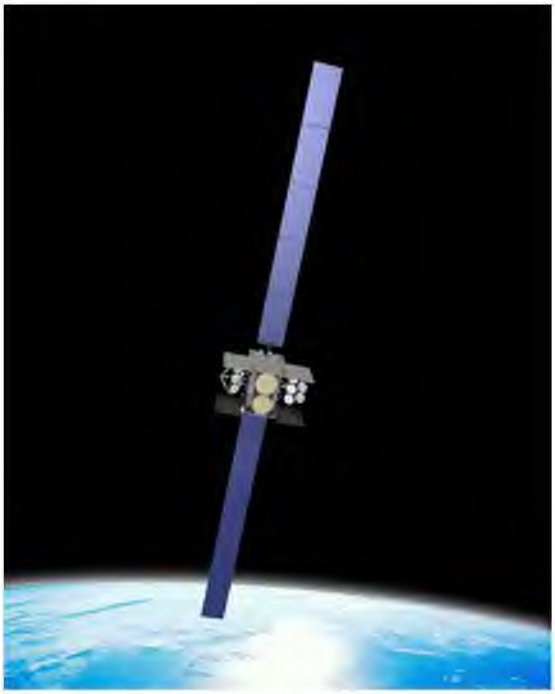
Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-326



Wideband Global SATCOM (WGS)

As of FY 2020 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

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Sensitivity Originator

No originator information is available at this time.

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

Wideband Global SATCOM (WGS)

DoD Component

Air Force

Joint Participants

Canada; Australia; Denmark; Luxembourg; The Netherlands; New Zealand; Norway; Czech Republic

Responsible Office

Mr. Thomas Becht
MILSATCOM Systems Directorate
483 N. Aviation Blvd.
El Segundo, CA 90245-2802

thomas.becht.1@us.af.mil

Phone: 310-653-9004
Fax: 310-653-9636
DSN Phone: 633-9004
DSN Fax: 633-9636
Date Assigned: June 1, 2018

References

SAR Baseline (Production Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated August 11, 2010

Approved APB

Air Force Acquisition Executive (AFAE) Approved Acquisition Program Baseline (APB) dated March 12, 2014

Mission and Description

Wideband Global Satellite Communications (SATCOM) (WGS), previously reported as Wideband Gapfiller Satellites, is a constellation of the Department of Defense's highest capacity communication satellites. WGS augments the Defense Satellite Communications System III and the Global Broadcast Service Phase II. WGS is a fully duplexed communications platform offering warfighters a significant increase in capacity, connectivity, and interoperability. It provides high capacity and digitally channelized service at both X and Ka frequency bands, opening up a new 2-way Ka communication capability. This highly flexible communications satellite design leverages commercial processes, practices and technology to provide a wideband payload compatible with existing and future terminals. WGS provides an order of magnitude increase in communications bandwidth to our infrastructure users, Soldiers, Sailors, Airmen, and Marines.

The WGS program is partially funded via International Partnerships. In exchange for access to a portion of the WGS constellation, Australia is providing funds for WGS-6 while Canada, Denmark, Luxembourg, the Netherlands, New Zealand, and the United States are providing funds for WGS-9. Norway and Czech Republic signed the multilateral Memorandum Of Understanding on July 4, 2017 and April 9, 2017, respectively, and provided funds for access to the constellation.

Executive Summary

Program Highlights Since Last Report

WGS program was over 90% expended and submitted a final SAR in 2016. The SAR is being reinitiated due to the Congressional add of $600.0M for "full funding for WGS 11 and 12" which dropped the WGS program expenditures below 90% and caused a total procurement cost breach against the current APB. Per the WGS APB Program Deviation Report dated August 2, 2018, an APB update is not recommended as the program is post-Milestone C and leveraging a commercial production line.

WGS Block I satellites became operational with WGS-1 in April 2008 (IOC was declared in January 2009), WGS-2 in August 2009, and WGS-3 in June 2010. WGS Block II satellites became operational with WGS-4 in August 2012, WGS-5 in December 2013 (FOC declared in May 2014) and WGS-6 in February 2014.

WGS-7 became operational in January 2016. WGS-8 launched on December 7, 2016 and became operational in July 2017. The Wideband Digital Channelizer upgrade, first implemented on WGS-8, completed on-orbit testing in April 2017. WGS-9 was launched on March 18, 2017 and became operational in October 2017.

The WGS-6 financial data is not reported in this SAR because funding is provided by Australia in exchange for access to a portion of the WGS constellation bandwidth. Similarly, WGS-9 financial data is not reported in this SAR because funding is provided by Canada, Denmark, Luxembourg, The Netherlands, and New Zealand in exchange for access to a portion of the WGS constellation bandwidth. Norway and Czech Republic signed the multilateral Memorandum Of Understanding on July 4, 2017 and April 9, 2017, respectively, and provided funds for access to the constellation.

WGS-10 successfully launched from Cape Canaveral Air Force Station on March 15, 2019. There are no current WGS space vehicle issues.

The FY 2018 Consolidated Appropriations Act directed the procurement of WGS 11 and 12. The Air Force plans to deliver one enhanced WGS-11 with the operational capacity of two current WGS satellites; the Air Force assesses this as the best approach to delivering the directed additional WGS capacity in a cost effective manner. A Request for Proposal was sent to Boeing Space Systems in June 2018, proposal was delivered January 22, 2019, and contract award estimated Summer 2019.

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

History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
May 2000	JROC approved the WGS ORD May 4, 2000
November 2000	DAB authorized WGS to proceed into a combined Milestone II/Production phase November 6, 2000
January 2001	Contract (six Firm Fixed Price satellites) awarded to Boeing Satellite Systems in El Segundo, California January 2, 2001
October 2006	Block II (Space Vehicles 4-6) contract signed October 17, 2006
October 2007	WGS-1 successfully launched from Cape Canaveral Air Force Station (CCAFS) October 10, 2007
November 2007	Memorandum of Understanding (MOU) between the United States and Australia for WGS-6 signed November 14, 2007
April 2008	WGS-1 became operational
January 2009	IOC declared
April 2009	WGS-2 successfully launched from CCAFS April 4, 2009
August 2009	WGS-2 became operational
December 2009	WGS-3 successfully launched from CCAFS December 5, 2009
June 2010	WGS-3 became operational
August 2010	Initial Block II Follow-on contract awarded August 20, 2010
April 2011	WGS certified by USD(AT&L) as satisfying all provisions of Section 2366b of Title 10, United States Code
November 2011	ADM for WGS-9 signed November 1, 2011
December 2011	WGS-8 production option exercised December 16, 2011
January 2012	WGS-4 successfully launched from CCAFS January 19, 2012
January 2012	MOU with Canada, Denmark, Luxembourg, the Netherlands, New Zealand, and the United States for WGS-9 signed January 12, 2012
July 2012	WGS-10 production contract awarded July 27, 2012
July 2012	WGS delegated to the Air Force as an ACAT IC July 24, 2012
August 2012	WGS-4 became operational
May 2013	WGS-5 successfully launched from CCAFS May 23, 2013
August 2013	WGS-6 successfully launched from CCAFS August 7, 2013
December 2013	WGS-5 became operational
February 2014	WGS-6 became operational
May 2014	FOC declared
July 2015	WGS-7 successfully launched from CCAFS July 23, 2015
January 2016	WGS-7 became operational
December 2016	WGS-8 successfully launched from CCAFS December 7, 2016
March 2017	WGS-9 successfully launched from CCAFS March 18, 2017
April 2017	Wideband Digital Channelizer upgrade first implemented on WGS-8 completed on-orbit testing

April 2017	Czech Republic signed the multilateral MOU April 9, 2017 providing funds for access to the constellation
July 2017	WGS-8 became operational
July 2017	Norway signed the multilateral MOU July 4, 2017 providing funds for access to the constellation
October 2017	WGS-9 became operational
April 2018	FY 2018 Consolidated Appropriations Act directed procurement of WGS 11/12
June 2018	Request for Proposal released to Boeing for WGS 11/12

Threshold Breaches

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

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

Explanation of Breach

The procurement breach is due to the Congressional add of $600.0M for full funding for WGS 11 and 12, which caused a total procurement cost breach against the current APB. Per the WGS APB Program Deviation Report dated August 2, 2018, an APB update is not recommended as the program is post-Milestone C and leveraging a commercial production line.

Schedule

Schedule Events				
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate
Milestone II/Procurement (DAB)	Oct 2000	Oct 2000	Apr 2001	Nov 2000
Contract Award EMD/Production	Dec 2000	Dec 2000	Jun 2001	Jan 2001
Critical Design Review	Mar 2002	Mar 2002	Sep 2002	Jul 2002
IOC	Aug 2008	Aug 2008	Feb 2009	Jan 2009
FOC	Jun 2013	Feb 2014	Aug 2014	May 2014

Change Explanations

None

Notes

WGS met the following conditions for a successful FOC:

a) Satellites 1-5 must be operating in their assigned orbital locations.
b) Satellites 1-5 must be capable of supporting deployed military forces in each coverage area and have the ability to focus those coverage areas anywhere within the satellite Field of View.
c) Satellites 1-5 must be fully capable of providing intra and inter-coverage connectivity and frequency cross-banding.
d) Satellites 1-5 and the control system must be fully capable of providing S-band platform and payload control.
e) Satellites 1-5 and the control system must be fully capable of providing X and Ka in-band satellite control in each satellite's operations region.
f) Satellites 1-5 must be fully interoperable with existing DoD X-band and Global Broadcast Service Ka-band terminals.
g) All program support needed to operate and maintain satellites 1-5 and associated mission control must be in place, to include: All operator, maintenance and software training completed, all training equipment and software delivered, all provisioning data delivered, all spares delivered, all depot support equipment delivered, all software maintenance documentation and maintenance support equipment delivered, payload equipment string delivered, and contractor anomaly resolution and software maintenance capability in place.

Performance

Performance Characteristics				
SAR Baseline Production Estimate	**Current APB Production Objective/Threshold**		**Demonstrated Performance**	**Current Estimate**
Coverage				
Capable of providing communicat-ions connec-tivity anywhere between 70 deg N and 65 deg S latitude and at all longitudes within each satellites field of view, 24 hrs a day	Capable of providing communicat-ions connec-tivity anywhere between 70 deg N and 65 deg S latitude and at all longitudes within each satellites field of view, 24 hrs a day	Capable of providing communicat-ions connec-tivity anywhere between 65 deg N and 65 deg S latitude and at all longitudes within each satellites field of view, 24 hrs a day	Confirmed by analysis using industry-standard Satellite Tool Kit. Operationally verified at 64º N latitude.	Capable of providing communications connectivity anywhere between 65º N and 65º S latitude and at all longitudes within each satellites field of view, 24 hrs a day.
Capacity				
Each satellite should provide a min throughput of 3.6 Gbps	Each satellite should provide a min throughput of 3.6 Gbps	Each satellite should provide a min throughput of 1.2 Gbps	Calculated simplex throughput of 4.186 Gbps*. Current average throughput is 2.1 Gbps.	Each satellite should provide a minimum throughput of ~2.14 Gbps.
Access and Control				
Provide platform and payload controlled capabilities to perform Launch and Early Orbit, On-Orbit Operations, Station-keeping, Satellite Reposition-ing, Platform and Payload Maintenance, and Anomaly Identification and Resolution	Provide platform and payload controlled capabilities to perform Launch and Early Orbit, On-Orbit Operations, Station-keeping, Satellite Reposition-ing, Platform and Payload Maintenance, and Anomaly Identification and Resolution	Provide platform and payload controlled capabilities to perform Launch and Early Orbit, On-Orbit Operations, Station-keeping, Satellite Reposition-ing, Platform and Payload Maintenance, and Anomaly Identification and Resolution	Positive platform and payload operator ratings.	Provide platform and payload controlled capabilities to perform Launch and Early Orbit, On-Orbit Operations, Station-keeping, Satellite Repositioning, Platform and Payload Maintenance, and Anomaly Identification and Resolution.
Interoperability				
Satellites must be fully inter-operable with existing and programmed DSCS and GBS terminals	Satellites must be fully inter-operable with existing and programmed DSCS and GBS terminals	Satellites must be fully inter-operable with existing and programmed DSCS and GBS terminals	Confirmed interoperability with 40 terminal types, including DSCS & GBS.	Satellites must be fully interoperable with existing and programmed DSCS and GBS terminals.

Requirements Reference
ORD 004-99 dated May 3, 2000

Change Explanations

None

Notes

* Capacity demonstrated performance of 4.186 Gbps is based on a scenario of optimized ground terminal power/antenna aperture function. Interoperability demonstrated performance is based on testing with 40 terminals.

Acronyms and Abbreviations

deg - degrees
DSCS - Defense Satellite Communications System
Gbps - Gigabits per second
GBS - Global Broadcast Service
hrs - hours
min - minimum
N - North
S - South

Track to Budget

General Notes

Budget documentations (i.e. P/R Docs) for program name remained unchanged; program began as "Wideband Gapfiller Satellites," but is now known as "Wideband Global SATCOM."

RDT&E

Appn	BA	PE
Air Force	04	0603854F

Project	Name	
644811	Wideband Gapfiller Satellites	(Sunk)

Procurement

Appn	BA	PE
Air Force	05	0303600F

Line Item	Name	
GAP000	Wideband Gapfiller Satellites	(Sunk)

Appn	BA	PE
Air Force	01	0303600F

Line Item	Name	
GAP000	Wideband Gapfiller Satellites	(Sunk)

Appn	BA	PE
Air Force	01	1203600F

Line Item	Name	
GAP000	Wideband Gapfiller Satellites	(Sunk)

Appn	BA	PE
Air Force	03	0303600F

Line Item	Name	
836780	Wideband Gapfiller Satellites	(Sunk)

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2010 $M			BY 2010 $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	417.2	417.2	458.9	444.3	380.7	380.7	409.6
Procurement	3193.4	3193.4	3512.6	3733.5[1]	3159.0	3159.0	3807.4
Flyaway	--	--	--	3700.7	--	--	3778.3
Recurring	--	--	--	3700.7	--	--	3778.3
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	32.8	--	--	29.1
Other Support	--	--	--	32.8	--	--	29.1
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	3610.6	3610.6	N/A	4177.8	3539.7	3539.7	4217.0

[1] *APB Breach*

Cost Notes

No cost estimate for the program has been completed in the previous year.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	0	0	0
Procurement	7	7	9
Total	7	7	9

Cost and Funding

Funding Summary

Appropriation Summary									
FY 2020 President's Budget / December 2018 SAR (TY$ M)									
Appropriation	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
RDT&E	409.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	409.6
Procurement	3795.3	12.1	0.0	0.0	0.0	0.0	0.0	0.0	3807.4
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2020 Total	4204.9	12.1	0.0	0.0	0.0	0.0	0.0	0.0	4217.0
PB 2018 Total	3610.4	12.1	0.0	0.0	0.0	0.0	0.0	0.0	3622.5
Delta	594.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	594.5

Funding Notes

The Missile Procurement Air Force/Space Procurement Air Force funding profile identified in this SAR does not include $64.0M (FY 2014 - FY 2017) for Commercial Satellite Communications Pathfinders.

Quantity Summary										
FY 2020 President's Budget / December 2018 SAR (TY$ M)										
Quantity	Undistributed	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Development	0	0	0	0	0	0	0	0	0	0
Production	0	9	0	0	0	0	0	0	0	9
PB 2020 Total	0	9	0	0	0	0	0	0	0	9
PB 2018 Total	0	8	0	0	0	0	0	0	0	8
Delta	0	1	0	0	0	0	0	0	0	1

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
1999	--	--	--	--	--	--	0.7
2000	--	--	--	--	--	--	4.5
2001	--	--	--	--	--	--	77.7
2002	--	--	--	--	--	--	79.0
2003	--	--	--	--	--	--	--
2004	--	--	--	--	--	--	--
2005	--	--	--	--	--	--	31.7
2006	--	--	--	--	--	--	78.5
2007	--	--	--	--	--	--	28.5
2008	--	--	--	--	--	--	--
2009	--	--	--	--	--	--	9.8
2010	--	--	--	--	--	--	42.5
2011	--	--	--	--	--	--	56.7
Subtotal	--	--	--	--	--	--	409.6

Annual Funding 3600 | RDT&E | Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	BY 2010 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1999	--	--	--	--	--	--	0.8
2000	--	--	--	--	--	--	5.4
2001	--	--	--	--	--	--	91.6
2002	--	--	--	--	--	--	92.1
2003	--	--	--	--	--	--	--
2004	--	--	--	--	--	--	--
2005	--	--	--	--	--	--	34.7
2006	--	--	--	--	--	--	83.4
2007	--	--	--	--	--	--	29.5
2008	--	--	--	--	--	--	--
2009	--	--	--	--	--	--	9.8
2010	--	--	--	--	--	--	42.0
2011	--	--	--	--	--	--	55.0
Subtotal	--	--	--	--	--	--	444.3

Annual Funding 3020 | Procurement | Missile 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
2001	--	24.6	--	--	24.6	--	24.6
2002	2	372.9	--	--	372.9	--	372.9
2003	1	184.1	--	--	184.1	--	184.1
2004	--	21.8	--	--	21.8	--	21.8
2005	--	35.4	--	--	35.4	--	35.4
2006	--	76.1	--	--	76.1	--	76.1
2007	1	428.7	--	--	428.7	--	428.7
2008	1	304.8	--	--	304.8	--	304.8
2009	--	50.4	--	--	50.4	--	50.4
2010	--	197.0	--	--	197.0	--	197.0
2011	1	517.0	--	--	517.0	--	517.0
2012	2	748.7	--	--	748.7	--	748.7
2013	--	25.1	--	--	25.1	--	25.1
2014	--	18.9	--	--	18.9	--	18.9
2015	--	29.1	--	--	29.1	--	29.1
Subtotal	8	3034.6	--	--	3034.6	--	3034.6

Annual Funding 3020 | Procurement | Missile Procurement, Air Force							
Fiscal Year	Quantity	BY 2010 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2001	--	28.8	--	--	28.8	--	28.8
2002	2	429.1	--	--	429.1	--	429.1
2003	1	209.4	--	--	209.4	--	209.4
2004	--	24.3	--	--	24.3	--	24.3
2005	--	38.3	--	--	38.3	--	38.3
2006	--	80.0	--	--	80.0	--	80.0
2007	1	439.9	--	--	439.9	--	439.9
2008	1	307.2	--	--	307.2	--	307.2
2009	--	50.1	--	--	50.1	--	50.1
2010	--	193.0	--	--	193.0	--	193.0
2011	1	496.3	--	--	496.3	--	496.3
2012	2	706.9	--	--	706.9	--	706.9
2013	--	23.2	--	--	23.2	--	23.2
2014	--	17.2	--	--	17.2	--	17.2
2015	--	26.2	--	--	26.2	--	26.2
Subtotal	8	3069.9	--	--	3069.9	--	3069.9

Cost Quantity Information 3020 | Procurement | Missile Procurement, Air Force		
Fiscal Year	**Quantity**	**End Item Recurring Flyaway (Aligned With Quantity) BY 2010 $M**
2001	--	--
2002	2	643.0
2003	1	299.8
2004	--	--
2005	--	--
2006	--	--
2007	1	504.5
2008	1	435.6
2009	--	--
2010	--	--
2011	1	498.2
2012	2	688.8
2013	--	--
2014	--	--
2015	--	--
Subtotal	8	3069.9

Annual Funding 3080 | Procurement | Other 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
2003	--	--	--	--	--	15.1	15.1
2004	--	--	--	--	--	10.8	10.8
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	--	--
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	--
2009	--	--	--	--	--	--	--
2010	--	--	--	--	--	1.6	1.6
2011	--	--	--	--	--	1.6	1.6
Subtotal	--	--	--	--	--	29.1	29.1

Annual Funding 3080 | Procurement | Other Procurement, Air Force							
Fiscal Year	Quantity	BY 2010 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2003	--	--	--	--	--	17.4	17.4
2004	--	--	--	--	--	12.2	12.2
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	--	--
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	--
2009	--	--	--	--	--	--	--
2010	--	--	--	--	--	1.6	1.6
2011	--	--	--	--	--	1.6	1.6
Subtotal	--	--	--	--	--	32.8	32.8

Annual Funding 3021 | Procurement | Space 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
2016	--	48.5	--	--	48.5	--	48.5
2017	--	48.8	--	--	48.8	--	48.8
2018	1	634.3	--	--	634.3	--	634.3
2019	--	12.1	--	--	12.1	--	12.1
Subtotal	1	743.7	--	--	743.7	--	743.7

Annual Funding 3021 | Procurement | Space Procurement, Air Force							
Fiscal Year	Quantity	BY 2010 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2016	--	42.8	--	--	42.8	--	42.8
2017	--	42.2	--	--	42.2	--	42.2
2018	1	535.8	--	--	535.8	--	535.8
2019	--	10.0	--	--	10.0	--	10.0
Subtotal	1	630.8	--	--	630.8	--	630.8

FY 2018 includes $600M Congressional add for "full funding for WGS 11 and 12." The Air Force plans to deliver one enhanced WGS-11 with the operational capacity of two current WGS satellites; the Air Force assesses this as the best approach to delivering the directed additional WGS capacity in a cost effective manner.

Cost Quantity Information 3021 | Procurement | Space Procurement, Air Force		
Fiscal Year	**Quantity**	**End Item Recurring Flyaway (Aligned With Quantity) BY 2010 $M**
2016	--	--
2017	--	--
2018	1	630.8
2019	--	--
Subtotal	1	630.8

Low Rate Initial Production

There is no LRIP for this program.

Foreign Military Sales

Country	Date of Sale	Quantity	Total Cost $M	Description
Multilateral	1/12/2012	1	418.6	MOU with Canada, Denmark, Luxembourg, the Netherlands and New Zealand was signed on January 12, 2012 for the procurement of WGS-9 in exchange for access to the WGS constellation. Norway and Czech Republic signed the MOU on July 4, 2017 and April 9, 2017, respectively, and provided funds for access to the constellation.
Australia	11/14/2007	1	297.0	MOU between the DoD of the United States of America and the DoD of Australia concerning production, operations, and support of WGS was signed on November 14, 2007. Australia is providing funds for WGS-6 in exchange for access to the WGS constellation.

Notes

The WGS program has no FMS; all sales in the table are International Cooperations.

Multilateral numbers include WGS-9 Channelizer upgrade.

Australia numbers reflect the final Boeing negotiated/settled cost for WGS-6.

Acronyms and Abbreviations

MOU - Memorandum of Understanding

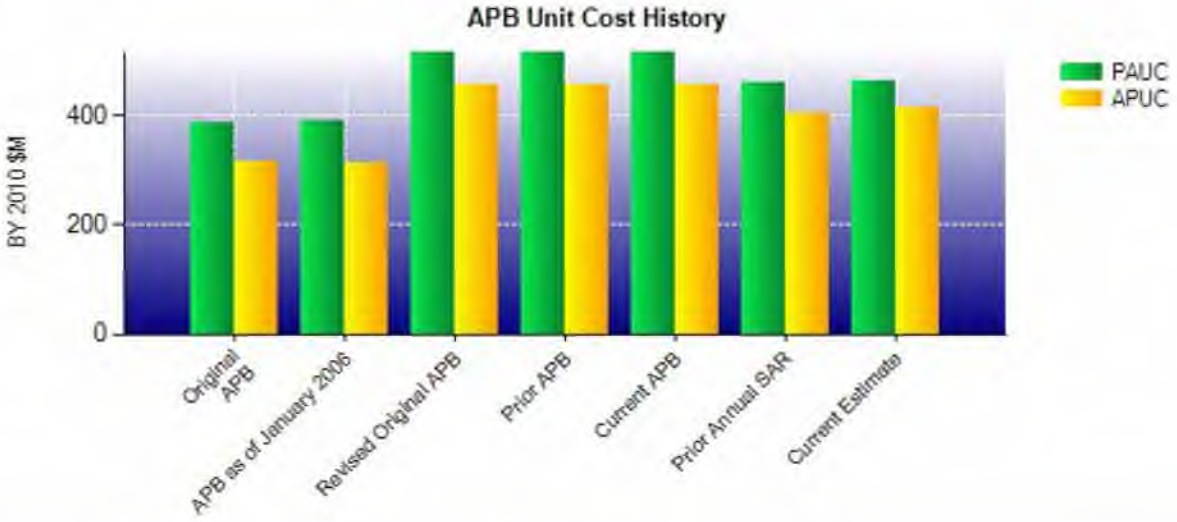
Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2010 $M Current UCR Baseline (Mar 2014 APB)	BY 2010 $M Current Estimate (Dec 2018 SAR)	% Change
Program Acquisition Unit Cost			
Cost	3610.6	4177.8	
Quantity	7	9	
Unit Cost	515.800	464.200	-10.00
Average Procurement Unit Cost			
Cost	3193.4	3733.5	
Quantity	7	9	
Unit Cost	456.200	414.833	-9.07

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2010 $M Revised Original UCR Baseline (Aug 2010 APB)	BY 2010 $M Current Estimate (Dec 2018 SAR)	% Change
Program Acquisition Unit Cost			
Cost	3610.6	4177.8	
Quantity	7	9	
Unit Cost	515.800	464.200	-10.00
Average Procurement Unit Cost			
Cost	3193.4	3733.5	
Quantity	7	9	
Unit Cost	456.200	414.833	-9.07



APB Unit Cost History					
Item	Date	BY 2010 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	Dec 2000	387.400	317.933	347.500	287.900
APB as of January 2006	Feb 2004	390.600	314.300	353.420	286.480
Revised Original APB	Aug 2010	515.800	456.200	505.671	451.286
Prior APB	Aug 2010	515.800	456.200	505.671	451.286
Current APB	Mar 2014	515.800	456.200	505.671	451.286
Prior Annual SAR	Dec 2016	459.488	403.950	452.812	401.612
Current Estimate	Dec 2018	464.200	414.833	468.556	423.044

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	
347.500	3.214	74.201	0.000	19.057	64.585	0.000	-2.886	158.171	505.671

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
505.671	2.600	50.373	0.000	36.067	-126.122	0.000	-0.033	-37.115	468.556

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	
287.900	2.786	108.257	0.000	0.000	55.229	0.000	-2.886	163.386	451.286

Current SAR Baseline to Current Estimate (TY $M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
451.286	2.522	62.458	0.000	36.067	-129.256	0.000	-0.033	-28.242	423.044

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone I	N/A	N/A	N/A	N/A
Milestone II	N/A	Oct 2000	Oct 2000	Nov 2000
Milestone III	N/A	N/A	N/A	N/A
IOC	N/A	Dec 2004	Aug 2008	Jan 2009
Total Cost (TY $M)	N/A	1042.5	3539.7	4217.0
Total Quantity	N/A	3	7	9
PAUC	N/A	347.500	505.671	468.556

Cost Variance

Summary TY $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	380.7	3159.0	--	3539.7
Previous Changes				
Economic	+0.7	+22.4	--	+23.1
Quantity	--	+406.7	--	+406.7
Schedule	--	--	--	--
Engineering	--	+146.1	--	+146.1
Estimating	+28.2	-521.0	--	-492.8
Other	--	--	--	--
Support	--	-0.3	--	-0.3
Subtotal	+28.9	+53.9	--	+82.8
Current Changes				
Economic	--	+0.3	--	+0.3
Quantity	--	+1058.0	--	+1058.0
Schedule	--	--	--	--
Engineering	--	+178.5	--	+178.5
Estimating	--	-642.3	--	-642.3
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	+594.5	--	+594.5
Total Changes	+28.9	+648.4	--	+677.3
CE - Cost Variance	409.6	3807.4	--	4217.0
CE - Cost & Funding	409.6	3807.4	--	4217.0

Summary BY 2010 $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	417.2	3193.4	--	3610.6
Previous Changes				
Economic	--	--	--	--
Quantity	--	+383.0	--	+383.0
Schedule	--	--	--	--
Engineering	--	+124.8	--	+124.8
Estimating	+27.1	-469.4	--	-442.3
Other	--	--	--	--
Support	--	-0.2	--	-0.2
Subtotal	+27.1	+38.2	--	+65.3
Current Changes				
Economic	--	--	--	--
Quantity	--	+893.7	--	+893.7
Schedule	--	--	--	--
Engineering	--	+150.8	--	+150.8
Estimating	--	-542.6	--	-542.6
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	+501.9	--	+501.9
Total Changes	+27.1	+540.1	--	+567.2
CE - Cost Variance	444.3	3733.5	--	4177.8
CE - Cost & Funding	444.3	3733.5	--	4177.8

Previous Estimate: December 2016

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+0.3
Adjustment for current and prior escalation. (Estimating)	-0.3	-0.3
Total Quantity variance resulting from an increase of one satellite from eight to nine (Air Force). (Subtotal)	+493.1	+583.8
Quantity variance resulting from an increase of one satellite from eight to nine (Air Force). (Quantity)	(+880.0)	(+1041.8)
Allocation to Engineering resulting from Quantity change. (Engineering) (QR)	(+150.8)	(+178.5)
Allocation to Estimating resulting from Quantity change. (Estimating) (QR)	(-537.7)	(-636.5)
Additional Quantity variance resulting from an increase of one satellite from eight to nine to account for the full FY 2018 Congressional add (Air Force). (Quantity)	+13.7	+16.2
Revised estimate due to Congressional General Reduction in FY 2018. (Estimating)	-4.6	-5.5
Procurement Subtotal	+501.9	+594.5

(QR) Quantity Related

Contracts

Contract Identification

Appropriation: Procurement
Contract Name: WGS-Block II Follow-On (SVs 7-10)
Contractor: Boeing Satellite Systems, Inc.
Contractor Location: 2260 Imperial Hwy.
El Segundo, CA 90245
Contract Number: FA8808-10-C-0001/3
Contract Type: Firm Fixed Price (FFP)
Award Date: August 31, 2011
Definitization Date: August 31, 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
442.6	N/A	1	1157.3	N/A	3	1157.3	1157.3

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the exercise of production options for satellites WGS-8 and WGS-10.

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	0	--
Production	7	7	9	77.78%
Total Program Quantity Delivered	7	7	9	77.78%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	4217.0	Years Appropriated	21
Expended to Date	3564.1	Percent Years Appropriated	100.00%
Percent Expended	84.52%	Appropriated to Date	4217.0
Total Funding Years	21	Percent Appropriated	100.00%

The above data is current as of March 11, 2019.

Notes

Three satellites (WGS 1-3) on the Block I contract, two satellites (WGS 4-5) on the Block II contract, and two satellites (WGS 7-8) on the Block II follow-on contract have been delivered to date.

A third satellite (WGS-6) on the Block II contract is funded by Australia and thus is not included in the APB costs, budgets, or quantities. Similar to WGS-6, WGS-9 is funded by international partners (Canada, Denmark, Luxembourg, The Netherlands, New Zealand, and the United States) and is also not included in the APB costs, budgets, or quantities. Norway and Czech Republic signed the Memorandum of Understanding on July 4, 2017 and April 9, 2017, respectively, and provided funds for access to the constellation.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	December 13, 2013
Source of Estimate:	SCP
Quantity to Sustain:	8
Unit of Measure:	Total Quantity
Service Life per Unit:	14.00 Years
Fiscal Years in Service:	FY 2009 - FY 2030

A Request for Proposal for the addition of WGS 11 was sent to Boeing Space Systems in June 2018, proposal was delivered January 22, 2019, and contract award estimated Summer 2019. O&S update to occur after contract award.

Sustainment Strategy

Contract Logistics Support (CLS) has been provided by Boeing covering the whole system, via a Time and Material CLIN option exercised every calendar year as necessary. On December 31, 2014 a separate CLS sustainment contract was established and started on January 1, 2015.

Antecedent Information

The antecedent system is Defense Satellite Communication System (DSCS) III. The first DSCS III satellite was launched in October 1982 and the last DSCS III satellite was launched in August 2003. O&S effort for DSCS transitioned to Air Force O&M funding in FY 2005. Prior to this transition, on-going O&S for on-orbit DSCS satellites were part of missile procurement costs. O&S costs include all costs for operating, maintaining and supporting the DSCS assets (14 satellites and ground segment) for an assumed designed life of ten years.

O&S costs for DSCS are based on validated requirements from Air Force Space Command Logistics Support Requirements Brochures for the FY 2004 PB.

The antecedent DSCS program office estimate is from April 2002 finalized in Air Force Space Command's budget request to Headquaters Air Force.

Annual O&S Costs BY2010 $M		
Cost Element	**WGS Average Annual Cost Per Total Quantity**	**DSCS (Antecedent) Average Annual Cost Per Total Quantity**
Unit-Level Manpower	8.909	0.000
Unit Operations	0.255	0.830
Maintenance	1.869	0.000
Sustaining Support	6.398	12.802
Continuing System Improvements	2.672	0.000
Indirect Support	4.165	1.304
Other	0.000	2.371
Total	24.268	17.307

Item	Total O&S Cost $M			
	WGS			DSCS (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	546.7	601.4	533.9	173.1
Then Year	662.0	N/A	650.7	0.0

Equation to Translate Annual Cost to Total Cost

Total O&S Costs = Average annual cost x years to sustain = $24.268M x 22 = $533.9M

O&S Cost Variance		
Category	**BY 2010 $M**	**Change Explanations**
Prior SAR Total O&S Estimates - Dec 2016 SAR	533.9	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	0.0	
Current Estimate	533.9	

Disposal Estimate Details

Date of Estimate:

Source of Estimate:

Disposal/Demilitarization Total Cost (BY 2010 $M):

The disposal estimate is TBD.