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Department of Defense  
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

# Modernized Selected Acquisition Report (MSAR) Weather System Follow-on (WSF)

FY 2025 President's Budget

Effective: December 31, 2023

Defense Acquisition Visibility Environment

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**(U) Common DoD Abbreviations**

\$B	Billions of Dollars
\$K	Thousands of Dollars
\$M	Millions of Dollars
ACAT	Acquisition Category
Acq O&M	Acquisition-Related Operations and Maintenance
ADM	Acquisition Decision Memorandum
APA	Additional Performance Attribute
APB	Acquisition Program Baseline
APPN	Appropriation
APUC	Average Procurement Unit Cost
BA	Budget Authority or Budget Activity
Blk	Block
BY	Base Year
CAE	Component Acquisition Executive
CAPE	Cost Assessment and Program Evaluation
CARD	Cost Analysis Requirements Description
CCE	Component Cost Estimate
CCP	Component Cost Position
CDD	Capability Development Document
CLIN	Contract Line Item Number
CPD	Capability Production Document
CY	Calendar Year or Constant Year
DAB	Defense Acquisition Board
DAE	Defense Acquisition Executive
DAES	Defense Acquisition Executive Summary
DAVE	Defense Acquisition Visibility Environment
DoD	Department of Defense
DSN	Defense Switched Network
EMD	Engineering and Manufacturing Development
EVM	Earned Value Management
FD	Full Deployment
FDD	Full-Deployment Decision
FMS	Foreign Military Sales
FOC	Full Operational Capability
FRP	Full-Rate Production
FY	Fiscal Year
FYDP	Future Years Defense Program
ICD	Initial Capabilities Document
ICE	Independent Cost Estimate
Inc	Increment
IOC	Initial Operational Capability
IT	Information Technology
JROC	Joint Requirements Oversight Council
KPP	Key Performance Parameter
KSA	Key System Attribute

LRIP	Low-Rate Initial Production
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program
MILCON	Military Construction
N/A	Not Applicable
O	Objective
O&M	Operations and Maintenance
O&S	Operating and Support
ORD	Operational Requirements Document
OSD	Office of the Secretary of Defense
PAUC	Program Acquisition Unit Cost
PB	President's Budget
PE	Program Element
PEO	Program Executive Officer
PM	Program Manager
POE	Program Office Estimate
R&MF	Revolving and Management Funds
RDT&E	Research, Development, Test, and Evaluation
SAR	Selected Acquisition Report
SCP	Service Cost Position
T	Threshold
TBD	To Be Determined
TY	Then Year
U.S.	United States
U.S.C	United States Code
UCR	Unit Cost Reporting
USD(A&S)	Under Secretary of Defense (Acquisition and Sustainment)

**(U) Program Description**

<b>Full Name</b> Weather System Follow-on	<b>Short Name</b> WSF
<b>PNO</b> 488	<b>Milestone Decision Authority</b> Component Acquisition Executive
<b>Lead Component</b> Department of the Air Force (Space Acquisition)	<b>Program Executive Office</b> Space Sensing (SFPEO/SS)
<b>Joint Program</b> No	<b>Acquisition Type</b> Major Defense Acquisition Program
<b>Adaptive Acquisition Pathway</b> Major Capability Acquisition	<b>Acquired Systems</b> WSF
<b>Acquisition Category</b> IB	
<b>Acquisition Status</b> Active Acquisition	

**Mission**

The Weather System Follow-On (WSF) is a low-earth orbiting microwave imaging system developed and delivered by the United States Space Force's Space Systems Command. WSF is the next generation of space-based passive microwave sensing technology. It will provide U.S. and Allied warfighters with essential weather data, including the measurement of ocean surface wind speed and direction, ice thickness, snow depth, soil moisture, and local spacecraft energetic charged particle environment. The ocean surface wind speed measurement enables tropical cyclone intensity determination by the Joint Typhoon Warning Center. The data gathered by WSF will be provided to meteorologists in support of the generation of a wide variety of weather products necessary to conduct mission planning and operations globally. WSF consists of multiple sub-efforts including the WSF-Microwave, Energetic Charged Particle, Compact Ocean Wind Vector Radiometer, and Space Situational Awareness Environmental Monitoring. WSF is an Acquisition Category IB program comprised of two Space Vehicles and their associated command, control, and data dissemination network. Global data is gathered, stored, and down-linked through the Air Force Satellite Control Network and disseminated to Air Force and Navy weather centers. Additionally, data is broadcast real time by the satellite for utilization by heritage Direct Readout Terminals that use the data for local weather forecasting.

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## (U) Executive Summary

### Program Highlights Since Last Report

The WSF team made significant progress during this reporting period. The WSF Space Vehicle 1 (SV-1) reached the Availability for Launch program baseline milestone on January 9, 2024, and is on track for the Initial Launch Capability on mission United States Space Force (USSF)-62 scheduled for April 11, 2024. WSF SV-1 was shipped January 26, 2024 to Vandenberg Space Force Base for launch processing. The WSF Program Office projects the IOC milestone date occurring in late September 2024, and FOC event in April 2025.

The WSF SV-1 environmental test phase began on April 24, 2023. SV-1 acoustics testing was completed on April 27, 2023 and launch separation shock testing was completed on May 5, 2023. SV-1 sine vibration testing was completed on May 19, 2023 and thermal vacuum testing completed on July 5, 2023. All environmental tests were conducted successfully with no major issues. BAE Systems, Space and Mission Systems Inc. (formerly Ball Aerospace prior to February 2024) completed the production of SV-1 on September 22, 2023.

The WSF Program Office worked closely with BAE, SpaceX, and the Aerospace Corporation to resolve a launch environments exceedances issue, which had the potential of impacting the IOC and FOC schedule. BAE completed their assessment of the USSF-62 Verification Loads Cycle on January 23, 2024 showed positive design load margins for all SV-1 components. Additionally, one of the four SV-1 Reaction Wheel Assemblies (RWA) needed additional analysis to determine that the bearings were not overstressed during SV-1 level vibration testing. The RWA subcontractor cleared the final RWA for flight for reinstallation and testing before starting the launch processing. The fourth RWA was installed on SV-1 at Vandenberg Space Force Base on January 31, 2024.

The WSF Program Office, BAE, and Naval Research Laboratory (NRL) Blossom Point Tracking Facility (BPTF) completed Mission Compatibility #3 Part B end to end system testing on August 10, 2023 between SV-1, the ground command and control facility and the Satellite Control Network test van. The final SV-1 to ground command and control test, Mission Compatibility #5, was completed on December 19, 2023. Additional mission compatibility tests through the Satellite Control Network were conducted during February 2024 and March 2024 to troubleshoot a command path data drop issue, which resulted in 17 days of delay to the launch schedule. The WSF Program Office and BPTF operators identified operational procedures and mitigations to support launch readiness. Also, BAE successfully completed the Functional Configuration Audit (FCA) and Physical Configuration Audit (PCA) on October 26, 2023.

The Space Operations Command (SpOC) decided a WSF backup Command and Control (C2) capability at the NRL BPTF is required to achieve Operational Acceptance (OA). WSF was originally baselined for the Enterprise Ground System, however changed the C2 baseline to NRL BPTF in February 2020 due to operational schedule constraints. NRL BPTF does not have a physical backup facility for continuity of operations. The Program Office has identified a concept for a cloud-based C2 capability, however this effort remains unfunded. Without a funded backup C2 capability, SpOC may decide not to operationally accept SV-1. If a backup C2 capability is funded and development is commenced before OA, SpOC is likely to accept SV-1 with a lien for

backup C2. The Program Office and SpOC are working to prioritize the backup C2 capability against other USSF unfunded requirements.

Lastly, SV-2 development remains on track. The WSF Program Office and BAE successfully conducted the SV-2 Technical Baseline Review (TBR) and the Microwave Imager (MWI) Delta Critical Design Review (CDR) / Manufacturing Readiness Review (MRR) on March 1, 2023. Subsequently, the WSF team conducted the SV-2 Spacecraft Bus Delta CDR on August 16, 2023, and finally the overall SV-2 System Delta CDR was completed on October 18, 2023.

**Defense Cost and Resource Center Cost and Software Data Reporting Compliance Rating: Red.** Any outstanding CSDR deliverables greater than six months overdue, or formally rejected CSDR deliverables outstanding greater than 30 days overdue.

The WSF satellite design highly leverages a heritage bus design, and similarly, the WSF ground services provider, NRL BPTF, is heavily leveraging existing ground capabilities. It is technically impractical and cost prohibitive to redesign WSF using a Modular Open System Approach.

#### (U) History of Significant Developments Since Program Inception

Date	Description
October 2012	Obtained authorization to enter into Materiel Solution Analysis phase and designated as a pre-Major Defense Acquisition Program with the Air Force (AF) as the lead component.
September 2014	Joint Requirements Oversight Council (JROC) reviewed the Space Based Environmental Monitoring (SBEM) Analysis of Alternative (AoA) results and supported recommendation of a materiel solution to address Gaps 3, 8, and 11.
March 2015	SECAF policy memo directed each pre-Milestone B United States Air Force satellite program to integrate an Energetic Charged Particles (ECP) sensor for anomaly attribution.
December 2015	The Program Office released a Request for Information requesting industry's intent and ability to develop, launch, and operate space-based commercial services that could meet the 12 SBEM AoA weather gaps.
January 2017	The Principal Deputy Assistant Secretary of the Air Force (Acquisition and Logistics) signed ADM authorizing Milestone B entrance criteria. Determined the streamlined WSF Draft CDD in AF initial staffing exhibited sufficient requirements maturity to release the WSF-M for Proposal.
June 2017	Chief of Staff of the AF approved WSF Draft CDD and validated Key Performance Parameters.
November 2017	The Program Office awarded a FFP contract to Ball Aerospace and Technologies Corporation.
May 2018	Spacecraft and Payload System Readiness Review (SRR) completed.
July 2018	Ground System SRR completed.
August 2018	Compact Environment Anomaly Sensor (CEASE III) ECP Engineering Design Unit completed.
October 2018	Spacecraft Preliminary Design Review (PDR) completed.
November 2018	System PDR completed.
July 2019	Microwave Imager CDR completed.
August 2019	Delta Ground PDR completed.



Date	Description
September 2019	Ground Initial Design Review and CEASE III ECP sensor Delta CDR completed.
September 2019	Air Force Review Board meeting with Service Acquisition Executive (SAE) for Milestone B, completion pending the JROC validation of the CDD.
October 2019	Cyber Table Top Mission-Based Cyber Risk Assessment completed.
December 2019	Spacecraft CDR completed.
December 2019	Ground Final Design Review completed.
January 2020	Ground CDR completed.
February 2020	CDD validation by the JROC.
April 2020	System CDR completed.
May 2020	SAE certified WSF prior to Milestone B, per 10 U.S.C. § 2366b, and approved Milestone B.
June 2020	SAF/AQ approved the WSF APB.
August 2020	Delta Interoperability Analysis Exercise completed.
October 2020	Director, Operational Test and Evaluation approved the WSF TEMP.
December 2020	Mission Assurance Technical Interchange Meeting completed.
April 2021	ECP Engineering Design Unit USSF completed testing.
May 2021	MWI entered Integration and Test (I&T).
June 2021	Ground System Microwave Sensor Data Processing Software completed.
August 2021	Primary Bus Structure completed.
August 2021	Cyber Vulnerability Test 1 completed.
November 2021	MWI Reflector Deployment Assembly delivered to I&T.
October 2022	Spacecraft Integration Readiness Review and Test Readiness Review completed.
October 2022	MWI and ECP sensor delivered for SV-1 Integration and Test.
November 2022	Interim Program Review completed; Decision approved to exercise the contract option for SV-2.
November 2022	Awarded Firm Fixed Price Contract Option for SV-2.
March 2023	SV-2 TBR and the MWI Delta CDR / MRR completed.
July 2023	SV-1 environmental testing completed.
August 2023	SV-2 Spacecraft Bust Delta CDR completed.
September 2023	SV-1 completed.
October 2023	SV-1 FCA and PCA completed.
October 2023	SV-2 System Delta CDR completed.
December 2023	Final Mission Compatibility end-to-end system testing completed.
January 2024	SV-1 Available for Launch acquisition program baseline milestone completed.
January 2024	SV-1 shipped to Vandenberg Space Force Base to begin launch preparation and processing.

**(U) Schedule****(U) Schedule Events**

Events		Development APB (Milestone) 6/17/2020 Objective	Development APB (Current) 6/17/2020 Objective / Threshold		Current Estimate 12/31/2023	Actual
CDR	Other	Mar 2020	Mar 2020	Sept 2020	-	24 Apr 2020
SV-1 Available for Launch	Other	Sept 2023	Sept 2023	Mar 2024	-	9 Jan 2024
SV-1 IOC	Other	Mar 2024	Mar 2024	Sept 2024	Sept 2024	-
SV-1 FOC	Other	Mar 2025	Mar 2025	Sept 2025	Apr 2025	-
SV-2 Available for Launch	Other	Jul 2027	Jul 2027	Jan 2028	Jul 2027	-

**Notes**

- Available for Launch is defined as spacecraft available for delivery to the launch processing facility. CHR(10)2. IOC is declared upon the successful completion of:
  - Launch and Early Orbit Testing
  - Multi-service Operational Utility Evaluation
  - Ground C3 network delivers SMD to the DoD Weather Centers enterprise security boundaries (FNMOC and 557 WW)
  - Direct readout is functional and RTD is available. (DRT procurement is a Service responsibility)
  - WSF-M sensor data is calibrated
  - SCA is transferred CHR(10)3. FOC is declared upon the successful completion of:
    - All IOC criteria
    - KPPs validated
    - MOT&E
    - System is accepted IAW the Operational Acceptance Plan and Life Cycle Support Plan.

**Schedule Baseline Deviation Explanation**

None

**(U) Current Significant Schedule Risks and Risks Identified at Milestones/Decisions**

Event	Date	Description
Current	12/31/2023	There are no known risks at this time.

(U) Performance

(U) Performance Attributes

Real-Time Data - Latency		KPP
Current Estimate 12/31/2023		RTD threshold latency is = 15 minutes, at least 95% of the time, for afloat operations when WSF-M satellite is in line of sight of tactical users.
Demonstrated Performance -		TBD
Development APB (Current)  6/17/2020	Objective	RTD threshold latency is <= 15 minutes, at least 95% of the time, for afloat operations when WSF-M satellite is in line of sight of tactical users.
	Threshold	(T=0) RTD threshold latency is <= 15 minutes, at least 95% of the time, for afloat operations when WSF-M satellite is in line of sight of tactical users.
Development APB (Milestone)  6/17/2020	Objective	RTD threshold latency is <= 15 minutes, at least 95% of the time, for afloat operations when WSF-M satellite is in line of sight of tactical users.
Range 1		KPP
Current Estimate 12/31/2023		Actual Wind Speed 5-7 m/s, Speed Uncertainty = 1.5 m/s, Direction Uncertainty = 30 degrees
Demonstrated Performance -		TBD
Development APB (Current)  6/17/2020	Objective	Actual Wind Speed 5-7 m/s, Speed Uncertainty <= 1.5 m/s, Direction Uncertainty <= 30 degrees
	Threshold	(T=0) Actual Wind Speed 5-7 m/s, Speed Uncertainty <= 1.5 m/s, Direction Uncertainty <= 30 degrees
Development APB (Milestone)  6/17/2020	Objective	Actual Wind Speed 5-7 m/s, Speed Uncertainty <= 1.5 m/s, Direction Uncertainty <= 30 degrees
Range 2		KPP
Current Estimate 12/31/2023		Actual Wind Speed >7-10 m/s, Speed Uncertainty = 1.5 m/s, Direction Uncertainty = 20 degrees
Demonstrated Performance -		TBD
Development APB (Current)  6/17/2020	Objective	Actual Wind Speed >7-10 m/s, Speed Uncertainty <= 1.5 m/s, Direction Uncertainty <= 20 degrees
	Threshold	(T=0) Actual Wind Speed >7-10 m/s, Speed Uncertainty <= 1.5 m/s, Direction Uncertainty <= 20 degrees
Development APB (Milestone)  6/17/2020	Objective	Actual Wind Speed >7-10 m/s, Speed Uncertainty <= 1.5 m/s, Direction Uncertainty <= 20 degrees
Range 3		KPP
Current Estimate		Actual Wind Speed >10-25 m/s, Speed Uncertainty = 2 m/

12/31/2023		s, Direction Uncertainty = 15 degrees
Demonstrated Performance -		TBD
Development APB (Current)  6/17/2020	Objective	Actual Wind Speed >10-25 m/s, Speed Uncertainty <= 2 m/s, Direction Uncertainty <= 15 degrees
	Threshold	(T=0) Actual Wind Speed >10-25 m/s, Speed Uncertainty <= 2 m/s, Direction Uncertainty <= 15 degrees
Development APB (Milestone)  6/17/2020	Objective	Actual Wind Speed >10-25 m/s, Speed Uncertainty <= 2 m/s, Direction Uncertainty <= 15 degrees
<b>Range 4</b>		<b>KPP</b>
Current Estimate 12/31/2023		Actual Wind Speed >25 m/s, Speed Uncertainty N/A; expected to be accurate, Direction Uncertainty N/A; expected to be accurate
Demonstrated Performance -		TBD
Development APB (Current)  6/17/2020	Objective	Actual Wind Speed >25 m/s, Speed Uncertainty N/A; expected to be accurate, Direction Uncertainty N/A; expected to be accurate
	Threshold	(T=0) Actual Wind Speed >25 m/s, Speed Uncertainty N/A; expected to be accurate, Direction Uncertainty N/A; expected to be accurate
Development APB (Milestone)  6/17/2020	Objective	Actual Wind Speed >25 m/s, Speed Uncertainty N/A; expected to be accurate, Direction Uncertainty N/A; expected to be accurate
<b>Stored Mission Data - Latency</b>		<b>KPP</b>
Current Estimate 12/31/2023		Latency threshold for SMD is = 2 hours, at least 95% of the time as measured over a 30 day period and is defined as the maximum time from data acquisition until delivery of the collected SMD to the Weather Centers' enterprise security boundaries.
Demonstrated Performance -		TBD
Development APB (Current)  6/17/2020	Objective	Latency threshold for SMD is <= 2 hours, at least 95% of the time as measured over a 30 day period and is defined as the maximum time from data acquisition until delivery of the collected SMD to the Weather Centers' enterprise security boundaries.
	Threshold	(T=0) Latency threshold for SMD is <= 2 hours, at least 95% of the time as measured over a 30 day period and is defined as the maximum time from data acquisition until delivery of the collected SMD to the Weather Centers' enterprise security boundaries.
Development APB (Milestone)  6/17/2020	Objective	Latency threshold for SMD is <= 2 hours, at least 95% of the time as measured over a 30 day period and is defined as the maximum time from data acquisition until delivery of the collected SMD to the Weather Centers' enterprise security boundaries.
<b>OSVW</b>		<b>KPP</b>

Current Estimate 12/31/2023		OSVW = 30 km
Demonstrated Performance -		TBD
Development APB (Current) 6/17/2020	Objective	OSVW <= 25 km
	Threshold	OSVW <= 30 km
Development APB (Milestone) 6/17/2020	Objective	OSVW <= 25 km
<b>OSVW and TCI Refresh Rate</b>		<b>KPP</b>
Current Estimate 12/31/2023		= 22 hours at a point of interest + 100 km in all directions from the point
Demonstrated Performance -		TBD
Development APB (Current) 6/17/2020	Objective	<= 6 hours
	Threshold	<= 22 hours at a point of interest + 100 km in all directions from the point
Development APB (Milestone) 6/17/2020	Objective	<= 6 hours
<b>OSVW and TCI Coverage</b>		<b>KPP</b>
Current Estimate 12/31/2023		Global over ice-free oceans, during the stated refresh period
Demonstrated Performance -		TBD
Development APB (Current) 6/17/2020	Objective	Global over ice-free oceans, during the stated refresh period
	Threshold	(T=0) Global over ice-free oceans, during the stated refresh period
Development APB (Milestone) 6/17/2020	Objective	Global over ice-free oceans, during the stated refresh period
<b>TCI</b>		<b>KPP</b>
Current Estimate 12/31/2023		TCI is defined as the measure of the maximum 1-minute averaged sustained wind speed, the associated maximum instantaneous gusts, the associated minimum sea-level pressure, and the radii of the 34-knot, 50-knot and 64-knot winds around a tropical cyclone. WSF-M will provide mission data to support TCI assessment to = 15 km in the Ka and W band propagation windows.
Demonstrated Performance -		TBD
Development APB (Current)	Objective	TCI is defined as the measure of the maximum 1-minute averaged sustained wind speed, the associated maximum

6/17/2020		instantaneous gusts, the associated minimum sea-level pressure, and the radii of the 34-knot, 50-knot and 64-knot winds around a tropical cyclone. WSF-M will provide mission data to support TCI assessment to $\leq 15$ km in the Ka and W band propagation windows.
	<b>Threshold</b>	(T=0) TCI is defined as the measure of the maximum 1-minute averaged sustained wind speed, the associated maximum instantaneous gusts, the associated minimum sea-level pressure, and the radii of the 34-knot, 50-knot and 64-knot winds around a tropical cyclone. WSF-M will provide mission data to support TCI assessment to $\leq 15$ km in the Ka and W band propagation windows.
Development APB (Milestone) 6/17/2020	<b>Objective</b>	TCI is defined as the measure of the maximum 1-minute averaged sustained wind speed, the associated maximum instantaneous gusts, the associated minimum sea-level pressure, and the radii of the 34-knot, 50-knot and 64-knot winds around a tropical cyclone. WSF-M will provide mission data to support TCI assessment to $\leq 15$ km in the Ka and W band propagation windows.
<b>Survivability</b>		<b>KPP</b>
Current Estimate 12/31/2023		Autonomous Operations - 60 days; Protect against and mitigate cyber domain attacks
Demonstrated Performance -		TBD
Development APB (Current) 6/17/2020	<b>Objective</b>	Autonomous Operations - 60 days; Protect against and mitigate cyber domain attacks
	<b>Threshold</b>	(T=0) Autonomous Operations - 60 days; Protect against and mitigate cyber domain attacks
Development APB (Milestone) 6/17/2020	<b>Objective</b>	Autonomous Operations - 60 days; Protect against and mitigate cyber domain attacks
<b>Sustainment</b>		<b>KPP</b>
Current Estimate 12/31/2023		System Ao - 0.92; Space Vehicle Ao - 0.99
Demonstrated Performance -		TBD
Development APB (Current) 6/17/2020	<b>Objective</b>	System Ao - 0.92; Space Vehicle Ao - 0.99
	<b>Threshold</b>	(T=0) System Ao - 0.92; Space Vehicle Ao - 0.99
Development APB (Milestone) 6/17/2020	<b>Objective</b>	System Ao - 0.92; Space Vehicle Ao - 0.99

**(U) Requirement Source:**

Sponsor(s): None

1. Document Type Not Provided

Notes: CDD dated February 19, 2020.

## Notes

The performance characteristics of the WSF-M program are defined by the CDD for WSF-M, reviewed and validated by the JROC Joint Capabilities Board on February 19, 2020.

1. OSVW measurement uncertainty (speed & direction) are validated through on orbit- testing and truth data comparison. Truth data is derived from quality-controlled buoy data and model predictions.CHR(10)2. OSVW and TCI Latency are verified via on-orbit testing during the IOC phase.CHR(10)3. OSVW and TCI Refresh Rates are verified via analysis using orbital parameters and off-nadir angles and validated post orbital insertion.CHR(10)4. OSVW and TCI Coverage are verified via analysis using orbital parameters and validated post orbital insertion.CHR(10)5. OSVW and TCI HSR are verified by combining ground-measured antenna beam patterns with analysis incorporating spin speed, instrument geometry, and integration time.CHR(10)6. Survivability is validated via a combination of flight vehicle demonstration and simulation on the FVTB.CHR(10)7. Sustainment: SV reliability and system availability are verified through analysis.

## Performance Deviation Explanation

None

**(U) Acquisition Budget Estimate**

**(U) Total Acquisition Estimates and Quantities**

Category (\$M) Base Year: 2019	Development APB (Milestone) 6/17/2020 CY\$ obs Objective	Development APB (Current) 6/17/2020 CY\$ obs Objective / Threshold		Current Estimate PB 2025 CY\$ obs / TY\$ obs	
RDT&E	982.7	982.7	1,081.0	930.3	1,005.5
Procurement	0.0	0.0	0.0	-	-
MILCON	0.0	0.0	0.0	-	-
O&M	0.0	0.0	0.0	-	-
R&MF	-	-	-	-	-
Total Acquisition	982.7	982.7	-	930.3	1,005.5
Program Acquisition Unit Cost	491.350	491.350	540.485	465.161	502.743
Average Procurement Unit Cost	-	-	-	-	-
Program End-Item Quantity					
Development	2	2		2	
Procurement	0	0		0	
O&M-Acquired	-	-		0	

**Budget Notes**

None

**Quantity Notes**

None

**Cost Baseline Deviation Explanation**

None

**(U) Risk and Sensitivity Analysis**

Current Procurement Estimate Risks (12/31/2023)	
1	There are no known risks at this time.
Current Baseline Risks (6/17/2020)	



Total Acquisition Cost (BY19\$M) - \$982.7M (Qty 2); PAUC - \$491.350 (Qty 2); Risks - A mathematically derived confidence level was not computed for this Life-Cycle Cost Estimate (LCCE). The LCCE does however represent the expected value, or mean, of the cost estimate distribution, typically between the 50 and 65% confidence levels. This LCCE takes into consideration relevant risks, including ordinary levels of external and unforeseen events. It aims to provide sufficient resources to execute the program under normal conditions encountering average levels of technical, schedule, and programmatic risk and external influence.

Original Baseline Risks (6/17/2020)

Total Acquisition Cost (BY19\$M) - \$982.7M (Qty 2); PAUC - \$491.350 (Qty 2); Risks - A mathematically derived confidence level was not computed for this Life-Cycle Cost Estimate (LCCE). The LCCE does however represent the expected value, or mean, of the cost estimate distribution, typically between the 50 and 65% confidence levels. This LCCE takes into consideration relevant risks, including ordinary levels of external and unforeseen events. It aims to provide sufficient resources to execute the program under normal conditions encountering average levels of technical, schedule, and programmatic risk and external influence.

**(U) Unit Costs**

**(U) Current Estimate Compared with Current Baseline**

Category (CY\$M) Base Year: 2019	Current Baseline 06/17/2020	Current Estimate PB 2025	% Change
<b>Program Acquisition Unit Cost</b>			
Acquisition Cost	982.7	930.3	
Program Quantity	2	2	
PAUC	491.350	465.161	-5.33%
<b>Average Procurement Unit Cost</b>			
Procurement Cost	0.0	-	
Procurement Quantity	0	0	
APUC	-	-	-

**(U) Current Estimate Compared with Original Baseline**

Category (CY\$M) Base Year: 2019	Original Baseline 06/17/2020	Current Estimate PB 2025	% Change
<b>Program Acquisition Unit Cost</b>			
Acquisition Cost	982.7	930.3	
Program Quantity	2	2	
PAUC	491.350	465.161	-5.33%
<b>Average Procurement Unit Cost</b>			
Procurement Cost	0.0	-	
Procurement Quantity	0	0	
APUC	-	-	-

**(U) Cost Growth Details**

**Impacts of Schedule Changes on Unit Cost**

Not Applicable.

**Impacts of Performance Changes on Unit Cost**

Not Applicable.

**Actions taken or Proposed to Control Future Cost Growth**

Not Applicable.

**Status of Each Major Contract and Significant Factors Contributing to Cost and Schedule Variance; Projected Effects on Future Program Costs**

See Contracts section.

**Notes**

None

**(U) Life-Cycle Costs**

**(U) Operating and Support and Disposal Cost Estimates Compared with Baseline**

Category (\$M) Base Year: 2019	Development APB (Milestone) 6/17/2020 CY\$ obs Objective	Development APB (Current) 6/17/2020 CY\$ obs Objective / Threshold		Current Estimate CY\$ obs / TY\$ obs	
Total O&S	118.2	118.2	130.0	78.6	99.8
Total Disposal	-	-	-	0.0	0.0

**(U) Current Cost Estimate Sources**

**Operating and Support Cost**

Type: Budget

Approved by: PEO, January 17, 2024

**Disposal/Demilitarization Cost**

Type: Budget

Approved by: PEO, January 17, 2024

**Operating and Support Baseline Deviation Explanation**

None

**Cost Notes**

Other category includes indirect support costs which is no longer part of the CAPE OS Categories. O&S costs include unit level manpower, unit operations, maintenance, sustaining support, continuing system improvements and indirect support. O&S cost elements as of January 2022 include support cost for the Energetic Charged Particle sensor hosted payload. WSF will be integrated into and flown from the Naval Research Laboratory Blossom Point Tracking Facility, which is an Enterprise Ground Services

**O&S and Disposal Cost Sources:** For Programs with an O&S Cost estimate or Disposal Cost estimate the O&S Cost Source and Disposal Cost Source listed in the MSAR are inaccurate due to a system limitation. See MSAR Supplement for corrected source(s).

**(U) Operating and Support Variance with Prior Estimate**

(CY\$M) Base Year: 2019	Estimate	
Prior Estimate (12/31/2022)	95.8	
Current Estimate	78.6	

(CY\$M) Base Year: 2019		
Category	Estimate	Explanation
	Variance	
Unit-Level Manpower	-2.2	Naval Research Laboratory (NRL) Ground Updates/ Shorter Period of Performance (PoP)
Unit Operations	-3.9	NRL Ground Updates/Shorter PoP
Maintenance	-1.1	NRL Ground Updates/Shorter PoP
Sustaining Support	-2.2	NRL Ground Updates/Shorter PoP
Continuing System Improvements	-6.1	NRL Ground Updates/Shorter PoP
Other	-1.7	Lower Withhold Factor
Not Categorized	0.0	

### (U) Operating and Support Cost Element Structure Estimates by Acquired System

(CY\$M) Base Year: 2019							
System	Unit-Level Manpower	Unit Operations	Maintenance	Sustaining Support	Continuing System Improvements	Other	Total
WSF	15.0	1.9	0.5	41.5	19.3	0.4	78.6
Program	15.0	1.9	0.5	41.5	19.3	0.4	78.6

### (U) Annual Operating and Support Costs per Unit Compared with Antecedent System

(CY\$M) Base Year: 2019							
System	Unit-Level Manpower	Unit Operations	Maintenance	Sustaining Support	Continuing System Improvements	Other	Total
WSF	1.5	0.2	0.0	4.1	1.9	0.0	7.9

### (U) Operating and Support Cost Estimate Assumptions

System	Quantity to Sustain	Unit Expected Service Life (Years)	Unit of Measure	Fiscal Years Operational
WSF	2	5.0	Satellite	2025 - 2032

#### Additional O&S Estimate Assumptions

None

#### Antecedent Estimate Assumptions

There is no identified Antecedent System.

**O&S Annual Cost Calculation Memo**

None

**(U) Technologies and Systems Engineering****(U) Current Significant Technical Risks and Risks Identified at Milestones/Decisions**

Event	Date	Description
Current	12/31/2023	There are no known risks at this time.

**(U) Performing Activities and Contracts****(U) External Government Activities**

None

**(U) Contracts and Efforts**

Contract Title	Contract Number / Effort	Contractor	Phase
Weather System Follow-On Microwave	FA881018C0002 / 1	BALL AEROSPACE & TECHNOLOGIES CORP.	Production

**(U) Contract and Effort Identification, Price, Quantity and Performance**

<b>Contract Number:</b>	FA881018C0002	<b>Order Number:</b>	-
<b>Contract Title:</b>	Weather System Follow-On Microwave	<b>Strategy:</b>	-
<b>CAGE:</b>	13993 - BALL AEROSPACE & TECHNOLOGIES CORP.	<b>Contracting Office:</b>	SSC/SNS - Space Sensing Environmental & Tactical Surveillance Acquisition Delta
<b>City, State/Province:</b>	BOULDER, CO		
<b>Effort Number:</b>	1	<b>Supported Phase:</b>	Production
<b>Type:</b>	Firm-Fixed-Price	<b>Award Date:</b>	November 8, 2017
<b>Latest Modification Date:</b>	-	<b>Definitization Date:</b>	-
<b>Latest Modification No.:</b>	P00071	<b>Work Start Date:</b>	November 15, 2017
<b>Technical Data Rights:</b>	-		
<b>Notes:</b>	This FFP contract is for WSF-M Production.		

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

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the result of multiple contract modifications to include: 1) exercising the WSF-Microwave Space Vehicle (SV) SV-1 Development and Fabrication option; 2) adding the Microwave Sounder, Microwave Imager end-to-end, Space Vehicle Early Integration, and Calibration and Validation special studies; 3) COVID-19 Request for Equitable Adjustment, 4) KI-700 GFP (Government Furnished Property) Request for Equitable Adjustment; 5) realigning the SV-1 schedule within the Government funding profile and transferring ground operations from Schriever Space Force Base to the Naval Research Lab Blossom Point Tracking Facility; 6) exercising the WSF-Microwave SV-1 Integration, Test, and Operations option; 7) adding Payload Processing Facility requirement to CLIN 0003 effective November 2, 2022; 8) exercising the WSF-Microwave SV-2 Development and Fabrication option; 9) adding ROP script tiger team to CLIN 0003 effective May 2023; 10) DC-DC (Direct Current) Converter Request for Equitable Adjustment; and 11) change to Mission Compatibility #3 and #5; 12) SpaceX Electrical Interface Implementation; 13) changing of the Initial Launch Capability date; and 14) to support the closure of open Satellite Operations Center and associated A-



Spec requirements from Pre-Ship Review.

Initial Price (TY\$M) Target / Ceiling		Current Price (TY\$M) Target / Ceiling		Estimate at Completion (TY\$M) Contractor / PM		Initial Quantity	Current Quantity	Delivered Quantity
93.7	-	520.4	-	-	520.4	-	2	-

**(U) Deliveries and Expenditures**

**(U) Acquisition Funding**

	Total Estimate	Actual to Date	Actual, Percent Complete
Years Appropriated	-	-	-
Appropriations (TY, \$M)	1,005.5	1,005.5	100.0%
Expenditures (TY, \$M)	1,005.5	709.5	70.6%

**(U) End Items Delivered**

	Total Required	Planned to Date	Actual to Date	Actual, Percent Complete
Development	2			
<b>Total</b>	<b>2</b>	-	-	-

**Notes**

None

## (U) International Program Aspects

### General Memo

Not Applicable

### Exportability and Business Issues

Not Applicable

Is design for international exportability planned?	No	Industry/Partner Exportability Cost-Sharing?	No
If not, has the MDA approved an exportability waiver for a U.S.-only design?	Not Applicable		

### Program Protection: Technology Security and Foreign Disclosure Issues

Not Applicable

### (U) Agreements

No International Agreements have been defined for WSF



UNCLASSIFIED

**Modernized  
Selected Acquisition Report  
Supplement**

**Weather System Follow-on  
(WSF)**

FY 2025 President's Budget  
As of: December 31, 2023

UNCLASSIFIED

## **MSAR Supplement Sections**

Program Description

Program Use of the Adaptive Acquisition Framework

Technologies and Systems Engineering

Funding Sources (Acquisition)

Funding Sources (Operating and Support)

Acquisition Estimate and Quantity Summary

Annual Acquisition Estimates by Appropriation Account

Acquired System Annual End-Item Quantities by Appropriation Account

Nuclear Costs

Operational Fielding Plan

O&S Independent Cost Estimate

Annual Operating and Support Estimates by Cost Element

## Program Description

**Full Name**

Weather System Follow-on

**Short Name**

WSF

**PNO**

488

**Lead Component**

Space Force

**AAF Pathway**

MCA

**Acquisition Type**

MDAP

**Acquired Systems**

WSF

### Related Programs

Full Name	PNO	Pathway	Type	ACAT/ BCAT	Acquisition Status	Costs in SAR?	
						Acq	O&S

## **Program Use of the Adaptive Acquisition Framework**

This acquisition is accomplished by a single program in the Major Capability Acquisition Pathway.

## Technologies and Systems Engineering

### Weather System Follow-on

#### Major Software Efforts

Title	Status	Fielding Date	Description

#### Major Engineering Changes

Title	Original Need Date	Fielding Date	Description, Rationale and Program Impacts



## Funding Sources (Acquisition)

### Acquisition Funding Notes

#### Weather System Follow-on

Category	Account	BA	Line Item	Program Element	RDT&E Project	Shared	Sunk
RDT&E	3600F	04	0604422F - Weather System Follow-on	0604422F	644289 - Weather Satellite Follow-On		
RDT&E	3600F	04	1206422F - Weather System Follow-on	1206422F	644289 - Weather Satellite Follow-On		
RDT&E	3620F	04	1206422SF - Weather System Follow-on	1206422SF	644289 - Weather Satellite Follow-On		
RDT&E	3620F	05	1206422SF - Weather System Follow-on	1206422SF	65A039 - Space Command/Control/Battle Mgmt		

## Funding Sources (Operating and Support)

*Note: Budget lines fund activities executed by the Program Office or Sustainment Office.*

### Operating and Support Funding Notes

Budget O&S cost budgeting lines have not been assigned to this program.

### Weather System Follow-on

Category	Account	BA	Line Item	Program Element	RDT&E Project	Shared	Sunk
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## Acquisition Estimate and Quantity Summary

### Weather System Follow-on

#### Acquisition Estimates

Category	PB 2025	TY (\$M)	Current Base Year	Original Base Year	Report Fiscal Year
			CY2019 (\$M)	CY2019 (\$M)	CY2024 (\$M)
RDT&E		1,005.5	930.3	930.3	1,114.7
Procurement		-	-	-	-
MILCON		-	-	-	-
O&M		-	-	-	-
Total Acquisition		1,005.5	930.3	930.3	1,114.7
PAUC		502.743	465.161	465.161	557.346
APUC		n/a	n/a	n/a	n/a

#### Acquisition End-Item Quantities

System	PB 2025	Development	Procurement
WSF		2	-
<b>Total</b>		<b>2</b>	<b>-</b>

#### Unit Description

WSF is a satellite and a ground system.

#### Current and Future Years Defense Program Summary, TY(\$M)

Appropriation	Prior	2024	2025	2026	2027	2028	2029	To Complete	Total
RDT&E	770.1	75.3	49.2	39.9	35.8	25.8	9.4	-	1,005.5
Procurement	-	-	-	-	-	-	-	-	-
MILCON	-	-	-	-	-	-	-	-	-
O&M	-	-	-	-	-	-	-	-	-
<b>PB 2025 Total</b>	<b>770.1</b>	<b>75.3</b>	<b>49.2</b>	<b>39.9</b>	<b>35.8</b>	<b>25.8</b>	<b>9.4</b>	<b>-</b>	<b>1,005.5</b>

## Annual Acquisition Estimates by Appropriation Account

(Aligned to Budget Position: PB 2025)

### Weather System Follow-on

Source for TY\$-CY\$ Conversion: SAF/FMCE Raw and Weighted Inflation Indices for DAF Accounts: 23 Feb 2024

<b>3600F - Research, Development, Test &amp; Eval, AF</b>					
fiscal year		Other/ Unallocated	Total TY(\$M)	Weighted Rate	Total CY2019 (\$M)
<b>Total</b>		<b>576.3</b>	<b>576.3</b>	-	<b>572.5</b>
2015		26.890	26.9	0.941761	28.6
2016		44.407	44.4	0.956163	46.4
2017		82.506	82.5	0.976171	84.5
2018		92.986	93.0	0.996692	93.3
2019		132.020	132.0	1.015221	130.0
2020		197.472	197.5	1.041332	189.6

## Annual Acquisition Estimates by Appropriation Account

(Aligned to Budget Position: PB 2025)

### Weather System Follow-on

Source for TY\$-CY\$ Conversion: SAF/FMCE Raw and Weighted Inflation Indices for DAF Accounts: 23 Feb 2024

3620F - RDTE, Space Force					
fiscal year		Other/ Unallocated	Total TY(\$M)	Weighted Rate	Total CY2019 (\$M)
<b>Total</b>		<b>429.2</b>	<b>429.2</b>	<b>-</b>	<b>357.8</b>
2015			-	0.941761	-
2016			-	0.956163	-
2017			-	0.976171	-
2018			-	0.996692	-
2019			-	1.015221	-
2020			-	1.041332	-
2021		80.307	80.3	1.087756	73.8
2022		66.405	66.4	1.155385	57.5
2023		47.110	47.1	1.188442	39.6
2024		75.327	75.3	1.217409	61.9
2025		49.207	49.2	1.243578	39.6
2026		39.901	39.9	1.269693	31.4
2027		35.753	35.8	1.296357	27.6
2028		25.828	25.8	1.323580	19.5
2029		9.367	9.4	1.351376	6.9

**Acquired System Annual End-Item Quantities by Appropriation Account**  
(Aligned to Budget Position: PB 2025)

**Weather System Follow-on**

3620F - RDTE, Space Force				
fiscal year	WSF			Total
<b>Total</b>	<b>2</b>			<b>2</b>
Undistributed	2			2

## **Nuclear Costs**

### **Weather System Follow-on**

#### **Program's Use of Department of Energy Resources**

None

## Operational Fielding Plan

### Weather System Follow-on

**System: WSF**

#### Fielding and Inventory Notes

Operational Fielding Plan does not apply to the WSF Program.

#### WSF Fielding Plan and Inventory

fiscal year	Store	Field	Expend/Loss	Decommission	Inventory
2023					
2024					-
2025					-
2026					-
2027					-
2028					-
2029					-



## O&S Independent Cost Estimate

### Weather System Follow-on

#### Independent and Current Cost Estimate Comparison

Category	CY2019 (\$M)	Independent Cost Estimate 8/1/2019	Current Estimate 12/1/2022	Variance with ICE (%)
Unit-Level Manpower		17.2	15.0	-13%
Unit Operations		5.8	1.9	-67%
Maintenance		1.6	0.5	-69%
Sustaining Support		43.7	41.5	-5%
Continued System Improvements		25.4	19.3	-24%
Other		2.1	0.4	-80%
<b>Total O&amp;S</b>		<b>95.8</b>	<b>78.5</b>	<b>-18%</b>

#### Independent Cost Estimate Source

Event: Milestone B  
 Type: Independent Cost Estimate  
 Approved by: Air Force Cost Analysis Agency, August 1, 2019

#### Current Cost Estimate Source

Type: Independent Cost Estimate  
 Approved by: Air Force Cost Analysis Agency, December 1, 2022

#### Cost Estimate Variance Explanation

The variance between the FY 2019 Milestone B ICE and the FY 2022 AFCAA ICE is primarily due to reduced Full Time Employee (FTE) quantity; staffing levels & costs provided by Naval Research Laboratory (NRL), in addition to lower software maintenance FTEs provided by the Program Office and NRL.

**Annual Operating and Support Estimates by Cost Element****Weather System Follow-on****System: WSF**

Source for TY-CY Conversion: Research, Development, Testing and Evaluation, AF: 23-Feb-2024

<b>Operating and Support Cost Elements</b>							
<b>fiscal year</b>	<b>1.0 Unit-Level Manpower</b>	<b>2.0 Unit Operations</b>	<b>3.0 Maintenance</b>	<b>4.0 Sustaining Support</b>	<b>5.0 Continuing System Improvements</b>	<b>Other</b>	<b>Total CY2019 (\$M)</b>
<b>Total</b>	<b>15.0</b>	<b>1.9</b>	<b>0.5</b>	<b>41.5</b>	<b>19.3</b>	<b>0.4</b>	<b>78.6</b>
2024							-
2025	0.532	0.069	0.005	1.479	0.684	0.014	2.8
2026	2.128	0.273	0.075	5.901	2.732	0.057	11.2
2027	2.145	0.273	0.075	5.936	2.752	0.057	11.2
2028	2.162	0.273	0.075	5.972	2.772	0.057	11.3
2029	2.179	0.273	0.075	6.007	2.792	0.058	11.4
2030	2.196	0.273	0.075	6.043	2.812	0.058	11.5
2031	2.214	0.273	0.075	6.080	2.833	0.059	11.5
2032	1.482	0.181	0.033	4.061	1.894	0.053	7.7