 14, 2013, a modification (P00022), was issued in the amount of $2.1M for the Cargo Restraint Alternate Location study, increasing the price of this FFP contract from $66.6M to $68.7M.

On October 6, 2014, a modification (P00049) was issued in the amount of $3.1M for the Hi-Strength Pallet Locks and Movable Smoke Barrier Verification / Certification Engineering study, increasing the contract price of this FFP contract from $68.7M to $71.8M

On February 6, 2015, a modification (P00052) was issued in the amount of $184K for additional support equipment, increasing the contract price of this FFP contract from $71.8M to $72.0M.

On September 18, 2015, a modification (P00066) was issued in the amount of $1.0M for the Characterization of Data Exchange study, increasing the contract price of this FFP contract from $72.0M to $73.0M.

On December 23, 2015, a modification (P00074) was issued in the amount of $7.3M for the Integrated Broadcast Service Common Interactive Broadcast study, increasing the contract price of this FFP contract from $73.0M to $80.3M.

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FFP) contract.

Contract Identification

Appropriation: Procurement

Contract Name: KC-46A Production Contract

Contractor: Boeing

Contractor Location: P.O. Box 3707
Seattle, WA 98214

Contract Number: FA8625-11-C-6600/3

Contract Type: Firm Fixed Price (FFP)

Award Date: February 24, 2011

Definitization Date: December 10, 2014

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
119.4	N/A	0	108.8	N/A	0	108.8	108.8

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to a reduction in scope when the Undefinitized Contract Action was definitized.

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FFP) contract.

Notes

On December 10, 2014, contract modification P00054 was signed by both the Program Office and the Contractor. This contractual modification in the amount of $84.5M represents the Undefinitized Contract Action (UCA) to purchase Support Equipment and Production Spares in advance of Milestone C as approved in the ADM signed on October 17, 2014.

On December 17, 2014, contract modification P00057 was signed by both the Program Office and the Contractor. This contractual modification in the amount of $34.9M represents the Interim Contractor Support Year 1 option.

On November 9, 2015, contract modification P00067 was signed by both the Program Office and the Contractor. This contractual modification reduced the price of the P00054 UCA by $10.6M due to a reduction in scope.

Contract Identification

Appropriation: RDT&E

Contract Name: KC-46A Aircrew Training Systems - Engineering and Manufacturing Development

Contractor: FlightSafety Services Corporation

Contractor Location: 10770 E. Briarwood Ave. Suite 100
Centennial, CO 80112-3807

Contract Number: FA8621-13-C-6247/0

Contract Type: Fixed Price Incentive(Firm Target) (FPIF), Firm Fixed Price (FFP)

Award Date: May 01, 2013

Definitization Date: May 01, 2013

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
78.4	86.6	N/A	78.4	86.6	N/A	86.6	86.6

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2015)	-6.2	-3.1
Previous Cumulative Variances	-1.7	-3.1
Net Change	-4.5	+0.0

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to a lack of mature aircraft data, primarily for the Weapons System Trainer subsystems such as the cockpit student station, computer systems, and aircraft systems. Additional costs to develop alternative solutions were incurred to maintain schedule. Additionally, the Contractor has elected to include their FFP CLIN efforts for program management in the program baseline and additional cost overruns have been associated with this effort.

The unfavorable net change in the schedule variance is due to a lack of mature aircraft data and defined operational procedures needed for design and engineering efforts. The Boom Operator Training device subsystem development is a significant contributor to this variance. The Weapon System Training sub-systems contribute to this variance as well.

Notes

The Aircrew Training System contract (FA8621-13-C-6247) contains both FPIF and FFP CLINs. While Earned Value data is not required on the FFP efforts, the Contractor has included actual performance in the monthly Earned Value data.

Contract Identification

Appropriation: MILCON

Contract Name: KC-46A MILCON (McConnell AFB)

Contractor: Archer Western Aviation Partners

Contractor Location: 929 W. Adams St.
Chicago, IL 60607-3021

Contract Number: W912DQ-14-C-4006

Contract Type: Firm Fixed Price (FFP)

Award Date: May 22, 2014

Definitization Date: May 22, 2014

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
143.7	N/A	N/A	147.2	N/A	N/A	147.2	147.2

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to contract modifications being awarded for additional MILCON projects.

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FFP) contract.

Notes

This contract will be a Design-Bid-Build of the 3-Bay General Purpose Hangar, Aircraft Parking Apron, 2-bay Corrosion Control/Fuel Cell Hangar and General Maintenance Hangar located at McConnell AFB Kansas.

As of December 14, 2015, additional contract modifications have been awarded, increasing the original contract price from $143.7 to $147.2M.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	4	0.00%
Production	0	0	175	0.00%
Total Program Quantity Delivered	0	0	179	0.00%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	48212.0	Years Appropriated	12
Expended to Date	4300.8	Percent Years Appropriated	50.00%
Percent Expended	8.92%	Appropriated to Date	10311.4
Total Funding Years	24	Percent Appropriated	21.39%

The above data is current as of February 09, 2016.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	October 31, 2014
Source of Estimate:	POE
Quantity to Sustain:	168
Unit of Measure:	Aircraft
Service Life per Unit:	40.00 Years
Fiscal Years in Service:	FY 2016 - FY 2069

In support of the Milestone B decision in February 2011, the Air Force developed a SCP. The MDA approved baselining the KC-46A program to this SCP. In October 2014, the KC-46A Division accomplished an update to this SCP in its third POE. This SAR reflects the POE update. Due to a program schedule rebaseline and an impending MS C estimate, the CY 2015 POE was waived. The MS C POE is currently in work and will be used to reconcile to a Service Cost Position and inform the MS C decision.

The KC-46A Program has 168 Primary Aircraft Authorized (PAA) and 11 back-up aircraft. The O&S estimate is based on the 168 PAA.

Sustainment Strategy

The KC-46A sustainment strategy will use United States Air Force (USAF) Two-Level logistics concepts supported by the USAF maintenance and logistics support structures and Organizational, Maintenance, Installation, and Training data rights. The sustainment strategy will use a Contractor Supported Weapons System concept during EMD, transitioning to an organic/performance-based logistics posture as soon as sustainable organic capabilities are established during production. Organizational-level maintenance will be done by Air Force personnel with assistance of contractor Field Service Representatives and supported by contractor Logistics Support Representatives beginning with Initial Operational Test and Evaluation. The most critical organic capabilities are planned for incremental stand-up during Interim Contractor Support. The Depot-level (C-Check) capability stand-up is targeted not later than two years after first production aircraft delivery. Subsequent depot operations will expand incrementally based upon the Depot Maintenance Activation Working Group developed activation plan. The KC-46A Program Office will closely coordinate with the Air Force Sustainment Center to facilitate planning, execution, and evaluation of the C-Check process and the follow-on stand-up of commodity support capability.

Antecedent Information

KC-135R&T is the antecedent system.

KC-135R&T costs have been normalized to reflect the average of 670 annual flying hours per aircraft in the KC-46A POE. KC-135R&T average annual cost per aircraft reflects actual FY 2014 costs reported in the Air Force Total Ownership Cost system (budget constrained). Most FY 2014 costs reflect the current state of KC-135R&T; however, there are a few exceptions, such as modification costs in Continuing System Improvements, where the FY 2014 KC-135R&T costs are lower than in previous years.

Annual O&S Costs BY2011 $M		
Cost Element	**KC-46A Average Annual Cost Per Aircraft**	**KC-135R&T (Antecedent) Average Annual Cost Per Aircraft**
Unit-Level Manpower	4.452	3.234
Unit Operations	4.069	3.969
Maintenance	3.045	3.793
Sustaining Support	0.512	0.189
Continuing System Improvements	0.894	0.072
Indirect Support	--	--
Other	--	--
Total	12.972	11.257

KC-46A costs shown in comparison with actual costs for the antecedent system, KC-135 R&T, reflect estimated average annual cost per aircraft.

The "Annual O&S Costs BY2011$M" comparison above excludes "Indirect Support" costs because these costs are not allocated to KC-135 R&T-specific Program Elements in the Air Force Total Ownership Cost system. However, these costs are included in the KC-46A Total O&S costs.

While the comparison is to FY 2014 actual KC-135 R&T costs, the Air Force projects KC-135 R&T O&S costs to increase, surpassing projected KC-46A O&S costs by FY 2020. This projected increase is not reflected in the “Annual O&S Costs BY 2011 $M” table above. This comparison is also not adjusted for the capability differences that exist between the two systems nor does it recognize the cost savings that may be realized due to the commerciality of the KC-46A aircraft (the KC-46A is derived from a commercial Boeing 767 variant). Because the 767 was designed to be cost competitive in the commercial marketplace, it is anticipated that the aircraft’s commercial efficiencies will facilitate improvement in the military operational costs for the KC-46A. In addition, the KC-46A has significantly more aerial refueling offload capability per aircraft compared to the KC-135 R&T and is a multi-role aircraft with significant secondary missions associated with airlift and aeromedical evacuation. The KC-46A can also provide boom/drogue refueling on the same sortie, and has enhanced net ready and survivability capabilities.

Item	Total O&S Cost $M			
	KC-46A			KC-135R&T (Antecedent)
	Current Development APB Objective/Threshold		Current Estimate	
Base Year	92720.6	101992.7	**104428.4**[1]	N/A
Then Year	182877.7	N/A	184068.6	N/A

[1] *APB O&S Cost Breach*

KC-46A total O&S cost ($M) in the “Total O&S Cost $M” table above reflects the October 2014 POE total O&S costs for FY 2016 - FY 2069. Total KC-46A O&S cost is not a simple extrapolation of the KC-46A average annual cost per aircraft shown in the preceding “Annual O&S Costs BY 2011 $M” table due to the exclusion of "Indirect Costs" associated with the KC-135 R&T. The KC-46A POE reflects the following assumptions: 168 PAA, 40-year service life, steady state beginning in FY 2029, and peacetime operations tempo with average annual flying hours of 489 hours per PAA through FY 2019, and 670 hours per PAA from FY 2020 and beyond. The KC-46A POE is based on legacy fleet history where KC-46A specific data is not available. A comparable total O&S cost for the antecedent system, KC-135 R&T, is not available.

Equation to Translate Annual Cost to Total Cost

Total KC-46A Aircraft O&S (BY 2011$M) = [unitized cost ($12.972M) x 40 operational aircraft years x 168 PAA] + Total O&S Indirect Support costs (excluded from the unitized cost comparison above to allow for a normalized comparison) + phase-in and phase-out costs (as aircraft are fielded and later retired).

O&S Cost Variance		
Category	**BY 2011 $M**	**Change Explanations**
Prior SAR Total O&S Estimates - Dec 2014 SAR	104428.4	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	0.0	
Current Estimate	104428.4	

Disposal Estimate Details

Date of Estimate: October 31, 2014

Source of Estimate: POE

Disposal/Demilitarization Total Cost (BY 2011 $M): Total costs for disposal of all Aircraft are 14.8

The KC-46A POE assumed that upon retirement at the end of the 40-year service life, each KC-46A aircraft would enter flyable storage at the Aircraft Maintenance and Regeneration Group and will be disposed after a period of five years.