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



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

As of FY 2021 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

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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)
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

Program Information

Program Name

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

DoD Component

Air Force

Responsible Office

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Date Assigned: June 21, 2019

References

SAR Baseline (Production Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated January 13, 2017

Approved APB

Air Force Acquisition Executive (AFAE) Approved Acquisition Program Baseline (APB) dated March 8, 2019

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 freighter floor 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

On January 10, 2019, the Air Force accepted the first KC-46A aircraft. As of December 31, 2019, twenty-seven aircraft have been delivered, twenty to McConnell Air Force Base (AFB), Kansas, five to Altus AFB, Oklahoma and two to Pease Air National Guard Base (ANGB), New Hampshire.

The EMD contract is 95.3% complete. Government funding has been stable.

In September 2019 the Program Office submitted an Exception SAR due to a schedule change in Initial Operational Test and Evaluation (IOT&E) Start, from March 2019 to October 2019. Three Category-1 Deficiencies (two related to the Remote Vision System (RVS) and one for the stiff boom) were the root cause of the schedule change as they delayed receiver certifications needed to complete Operational Test Readiness Review (OTRR) approval. Formal approval of OTRR and achievement of the baselined IOT&E Start schedule milestone occurred in October 2019, one month later than the APB threshold date of September 2019. A Program Deviation Report was submitted identifying the schedule breach with a recommendation to take no further action regarding the schedule baseline as the remaining program schedule milestones, despite increased risk, are estimated to be within their respective APB threshold dates.

The KC-46 Program continues to work on resolving the Category-I deficiencies associated with the RVS and the stiff refueling boom. The KC-46 Program Office expects that it will take 3 to 4 years for Boeing to develop design solutions for these issues and a few more years to retrofit existing aircraft. For the RVS, Boeing agreed to fixes at their expense. The government will pay for the boom fix and an undefinitized contract action was placed on contract on August 2, 2019. The Program Office closed a separate Category-I deficiency regarding cargo locks in December 2019. Retrofits with new cargo locks are underway and expected to be complete in May 2020.

Test:

Additional receiver certification tests at Edwards Air Force Base started in January 2019 and continued through December 2019, resulting in completed aerial refueling certification tests for the following pairs: F-16, C-17, KC-46A, B-52, F/A-18C/D, F-15, KC/TC-135(T/R), F-35A, C-5M, C-130, MV/CV-22, and F-18E/F. A KC-46A deployment to Naval Air Station Patuxent River was conducted in February 2019 to evaluate a Centerline Drogue System upgrade to correct a previously identified deficiency. Flight testing at Pax River was completed within one week with an F/A-18 and demonstrated a successful correction. Wing Aerial Refueling Pod (WARP) specification compliance testing, and F/A-18C/D WARP receiver certification testing were completed late summer through fall of 2019. Additional WARP testing towards Federal Aviation Administration certification and military airworthiness certification will take place through the summer of 2020.

Production:

The Air Force exercised the contract options for Lot 5, 15 aircraft, in September 2019. As a result, the Air Force has a total of 71 aircraft on contract. 67 are funded with production appropriation and 4 are funded with development appropriation. Production of the 1st FMS aircraft, VH401 for Japan, continues in the 767-2C build process.

Sustainment:

The Sustainment team currently is supporting twenty- seven fielded aircraft at two Main Operating Bases (McConnell & Pease) and one training base (Altus). The KC-46A continues to work through multiple challenges within the supply chain areas addressing issues and concerns with utilizing a contractor inventory control point and a government inventory control point. With support from Defense Logistics Agency and 448th Supply Chain Management Wing, the program managed to resolve several critical issues facing the operational bases from potential delivery of excessive spares and consumables, preventing a disruption in ongoing operations. The program continues to deliver support equipment and to date has delivered over 10,000 part numbers. Depot activation actions are ongoing with four successful Depot Maintenance Activation Working Groups occurring in 2019. The Depot activation team finalized the critical path to the first organic C-Check, a depot level scheduled inspection, scheduled for mid-FY 2020. Technical manual distribution systems are in place at all current KC-46

locations.

Training:

The KC-46 Aircrew Training System (ATS) program delivered device suites to Altus AFB, McConnell AFB, Pease ANGB and Seymour Johnson AFB in CY2019. The government certified and accepted Weapon System Trainer (WST) and Boom Operator Trainer (BOT) at McConnell AFB and Fuselage Trainer (FuT) at Pease ANGB. The ATS program was declared Ready For Training on July 31, 2019. The first Pilot Transition Course/ Boom Operator Transition Course began August 5, 2019 and completed October 25, 2019.

The KC-46 Maintenance Training System (MTS) program successfully completed ten Integrated Multimedia Instruction course Small Group Tryouts, culminating in the DD-250 of the first MTS course, Mission Ready Airmen (MRA). The first MRA course at McConnell AFB was taught August 20, 2019 and completed November 4, 2019.

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

History of Significant Developments Since Program Initiation	
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History of Significant Developments Since Program Initiation	
Date	Significant Development Description
February 2011	The USD(AT&L) conducted a successful Milestone B DAB.
February 2011	The USD(AT&L) signed the APB reflecting the Milestone B approval.
February 2011	The Boeing Company was awarded the KC-46A contract. The Fixed-Price Incentive Firm contract was awarded for the EMD 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.
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 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.
June 2012	Deputy Assistant Secretary of Defense, Systems Engineering, validated successful completion of PDR.
July 2013	The KC-46A Program successfully completed the planned Weapon System 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.
September 2013	The KC-46A ATS conducted a System Requirement Review and SFR.
September 2015	EMD-2 completed a major milestone, KC-46A First Flight.
November 2015	EMD-2 deployed the boom and both drogue systems in flight for the first time.
January 2016	EMD-2 completed the first KC-46A aerial refueling by offloading 1,600 pounds of fuel to an F-16C.
February 2016	EMD-2 completed fuel transfer with F/A-18 aircraft.
February 2016	EMD-2 completed KC-10 fuel transfer conducted with KC-46A as a receiver.
May 2016	MDA notified of Milestone B APB schedule breach to IOT&E Start.
June 2016	KC-46A ATS successfully completed full system CDR.
July 2016	EMD-4 completed fuel transfer to the F-16C, C-17A, and A-10C aircrafts with the boom axial load fix in-place.
August 2016	Program accomplished Milestone C.
December 2016	Boeing delivered new KCR-0800 schedule, Required Assets Available slipped to October 2018.
November 2017	KC-46A delegated to ACAT IC program.
December 2017	Federal Aviation Administration (FAA) issued KC-46A Amended Type Certificate.

September 2018	FAA issued KC-46A Supplemental Type Certificate.
November 2018	Air Force issued Military Flight Release for KC-46A.
November 2018	Completed flight testing of eight receiver aircraft for aerial refueling certification.
December 2018	Received approval of F-16, C-17, and KC-46A (receiving fuel from a KC-135) receiver certifications.
January 2019	Air Force accepted first KC-46A aircraft on January 10, 2019.
January 2019	First KC-46A aircraft delivery to McConnell AFB January 25, 2019.
February 2019	First KC-46A aircraft delivery to Altus AFB February 8, 2019.
February 2019	KC-46A deliveries halted due to Foreign Object Debris (FOD) issues at Boeing
April 2019	Air Force resumed KC-46A deliveries after Boeing implemented additional corrective actions and finalized a FOD Corrective Action Plan with the government.
May 2019	The KC-46A Program began dedicated operational test with AFOTEC's execution of the IOT&E Test Plan.
August 2019	First KC-46A aircraft delivery to Pease Air National Guard Base August 8, 2019
October 2019	Operational Test Readiness Review approved and IOT&E Start schedule milestone achieved.

Threshold Breaches

APB Breaches

Schedule		<input checked="" type="checkbox"/>
Performance		<input type="checkbox"/>
Cost	RDT&E	<input type="checkbox"/>
	Procurement	<input type="checkbox"/>
	MILCON	<input type="checkbox"/>
	Acq O&M	<input type="checkbox"/>
O&S Cost		<input type="checkbox"/>
Unit Cost	PAUC	<input type="checkbox"/>
	APUC	<input type="checkbox"/>

Explanation of Breach

A schedule breach occurred for IOT&E Start because the receiver certifications needed to complete Operational Test Readiness Review (OTRR) approval were delayed, primarily due to three Category-1 Deficiencies (two related to the Remote Vision System, and one for the stiff boom). Formal approval of OTRR occurred on October 22, 2019, and the IOT&E Start milestone has been achieved. A Program Deviation Report was submitted in October 2019.

Nunn-McCurdy Breaches

Current UCR Baseline		
	PAUC	None
	APUC	None
Original UCR Baseline		
	PAUC	None
	APUC	None

Schedule



Schedule Events				
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate
Milestone B and Contract Award	Feb 2011	Feb 2011	Feb 2011	Feb 2011
Milestone C	Aug 2016	Aug 2016	Aug 2016	Aug 2016
IOT&E Start	Nov 2017	Mar 2019	Sep 2019	Oct 2019¹
FRP Decision	Aug 2019	Apr 2020	Oct 2020	Sep 2020 (Ch-1)
RAA	Oct 2018	Jun 2020	Feb 2021	Dec 2020 (Ch-2)

¹ APB Breach

Change Explanations

(Ch-1) The current estimate for FRP Decision changed from July 2020 to September 2020 due to Initial Operational Test & Evaluation execution delays associated with Remote Vision System and stiff air refueling boom Category-I deficiencies.
 (Ch-2) The current estimate for RAA changed from June 2020 to December 2020 due to contractor delays in the qualification testing of the Wing Aerial Refueling Pods.

Notes

- 1/ The KC-46 Program began dedicated operational test with Air Force Operational Test and Evaluation Center's execution of the IOT&E Test Plan in May 2019. The IOT&E Start milestone occurred on October 22, 2019, with formal approval of the Operational Test Readiness Review.
- 2/ RAA is being used as a surrogate for Initial Operating Capability. RAA is defined as 18 aircraft meeting the final product baseline established at Physical Configuration Audit, two spare engines delivered, and nine ship sets of wing aerial refueling pods in place.
- 3/ The RAA threshold date is eight months beyond the objective date based on KC-46 Program Office schedule analysis of the contractor trends and past performance, to include risks associated with the certification of the wing aerial refueling pods.

Acronyms and Abbreviations

FAA - Federal Aviation Administration
IOT&E - Initial Operational Test and Evaluation
RAA - Required Assets Available

Performance

Performance Characteristics				
SAR Baseline Production Estimate	Current APB Production Objective/Threshold	Demonstrated Performance	Current Estimate	
Tanker Air Refueling Capability				
The aircraft should be capable of accomplishing air refueling of all current and programmed fixed-wing and 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. The aircraft shall be able to effectively conduct (non-simultaneously) both boom and drogue air refuelings on the same mission. While engaged, the KC-46A 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 fixed wing and tilt rotor receiver aircraft.	The aircraft should be capable of accomplishing air refueling of all current and programmed fixed-wing and 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. The aircraft shall be able to effectively conduct (non-simultaneously) both boom and drogue air refuelings on the same mission. While engaged, the KC-46A 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 fixed wing and tilt rotor receiver aircraft.	The aircraft shall be capable of accomplishing 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-simultaneously) both boom and drogue air refuelings on the same mission. While engaged, the KC-46A 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.	SVR was conducted in 1QCY19 confirming non-compliance with requirements in the aerial refueling system specific to the Remote Vision System (RVS). Redesign efforts are currently underway to improve functionality of RVS to meet Critical Performance Parameters in order to resolve non-compliance's. At completion, we will provide demonstrated performance for this KPP.	Will meet or exceed Current APB Threshold. (Ch-1)
Fuel Offload versus Radius				
The aircraft shall be capable, as a minimum, of an offload versus radius as depicted in Figure 5.1; exceed offload/radius as	The aircraft shall be capable, as a minimum, of an offload versus radius as depicted in Figure 5.1; exceed offload/radius as	The aircraft shall be capable, as a minimum, of an offload versus radius as depicted in Figure 5.1. Radius is defined as standard day	TBD. SVR projected to complete in 4QCY 2020.	Will meet or exceed Current APB Objective. (Ch-1)

depicted in Figure 5.1. Radius is defined as standard day takeoff, fly to the AR track, orbit for one hour, offload fuel, and return to original base with required reserve fuel. Aircraft should operate with maximum fuel efficiency within current aviation technology, without any degradation to mission/aircraft performance.	depicted in Figure 5.1. Radius is defined as standard day takeoff, fly to the AR track, orbit for one hour, offload fuel, and return to original base with required reserve fuel. Aircraft should operate with maximum fuel efficiency within current aviation technology, without any degradation to mission/aircraft performance.	takeoff, fly to the AR track, orbit for one hour, offload fuel, and return to original base with required reserve fuel. Aircraft should operate with maximum fuel efficiency within current aviation technology, without any degradation to mission/aircraft performance.		
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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 requirements, 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 communications.	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 requirements, 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 communications.	(T=O) 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 requirements, 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 communications.	TBD. SVR projected to complete in 4QCY 2020.	Will meet or exceed Current APB Objective.	(Ch-1)
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Airlift Capability

The aircraft shall be capable of efficiently transporting equipment and personnel and fit seamlessly into the Defense Transportation System. The aircraft's entire main cargo deck must be convertible to an all cargo configuration that accommodates 463L pallets, an all passenger configuration (plus baggage) (or equivalent AE capability to include	The aircraft shall be capable of efficiently transporting equipment and personnel and fit seamlessly into the Defense Transportation System. The aircraft's entire main cargo deck must be convertible to an all cargo configuration that accommodates 463L pallets, an all passenger configuration (plus baggage) (or equivalent AE capability to include	(T=O) The aircraft shall be capable of efficiently transporting equipment and personnel and fit seamlessly into the Defense Transportation System. The aircraft's entire main cargo deck must be convertible to an all cargo configuration that accommodates 463L pallets, an all passenger configuration (plus baggage) (or equivalent AE capability to include	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	Will meet or exceed Current APB Objective.	(Ch-1)
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ambulatory and/or patient support pallets), and must optimize a full range of palletized cargo, passengers, and AE configurations that fully and efficiently utilize all available main deck space.	ambulatory and/or patient support pallets), and must optimize a full range of palletized cargo, passengers, and AE configurations that fully and efficiently utilize all available main deck space.	ambulatory and/or patient support pallets), and must optimize a full range of palletized cargo, passengers, and AE configurations that fully and efficiently utilize all available main deck space.	processes employed by AMC on other airlift aircraft was also completed.	
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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. SVR projected to complete in 4QCY 2020.	Will meet or exceed Current APB Objective.	(Ch-1)
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Force Protection

Aircraft shall be able to operate in chemical and biological environments.	Aircraft shall be able to operate in chemical and biological environments.	(T=O) Aircraft shall be able to operate in chemical and biological environments.	TBD. SVR projected to complete in 4QCY 2020.	Will meet or exceed Current APB Objective.	(Ch-1)
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Net-Ready

The KC-46 Program Office will provide installed performance values to the Joint Interoperability Test Command at the Operational Test Readiness Review upon completion of developmental testing and evaluation. These installed performance values will facilitate JITC's joint interoperability certification during Initial Operational Testing and Evaluation. The NR-KPP shall be satisfied following a performance assessment of the system capability as defined in the CPD NR-KPP attribute table.	The KC-46 Program Office will provide installed performance values to the Joint Interoperability Test Command at the Operational Test Readiness Review upon completion of developmental testing and evaluation. These installed performance values will facilitate JITC's joint interoperability certification during Initial Operational Testing and Evaluation. The NR-KPP shall be satisfied following a performance assessment of the system capability as defined in the CPD NR-KPP attribute table.	(T=O) The KC-46 Program Office will provide installed performance values to the Joint Interoperability Test Command at the Operational Test Readiness Review upon completion of developmental testing and evaluation. These installed performance values will facilitate JITC's joint interoperability certification during Initial Operational Testing and Evaluation. The NR-KPP shall be satisfied following a performance assessment of the system capability as defined in the CPD NR-KPP attribute table.	TBD. SVR projected to complete in 4QCY 2020.	Will meet or exceed Current APB Objective.	(Ch-1)
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Survivability

<p>Aircraft Self-Protection Measures (SPM). Tanker aircraft shall be able to operate in hostile environments as discussed in section 2 and AFTTP 3-3.22B. SPM shall provide automated protection against IR threats as described in AMC Annex to LAIRCM ORD 314-92 dated 25 Jan 2001. SPM shall provide automated protection against radio frequency (RF) threats as described in the Advanced Situational Awareness and Countermeasures (ASACM) CDD, 22 May 06, with the exception of Reduction in Lethality values in Table 28. 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 countermeasures and DS to avoid potential threats as discussed in ASACM CDD. The aircraft system shall support use of existing night vision devices and laser eye protection devices. KC-46A must be capable of flying tanker tactical profiles as specified in MCM 3-1, Vol 22, AF Tactics, Training, Procedures (U), Jun 03 (S//NF). The aircraft shall be capable of takeoff, landing, and air refueling, as a tanker and receiver in an NVIS environment. The KC-</p>	<p>Aircraft Self-Protection Measures (SPM). Tanker aircraft shall be able to operate in hostile environments as discussed in section 2 and AFTTP 3-3.22B. SPM shall provide automated protection against IR threats as described in AMC Annex to LAIRCM ORD 314-92 dated 25 Jan 2001. SPM shall provide automated protection against radio frequency (RF) threats as described in the Advanced Situational Awareness and Countermeasures (ASACM) CDD, 22 May 06, with the exception of Reduction in Lethality values in Table 28. 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 countermeasures and DS to avoid potential threats as discussed in ASACM CDD. The aircraft system shall support use of existing night vision devices and laser eye protection devices. KC-46A must be capable of flying tanker tactical profiles as specified in MCM 3-1, Vol 22, AF Tactics, Training, Procedures (U), Jun 03 (S//NF). The aircraft shall be capable of takeoff, landing, and air refueling, as a tanker and receiver in an NVIS environment. The KC-</p>	<p>(T=O) Aircraft Self-Protection Measures (SPM). Tanker aircraft shall be able to operate in hostile environments as discussed in section 2 and AFTTP 3-3.22B. SPM shall provide automated protection against IR threats as described in AMC Annex to LAIRCM ORD 314-92 dated 25 Jan 2001. SPM shall provide automated protection against radio frequency (RF) threats as described in the Advanced Situational Awareness and Countermeasures (ASACM) CDD, 22 May 06, with the exception of Reduction in Lethality values in Table 28. 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 countermeasures and DS to avoid potential threats as discussed in ASACM CDD. The aircraft system shall support use of existing night vision devices and laser eye protection devices. KC-46A must be capable of flying tanker tactical profiles as specified in MCM 3-1, Vol 22, AF Tactics, Training, Procedures (U), Jun 03 (S//NF). The aircraft shall be capable of takeoff, landing, and air refueling, as a tanker and receiver in an NVIS environment. The KC-</p>	<p>SVR was conducted in 1QCY19 confirming non-compliance with requirements to meet Self Protection Measure specific to the RVS and use of LWIR in hostile environments. Redesign efforts are currently underway to improve functionality of RVS to meet Critical Performance Parameters in order to resolve non-compliances enabling LWIR functionality. At completion, we will provide demonstrated performance for KPP.</p>	<p>Will meet or exceed Current APB Threshold.</p>	<p>(Ch-1)</p>
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46A fleet shall have EMP protection for flight-critical aircraft systems.	46A fleet shall have EMP protection for flight-critical aircraft systems.	46A fleet shall have EMP protection for flight-critical aircraft systems.			
Simultaneous Multi-Point Refuelings					
The aircraft shall be provisioned (including structural modifications, plumbing, electrical, etc.) for simultaneous multi-point drogue refueling.	The aircraft shall be provisioned (including structural modifications, plumbing, electrical, etc.) for simultaneous multi-point drogue refueling.	(T=O) The aircraft shall be provisioned (including structural modifications, plumbing, electrical, etc.) for simultaneous multi-point drogue refueling.	TBD. SVR projected to complete in 4QCY 2020.	Will meet or exceed Current APB Objective.	(Ch-1)
Operational Availability					
Operational Availability (Ao) rate will be used as a primary, capstone measure for reliability, maintainability, availability and supportability. Ao measures the percent of aircraft available for tasking. Ao equals total aircraft inventory (TAI) less the number of depot possessed aircraft (including scheduled and unscheduled depot maintenance) less the number of aircraft that are not mission capable divided by TAI. Operational availability shall not be less than 80% and 89%.	Operational Availability (Ao) rate will be used as a primary, capstone measure for reliability, maintainability, availability and supportability. Ao measures the percent of aircraft available for tasking. Ao equals total aircraft inventory (TAI) less the number of depot possessed aircraft (including scheduled and unscheduled depot maintenance) less the number of aircraft that are not mission capable divided by TAI. Operational availability shall not be less than 80% and 89%.	Operational Availability (Ao) rate will be used as a primary, capstone measure for reliability, maintainability, availability and supportability. Ao measures the percent of aircraft available for tasking. Ao equals total aircraft inventory (TAI) less the number of depot possessed aircraft (including scheduled and unscheduled depot maintenance) less the number of aircraft that are not mission capable divided by TAI. Operational availability shall not be less than 80%.	TBD. SVR projected to complete in 4QCY 2020.	Will meet or exceed APB Objective.	(Ch-1)
Reliability and Maintainability					
Reliability and Maintainability (R&M) shall be sufficient to generate, deploy, operate, sustain and recover the tanker in the conduct of operations to levels and degrees of readiness and performance as prescribed in 6.6.3 and 6.6.4. The aircraft will be designed with ease of maintenance, improved diagnostics and system	Reliability and Maintainability (R&M) shall be sufficient to generate, deploy, operate, sustain and recover the tanker in the conduct of operations to levels and degrees of readiness and performance as prescribed in 6.6.3 and 6.6.4. The aircraft will be designed with ease of maintenance, improved diagnostics and system	(T=O) Reliability and Maintainability (R&M) shall be sufficient to generate, deploy, operate, sustain and recover the tanker in the conduct of operations to levels and degrees of readiness and performance as prescribed in 6.6.3 and 6.6.4. The aircraft will be designed with ease of maintenance, improved diagnostics and system	TBD. SVR projected to complete in 4QCY 2020.	Will meet or exceed APB Objective.	(Ch-1)

reliability to minimize the support required.	reliability to minimize the support required.	reliability to minimize the support required.		
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Requirements Reference

CPD for KC-135 Replacement Aircraft (KC-46A), R4.4 approved by JROC Memorandum (023-16), dated April 21, 2016, re-validated by JROC Memorandum (043-18), dated May 2, 2018.

Change Explanations

(Ch-1) Comment updates were made to the Current Estimate to eliminate redundant information.

Notes

The Tanker AR Capability KPP objective requires the air refueling of all current and programmed fixed-wing receiver aircraft and the air refueling of all current and programmed tilt-rotor receiver aircraft. The ability to refuel at a maximum in-flight gross weight portion of this KPP objective was not included as one of the contractually-required 372 mandatory requirements.

Figure 5.1, as referenced in the objective and threshold values, is located in the CPD.

The KC-46A CPD references five KSAs. To maintain alignment with the approved Milestone B APB, only two have been referenced in the Milestone C update.

Development test is completed on the aircraft's LWIR cameras within the remote vision system. LWIR cameras are necessary for a KC-46A to perform as a tanker in a NVIS environment. LWIR performance was deemed unsatisfactory and conducting NVIS air refueling is prohibited until fixes are incorporated. Boeing has agreed to address the LWIR performance in the overall remote vision system improvements they are planning to incorporate.

Acronyms and Abbreviations

AE - Aeromedical Evacuation
AF - Air Force
AFTTP - Air Force Tactics, Techniques, and Procedures
AMC - Air Mobility Command
Ao - Operational Availability
AR - Aerial Refueling
ASACM - Advanced Situational Awareness and Countermeasures
ATC - Air Traffic Control
BLOS - Beyond Line of Sight
CNS/ATM - Communication Navigation Surveillance/Air Traffic Management
EMP - Electromagnetic Pulse
IAW - In Accordance With
IR - Infrared
JITC - Joint Interoperability Test Command
LAIRCM - Large Aircraft Infrared Countermeasures
LOS - Line of Sight
LWIR - Long Wave Infrared
MCM - Multi-Command Manual
NR - Net Ready
NVIS - Night Vision and Imaging Systems
ORD - Operational Requirements Document
R&M - Reliability and Maintainability
RF - Radio Frequency
SPM - Self-Protection Measures
STANAGs - Standard Agreements
SVR - System Verification Review
TAI - Total Aircraft in the Inventory
Vol - Volume

Track to Budget

RDT&E

Appn	BA	PE	
Air Force	3600	07	0401221F
	Project	Name	
	674927	KC-135 Replacement Tanker	
Air Force	3600	05	0605221F
	Project	Name	
	655271	KC-46 RDT&E	

Notes

RDT&E PE 0401221F was previously sunk, but is now active for FY 2021 and beyond.

Procurement

Appn	BA	PE	
Air Force	3010	06	0401221F
	Line Item	Name	
	000999	Initial Spares	(Shared)
Air Force	3010	02	0401221F
	Line Item	Name	
	KC046A	KC-46A Tanker	

MILCON

Appn	BA	PE	
Air Force	3300	01	0401221F
	Project	Name	
	VARIOUS	KC-46, MILCON	
Air Force	3730	01	0501221F
	Project	Name	
	VARIOUS	KC-46A Air Force Reserve (AFR) MILCON	(Sunk)
Air Force	3830	01	0501413F
	Project	Name	
	VARIOUS	KC-46, Air National Guard (ANG), MILCON	(Sunk)

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2016 \$M			BY 2016 \$M	TY \$M		
	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	SAR Baseline Production Estimate	Current APB Production Objective	Current Estimate
RDT&E	6054.7	6054.7	6660.2	6156.6	5897.7	5897.7	6031.0
Procurement	30897.3	30897.3	33987.0	30032.1	35494.1	35494.1	34867.1
Flyaway	--	--	--	25104.6	--	--	29144.3
Recurring	--	--	--	25104.6	--	--	29144.3
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	4927.5	--	--	5722.8
Other Support	--	--	--	2462.6	--	--	2866.5
Initial Spares	--	--	--	2464.9	--	--	2856.3
MILCON	2577.1	2577.1	2834.8	2589.0	2966.7	2966.7	3078.5
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	39529.1	39529.1	N/A	38777.7	44358.5	44358.5	43976.6

Current APB Cost Estimate Reference

Milestone C SCP Addendum dated August 26, 2016

Cost Notes

POE Cost Risks:

A POE was completed for the program in October 2019. The following risks and issues were considered in the POE:

1. Remote Vision System (RVS) Performance – RVS deficiencies have been discovered in developmental and operational testing, limiting KC-46's operational utility until a fix can be developed and implemented.
2. Boom Deficiencies - Boom load alleviation deficiencies (e.g. radial loads, stiff boom) are limiting the refueling capability of certain aircraft with the KC-46.

Due to the fixed price nature of the aircraft development contract, discrete costs were not included in the POE for the RVS hardware and software changes. However, costs were included for associated Government test activities. The POE included costs for both the Boom Telescope Actuator Redesign Engineering Change Proposal with Boeing, as well as associated government costs.

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

Cost and Funding

Funding Summary

Appropriation Summary									
FY 2021 President's Budget / December 2019 SAR (TY\$ M)									
Appropriation	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
RDT&E	5748.8	45.7	88.2	86.2	41.3	20.8	0.0	0.0	6031.0
Procurement	11943.3	2133.3	3044.3	2479.8	2617.9	3201.5	3081.2	6365.8	34867.1
MILCON	1047.4	26.1	10.7	240.0	165.0	253.9	0.0	1335.4	3078.5
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2021 Total	18739.5	2205.1	3143.2	2806.0	2824.2	3476.2	3081.2	7701.2	43976.6
PB 2020 Total	18910.2	2299.9	3528.2	2764.1	2806.8	3140.1	3584.0	6568.9	43602.2
Delta	-170.7	-94.8	-385.0	41.9	17.4	336.1	-502.8	1132.3	374.4

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 when the contract was awarded. The remaining aircraft are to be purchased using Procurement funds.

Adjustments not reflected in FY 2021 Automated Budget Interactive Data Environment System:

Procurement FY 2019: \$52.0M of Program Budget Authority withdrawn pending rescission - currently on Air Force (AF) withhold.

Adjustment not reflected in FY 2021 PB Automated Budget Interactive Data Environment System:

Procurement: \$113.4M of FY 2019 Program Budget Authority withdrawn pending rescission - currently on AF withhold.

Quantity Summary										
FY 2021 President's Budget / December 2019 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
Development	4	0	0	0	0	0	0	0	0	4
Production	0	67	12	15	12	12	15	15	27	175
PB 2021 Total	4	67	12	15	12	12	15	15	27	179
PB 2020 Total	4	67	12	15	12	12	15	15	27	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	--	--	--	--	--	--	105.1
2017	--	--	--	--	--	--	113.7
2018	--	--	--	--	--	--	72.2
2019	--	--	--	--	--	--	77.8
2020	--	--	--	--	--	--	45.7
2021	--	--	--	--	--	--	88.2
2022	--	--	--	--	--	--	86.2
2023	--	--	--	--	--	--	41.3
2024	--	--	--	--	--	--	20.8
Subtotal	4	--	--	--	--	--	6031.0

Annual Funding							
3600 RDT&E Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	BY 2016 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2005	--	--	--	--	--	--	12.2
2006	--	--	--	--	--	--	11.7
2007	--	--	--	--	--	--	76.8
2008	--	--	--	--	--	--	18.5
2009	--	--	--	--	--	--	19.5
2010	--	--	--	--	--	--	330.2
2011	--	--	--	--	--	--	572.5
2012	--	--	--	--	--	--	855.0
2013	--	--	--	--	--	--	1591.8
2014	--	--	--	--	--	--	1514.8
2015	--	--	--	--	--	--	549.6
2016	--	--	--	--	--	--	103.8
2017	--	--	--	--	--	--	110.1
2018	--	--	--	--	--	--	68.5
2019	--	--	--	--	--	--	72.4
2020	--	--	--	--	--	--	41.7
2021	--	--	--	--	--	--	78.9
2022	--	--	--	--	--	--	75.6
2023	--	--	--	--	--	--	35.5
2024	--	--	--	--	--	--	17.5
Subtotal	4	--	--	--	--	--	6156.6

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	1149.3	--	--	1149.3	306.8	1456.1	
2016	12	1747.9	--	--	1747.9	301.2	2049.1	
2017	15	2212.0	--	--	2212.0	501.2	2713.2	
2018	18	2698.6	--	--	2698.6	494.4	3193.0	
2019	15	2217.8	--	--	2217.8	304.6	2522.4	
2020	12	1965.7	--	--	1965.7	167.6	2133.3	
2021	15	2378.3	--	--	2378.3	666.0	3044.3	
2022	12	2006.2	--	--	2006.2	473.6	2479.8	
2023	12	2139.0	--	--	2139.0	478.9	2617.9	
2024	15	2742.9	--	--	2742.9	458.6	3201.5	
2025	15	2621.4	--	--	2621.4	459.8	3081.2	
2026	15	2780.2	--	--	2780.2	488.3	3268.5	
2027	12	2485.0	--	--	2485.0	612.3	3097.3	
Subtotal	175	29144.3	--	--	29144.3	5722.8	34867.1	

Annual Funding								
3010 Procurement Aircraft Procurement, Air Force								
Fiscal Year	Quantity	BY 2016 \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
2014	--	--	--	--	--	9.4	9.4	
2015	7	1123.9	--	--	1123.9	300.1	1424.0	
2016	12	1677.4	--	--	1677.4	289.1	1966.5	
2017	15	2081.1	--	--	2081.1	471.5	2552.6	
2018	18	2483.6	--	--	2483.6	455.1	2938.7	
2019	15	2001.3	--	--	2001.3	274.8	2276.1	
2020	12	1739.7	--	--	1739.7	148.3	1888.0	
2021	15	2063.6	--	--	2063.6	577.9	2641.5	
2022	12	1706.6	--	--	1706.6	402.9	2109.5	
2023	12	1783.9	--	--	1783.9	399.4	2183.3	
2024	15	2242.7	--	--	2242.7	374.9	2617.6	
2025	15	2101.3	--	--	2101.3	368.6	2469.9	
2026	15	2184.9	--	--	2184.9	383.7	2568.6	
2027	12	1914.6	--	--	1914.6	471.8	2386.4	
Subtotal	175	25104.6	--	--	25104.6	4927.5	30032.1	

Annual Funding 3300 MILCON Military Construction, Air Force	
Fiscal Year	TY \$M
	Total Program
2010	1.6
2011	2.6
2012	11.2
2013	--
2014	206.6
2015	168.2
2016	67.6
2017	32.7
2018	239.1
2019	170.4
2020	26.1
2021	10.7
2022	240.0
2023	165.0
2024	253.9
2025	--
2026	447.4
2027	447.5
2028	440.5
Subtotal	2931.1

Annual Funding 3300 MILCON Military Construction, Air Force	
Fiscal Year	BY 2016 \$M
	Total Program
2010	1.7
2011	2.7
2012	11.5
2013	--
2014	203.9
2015	163.2
2016	64.4
2017	30.5
2018	218.8
2019	152.9
2020	22.9
2021	9.2
2022	202.8
2023	136.7
2024	206.2
2025	--
2026	349.3
2027	342.5
2028	330.5
Subtotal	2449.7

Annual Funding 3830 MILCON Military Construction, Air National Guard	
Fiscal Year	TY \$M
	Total Program
2013	0.7
2014	--
2015	41.9
2016	2.0
2017	1.5
Subtotal	46.1

Annual Funding 3830 MILCON Military Construction, Air National Guard	
Fiscal Year	BY 2016 \$M
	Total Program
2013	0.7
2014	--
2015	41.1
2016	1.9
2017	1.4
Subtotal	45.1

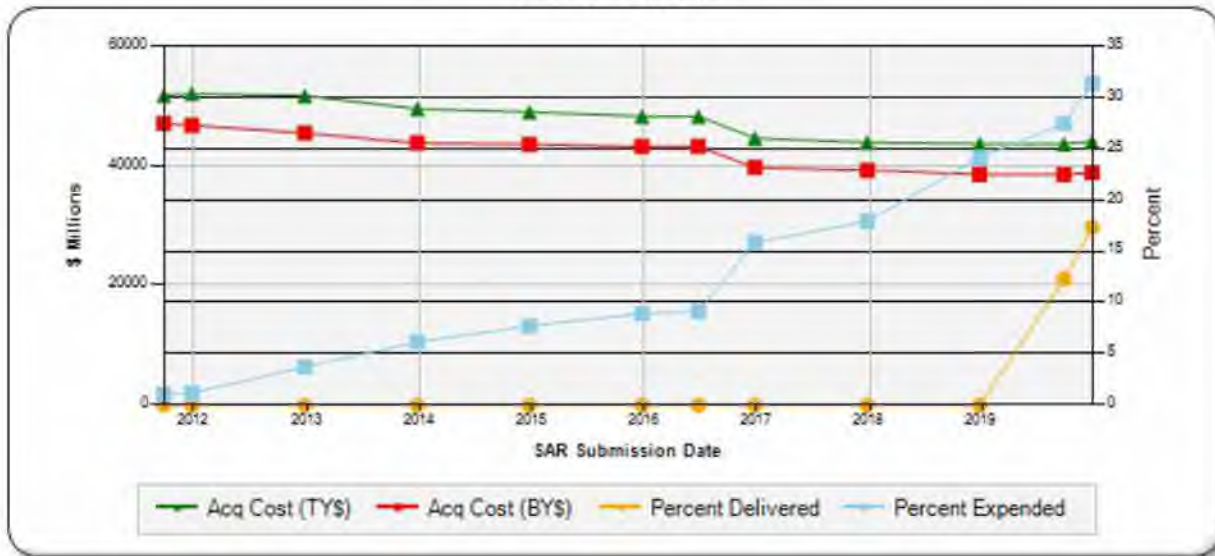
Annual Funding 3730 MILCON Military Construction, Air Force Reserve	
Fiscal Year	TY \$M
	Total Program
2017	94.9
2018	6.4
Subtotal	101.3

Annual Funding 3730 MILCON Military Construction, Air Force Reserve	
Fiscal Year	BY 2016 \$M
	Total Program
2017	88.4
2018	5.8
Subtotal	94.2

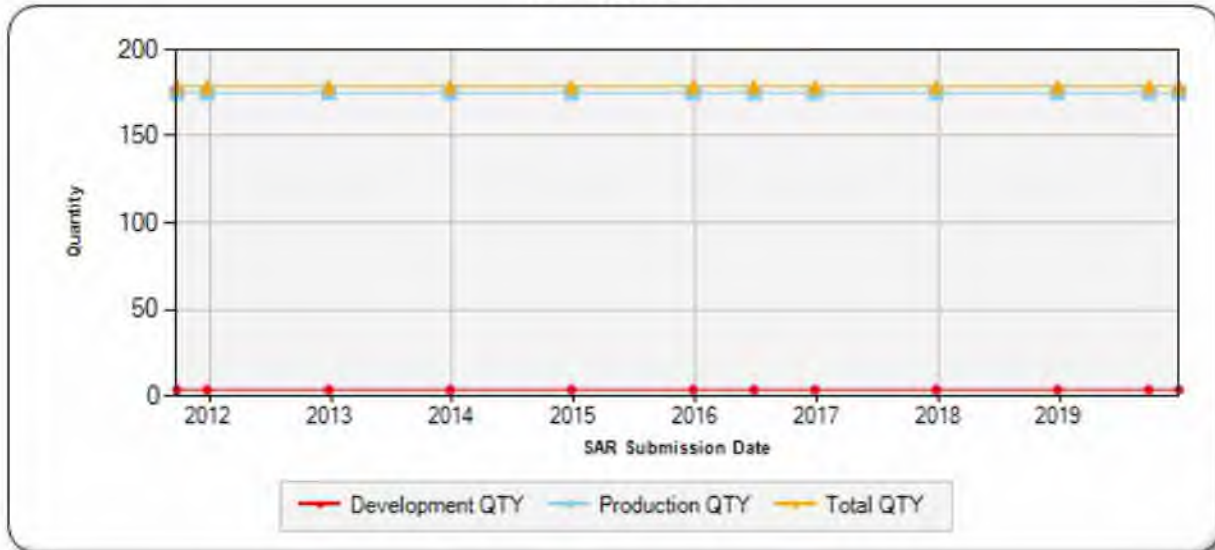
Charts

KC-46A first began SAR reporting in September 2011

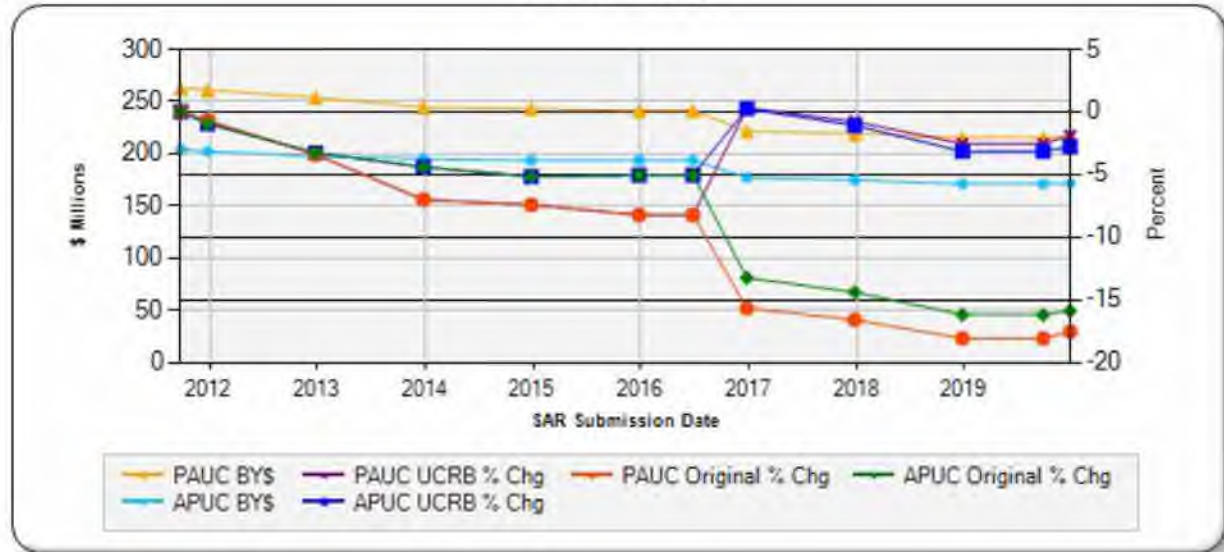
Program Acquisition Cost - KC-46A
Base Year 2016 \$M



Quantity - KC-46A



Unit Cost - KC-46A
Base Year 2016 \$M



Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
KC-46A Initial (January 2012)	
1.	Risk: High percentage of planned Software (SW) reuse which has historically resulted in a high degree of scrap and rework. If Hardware (HW) and SW are not integrated in time to support flight test, then the tanker flight test schedule will be delayed and costs will increase. Status: Item is no longer a significant risk.
2.	Risk: Meeting schedule requirements is dependent upon successfully managing the aggregation risks associated with in-line provisioning, the Federal Aviation Administration (FAA) certification process, SW development and integration and optimization of the flight test program. Status: Item is no longer a significant risk.
3.	Risk: If the target weight (Operating Empty Weight (OEW) = 204,450lbs) is not achieved, then the aircraft will be non-compliant to the System Specifications and additional weight reduction activities will need to occur that are not in the current baseline. Status: Post Milestone C, item is no longer tracked as a top risk.
4.	Risk: Radio Frequency energy interaction with the airframe creates unique challenges for the integrator and Radar Warning Receiver supplier to develop a high performing system which meets all requirements. If robust flight testing scenarios discover latent performance issues, then additional effort will be required to complete the activity. Status: Item is no longer tracked as a significant risk.
5.	Risk: If the revised Wing Aerial Refueling Pod (WARP) design induces hose instability due to the new aerodynamic shape being employed, then additional configuration changes and incremental analysis/testing not assumed in the current baseline will be required to resolve issues. Status: Risk was rewritten, is now covered in risk #1, WARP.
Current Estimate (December 2019)	
1.	Risk: WARP – If subcontractor does not produce a conformed and qualified WARP in time to meet test events, then it will negatively impact System Verification Review (SVR) Update, aircraft certification, and Air Refueling (AR) Certification.
2.	Risk: Air Refueling Receiver Certification Delays - If the AR Receiver Certifications are not complete before or within the planned Initial Operational Test and Evaluation (IOT&E) test period, then completion of IOT&E will be delayed due to IOT&E closure criteria not being met.

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (March 2019)	
1.	The CAPE ICE (August 10, 2016) identified the following risks at Milestone C: The Department has historically demonstrated limited ability to maintain stable requirements and limit changes to program technical baselines for complex weapon systems. Furthermore, the potential of engineering change introduces the possibility of opening the terms and conditions of the KC-46A contract, causing upward pressure on prices, even though the initial contract was awarded on a competitive basis.
2.	KC-46A annual procurements lots 3 through 13 include a 'Not to Exceed' (NTE) unit price with Economic Price Adjustment (EPA). The EPA is sensitive to relatively small changes in the contractual Producer Price Index.
3.	Final negotiation of annual procurement lot prices from the pre-priced NTE values.
4.	Analogous DoD programs have historically taken longer to establish an organic capability than the time estimated for KC-46A to transition from Interim Contractor Support.
5.	The procurement of annual quantities, other than the target quantity, introduces significant unit pricing penalties.
Original Baseline Estimate (August 2011)	
1.	The CAPE ICE (February 22, 2011) identified the following risks as Milestone B: (1) The Department has historically demonstrated limited ability to maintain stable requirements and limit changes to program technical baselines for complex weapon systems. Furthermore, the potential of engineering change introduces the possibility of opening the terms and conditions of the KC-46A contract, causing upward pressure on prices, even though the initial contract was awarded on a competitive basis. (2) The procurement of annual quantities, other than the target quantity, introduces significant unit pricing penalties.
Revised Original Estimate (N/A)	
None	
Current Procurement Cost (December 2019)	
1.	Current procurement cost risks match current baseline.

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	2/24/2011	11/28/2017
Approved Quantity	19	67
Reference	Milestone B ADM	Milestone C ADM and KC-46 Lot 5 ADM
Start Year	2015	2015
End Year	2016	2019

The Current Total LRIP Quantity is more than 10% of the total production quantity . On August 12, 2016, the DAE approved the increase of LRIP quantity from 19 to 49 aircraft in the Milestone C ADM. The increase is the result of changing Lot 3 and Lot 4 from FRP Lots to LRIP Lots. On November 28, 2017, the DAE further approved an increase of LRIP quantity to 64 aircraft in the KC-46A Lot 5 ADM. When Congress enacted the FY 2018 budget, 3 additional aircraft were added to Lot 4, bringing the LRIP quantity to 67.

Foreign Military Sales

Country	Date of Sale	Quantity	Total Cost \$M	Description
Japan	2/23/2017	2	448.0	The second Japanese FMS case was signed on February 23, 2017, funding unique aircraft configuration development. The case has been amended three times thus far to fund the first and second aircraft, as well as associated government furnished equipment that will be integrated into the Japanese KC-46s.
Japan	8/18/2016	0	9.0	Letter of Offer and Acceptance

Notes

Japan: The Japanese FMS case was signed on February 23, 2017. The current contract, valued at \$449M covers: aircraft 1 and 2, pre-delivery Integrated Logistics Support and associated government furnished equipment that will be integrated into the Japanese KC-46s. There are priced options for aircraft 3 and 4 valued at \$342M. The Program Office is working on future amendments to provide funding for aircraft 3, 4, 5 and 6 with an expected signature in May 2020.

Israel: Case IS-D-GDJ was updated December 2019 and provides a PM position for case development. In May 2019, the Program Office received a Letter of Request (LOR) for Letter of Offer and Acceptance (LOA) for 2 aircraft with the option to purchase up to 8 and associated support requirements. Boeing provided updated pricing information on December 11, 2019. The Program Office is developing the Acquisition Strategy and response for LOA for the program, targeting completion in June 2020.

UAE: The Program Office received a LOR for LOA on June 17, 2019. The Program Office is working with Boeing to gather information to provide a LOA to UAE by mid-2020.

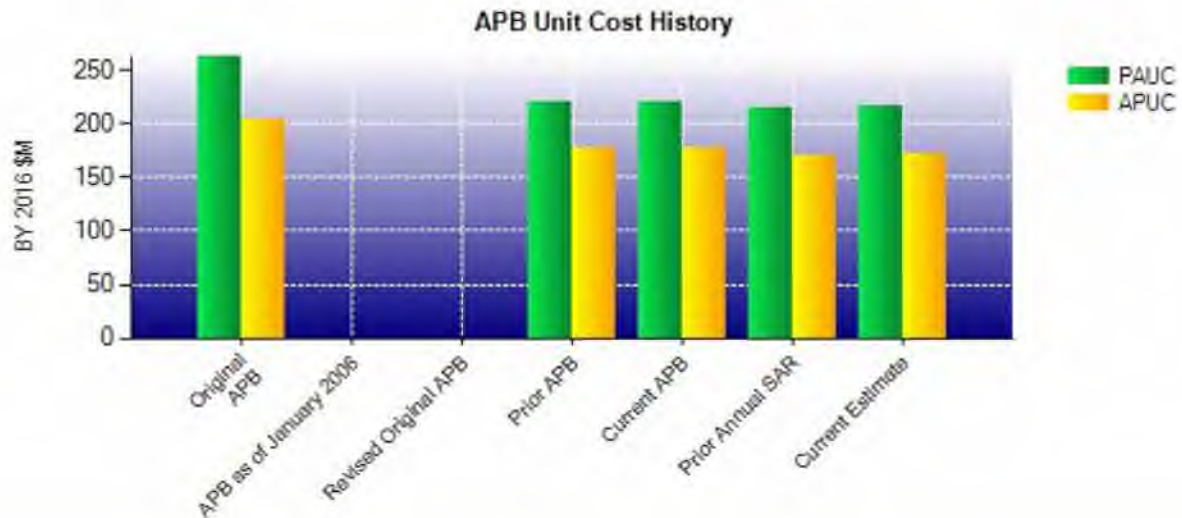
Poland: Program Office provided updated Price and Availability (P&A) data, which the country received September 16, 2019.

Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2016 \$M	BY 2016 \$M	% Change
	Current UCR Baseline (Mar 2019 APB)	Current Estimate (Dec 2019 SAR)	
Program Acquisition Unit Cost			
Cost	39529.1	38777.7	
Quantity	179	179	
Unit Cost	220.833	216.635	-1.90
Average Procurement Unit Cost			
Cost	30897.3	30032.1	
Quantity	175	175	
Unit Cost	176.556	171.612	-2.80
Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2016 \$M	BY 2016 \$M	% Change
	Original UCR Baseline (Aug 2011 APB)	Current Estimate (Dec 2019 SAR)	
Program Acquisition Unit Cost			
Cost	47021.2	38777.7	
Quantity	179	179	
Unit Cost	262.688	216.635	-17.53
Average Procurement Unit Cost			
Cost	35699.9	30032.1	
Quantity	175	175	
Unit Cost	203.999	171.612	-15.88



APB Unit Cost History					
Item	Date	BY 2016 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Aug 2011	262.688	203.999	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	Jan 2017	220.833	176.556	247.813	202.823
Current APB	Mar 2019	220.833	176.556	247.813	202.823
Prior Annual SAR	Dec 2018	215.225	170.995	243.588	198.468
Current Estimate	Dec 2019	216.635	171.612	245.679	199.241

SAR Unit Cost History

Initial SAR Baseline to Current SAR Baseline (TY \$M)									
Initial PAUC Development Estimate	Changes								PAUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
288.828	5.789	0.000	-0.009	0.000	-48.519	0.000	-1.293	-44.032	247.813

Current SAR Baseline to Current Estimate (TY \$M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
247.813	0.727	0.000	5.443	0.000	-4.587	0.000	-3.717	-2.134	245.679

Initial SAR Baseline to Current SAR Baseline (TY \$M)									
Initial APUC Development Estimate	Changes								APUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
229.920	4.918	0.000	-0.010	0.000	-33.806	0.000	-1.294	-30.192	202.823

Current SAR Baseline to Current Estimate (TY \$M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
202.823	0.699	0.000	4.292	0.000	-4.772	0.000	-3.802	-3.583	199.241

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	Feb 2011	Feb 2011
Milestone C	N/A	Aug 2015	Aug 2016	Aug 2016
IOC	N/A	Aug 2017	Oct 2018	Dec 2020
Total Cost (TY \$M)	N/A	51700.2	44358.5	43976.6
Total Quantity	N/A	179	179	179
PAUC	N/A	288.828	247.813	245.679

The RAA date is defined as 18 aircraft meeting the final product baseline established at Physical Configuration Audit, two spare engines delivered, and nine ship sets of wing aerial refueling pods in place.

Cost Variance

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	5897.7	35494.1	2966.7	44358.5
Previous Changes				
Economic	+2.4	+161.8	+6.9	+171.1
Quantity	--	--	--	--
Schedule	+71.0	+751.1	--	+822.1
Engineering	--	--	--	--
Estimating	-123.3	-626.6	+48.9	-701.0
Other	--	--	--	--
Support	--	-1048.5	--	-1048.5
Subtotal	-49.9	-762.2	+55.8	-756.3
Current Changes				
Economic	-0.2	-39.4	-1.4	-41.0
Quantity	--	--	--	--
Schedule	+59.2	--	+93.2	+152.4
Engineering	--	--	--	--
Estimating	+124.2	-208.5	-35.8	-120.1
Other	--	--	--	--
Support	--	+383.1	--	+383.1
Subtotal	+183.2	+135.2	+56.0	+374.4
Total Changes	+133.3	-627.0	+111.8	-381.9
Current Estimate	6031.0	34867.1	3078.5	43976.6

Summary BY 2016 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	6054.7	30897.3	2577.1	39529.1
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	+65.1	+531.9	--	+597.0
Engineering	--	--	--	--
Estimating	-123.9	-552.2	+28.0	-648.1
Other	--	--	--	--
Support	--	-952.8	--	-952.8
Subtotal	-58.8	-973.1	+28.0	-1003.9
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	+50.4	--	+16.6	+67.0
Engineering	--	--	--	--
Estimating	+110.3	-175.9	-32.7	-98.3
Other	--	--	--	--
Support	--	+283.8	--	+283.8
Subtotal	+160.7	+107.9	-16.1	+252.5
Total Changes	+101.9	-865.2	+11.9	-751.4
Current Estimate	6156.6	30032.1	2589.0	38777.7

Previous Estimate: September 2019

RDT&E	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	-0.2
Schedule variance to reflect schedule stretch-out for Take-Off and Landing Data requirement. (Schedule)	+21.7	+26.0
Schedule variance to reflect updated Aircrew Training Systems (ATS) execution plan for Boom Telescope Actuator Redesign (BTAR) and Remote Vision System (RVS). (Schedule)	+5.6	+6.6
Schedule variance to reflect test schedule stretch-out for Aerial Refueling Airplane Simulator Qualifications, BTAR, and RVS requirements. (Schedule)	+23.1	+26.6
Adjustment for current and prior escalation. (Estimating)	+0.2	+0.2
Revised FY 2018 estimate for DoD budget adjustment. (Estimating)	-4.1	-4.4
Revised FY 2018 estimate for Below Threshold Reprogramming (BTR). (Estimating)	+0.9	+1.0
Revised FY 2019 estimate for BTR. (Estimating)	+3.5	+3.8
Revised Aircraft Product Development estimate to reflect updated execution plan. (Estimating)	+93.0	+105.0
Revised Direct Mission Support estimate to reflect updated execution plan. (Estimating)	+1.5	+1.6
Revised Program Management Administration estimate to reflect updated execution plan. (Estimating)	-1.5	-1.7
Revised ATS estimate to reflect updated execution plan. (Estimating)	+10.0	+11.4
Revised FY 2019 estimate for DoD budget adjustment. (Estimating)	+6.8	+7.3
RDT&E Subtotal	+160.7	+183.2

Procurement	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	-39.4
Adjustment for current and prior escalation. (Estimating)	+8.5	+9.1
Revised estimate to reflect application of new outyear inflation indices. (Estimating)	+19.7	+24.4
Revised FY 2016-FY 2019 estimate for DoD Budget Adjustments. (Estimating)	-1.4	-1.4
Revised FY 2020 estimate to reflect Appropriations Conference results. (Estimating)	-83.9	-94.8
Revised FY 2018 estimate to reflect rescission. (Estimating)	-69.9	-76.0
Revised FY 2018 estimate to reflect omnibus reprogramming. (Estimating)	-42.2	-45.8
Revised Engineering Change Order estimate to reflect fact-of-life changes. (Estimating)	+149.9	+154.2
Revised components of Airframe estimate for Economic Price Adjustment, studies, Wing Air Refueling Pods, and palletized seating to reflect fact-of-life execution changes. (Estimating)	-156.2	-187.7
Revised BTAR estimate to reflect updated requirements and updated lot cut-in. (Estimating)	+60.4	+80.3
Revised Large Aircraft Infra-Red Countermeasures estimate to reflect updated LASER contract pricing. (Estimating)	-60.8	-70.8
Adjustment for current and prior escalation. (Support)	+1.8	+2.1
Increase in Other Support due to miscellaneous adjustments to include: increases in ATS and Maintenance Training Systems, operational site activation, Depot Stand-Up, Interim Contractor Support, and PMA, use of new outyear inflation indices, and	+113.4	+171.2

decreases in Support Equipment and DMS. (Support)		
Increase in Initial Spares requirements based on updated Proposed Spares Parts List, addition of the Comprehensive Depot Parts List, and use of new outyear inflation indices. (Support)	+168.6	+209.8
Procurement Subtotal	+107.9	+135.2

MILCON	SM	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	-1.4
New Schedule Change - rephase requirements to align with budget. (Schedule)	+16.6	+93.2
Adjustment for current and prior escalation. (Estimating)	+0.6	+0.6
Revised estimate to reflect application of new outyear inflation indices. (Estimating)	+0.4	+0.8
Revised estimate to reflect reprogramming actions (Military Construction, Air Force). (Estimating)	-30.4	-33.7
Revised estimate to reflect reprogramming actions (Military Construction, Air National Guard). (Estimating)	-0.8	-0.8
Revised estimate to reflect reprogramming actions (Military Construction, Air Force Reserve). (Estimating)	-2.5	-2.7
MILCON Subtotal	-16.1	+56.0

Contracts

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	11090.8	N/A	67	11090.8	11090.8

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the definitization of an Undefined Contract Action (UCA), the exercise of Lots 1 and 2, addition of Large Aircraft Infrared Countermeasures (LAIRCM) to Lots 1 and 2, a required cost accounting change for Pension Harmonization, and the following modifications.

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 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 (ICS) 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.

On March 4, 2016, contract modification P00082 was signed by both the Program Office and the Contractor. This contractual modification partially definitized the P00054 UCA and reduced the price by \$1.1M.

On August 10, 2016, contract modification PZ0060 was signed by both the Program Office and the Contractor. This contractual modification completed the definitization of the P00054 UCA, reducing the price by \$15.9M.

On August 18, 2016, contract modification P00099 was signed by the Program Office. This contractual modification in the amount of \$2.814B represents the Lots 1 and 2 option exercises.

On September 15, 2016, contract modification P00053 was signed by both the Program Office and the Contractor. This contractual modification in the amount of \$99.0M represents the addition of LAIRCM for Lots 1 and 2.

On September 23, 2016, contract modification P00103 was signed by both the Program Office and the Contractor. This contractual modification in the amount of \$12.1M represents the required cost accounting change for Pension

Harmonization.

On January 27, 2017, contract modification P00110 was signed by both the Program Office and the Contractor. This contractual modification in the amount of \$2.1B represents Lot 3 aircraft, spare engines, and Wing Aerial Refueling Pods.

On March 24, 2017, contract modification P00117 was signed by both the Program Office and the Contractor. This contractual modification in the amount of \$59.2M represents the ICS Year 2 option.

On July 12, 2017, a contract modification (P00101) was issued in the amount of \$2.9M for a Software System Integration Lab Study.

On September 20, 2017, a contract modification (P00129) was issued in the amount of \$772K for KY-100M Integration.

On September 26, 2017, a contract modification (P00067) was issued in the amount of \$43.8M for SE.

On September 27, 2017, a contract modification (P00080) was issued in the amount of \$38.8M for KC-46 Initial Common Spares and Readiness Spares Packages in support of Production Aircraft Lots 1 and 2.

On December 21, 2017, a contract modification (P00132) was issued in the amount of \$6.7M for an UCA for subscriptions and software licenses.

P00067 and P00080 were issued as Fixed-Price Incentive Fee efforts. The Program Office has not yet received a Contract Performance Report for these efforts.

On December 29, 2017, a contract modification (P00144) was issued in the amount \$41K for the KY-100M System/Software Integration Laboratory Restoration and Closure.

On March 21, 2018, a contract modification (P00085) was issued in the amount of \$21.3M for Support Equipment.

On May 3, 2018, a contract modification (P00143) was issued in the amount of \$1.3M for the LAIRCM Block 30 Flight Test Study.

On July 19, 2018, a contract modification (P00158) was issued in the amount of \$1.1M for Contract Line Item Number 1403 KY-100M Cut-In.

On July 24, 2018, a contract modification (P00131) was issued in the amount of \$271K for G081 Contract Change Proposal (CCP).

On August 30, 2018, a contract modification (P00128) was issued in the amount of \$61M for Lot 3 Spares.

On September 10, 2018, a contract modification (P00141) was issued in the amount of \$2.9B for Lot 4 Aircraft, Spares, and Support Equipment.

On September 13, 2018, a contract modification (P00160) was issued in the amount of \$409K for CLIN 0216 G081 data files.

On September 27, 2018, a contract modification (P00164) was issued in the amount of \$2.1M for subscriptions and licenses UCA option exercise.

On December 14, 2018, a contract modification (PZ0153) was issued in the amount of -\$5.6M to definitize the subscriptions and licenses UCA.

On December 17, 2018, a contract modification (P00168) was issued in the amount of \$6.6M for subscriptions and licenses and CY 2019 renewals.

On February 5, 2019, a contract modification (P00161) was issued in the amount of \$493,882 for Lot 3 G081 Flat File option exercise.

On March 14, 2019, a contract modification (P00146) was issued in the amount of \$3,470,786.78 to exercise options for additional Logistics Service Representative (LSR) / Field Service Representative (FSR) support at main operating bases.

On June 28, 2019, a contract modification (P00182) was issued in the amount of \$70,968,876 for Interim Contractor Support Year 3 option exercise.

On September 17, 2019, a contract modification (P00192) was issued in the amount of \$1,088,451.52 for LSR and FSR at Pease ANGB additional year option exercise.

On September 26, 2019, a contract modification (P00154) was issued in the amount of \$11,986,000.00 for Radio Frequency Simulator for Mission Data File Reprogramming Center.

On September 27, 2019, a contract modification (P00165) was issued in the amount of \$2,628,005,872.00 for Lot 5 Production Buy.

Cost and Schedule Variance Explanations

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

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	173.5	N/A	N/A	173.5	173.5

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to contract modifications for studies, support equipment, a required cost accounting change for Pension Harmonization, and the following modifications.

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.

On April 5, 2016, a modification (P00084) was issued in the amount of \$4.3M for the Characterization of Data Exchange II study, increasing the contract price of this FFP contract from \$80.3M to \$84.6M.

On April 11, 2016, a modification to the FFP contract (P00079) was issued to change the contractual EMD completion date to June 24, 2018.

On April 29, 2016, a modification (P00086) was issued in the amount of \$88K for the Phase III EMD Aircraft Data, Tolerances, and Data Rate Measurement Capabilities Study, maintaining the contract price of this FFP contract at \$84.6M.

On August 12, 2016, a modification (P00100) was issued in the amount of \$26.3M reflecting an equitable adjustment to the contract price arising from the Pension Protection Act, increasing the contract price from \$84.6M to \$110.9M.

On July 13, 2017, a modification (P00115) was issued in the amount of \$1.1M for the Mission Data File (MDF) Study, increasing the contract price from \$110.9 to \$112.1M.

On August 10, 2017, a modification (P00127) was issued in the amount of \$138K, increasing the contract price from \$112.1M to \$112.2M.

On August 18, 2017, a modification (P00119) was issued in the amount of \$7.7M for the Aerial Refueling Operator (ARO) Instructor Override Study, increasing the contract price from \$112.2M to \$119.9M.

On September 15, 2017, a modification (P00112) was issued in the amount of \$834K for the Automated Performance Tool (APT) Study, increasing the contract price from \$119.7M to \$120.7M.

On September 25, 2017, a modification (P00111) was issued in the amount of \$7.4M for the Aerial Refueling Airplane Simulator Qualifications (ARASQ) Data Collection Study, increasing the contract price from \$120.7M to \$128.1M.

On October 17, 2017, a modification (P00118) was issued in the amount of \$8.4M for the Command & Control Mobility Enterprise Information System (C2 MEIS)/Airborne Network Global Information Grid Interface (ANGI) Study, increasing the contract price from \$128.1M to \$136.5M.

On January 18, 2018, a modification (P00138) was issued in the amount of \$39K for the APT Interim Solution Study, increasing the contract price from \$136.5 to \$136.6M.

On July 2, 2018, a modification (P00157) was issued in the amount of \$781K for additional trips for the MDF Study, increasing the contract price from \$136.6M to \$137.3M.

On July 24, 2018, a modification (P00131) was issued in the amount of \$524K for G081 CCP, increasing the contract price from \$137.3M to \$137.8M.

On August 8, 2018, a modification (P00147) was issued in the amount of \$10.0M for the Block 1 Risk Reduction Study, increasing the contract price from \$137.8M to \$147.9M.

On August 9, 2018, a modification (P00120) was issued in the amount of \$5.7M for the APT Phase 2 Federal Aviation Administration (FAA) Certification Study, increasing the contract price from \$147.9M to \$153.6M.

On August 22, 2018, a modification (P00124) was issued in the amount of \$8.7M for the MDF Equipment CCP, increasing the contract price from \$153.6M to \$162.3M.

On August 31, 2018, a modification (P00155) was issued in the amount of \$11.0M for the Airframe and Aerial Refueling Receiver Study, increasing the contract price from \$162.3M to \$173.3M.

On April 9, 2019, a modification (P00136) was issued in the amount of \$198,434.00 for payment of proposal preparation only for ARASQ follow-on study and Windows 10 Study, increasing the contract price from \$173.3M to \$173.5M

Cost and Schedule Variance Explanations

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

Contract Identification

Appropriation: Procurement
Contract Name: KC-46 Aircrew Training Systems-Production
Contractor: FlightSafety Services Corporation
Contractor Location: 10770 E. Briarwood Ave. Suite 100
 Centennial, CO 80112-3807
Contract Number: FA8621-13-C-6247
Contract Type: Firm Fixed Price (FFP)
Award Date: May 01, 2013
Definitization Date: May 31, 2017

Contract Price								
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)		
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager	
68.9	N/A	N/A	133.3	N/A	14	133.3	133.3	

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to contract modifications that have been awarded, increasing the original contract price from \$68.9M to \$133.3M.

Cost and Schedule Variance Explanations

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

Notes

FFP Production Option Year (OY) 1 exercised in June 2016 (\$35.6M).

FFP Production OY2 exercised in May 2017 (\$33.3M).

FFP Production OY3 exercised in April 2018 (\$35.4M).

FFP Production OY4 exercised in April 2019 (\$29.0M).

Contract Identification

Appropriation: RDT&E
Contract Name: KC-46 Aircrew Training Systems
Contractor: FlightSafety Services Corporation
Contractor Location: Centennial, CO
Contract Number: FA8621-13-C-6247/0
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
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	8	78.4	86.6	8	86.6	86.6	

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/30/2019)	-24.3	-6.0
Previous Cumulative Variances	--	--
Net Change	-24.3	-6.0

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to the increased prices for aircraft parts, data licenses, PM issues related to schedule and EVM requirements, and late receipt of aircraft data delaying completion of Hardware Software Integration (HSI).

The unfavorable cumulative schedule variance is due to the lack of aircraft data and delay in completion of HSI.

Notes

This contract is more than 90% complete; therefore, this is the final report for this contract.

Contract Identification

Appropriation: RDT&E
Contract Name: KC-46A Tanker Boom Telescope Actuator Redesign
Contractor: The Boeing Company
Contractor Location: BDS - Boeing Defense, Space & Security - Puget Sound
 7755 E. Marginal Way
 Seattle, WA 98108-4002
Contract Number: FA8625-11-C-6600/2
Contract Type: Cost Plus Fixed Fee (CPFF)
Award Date: August 02, 2019
Definitization Date:

Contract Price								
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)		
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager	
55.5	N/A	N/A	55.5	N/A	N/A	55.5	55.5	

Contract Variance			
Item	Cost Variance		Schedule Variance
Cumulative Variances To Date (1/23/2020)	+1.4		-1.9
Previous Cumulative Variances	--		--
Net Change	+1.4		-1.9

Cost and Schedule Variance Explanations

The favorable cumulative cost variance is due to efficiencies realized during the Stress Source Control Drawing (SCD) effort, less effort than initially expected for planning and management, and misaligned actuals for proposal preparation and hours for trade studies.

The unfavorable cumulative schedule variance is due to Systems Engineering inefficiencies due to learning and late specification releases, and Moog Statement of Work coordination.

Notes

The Program Office awarded an Undefined Contract Action (UCA) with Boeing for the Boom Telescope Actuator Redesign (BTAR) development effort on August 2, 2019.

Contract Identification

Appropriation: RDT&E
Contract Name: KC-46 Maintenance Training System
Contractor: The Boeing Company
Contractor Location: Defense, Space, and Security
 6200 JS McDonnell Blvd
 St Louis, MO 63134
Contract Number: FA8621-16-C-6390
Contract Type: Firm Fixed Price (FFP)
Award Date: July 06, 2016
Definitization Date: July 06, 2016

Contract Price								
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)		
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager	
46.4	N/A	N/A	45.3	N/A	N/A	46.4	46.4	

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to modifications for executing the Training Systems Requirements Analysis update and travel.

Cost and Schedule Variance Explanations

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

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	4	0.00%
Production	40	31	175	17.71%
Total Program Quantity Delivered	40	31	179	17.32%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	43976.6	Years Appropriated	16
Expended to Date	13743.5	Percent Years Appropriated	66.67%
Percent Expended	31.25%	Appropriated to Date	20944.6
Total Funding Years	24	Percent Appropriated	47.63%

The above data is current as of February 10, 2020.

Notes

Total expended to date includes \$532.9M in MILCON expenditures.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	October 30, 2019
Source of Estimate:	POE
Quantity to Sustain:	166
Unit of Measure:	Aircraft
Service Life per Unit:	40.00 Years
Fiscal Years in Service:	FY 2017 - FY 2069

The KC-46A Program has 166 Primary Aircraft Authorized (PAA) and 13 back-up aircraft. The O&S estimate is based on 166 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

The antecedent system is the KC-135R&T.

KC-135R&T is the antecedent system. KC-135R&T costs have been normalized to reflect the average of 662 annual flying hours per aircraft in the KC-46 Milestone C SCP. KC-135R&T average annual cost per aircraft reflects actual FY 2018 costs reported in the Air Force Total Ownership Cost (AFTOC) system (budget constrained). Most FY 2018 costs reflect the current state of KC-135R&T; however, there are a few exceptions, such as flying hour costs (Fuel, POL, HW modifications), where the FY 2018 KC-135R&T costs are lower than in previous years.

Annual O&S Costs BY2016 \$M			
Cost Element	KC-46A		KC-135R&T (Antecedent)
	Average Annual Cost Per Aircraft		Average Annual Cost Per Aircraft
Unit-Level Manpower	4.795		3.105
Unit Operations	3.398		2.747
Maintenance	5.024		5.311
Sustaining Support	1.114		0.096
Continuing System Improvements	0.891		0.211
Indirect Support	--		--
Other	--		--
Total	15.222		11.470

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 BY 2016 \$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 Decision Support System (AFTOC). However, these costs are included in the KC-46A Total O&S costs.

While the comparison is to FY 2018 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. This projected increase is not reflected in the "Annual O&S Costs BY 2016 \$M" table above. The KC-46A Average Annual Cost Per Aircraft above is a life cycle steady state average that includes price escalation. The KC-135 R&T Average Annual Cost Per Aircraft above is an FY 2018 actual cost (BY 2016), and therefore does not include future price escalation.

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 Production APB Objective/Threshold		Current Estimate	
Base Year	125041.0	137545.1	119171.4	N/A
Then Year	220824.2	N/A	219993.5	N/A

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 2016 \$M" table due to the exclusion of "Indirect Costs" associated with the KC-135 R&T. The KC-46A POE reflects the following assumptions: 166 PAA, 40-year service life, steady state beginning in FY 2029 through FY 2058, and peacetime operations tempo with average annual flying hours of 662 hours per PAA. The KC-46A SCP 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 2016 \$M) = [unitized cost (\$15.222M average steady state) x 30 steady state years x 166 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). \$119,171.4M (BY 2016 \$M) = \$75,795.17M + \$17,417.80M + \$15,753.38M + \$10,204.62M

O&S Cost Variance		
Category	BY 2016 \$M	Change Explanations
Prior SAR Total O&S Estimates - Sep 2019 SAR	119747.2	
Programmatic/Planning Factors	-2253.2	Decrease driven by manpower update and reduction of FH's through FY 2030 due to Boom/RVS limitations.
Cost Estimating Methodology	40.7	Discrete estimates for Sustaining Engineering and Subscription services
Cost Data Update	151.4	Increase driven by increased fidelity to C-check packages 'A' & 'B' + ~1.7M hours
Labor Rate	0.0	
Energy Rate	1440.4	Fuel price increase Offset by a decrease of FH's through FY 2030 due to Boom/RVS issues
Technical Input	44.9	Increase driven by new requirements (TSAS/ACO, SW DR fixes, ac Care & feeding) also updated estimates for (PACS - Kit Buys, SATURN/MUOS, MIDS/JTRS, ROBE & OGC's)
Other	0.0	
Total Changes	-575.8	
Current Estimate	119171.4	

Disposal Estimate Details

Date of Estimate:	October 30, 2019
Source of Estimate:	POE
Disposal/Demilitarization Total Cost (BY 2016 \$M):	15.6

The KC-46A CY 2019 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.