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Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

PAIRS CASE 2022-C-0347

VC-25B

THE NEW AIR FORCE ONE

Selected Acquisition Report (SAR)



AS OF THE FY 2023 PB
U.S. AIR FORCE

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Program Manager

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Mission and Description

The VC-25B Program will replace the United States Air Force Presidential VC-25A fleet which faces capability gaps, rising maintenance costs, and parts obsolescence as it ages beyond 30 years. The VC-25B Program Office will deliver two new aircraft to meet the requirements for the President to execute the three roles of Head of State, Chief Executive, and Commander-in-Chief.

The Boeing 747-8 aircraft will be uniquely modified to provide the President, staff, and guests with safe and reliable air transportation with an equivalent level of communications capability and security available in the White House. The modifications to the 747-8 aircraft will include an electrical power upgrade, dual auxiliary power units that are usable in flight, a mission communication system, an executive interior, military avionics, a self-defense system, autonomous enplaning and deplaning, and autonomous baggage loading. In addition to the aircraft modifications, this effort will involve VC-25B aircraft design, modification, integration, test, evaluation, and certification; pre-operational support; design and delivery of key end-user items, such as test benches and ground support equipment; aircraft paint; and final aircraft delivery preparations.

Executive Summary

Program Highlights Since Last Report

In late 2020, Boeing, in partnership with the VC-25B Program Office (PO), began an analysis and rebuild of the program's Integrated Master Schedule (IMS) to improve integration within the program, address learning to date, and correct IMS deficiencies. In parallel, Boeing's Interiors supplier became increasingly behind schedule, was missing contractual commitments, and was showing signs of financial insolvency. Boeing terminated their subcontract with their Interiors supplier on April 7, 2021 and moved work to a new supplier and brought some work in house.

Boeing's initial IMS revision for the VC-25B program was submitted in April 2021 and subsequently revised August 2021. Although an initial Schedule Risk Assessment (SRA) indicated a 12-month delay, further Boeing analysis showed a delay of approximately 17 months for contractual deliveries of both aircraft. This delay resulted in an Acquisition Program Baseline (APB) schedule breach for the remaining APB milestones (First Flight, Operational Test, RAA for IOC, and RAA for FOC). A Program Deviation Report (PDR) for this schedule delay was submitted to the Defense Acquisition Executive (DAE) on May 24, 2021 and subsequently reported to Congress in October 2021 via transmittal letter and quarterly Defense Committee Professional Staff Member engagements. The current Boeing assessment of an approximate 17-month delay will inform the program's APB rebaseline request, which is in staffing to USD(A&S).

To date, Boeing has not submitted a request for equitable adjustment on the \$3.9B contract to design, modify, test, and deliver two VC-25B aircraft. Boeing has submitted an assessment of impacts to the program from COVID-19 and the Interiors supplier termination, as well as a request to extend the contract 17 months. The Air Force is working diligently to assess the schedule and Boeing submissions, and in 2nd Quarter FY 2022 will begin negotiations to formally update VC-25B contractual delivery dates.

Modification of both aircraft moved forward with both achieving major modification milestones. Aircraft #30000 achieved Decrib (March 2021) and Weight on Wheels (October 2021) and is now focused on the next milestone, Wires Ready. Aircraft #31000 achieved Decrib in January 2022 and is now pressing towards Weight on Wheels.

In September 2021, the VC-25B program awarded a key product support contract, Initial Spares Phase 1a for Long-Lead items to include spare engines.

Program test planning activities have executed on-schedule, and opportunities have been pursued to align the test community and Boeing to support complete testing and certification activities as efficiently as possible. The Integrated Test Team's current focus is on test planning and test procedure development. The team is also developing the concept of operations for implementing Operational Testing during Developmental Testing.

FY 2021 funding is adequate to meet mission requirements. The program is currently exceeding Office of the Secretary of Defense goals for both obligations and expenditures in FY 2021. The FY 2022 and FY 2023 budgets are sufficient to meet all mission requirements. Due to schedule delays that will require re-phasing of the \$3.9B Firm-Fixed-Price contract, a \$50.6M Omnibus source in FY 2020, a \$25M HAC-D

mark in FY 2022, and identified spares shortfalls, the program will require additional funding FY 2024-2027.

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

History of Significant Developments Since Program Initiation

Date	Description
Sep 2021	Awarded Initial Spares Phase 1a (Long-Lead) Contract.
May 2021	Submitted Program Deviation Report for schedule to the Defense Acquisition Executive (DAE).
Dec 2020	Awarded Peculiar Support Equipment contract.
Sep 2020	Awarded Initial Training Contract.
Jun 2020	Commenced modification on Aircraft #2.
Apr 2020	Awarded Technical Publications Contract.
Mar 2020	Closed out Critical Design Review.
Feb 2020	Commenced modification on Aircraft #1.
Jan 2020	Conducted System Critical Design Review (CDR).
Dec 2019	Definitized Engineering & Manufacturing Development (EMD) Undefined Contract Action (UCA).
Dec 2019	Conducted Modification Readiness Review (MRR).
Dec 2018	Defense Acquisition Executive approved Acquisition Program Baseline.
Dec 2018	Closed out Preliminary Design Review (PDR).
Jul 2018	Awarded EMD UCA.
Apr 2018	Ferried Aircraft #2 to the San Antonio modification facility.
Mar 2018	Ferried Aircraft #1 to the San Antonio modification facility.
Feb 2018	POTUS and Boeing CEO informally agree to \$3.9B FFP deal.
Sep 2017	Awarded Preliminary Design Contract.
Aug 2017	Purchased two (2) 747-8 commercial aircraft from Boeing.
Mar 2017	JROC approved Capability Development Document (CDD).
Sep 2016	DAE approved MS-B decision.

Schedule

Schedule Events

Schedule Events					
Events	Initial Development APB	Category	Current APB Development Objective/Threshold		Current Estimate/Actual
Initiate Aircraft Modification	Jan 2020	CDR	Jan 2020	Jan 2021	Feb 2020
Initiate DT&E (First Flight)	Aug 2021	DT&E	Aug 2021	Aug 2022	May 2023^A
Start IOT&E	Jun 2023	IOT&E	Jun 2023	Jun 2024	Sep 2025^A
Achieve RAA for IOC	Dec 2021	IOC	Dec 2023	Dec 2024	Feb 2026^A
Achieve RAA for FOC	Apr 2024	FOC	Apr 2024	Apr 2025	Jul 2026^A

^A APB Breach

Schedule Notes

1/ Aircraft modification began after the system design was determined stable by completing Critical Design Review and Modification Readiness Reviews. Modification commenced on February 25, 2020 within four weeks of the baseline objective date of January 2020.

2/ The primary purpose of Developmental Test & Evaluation (DT&E) is to verify the system's design meets all technical specifications and contract requirements have been met. DT&E is sponsored by the Program Office and can be conducted by the Government, by the contractor, or by a mix of both. DT&E employs integrated testing methodologies to the maximum extent possible. Integrated testing is the collaborative planning and execution of test phases and events to provide shared data in support of independent analysis, evaluation, and reporting by all stakeholders.

3/ Operational test is the field test, under realistic operational conditions, of any item (or key component) of the air vehicle, equipment, or support equipment for the purpose of determining the effectiveness and suitability of the system for use by the Presidential Airlift Group (PAG) and the evaluation of the results of such test. Initial Operational Test & Evaluation entrance criteria are as defined in the VC-25B Test and Evaluation Master Plan.

4/ Required Assets Available (RAA) for Initial Operational Capability (IOC) is defined as the delivery, inspection, and acceptance of one fully Presidential Mission Ready (PMR) VC-25B to the PAG, at Joint Base Andrews, to enable IOC, as defined in the Capability Development Document (CDD). This mission-ready asset will have the full complement of initial product support elements, including logistics, initial spares, peculiar support equipment, Mission Communication System and Flight Deck test benches, Technical Orders, maintenance systems, and initial aircrew/maintenance training in place to ensure the VC-25B aircraft delivery is fully supportable.

5/ RAA for Full Operational Capability (FOC) is defined as the delivery, inspection, and acceptance of the second fully PMR VC-25B to the PAG, at Joint Base Andrews, to enable FOC, as defined in the CDD. FOC is the demonstrated capability to fully provide world-wide transportation to conduct Presidential duties as Commander-in-Chief, Chief Executive, and Head of State. FOC will be achieved once two VC 25B

aircraft are fielded, all required manpower is trained and in place, logistics and maintenance systems are mission ready, and facilities exist to house the VC-25B system.

6/ The program office is analyzing the revised Boeing IMS and the associated schedule risk assessment data to form an independent assessment to inform contractual and APB updates. The program threshold dates will have an impact on the congressionally-mandated retirement of VC-25A aircraft by December 31, 2025 set forth in the FY 2018 NDAA. The VC-25A program office will make recommendations for continued operations and sustainment of VC-25A to account for any VC-25B delays.

Deviation Explanations

Boeing terminated their Interiors subsystem supplier due to poor performance and severe financial solvency issues. The work was transitioned to a new supplier. Boeing submitted an updated IMS to reflect the Interiors transition and other risks. Assessments by the Air Force, with inputs from Boeing, show the remaining four APB schedule milestones: First Flight, Operational Test Start, RAA for IOC, and RAA for FOC breach the APB thresholds. An APB rebaseline request is in staffing for MDA review.

Performance

Performance Characteristics				
Initial Development APB	Current APB Development Objective/Threshold	Demonstrated Performance	Current Estimate Or Actual	
Unrefueled Range (KPP #1-1)				
The VC-25B should be capable of an unrefueled, maximum mission payload, no wind range of 7,100 nm after departure from JBA	The VC-25B should be capable of an unrefueled, maximum mission payload, no wind range of 7,100 nm after departure from JBA	The VC-25B shall be capable of an unrefueled, maximum mission payload, no wind range of 5,900 nm after departure from JBA	TBD	The VC-25B shall be capable of an unrefueled, maximum mission payload, no wind range of 5,900 nm after departure from JBA
Aircraft Electrical Power (KPP #1-2)				
Aircraft Electrical Power: Full Load Management				
Under full electrical system load, after the failure of one engine or associated generators, the aircraft electrical system shall maintain all electrical loads without load shedding and without the use of any APU	Under full electrical system load, after the failure of one engine or associated generators, the aircraft electrical system shall maintain all electrical loads without load shedding and without the use of any APU	(T=O) Under full electrical system load, after the failure of one engine or associated generators, the aircraft electrical system shall maintain all electrical loads without load shedding and without the use of any APU	TBD	Under full electrical system load, after the failure of one engine or associated generators, the aircraft electrical system shall maintain all electrical loads without load shedding and without the use of any APU
Aircraft Electrical Power: Power Switching				
The aircraft shall provide a no-break capability for all aircraft electrical systems when switching between any on board or ground power source	The aircraft shall provide a no-break capability for all aircraft electrical systems when switching between any on board or ground power source	(T=O) The aircraft shall provide a no-break capability for all aircraft electrical systems when switching between any on board or ground power source	TBD	The aircraft shall provide a no-break capability for all aircraft electrical systems when switching between any on board or ground power source
Aircraft Electrical Power: Redundancy				
The auxiliary power system shall consist of a 100% redundancy capability	The auxiliary power system shall consist of a 100% redundancy capability	(T=O) The auxiliary power system shall consist of a 100% redundancy capability	TBD	The auxiliary power system shall consist of a 100% redundancy capability
Mission Communication System (KPP #2-1)				
Mission Communication System: Simultaneous Use				
The VC-25B MCS shall be capable of providing VC-25B passengers and crew simultaneous day-to-day and EA/C2 voice, data, and video teleconference services at classification levels from unclassified through TS/SCI	The VC-25B MCS shall be capable of providing VC-25B passengers and crew simultaneous day-to-day and EA/C2 voice, data, and video teleconference services at classification levels from unclassified through TS/SCI	(T=O) The VC-25B MCS shall be capable of providing VC-25B passengers and crew simultaneous day-to-day and EA/C2 voice, data, and video teleconference services at classification levels from unclassified through TS/SCI	TBD	The VC-25B MCS shall be capable of providing VC-25B passengers and crew simultaneous day-to-day and EA/C2 voice, data, and video teleconference services at classification levels from unclassified through TS/SCI

Mission Communication System: Simultaneous Voice/Data Connections				
The VC-25B MCS should provide 80 simultaneous (voice or data) connections for mission operations	The VC-25B MCS should provide 80 simultaneous (voice or data) connections for mission operations	The VC-25B MCS shall provide 70 simultaneous (voice or data) connections for mission operations	TBD	The VC-25B MCS shall provide 70 simultaneous (voice or data) connections for mission operations
Mission Communication System: Data Throughput Rate				
The VC-25B MCS should provide an aggregate forward link data throughput rate of 60 Mbps for mission operations	The VC-25B MCS should provide an aggregate forward link data throughput rate of 60 Mbps for mission operations	The VC-25B MCS shall provide an aggregate forward link data throughput rate of 50 Mbps for mission operations	TBD	The VC-25B MCS shall provide an aggregate forward link data throughput rate of 50 Mbps for mission operations
Mission Communication System: Simultaneous Video Connections				
The VC-25B MCS shall provide two simultaneous video teleconference connections for mission operations	The VC-25B MCS shall provide two simultaneous video teleconference connections for mission operations	(T=O) The VC-25B MCS shall provide two simultaneous video teleconference connections for mission operations	TBD	The VC-25B MCS shall provide two simultaneous video teleconference connections for mission operations
Mission Communication System: Video Throughput Rate				
The VC-25B MCS should provide a video throughput rate of 8 Mbps for mission operations	The VC-25B MCS should provide a video throughput rate of 8 Mbps for mission operations	The VC-25B MCS shall provide a video throughput rate of 4 Mbps for mission operations	TBD	The VC-25B MCS shall provide a video throughput rate of 4 Mbps for mission operations
Management (KPP #2-2)				
Management: MCS On-Board Management				
The MCS as a whole and its sub-systems in particular shall be centrally managed from aboard VC-25B	The MCS as a whole and its sub-systems in particular shall be centrally managed from aboard VC-25B	(T=O) The MCS as a whole and its sub-systems in particular shall be centrally managed from aboard VC-25B	TBD	The MCS as a whole and its sub-systems in particular shall be centrally managed from aboard VC-25B
Management: MCS Emergency Bypass Capability				
The MCS shall have an emergency bypass capability (capability to manual transfer for connectivity if the MCS malfunctions)	The MCS shall have an emergency bypass capability (capability to manual transfer for connectivity if the MCS malfunctions)	(T=O) The MCS shall have an emergency bypass capability (capability to manual transfer for connectivity if the MCS malfunctions)	TBD	The MCS shall have an emergency bypass capability (capability to manual transfer for connectivity if the MCS malfunctions)
Management: MCS Services Prioritization				
The MCS shall prioritize passenger communication/information technologies, methodologies, and services automatically from aboard VC-25B	The MCS shall prioritize passenger communication/information technologies, methodologies, and services automatically from aboard VC-25B	(T=O) The MCS shall prioritize passenger communication/information technologies, methodologies, and services automatically from aboard VC-25B	TBD	The MCS shall prioritize passenger communication/information technologies, methodologies, and services automatically from aboard VC-25B
Management: MCS CSO Override				
The MCS shall provide the CSO the ability to override the MCS automated management functions	The MCS shall provide the CSO the ability to override the MCS automated management functions	(T=O) The MCS shall provide the CSO the ability to override the MCS automated management	TBD	The MCS shall provide the CSO the ability to override the MCS automated management functions

Materiel Availability (KPP #6-1)				
The VC-25B shall have fleet materiel availability of 75% across its expected 30 year lifecycle. Materiel Availability is calculated using the following formula: $Am = ((Total\ Time - (Scheduled\ Downtime + Unscheduled\ Downtime))/Total\ Time)$	The VC-25B shall have fleet materiel availability of 75% across its expected 30 year lifecycle. Materiel Availability is calculated using the following formula: $Am = ((Total\ Time - (Scheduled\ Downtime + Unscheduled\ Downtime))/Total\ Time)$	(T=O) The VC-25B shall have fleet materiel availability of 75% across its expected 30 year lifecycle. Materiel Availability is calculated using the following formula: $Am = ((Total\ Time - (Scheduled\ Downtime + Unscheduled\ Downtime))/Total\ Time)$	TBD	The VC-25B shall have fleet materiel availability of 75% across its expected 30 year lifecycle. Materiel Availability is calculated using the following formula: $Am = ((Total\ Time - (Scheduled\ Downtime + Unscheduled\ Downtime))/Total\ Time)$
Mission-Capable Rate (KPP #6-2)				
The VC-25B MC rate should be 96.7%. MC rate is the percent of aircraft possessed hours that were FMC and PMC for the unit over a specified period	The VC-25B MC rate should be 96.7%. MC rate is the percent of aircraft possessed hours that were FMC and PMC for the unit over a specified period	The VC-25B MC rate shall be 95.7%. MC rate is the percent of aircraft possessed hours that were FMC and PMC for the unit over a specified period	TBD	The VC-25B MC rate shall be 95.7%. MC rate is the percent of aircraft possessed hours that were FMC and PMC for the unit over a specified period
Net-Ready (KPP #7)				
Support to Military Operations: Simultaneous Connections				
Mission: VC-25B should provide secure and/or non-secure voice, data and video communications from SBU up to and including TS/SCI classification levels to passengers and aircrew for flight and mission operations. Number of simultaneous (voice or data) connections for mission operations: 80. Number of simultaneous video connections for mission operations: 2 Conditions: Throughout the threat spectrum and the full range of military operations (including: conventional contested, degraded, and/or denied environments) in accordance with CJCSI 6811.01B Conditions: Throughout the aircraft operating range capability and coverage (Ground and inflight operations) Conditions: All-weather	Mission: VC-25B should provide secure and/or non-secure voice, data and video communications from SBU up to and including TS/SCI classification levels to passengers and aircrew for flight and mission operations. Number of simultaneous (voice or data) connections for mission operations: 80. Number of simultaneous video connections for mission operations: 2 Conditions: Throughout the threat spectrum and the full range of military operations (including: conventional contested, degraded, and/or denied environments) in accordance with CJCSI 6811.01B Conditions: Throughout the aircraft operating range capability and coverage (Ground and inflight operations) Conditions: All-weather	Mission: VC-25B shall provide secure and/or non-secure voice, data and video communications from SBU up to and including TS/SCI classification levels to passengers and aircrew for flight and mission operations. Number of simultaneous (voice or data) connections for mission operations: 70. Number of simultaneous video connections for mission operations: 2 Conditions: Throughout the threat spectrum and the full range of military operations (including: conventional contested, degraded, and/or denied environments) in accordance with CJCSI 6811.01B Conditions: Throughout the aircraft operating range capability and coverage (Ground and inflight operations) Conditions: All-weather	TBD	Mission: VC-25B shall provide secure and/or non-secure voice, data and video communications from SBU up to and including TS/SCI classification levels to passengers and aircrew for flight and mission operations. Number of simultaneous (voice or data) connections for mission operations: 70. Number of simultaneous video connections for mission operations: 2 Conditions: Throughout the threat spectrum and the full range of military operations (including: conventional contested, degraded, and/or denied environments) in accordance with CJCSI 6811.01B Conditions: Throughout the aircraft operating range capability and coverage (Ground and inflight operations) Conditions: All-weather
Support to Military Operations: BLOS Connection Availability				
VC-25B should provide non-secure and secure	VC-25B should provide non-secure and secure	VC-25B shall provide non-secure and secure voice,	TBD	VC-25B shall provide non-secure and secure voice,

voice, data and video using WB and NB BLOS communications: Connection Availability of 99%	voice, data and video using WB and NB BLOS communications: Connection Availability of 99%	data and video using WB and NB BLOS communications: Connection Availability of 98%		data and video using WB and NB BLOS communications: Connection Availability of 98%
Support to Military Operations: LOS Connection Availability				
VC-25B should provide non-secure and secure voice, data and video using WB and NB LOS communications: Connection Availability of 99%	VC-25B should provide non-secure and secure voice, data and video using WB and NB LOS communications: Connection Availability of 99%	VC-25B shall provide non-secure and secure voice, data and video using WB and NB LOS communications: Connection Availability of 98%	TBD	VC-25B shall provide non-secure and secure voice, data and video using WB and NB LOS communications: Connection Availability of 98%
Enter and be Managed in the Network: TS/SCI Network Time to Connect				
VC-25B should connect to operational network from power up: Network: TS/SCI classified networks: Measure: <1 min Conditions: Continuous network connectivity	VC-25B should connect to operational network from power up: Network: TS/SCI classified networks: Measure: <1 min Conditions: Continuous network connectivity	VC-25B shall connect to operational network from power up: Network: TS/SCI classified networks: Measure: <3 min Conditions: Continuous network connectivity	TBD	VC-25B shall connect to operational network from power up: Network: TS/SCI classified networks: Measure: <3 min Conditions: Continuous network connectivity
Enter and be Managed in the Network: Secret Network Time to Connect				
VC-25B should connect to operational network from power up: Network: Secret classified networks: Measure: <1 min Conditions: Continuous network connectivity	VC-25B should connect to operational network from power up: Network: Secret classified networks: Measure: <1 min Conditions: Continuous network connectivity	VC-25B shall connect to operational network from power up: Network: Secret classified networks: Measure: <3 min Conditions: Continuous network connectivity	TBD	VC-25B shall connect to operational network from power up: Network: Secret classified networks: Measure: <3 min Conditions: Continuous network connectivity
Enter and be Managed in the Network: Unclassified Network Time to Connect				
VC-25B should connect to operational network from power up: Network: Unclassified networks: Measure: <1 min Conditions: Continuous network connectivity	VC-25B should connect to operational network from power up: Network: Unclassified networks: Measure: <1 min Conditions: Continuous network connectivity	VC-25B shall connect to operational network from power up: Network: Unclassified networks: Measure: <3 min Conditions: Continuous network connectivity	TBD	VC-25B shall connect to operational network from power up: Network: Unclassified networks: Measure: <3 min Conditions: Continuous network connectivity
Exchange Information (Voice): TS/SCI BLOS Time to Connect				
Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure voice from SBU up to and including TS/SCI classification levels using WB and NB BLOS communications Measure: VC-25B shall establish WB connection in <1 min, VC-25B shall establish NB	Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure voice from SBU up to and including TS/SCI classification levels using WB and NB BLOS communications Measure: VC-25B shall establish WB connection in <1 min, VC-25B shall establish NB	(T=O) Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure voice from SBU up to and including TS/SCI classification levels using WB and NB BLOS communications Measure: VC-25B shall establish WB connection in <1 min, VC-	TBD	Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure voice from SBU up to and including TS/SCI classification levels using WB and NB BLOS communications Measure: VC-25B shall establish WB connection in <1 min, VC-25B shall establish NB

connection in <1 sec	connection in <1 sec	25B shall establish NB connection in <1 sec		connection in <1 sec
Exchange Information (Voice): BLOS Connectivity Rate				
Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Measure: VC-25B should maintain connection success based on no loss of synchronization or carrier loss at 99% Condition: Strength of encryption - NSA Type 1	Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Measure: VC-25B should maintain connection success based on no loss of synchronization or carrier loss at 99% Condition: Strength of encryption - NSA Type 1	Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Measure: VC-25B shall maintain connection success based on no loss of synchronization or carrier loss at 96% Condition: Strength of encryption - NSA Type 1	TBD	Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Measure: VC-25B shall maintain connection success based on no loss of synchronization or carrier loss at 96% Condition: Strength of encryption - NSA Type 1
Exchange Information (Voice): LOS Time to Connect				
Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure voice using WB and NB LOS communications Measure: VC-25B shall establish connection <1 sec	Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure voice using WB and NB LOS communications Measure: VC-25B shall establish connection <1 sec	(T=O) Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure voice using WB and NB LOS communications Measure: VC-25B shall establish connection <1 sec	TBD	Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure voice using WB and NB LOS communications Measure: VC-25B shall establish connection <1 sec
Exchange Information (Voice): LOS Connectivity Rate				
Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Measure: VC-25B should maintain connection success based on no loss of synchronization or carrier loss for 99% Condition: Strength of encryption - NSA Type 1	Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Measure: VC-25B should maintain connection success based on no loss of synchronization or carrier loss for 99% Condition: Strength of encryption - NSA Type 1	Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Measure: VC-25B shall maintain connection success based on no loss of synchronization or carrier loss for 96% Condition: Strength of encryption - NSA Type 1	TBD	Information Element: Air to Air C2 Coordination (ORE1-8) EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Measure: VC-25B shall maintain connection success based on no loss of synchronization or carrier loss for 96% Condition: Strength of encryption - NSA Type 1
Exchange Information (Data): Establish Connection				
Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure data communications connectivity with Ground	Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure data communications connectivity with Ground	(T=O) Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure data communications connectivity with Ground	TBD	Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure data communications connectivity with Ground

Entry Point networks from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B shall establish connection <1 sec	Entry Point networks from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B shall establish connection <1 sec	Entry Point networks from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B shall establish connection <1 sec		Entry Point networks from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B shall establish connection <1 sec
Exchange Information (Data): Aggregate Throughput				
Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure data communications connectivity with Ground Entry Point networks from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B should provide aggregate throughput of 60 Mbps Condition: Strength of encryption - NSA Type 1	Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure data communications connectivity with Ground Entry Point networks from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B should provide aggregate throughput of 60 Mbps Condition: Strength of encryption - NSA Type 1	Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure data communications connectivity with Ground Entry Point networks from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B shall provide aggregate throughput of 50 Mbps Condition: Strength of encryption - NSA Type 1	TBD	Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure data communications connectivity with Ground Entry Point networks from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B shall provide aggregate throughput of 50 Mbps Condition: Strength of encryption - NSA Type 1
Exchange Information (Video): Establish Connection				
Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure externally hosted video teleconference communications connectivity from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B should establish connection in <1 min	Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure externally hosted video teleconference communications connectivity from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B should establish connection in <1 min	Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure externally hosted video teleconference communications connectivity from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B shall establish connection in <3 min	TBD	Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure externally hosted video teleconference communications connectivity from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B shall establish connection in <3 min
Exchange Information (Video): Throughput				
Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure externally hosted video teleconference	Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure externally hosted video teleconference	Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure externally hosted video teleconference	TBD	Information Element: EA/C2 Coordination (ORE3-4, 7-10) Business Enterprise Communication (ORE3-4, 7-10) Mission: Provide non-secure and secure externally hosted video teleconference

communications connectivity from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B should provide throughput of 8 Mbps Condition: Strength of encryption - NSA Type 1	communications connectivity from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B should provide throughput of 8 Mbps Condition: Strength of encryption - NSA Type 1	communications connectivity from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B shall provide throughput of 4 Mbps Condition: Strength of encryption - NSA Type 1		communications connectivity from SBU up to and including TS/SCI classification levels using WB and NB, BLOS and LOS communications Measure: VC-25B shall provide throughput of 4 Mbps Condition: Strength of encryption - NSA Type 1
Energy (KPP #8)				
N/A	N/A	N/A	TBD	N/A

Memo

1/ In coordination with Joint Staff J-4/Engineering Division, the mandatory Energy KPP is not applicable for VC-25B. VC-25B is not a combat aircraft nor is it a system where the provision of energy to the system impacts operational reach, or requires protection of energy infrastructure or energy resources in the logistics supply chain. VC-25B does not directly affect the burden on the force to provide and protect critical energy supplies and does not rely upon other military activities or units for sustainment. While it is important to optimize fuel demand in capability solutions, fuel efficiencies are an inherent part of aircraft manufacturers' processes and maximized to meet other performance requirements (e.g., range, performance).

Requirements Source:

Capability Development Document (CDD) For Presidential Aircraft Recapitalization dated March 24, 2017. Validated and signed by the Vice Chairman of the Joint Chiefs of Staff.

Significant Schedule Risks

Significant Schedule Risks
Certification Delays (December 2021)
1. The contractor may struggle to obtain Federal Aviation Administration certification in a timely manner.
EMD Funds Phasing (December 2021)
1. Schedule delays that will require re-phasing of funding FY24-27 for the \$3.9B FFP contract and product support efforts yet to be put on contract.
Boeing Manpower Limitations (December 2021)
1. Modification manpower limitations due to a competitive labor market for aviation structural mechanics and high Yankee White rejection rates for touch labor.
Interiors Supplier Transition (December 2021)
1. Lack of engineering data and conformance concerns from previous supplier's designs have led to certification issues.
Wiring Design, Manufacturing, and Install (December 2021)
1. Delays in wire design impacting fabrication and installation. Slow execution due to change capture, volume, error-checks, and supplier management delays
Current Estimate (December 2021)
1. Due to a new contractor Integrated Master Schedule and associated risk assessment, the program is projecting a schedule delay of approximately 17 months.

Acquisition Budget Estimate

Total Acquisition Cost

		Development APB	Current APB (12/3/2018)		Budget Estimate PB 2023		
Category	Base Year	Objective (BY\$)	Objective (BY\$)	Threshold (BY\$)	BY\$	TY\$	Deviation
RDT&E	2018	4,557.5	4,557.5	5,013.3	4,622.4	4,957.8	
Procurement	2018	51.0	51.0	56.1	22.0	23.4	
MILCON	2018	403.6	403.6	444.0	395.1	424.6	
Acq. O&M	2018	1.9	1.9	2.1	2.3	2.6	0.2
Total	2018	5,014.0	5,014.0	-	5,041.9	5,408.3	
PAUC	2018	2,507.0	2,507.0	2,757.7	2,520.9	2,704.2	
APUC	2018						

Total End Item Quantity

Quantity Category	Current APB Quantity	Current Estimate Quantity
Development	2	2
Procurement	0	0

Budget Notes:

A Majority of the RDT&E change since the previous SAR is due to updated estimates for product support elements (Initial Spares & Technical Data). Changes also stem from an above threshold reprogramming action (FY20) to fund to the program APB, and additional funding requirements for Government costs in FY26. The MILCON requirement has also been updated since the previous SAR, with changes being driven to align the program budget to the actual contract requirements.

Cost Deviations Explanations:

The breach to the Acquisition Operations and Maintenance (O&M) was previously reported in the December 2019 SAR. A VC-25B Program Office Estimate update for CY 2019 has resulted in an APB breach of \$0.4M. This breach is a result of the realignment of requirements from Other Procurement appropriation to the O&M appropriation in support of the outfitting of the VC-25B Hangar Complex. A PDR was submitted and an updated APB will be submitted alongside the schedule APB update that is expected to occur in the near future.

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (December 2018)	
1.	Contractor has pulled certification plan approvals with Federal Aviation Administration (FAA) early in process to reduce risk of certification delays later. Program Office, contractor, and suppliers are working proactive plans to reduce certification risk.
2.	Funding will be addressed in future budget cycles.
3.	Contractor is maximizing escort use in accordance with policy provided by PO and Presidential Airlift Group (PAG), heavily leveraging temporary and contract labor, and latest Boeing SRA accounts for lower available manpower (150 structural mechanics vs. 300).
Original Baseline Estimate (December 2018)	
1.	The Current Baseline Estimate risks identified are the same as the Original Baseline Estimate (December 2018).
Revised Original Estimate (N/A)	
None	
Current Procurement Cost (June 2021)	
1.	There are no known risks with this program at this time.

Unit Cost

Current Baseline Compared with Current Estimate

Category (\$M) Years 2018	Base	Current APB	Current Estimate	% Change	NMC Breach
PAUC					
Cost		5014.0	5047.5	-	-
Quantity		2	2	-	-
Unit Cost		2507.0	2523.750	0.67%	
APUC					
Cost		51.0	22.0	-	-
Quantity		0	0	-	-
Unit Cost		-	-	-	

Original Baseline Compared with Current Estimate

Category (\$M) Base Year 2018	Current APB 12/3/2018	Current Estimate POM 2023	% Change	NMC Breach
PAUC				
Cost	5014.0	5047.5	-	-
Quantity	2	2	-	-
Unit Cost	2507.0	2523.750	0.67%	
APUC				
Cost	51.0	22.0	-	-
Quantity	0	0	-	-
Unit Cost	-	-	-	

Unit Cost Notes

Cost growth since the prior submission has been primarily driven by an updated estimate for Initial Spares. The Initial Spares basis of estimate was updated with the FY 2021 POE to incorporate a priced list of suggested spares for the fleet and is regarded as a more refined requirement than the prior analogy based BOE. FY 2022 POE will address the updated program schedule and APB schedule rebaseline targeted for Second Quarter CY 2022.

Actions Taken or Proposed to Control Future Cost Growth:

Additional schedule has been modeled in the updated cost estimate. Additional Other Government Costs (PMA, Travel, etc.) related to schedule impacts have been estimated at \$6.3M (BY 2018\$'s). It is not expected that contract costs (Firm Fixed Price) will be affected by schedule impacts.

Contracts

Contract Data (\$TYM)		
Contract Number	FA8625-16-C-6599	
Effort Number	--	
Modification Number	--	
Contract Type	Firm-Fixed-Price	
Award Date	1/29/2016	
Definitization Date	12/26/2019	
Order Number		
CAGE Code/CAGE Legal Name	The Boeing Company	
Contract Title	VC-25B Program	
Contract Address	Seattle, WA	
Contracts/Effort Price, Quantity, and Performance (\$M)		
Initial Target Price	Current Target Price	
25.8	4,005.0	
Initial Ceiling Price	Current Ceiling Price	
N/A	N/A	
Contract's EAC	PM's EAC	
4,005.0	4,005.0	
Initial Quantity	Current Quantity	Delivered Quantity
2	2	2
BAC	BCWP	ACWP
N/A	N/A	N/A
BCWS	Cost Variance	Schedule Variance
N/A	N/A	N/A

Contract Notes:

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to scope increases associated with risk reduction studies, purchase of two 747-8 commercial aircraft, Preliminary Design, and Engineering & Manufacturing Development. The Initial Target Price 'Target' amount of \$25.8M represents the "Pre-Milestone B" efforts on the EMD contract, awarded in January 2016, as negotiations for the overall EMD effort were in-work.

Technologies and Systems Engineering

Significant Technical Risks
Current Estimate (December 2021)
<p>1. Low-Speed Aerodynamics Stability & Control and Flight Control Law - If E-Cab piloted sessions and desktop simulation analysis (both based upon the high speed wind tunnel/parent flight test base), indicate that the OML changes adversely impact the handling characteristics of the airplane this could prevent certification by analysis</p>
<p>2. High-Speed Aerodynamics Stability & Control and Flight Control Law - The E-Cab piloted sessions and desktop simulation analysis (both based upon the high speed wind tunnel/parent flight test base) had shown that the VC-25B OML further exacerbated the marginal high-speed handling characteristics of the parent airplane.</p>
<p>3. APU Inlet Certification Testing and Production – Issues found during the pre-production verification activities of the inlet fabrication are putting the schedule of all inlets sets at risk driving cost overruns and late certification activities.</p>
<p>4. Electrical Design Integration – Wire Bundles – If Wire Bundles Deliveries are not met, significant out of sequence wire installation will occur causing program schedule slide.</p>
<p>5. Smoke Penetration and Halon Retention Risk Reduction – VC-25B modifications have significantly changed the physical interfaces between cargo compartment and passenger cabin; preventing smoke from penetrating into occupied areas requires all physical interfaces to be identified and closed out as much as practicable.</p>
<p>6. Aircraft Test Schedule Execution Rates – Given the test team has planned for a challenging test schedule, if enablers are not put in place or the aircraft is not test ready without sufficient program capacity/efficiency to absorb non-standard work then there is risk that the program will not meet commitments. Aggressive flight/ground test rates and lack of re-fly/maintenance scheduling.</p>
<p>7. MCS LRU Data Required for Certification – If the LRU equipment data required by the Boeing ODA for certification of the Mission Communications System (MCS) is not available, then a redesign of the MCS installations and/or LRUs would be required.</p>
<p>8. Qualification Test Performance – If qualification tests are not performed in a timely manner and not executed with a defined process, there will be downstream impact to TIAs, Flight Test, and Delivery timelines.</p>
<p>9. Non-Rechargeable Lithium Batteries (NLRB) – If avionics and communications LRUs containing NLRBs greater than 2 watt-hours in capacity are not FAA certifiable, then design changes will be required potentially impacting schedule.</p>
<p>10. Presidential Quality Standards - If finished PAR aircraft mission interior does not meet inspection/acceptance standards for Presidential/Head of State/VIP quality, then the Program may incur increased costs and schedule delays</p>
<p>11. MCS COTS EWIS Component Certification - If a certification path is not defined quickly for ~120 new COTS wire harness connectors/backshells/cables driven by MCS LRU interfaces, then released engineering may need to be changed to incorporate installation mitigations.</p>
<p>12. Deflection Based Ceiling IFL to Structure - . If current design induces too large of a load into airframe components or bin rails then could result in redesign of Jormac/GDC components or reinforcements of airframe or bin rails. If current loading exceeds bin rail capabilities then localized reinforcements will be necessary to be designed.</p>
<p>13. Buckets 3-4 Fabrication Flows - If the overall level of change does not decline and fabrication flows for racks, panels and shelves are not reduced, then deliveries will not support Program critical path installation dates.</p>

Deliveries and Expenditures

Deliveries

Deliveries					
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered	
Development	2	2	2	100.00%	
Production	0	0	0	0.00%	
Total Program Quantity Delivered	0	0	0	0.00%	

Expended and Appropriated (TY \$M)

Total Acquisition Cost: 5,408.3

Expended to Date: 2,818.1

Percent Expended: 52.1%

Total Funding Years: 16

Years Appropriated: 12

Percent Years Appropriated: 75.0%

Appropriated to Date: \$3,291.4

Percent Appropriated: 60.9%

Low Rate Initial Production

There is no LRIP for this program.

Operating and Support Costs

Total Program O&S Cost Compared with Baseline

Category	Base Year	Development APB (Current) 12/3/2018		Current Estimate 11/20/2020	
		Objective (BY\$)	Threshold (BY\$)	BY\$	TY\$
Total O&S	2018	7,640.6	8,404.7	7,713.9	12,529.74

O&S Cost Breakdown

Category (\$M)	Base Year	VC-25B Cost Estimate
Unit-Level Manpower	2018	1,556.5
Unit Operations	2018	409.3
Maintenance	2018	1,704.3
Sustaining Support	2018	2,398.9
Continued System Improvements	2018	991.2
Indirect Support	2018	653.7
Total		7,713.9

O&S Cost Notes

The Product Support Strategy for VC-25B is organic organizational level (O-level) maintenance, and Contractor Logistics Support for depot maintenance in accordance with the Depot Source of Repair assignment.

- Primary Aerospace Vehicle Inventory (PAI): 2
- Operational Availability: Mission Capability Goal: 95.7%
- Materiel Availability Goal: 75%
- Mean Time Between Maintenance - Total: 0.27 hours
- Service Life: 30 years