Exhibit P-40, Budget Line Item Justification: PB 2020 Air Force	Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F: Other Procurement, Air Force / BA 03: Electronics and Telecommunications Equip / BSA 3: Electronics Programs	**P-1 Line Item Number / Title:** 833070 / Weather Observation Forecast

ID Code (A=Service Ready, B=Not Service Ready): A	Program Elements for Code B Items: N/A	Other Related Program Elements: 0305111F

Line Item MDAP/MAIS Code: N/A

Resource Summary	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Procurement Quantity *(Units in Each)*	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Cost *($ in Millions)*	0.000	40.116	52.113	31.447	-	31.447	36.554	32.762	35.315	33.946	-	262.253
Less PY Advance Procurement *($ in Millions)*	-	-	-	-	-	-	-	-	-	-	-	-
Net Procurement (P-1) *($ in Millions)*	0.000	40.116	52.113	31.447	-	31.447	36.554	32.762	35.315	33.946	-	262.253
Plus CY Advance Procurement *($ in Millions)*	-	-	-	-	-	-	-	-	-	-	-	-
Total Obligation Authority *($ in Millions)*	**0.000**	**40.116**	**52.113**	**31.447**	**-**	**31.447**	**36.554**	**32.762**	**35.315**	**33.946**	**-**	**262.253**
(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)												
Initial Spares *($ in Millions)*	-	0.109	-	-	-	-	-	-	-	-	-	0.109
Flyaway Unit Cost *($ in Millions)*	-	-	-	-	-	-	-	-	-	-	-	-
Gross/Weapon System Unit Cost *($ in Millions)*	-	-	-	-	-	-	-	-	-	-	-	-

Description:

PE 0305111F WEATHER SERVICE

The Weather Observation Forecast (WOF) procurement line acquires meteorological equipment, ground-based space environment sensing systems, and information systems supporting the 2018 National Defense Strategy (NDS) lines of effort. This funding rebuilds readiness for a more lethal and resilient force by procuring and upgrading fixed and tactical equipment for observing and forecasting terrestrial and space environmental impacts in support of global AF, Army and Special Operations forces. Funding to procure and upgrade information systems to process, store, analyze and disseminate decision-grade weather information enables accurate prediction of environmental impacts to optimize mission planning and execution, targeting, weaponeering, and battle damage assessment and enhances the effectiveness and survivability of AF and Army weapon systems, precision munitions, and AF and government agency space systems. Alliances are strengthened through weather system technological upgrades to ensure critical interoperability with DoD, allies, and interagency partners in support of multi-domain combat operations. Funding for WOF also ensures greater performance and affordability through improvements to architecture and system efficiency, migration to cloud computing for systems and services, as well as retirement of legacy equipment.

AF Weather Services (AFWS) activities align under four capability areas: 1) Weather Data Collection, 2) Weather Data Analysis and Dissemination, 3) Weather Forecasting, and 4) Product Tailoring/Warfighter Applications. This alignment ensures an integrated and systems-oriented approach to program management decisions. Development funding for Weather Observation/Forecast is in Program Element (PE) 0305111F, Weather Service.

1. Weather Data Collection Systems: Provides automated atmospheric and ground-based space environmental sensing capabilities at fixed and deployed locations worldwide. The data gathered by multiple sensor systems is exploited for environmental battlespace awareness, characterization, safety of flight, resource protection, and space weather anomaly assessments and impacts.

A. Observing System 21/AN/FMQ-23--Observing System 21/AN/FMQ-23 provides automated weather observing systems both home station and deployed to collect weather elements and formulate aviation surface weather reports. Program actions include but are not limited to the acquisition of new weather systems/sensors and the normalization to a standard weather sensing baseline comprised of fixed and tactical weather collection components.

B. Ionospheric Ground Sensors (IGS)--IGS capital equipment replacement consists of the replacement of unsupportable, functionally obsolete, and inoperable Next Generation Ionosonde (NEXION), Ionospheric Scintillation Technological Observatory (ISTO), and other similar equipment. IGS data is transmitted via unclassified DoD networks to the Air Force Weather Enterprise and is utilized to show real-time impacts to DoD and government agency Satellite Communication (SATCOM) users; provide geo-location, Global Positioning System (GPS) error and corrections; and communication forecasts. NEXION is a Commercial

Exhibit P-40, Budget Line Item Justification: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F: Other Procurement, Air Force / BA 03: Electronics and Telecommunications Equip / BSA 3: Electronics Programs	P-1 Line Item Number / Title: 833070 / Weather Observation Forecast	
ID Code (A=Service Ready, B=Not Service Ready): A	Program Elements for Code B Items: N/A	Other Related Program Elements: 0305111F
Line Item MDAP/MAIS Code: N/A		

off-the-shelf (COTS) vertical incidence low-power radar sensor that obtains measurements of the ionosphere from directly overhead in the medium and high frequency radio bands (2-30 MHz). ISTO is a world-wide network of ground-based, passive, multi-frequency COTS receivers that measure ionospheric scintillation and total electron content in real-time by analyzing various satellite signals.

C. AN/TMS-2 Portable Doppler Radar (PDR)—PDR is a Commercial-off-the-shelf (COTS) weather radar that detects weather hazards, to include precipitation and wind threats. The PDR collects and delivers weather data to feed the production of weather warnings, watches, advisories, and other mission-essential weather products to support air and ground operations. PDR also serves as a data feed in austere and data sparse areas for the Global Synthetic Radar capability.

D. Next-Generation Radar (NEXRAD)--Tri-agency (National Weather Service, US Air Force and Federal Aviation Administration) program that manages 159 Doppler weather radars that provides networked radar data and products for flight operations and resource protection. The US Air Force owns 25 world-wide systems. Program actions include capital equipment replacement of components reaching end of life and Service Life Extension Program which includes the transmitter, pedestal and shelters.

E. AN/UMQ-13 Meteorological Data Station (MARK IV-B)--MARK IV-B provides warfighters tactical access to timely, accurate data from the latest generation of weather satellites for consideration in making mission critical decisions affecting the safety of personnel and equipment. MARK IV-B systems receive, process, display, store, and distribute interrogatable meteorological satellite (METSAT) information to operational users worldwide to support warfighter planning and execution via unclassified and classified networks. This system also provides cloud modeling and forecast validation data for the Air Force Weather Weapon System.

F. Solar Electro-Optical Network (SEON)—Consists of AN/FMQ-7 Solar Observing Optical Network (SOON) and Radio Solar Telescope Network (RSTN) which includes AN/FRR-95 Radio Interference Measuring Set (RIMS) and A/F24U-10 Solar Radio Spectrograph (SRS). SEON provides real time data on solar activity that interferes with radio frequency bands of satellites, radars, radio communications, and power grids. SEON has five sites located at Learmonth, Australia, San Vito, Italy, Kaena Point, HI, (RIMS and SRS) Sagamore Hill, MA, (RIMS and SRS) and Holloman AFB, NM (SOON).

2. Weather Data Analysis and Dissemination: Provides centralized, cybersecure Weather Web Service capability for integration into command and control systems, on-demand availability of weather impacts and products for the warfighter on all enclaves, specific mission-tailored weather data for global operations, and weapon system interoperability which shortens the Combatant Commander kill chain through machine to machine interfaces. The Weather Data Analysis and Dissemination capability area includes activities for Weather Data Analysis Increment 4, Increment 5 (WDA and WDA-Inc 5), and capital equipment replacement.

A. Weather Data Analysis (WDA)-- The WDA program provides a large-scale data processing, product generation, and presentation system supporting Open Geospatial Consortium (OGC) services architecture and providing capability to ingest, process, store, access, and disseminate meteorological oceanographic (METOC) data. WDA provides data storage and network infrastructure supporting production, development and testing activities and transport of data among multiple nodes and classification levels. Specifically, Enterprise Storage provides the storage and capability to move data between various storage devices. Ingest Services ensure data providers can present their data to designated storage and Dissemination Services and ensure data consumers have access to storage and/or the ability to move data to locations specified by the consumer. Ingest, Dissemination, and Storage Services are provided on all security enclaves for Production, Test and Development activities. All aspects of Enterprise Storage are in the approved architecture and bound by best security practice principles in an effort to meet cybersecurity requirements, standardize, and eliminate one-off solutions wherever possible. With Build D, WDA Inc 4 will migrate the Strategic Data Center towards COTS capabilities, expand Open Geospatial Consortium (OGC) services in order to increase machine to machine integration with AF, Army, and government agency programs and weapon systems, provide additional enterprise infrastructure extension/ augmentation, and integrate with the Air Force Weather-Web Services (AFW WEBS) capability. The majority of services will migrate into a cloud computing environment in alignment with the DoD "Cloud Smart strategy to decrease Operations and Maintenance Costs.

B. Weather Data Analysis-Increment 5 (WDA-Inc 5)--WDA-Inc 5 is a continuation of WDA-Increment 4. WDA-Inc 5 will use a Continuous Delivery/Continuous Integration approach for software and will achieve an open architecture following Modular Open System Architecture (MOSA) guidelines, providing an interoperable, flexible, responsive, expandable, and cost effective system. MOSA facilitates easy "plug-and-play" of Government off-the-shelf (GOTS) and commercial off-the-shelf (COTS) hardware and software products, enabling server consolidation and the transition to cloud computing. The WDA-Inc 5 program will operate on all security environments to ensure interoperability with AF, Army, and government agency programs, mission partners, and weapon systems. It will also overhaul the forecaster interface and integrate the multitude of weather information distribution systems. All of this will be achieved using latest state-of-the-art technology.

Exhibit P-40, Budget Line Item Justification: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F: Other Procurement, Air Force / BA 03: Electronics and Telecommunications Equip / BSA 3: Electronics Programs	P-1 Line Item Number / Title: 833070 / Weather Observation Forecast	
ID Code (A=Service Ready, B=Not Service Ready): A	Program Elements for Code B Items: N/A	Other Related Program Elements: 0305111F
Line Item MDAP/MAIS Code: N/A		

C. Weather Data Analysis-Capital Equipment Replacement (WDA-CER): WDA Ingest, Dissemination, and Enterprise Storage (IDES) provides for storage and capability to move data between various storage devices in the Air Force Weather enterprise. Ingest Services ensure data providers can present their data to designated storage and Dissemination Services ensure data consumers have access to storage and/or the ability to move data to location specified by the consumer. IDES services are on all security enclaves for Production, Test and Development activities. All aspects of IDES are in the DoD approved architecture, bound by best cybersecurity practice principles, in an effort to meet security requirements, standardize, and eliminate one-off solutions, wherever possible. The IDES contract vehicle will address hardware and software enhancements from FY18-20 and will be used to retire End of Life/End of Service legacy equipment.

3. Weather Forecasting System: Provides advanced scientific numerical weather prediction capabilities for automated, high resolution forecast products for mission planning, rehearsal, and execution. Weather Forecasting includes activities for Numerical Weather Modeling (NWM).

A. Numerical Weather Modeling (NWM)--Provides warfighter with increased global environmental battlespace awareness for use in strategic, operational, and tactical mission planning, rehearsal, and execution through advanced scientific numerical weather prediction capabilities. Supports technology insertion/scientific improvements to AF weather analysis and forecasting capability with emphasis on clouds, theater-scale weather, and aerosol/chemical constituents. Provides improvements to specific weather capability gaps to Joint/AF mission areas, NDS focus areas, and provides forecast products to create advisories and warnings for DoD resource protection and support additional national defense missions and capabilities.

4. Product Tailoring/Warfighter Applications: Provides timely, local and regional target-scale weather information to operational commanders within a given Area of Responsibility and at tactical levels provides front-line weather information to warfighters in support of combat operations. Supports the 'train as you fight' concept by assuring fixed and deployable systems have similar performance parameters and user interfaces.

A. Joint Environmental Toolkit (JET)--Provides a standard AF Weather forecaster toolkit to ingest weather data and deliver timely, tailorable, and precise weather impacts to the warfighter. JET is installed at 8 regional centers, 1 training center, and 154 tactical weather units.

Funding for this exhibit is contained in PE 0305111F.

Management services costs include Federally Funded Research and Development Centers and Advisory and Assistance Services.

Funding may be used to address Diminishing Manufacturing Sources (DMS) issues.

As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is $14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.

Exhibit P-40, Budget Line Item Justification: PB 2020 Air Force	Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F: Other Procurement, Air Force / BA 03: Electronics and Telecommunications Equip / BSA 3: Electronics Programs	**P-1 Line Item Number / Title:** 833070 / Weather Observation Forecast
ID Code (A=Service Ready, B=Not Service Ready): A	**Program Elements for Code B Items:** N/A — **Other Related Program Elements:** 0305111F
Line Item MDAP/MAIS Code: N/A	

Exhibits Schedule					Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Exhibit Type	Title*	Subexhibits	ID CD	MDAP/ MAIS Code	Quantity / Total Cost *(Each) / ($ M)*	Quantity / Total Cost *(Each) / ($ M)*	Quantity / Total Cost *(Each) / ($ M)*	Quantity / Total Cost *(Each) / ($ M)*	Quantity / Total Cost *(Each) / ($ M)*	Quantity / Total Cost *(Each) / ($ M)*
P-5	FMQ-23		A		- / -	1 / 1.358	2 / 1.422	3 / 1.153	- / -	3 / 1.153
P-5	JET		B		- / -	- / 3.614	- / 0.556	- / 1.917	- / -	- / 1.917
P-40a	Weather Data Collection Systems				- / -	- / 11.618	- / 16.074	- / 10.270	- / -	- / 10.270
P-5	WDA		B		- / -	- / 5.184	- / 7.812	- / -	- / -	- / -
P-40a	WDA-CER				- / -	- / -	- / 17.227	- / 9.391	- / -	- / 9.391
P-5	WDA-Inc 5		B		- / -	- / -	- / -	- / 5.588	- / -	- / 5.588
P-40a	WOF				- / 0.000	- / 18.342	- / 9.022	- / 3.128	- / 0.000	- / 3.128
P-40	**Total Gross/Weapon System Cost**				**- / 0.000**	**- / 40.116**	**- / 52.113**	**- / 31.447**	**- / -**	**- / 31.447**

Exhibits Schedule					FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Exhibit Type	Title*	Subexhibits	ID CD	MDAP/ MAIS Code	Quantity / Total Cost *(Each) / ($ M)*	Quantity / Total Cost *(Each) / ($ M)*	Quantity / Total Cost *(Each) / ($ M)*	Quantity / Total Cost *(Each) / ($ M)*	Quantity / Total Cost *(Each) / ($ M)*	Quantity / Total Cost *(Each) / ($ M)*
P-5	FMQ-23		A		- / -	- / -	- / -	- / -	- / -	- / -
P-5	JET		B		- / -	- / -	- / -	- / -	- / -	- / -
P-40a	Weather Data Collection Systems				- / -	- / -	- / -	- / -	- / -	- / -
P-5	WDA		B		- / -	- / -	- / -	- / -	- / -	- / -
P-40a	WDA-CER				- / -	- / -	- / -	- / -	- / -	- / -
P-5	WDA-Inc 5		B		- / -	- / -	- / -	- / -	- / -	- / -
P-40a	WOF				- / 3.921	- / 1.146	- / 2.264	- / 0.537	- / 0.000	- / 38.360
P-40	**Total Gross/Weapon System Cost**				**- / 36.554**	**- / 32.762**	**- / 35.315**	**- / 33.946**	**- / -**	**- / 262.253**

*Title represents 1) the Number / Title for Items; 2) the Number / Title [DODIC] for Ammunition; and/or 3) the Number / Title (Modification Type) for Modifications. Title represents the P-40a Title when only the P-40a Summary/Total is shown.

Note: Totals in this Exhibit P-40 set may not be exact or sum exactly due to rounding.

Justification:
PE 0305111F WEATHER SERVICE

1. Weather Data Collection Systems:

A. Observing System 21/AN/FMQ-23: FY20 funding will procure up to 3 FMQ-23 systems and additional sensor, communication and dissemination equipment for weather observations at AF and Army homestation and expeditionary airfields. These systems and sensors will ensure the continued delivery of observed weather conditions to the warfighter, compliance with cyber security requirements, and interoperability with the Joint Environmental Toolkit.

B. Ionospheric Ground Sensors (IGS): FY20 funding will procure site feasibility surveys and 2 equipment installations at Wake Island and Thule Greenland as well as the replacement of unsupportable, obsolete, and inoperable capital equipment. The Wake Island and Thule Greenland NEXION systems will decrease ionospheric characterization gaps in direct support of Early Warning Radar missions at both sites and

Exhibit P-40, Budget Line Item Justification: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F: Other Procurement, Air Force / BA 03: Electronics and Telecommunications Equip / BSA 3: Electronics Programs	P-1 Line Item Number / Title: 833070 / Weather Observation Forecast	
ID Code (A=Service Ready, B=Not Service Ready): A	Program Elements for Code B Items: N/A	Other Related Program Elements: 0305111F
Line Item MDAP/MAIS Code: N/A		

Theater Missile Defense at Wake Island. Funding enables rapid response to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc.

C. Portable Doppler Radar (PDR): No FY20 funding requested.

D. MARK IV-B: FY20 funding will maintain antenna, data feed, software, and hardware architecture as well as capital equipment replacement of damaged antenna radomes and provide new ingest server modifications. Funding enables rapid response to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc.

E. NEXRAD: FY20 funding will continue Service Life Extension Program for pedestals and shelters. Other capital equipment replacement includes Radar Products Generator (RPG) Central Processing Unit Refresh, RPG Communications and Radar Data Acquisition Router Refresh which incorporates the latest cybersecurity standards.

F. Solar Electro-Optical Network (SEON): FY20 funding will continue the Obsolete Parts Replacement Project for the Radio Interference Measuring Set (RIMS), Solar Radio Spectrograph (SRS), and Radio Solar Telescope Network (RSTN) and the replacement of failing antenna pedestals. This funding will reduce the amount of obsolete parts that currently have no replacements or vendors, and limited or no spare parts available. Due to aging RSTN pedestals, SEON sites are increasingly less reliable to provide critical solar data to warfighters and DoD agencies that require the data for military operations and communications. Funding enables rapid response to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc.

2. Weather Data Analysis (WDA) and Dissemination:

A. WDA: FY20 funding will finalize WDA Inc-4 activities and transition to Inc-5. Efforts will expand the WDA database, continue a single services delivery baseline, provide net-centric delivery of weather data to weather, command and control, and other forces, continue the Cross Domain Solution data filter life cycle replacement and provide a robust infrastructure to enable exploitation of environmental data records from DoD and leveraged satellite sources.

B. WDA-Inc 5: FY20 funding efforts include but are not limited to a transition to Continuous Delivery/Continuous Integration approach for software and creation of a modular open system architecture, which will enable server consolidation, the transfer to a cloud computing environment, machine to machine integration, and an increase in capability bandwidth on all security enclaves. Additional efforts include expansion of the WDA database, continuing a single services delivery baseline, providing net-centric delivery of weather data to the warfighter, command and control, and other DoD agencies, continuing the Cross Domain Solution data filter life cycle replacement and providing a robust infrastructure to enable exploitation of environmental data records from DoD and leveraged satellite sources. Funding will procure computer hardware and associated integration software in order to begin WDA Inc-5 as well as Air Force Weather Web Services (AFW-WEBS) Build 3.0.

C. WDA-CER: FY20 funding will procure computer hardware and associated integration software in order to increase the storage capacity for new weather satellites and numerical weather modeling data by procuring additional information technology infrastructure to support new data sources during this fiscal year. Additional efforts include refreshing communication infrastructure in all security enclaves, continuing procurement of communication network infrastructure to include firewall boundary devices, switches, routers, and time servers to enhance the connectivity to the 14WS located in Asheville, NC and the Oak Ridge National Lab for High Performance Computing (HPC) to improve Global Weather Models. It will also increase and improve cybersecurity to prevent foreign intrusions and denial of service attacks. Funding will also refresh End of Life/Service (EOL/EOS) hardware and software in preparation for a Command Cyber Readiness Inspection.

3. Weather Forecasting:

A. Numerical Weather Modeling (NWM): FY20 funding includes but is not limited to completion of the procurement and fielding of the new HPC system Oak Ridge National Lab, procurement of computer and storage hardware to begin fielding the Global Synthetic Weather Radar (GSWR) capability, and continued hardware procurement to support exploitation of new METSAT data sources, and procurement of hardware for space weather modeling emergent requirements.

Exhibit P-40, Budget Line Item Justification: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F: Other Procurement, Air Force / BA 03: Electronics and Telecommunications Equip / BSA 3: Electronics Programs	P-1 Line Item Number / Title: 833070 / Weather Observation Forecast	
ID Code (A=Service Ready, B=Not Service Ready): A	Program Elements for Code B Items: N/A	Other Related Program Elements: 0305111F
Line Item MDAP/MAIS Code: N/A		

4. Product Tailoring/Warfighter Applications:

A. Joint Environmental Toolkit (JET): FY20 funding will purchase 2 additional Sensor Collection Appliances (SCAs), conduct technical refresh of 160 fielded SCAs, conduct technical refresh of Aviation Tactics Evaluation Group (AvTEG) JET system, and continue tactical weather data integration efforts.

Efforts with funding starting in FY 2021 through FY 2024 are summarized on the P-40. Not all details of this funding are included in this P-40 exhibit set. A summary of the excepted details is as follows:

(a) FY 2021 Cost Delta: 32.633 million
(b) FY 2022 Cost Delta: 31.616 million
(c) FY 2023 Cost Delta: 33.051 million
(d) FY 2024 Cost Delta: 33.409 million
(e) FY Total Cost Delta: 223.893 million

Exhibit P-5, Cost Analysis: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F / 03 / 3	**P-1 Line Item Number / Title:** 833070 / Weather Observation Forecast	**Item Number / Title [DODIC]:** FMQ-23
ID Code (A=Service Ready, B=Not Service Ready) : A		**MDAP/MAIS Code:**

Resource Summary	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Procurement Quantity *(Units in Each)*	-	1	2	3	-	3
Gross/Weapon System Cost *($ in Millions)*	-	1.358	1.422	1.153	-	1.153
Less PY Advance Procurement *($ in Millions)*	-	-	-	-	-	-
Net Procurement (P-1) *($ in Millions)*	-	1.358	1.422	1.153	-	1.153
Plus CY Advance Procurement *($ in Millions)*	-	-	-	-	-	-
Total Obligation Authority *($ in Millions)*	**-**	**1.358**	**1.422**	**1.153**	**-**	**1.153**
(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)						
Initial Spares *($ in Millions)*	-	-	-	-	-	-
Gross/Weapon System Unit Cost *($ in Millions)*	-	1.358	0.711	0.384	-	0.384

Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.

Cost Elements	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*
Hardware - Hardware End Item Cost																		
Recurring Cost																		
FMQ-23	-	-	-	0.250	1	0.250	0.250	2	0.500	0.250	3	0.750	-	-	-	0.250	3	0.750
Subtotal: Recurring Cost	-	-	-	-	-	*0.250*	-	-	*0.500*	-	-	*0.750*	-	-	-	-	-	*0.750*
Subtotal: Hardware - Hardware End Item Cost	**-**	**-**	**-**	**-**	**-**	***0.250***	**-**	**-**	***0.500***	**-**	**-**	***0.750***	**-**	**-**	**-**	**-**	**-**	***0.750***
Support - Support End Item Cost																		
TESTING FMQ-23	-	-	-	-	-	0.025	-	-	0.045	-	-	0.023	-	-	-	-	-	0.023
INTERIM CONTRACTOR SUPPORT LABOR FMQ-23	-	-	-	-	-	0.577	-	-	0.079	-	-	0.000	-	-	-	-	-	0.000
DIRECT MISSION SUPPORT CONTRACTOR SERVICES FMQ-23	-	-	-	-	-	0.210	-	-	0.309	-	-	0.250	-	-	-	-	-	0.250
PROGRAM MANAGEMENT ADMINISTRATION CONTRACTOR SERVICES FMQ 23	-	-	-	-	-	0.271	-	-	0.382	-	-	0.063	-	-	-	-	-	0.063
PROGRAM MANAGEMENT ADMINISTRATION OTHER GOVERNMENT SERVICES FMQ 23	-	-	-	-	-	0.025	-	-	0.107	-	-	0.067	-	-	-	-	-	0.067
Subtotal: Support - Support End Item Cost	**-**	**-**	**-**	**-**	**-**	***1.108***	**-**	**-**	***0.922***	**-**	**-**	***0.403***	**-**	**-**	**-**	**-**	**-**	***0.403***

Exhibit P-5, Cost Analysis: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F / 03 / 3	P-1 Line Item Number / Title: 833070 / Weather Observation Forecast	Item Number / Title [DODIC]: FMQ-23
ID Code (A=Service Ready, B=Not Service Ready) : A		MDAP/MAIS Code:

Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.

Cost Elements	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)
Gross/Weapon System Cost	-	-	-	1.358	1	1.358	0.711	2	1.422	0.384	3	1.153	-	-	-	0.384	3	1.153

Remarks:
Note: Actual number of systems procured will be dependent on location and site requirements.

Exhibit P-5, Cost Analysis: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F / 03 / 3	**P-1 Line Item Number / Title:** 833070 / Weather Observation Forecast	**Item Number / Title [DODIC]:** JET
ID Code (A=Service Ready, B=Not Service Ready) : B	**MDAP/MAIS Code:**	

Resource Summary	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Procurement Quantity *(Units in Each)*	-	-	-	-	-	-
Gross/Weapon System Cost *($ in Millions)*	-	3.614	0.556	1.917	-	1.917
Less PY Advance Procurement *($ in Millions)*	-	-	-	-	-	-
Net Procurement (P-1) *($ in Millions)*	-	3.614	0.556	1.917	-	1.917
Plus CY Advance Procurement *($ in Millions)*	-	-	-	-	-	-
Total Obligation Authority *($ in Millions)*	**-**	**3.614**	**0.556**	**1.917**	**-**	**1.917**
(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)						
Initial Spares *($ in Millions)*	-	-	-	-	-	-
Gross/Weapon System Unit Cost *($ in Millions)*	-	-	-	-	-	-

Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.

Cost Elements	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*	Unit Cost *($ M)*	Qty *(Each)*	Total Cost *($ M)*
Hardware - JET Cost																		
Recurring Cost																		
JET EQUIPMENT LIFE CYCLE REPLACEMENT	-	-	-	-	-	3.415	-	-	0.386	-	-	1.749	-	-	-	-	-	1.749
Subtotal: Recurring Cost	-	-	-	-	-	*3.415*	-	-	*0.386*	-	-	*1.749*	-	-	-	-	-	*1.749*
Subtotal: Hardware - JET Cost	**-**	**-**	**-**	**-**	**-**	***3.415***	**-**	**-**	***0.386***	**-**	**-**	***1.749***	**-**	**-**	**-**	**-**	**-**	***1.749***
Support - JET Cost																		
PROGRAM MANAGEMENT ADMINISTRATION CONTRACTOR SERVICES JET	-	-	-	-	-	0.081	-	-	0.070	-	-	0.074	-	-	-	-	-	0.074
PROGRAM MANAGEMENT ADMINISTRATION OTHER GOVERNMENT SERVICES JET	-	-	-	-	-	0.118	-	-	0.100	-	-	0.094	-	-	-	-	-	0.094
Subtotal: Support - JET Cost	**-**	**-**	**-**	**-**	**-**	***0.199***	**-**	**-**	***0.170***	**-**	**-**	***0.168***	**-**	**-**	**-**	**-**	**-**	***0.168***
Gross/Weapon System Cost	**-**	**-**	**-**	**-**	**-**	**3.614**	**-**	**-**	**0.556**	**-**	**-**	**1.917**	**-**	**-**	**-**	**-**	**-**	**1.917**

Exhibit P-40a, Budget Item Justification For Aggregated Items: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F / 03 / 3	**P-1 Line Item Number / Title:** 833070 / Weather Observation Forecast	**Aggregated Items Title:** Weather Data Collection Systems

Item Number / Title [DODIC]	ID CD	MDAP/ MAIS Code	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
			Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)
Hardware - Hardware End Item Cost																				
IGS	A		-	-	-	0.185	2	0.370	0.185	2	0.370	0.185	2	0.370	-	-	-	0.185	2	0.370
Portable Doppler Radar	A		-	-	-	0.715	11	7.869	0.682	11	7.500	-	-	-	-	-	-	-	-	-
MARK IV-B	A		-	-	-	-	-	-	1.179	1	1.179	1.430	1	1.430	-	-	-	1.430	1	1.430
NEXRAD	A		-	-	-	-	-	-	-	-	2.151	-	-	2.210	-	-	-	-	-	2.210
SEON	A		-	-	-	-	-	0.000	1.200	1	1.200	3.000	1	3.000	-	-	-	3.000	1	3.000
Subtotal: Hardware - Hardware End Item Cost			**-**	**-**	**-**	**-**	**-**	***8.239***	**-**	**-**	***12.400***	**-**	**-**	***7.010***	**-**	**-**	**-**	**-**	**-**	***7.010***
Support - Support End Item Cost																				
INSTALLATION IGS	A		-	-	-	1.690	2	3.379	1.837	2	3.674	1.630	2	3.260	-	-	-	1.630	2	3.260
ASSISTANCE AND ADVISORY SERVICE A&AS	A		-	-	-	-	-	0.000	-	-	0.000	-	-	-	-	-	-	-	-	-
Subtotal: Support - Support End Item Cost			**-**	**-**	**-**	**-**	**-**	***3.379***	**-**	**-**	***3.674***	**-**	**-**	***3.260***	**-**	**-**	**-**	**-**	**-**	***3.260***
Total			**-**	**-**	**-**	**-**	**-**	**11.618**	**-**	**-**	**16.074**	**-**	**-**	**10.270**	**-**	**-**	**-**	**-**	**-**	**10.270**

Note: Subtotals or Totals in this Exhibit P-40a may not be exact or sum exactly, due to rounding.

Exhibit P-5, Cost Analysis: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F / 03 / 3	**P-1 Line Item Number / Title:** 833070 / Weather Observation Forecast	**Item Number / Title [DODIC]:** WDA
ID Code (A=Service Ready, B=Not Service Ready) : B	**MDAP/MAIS Code:**	

Resource Summary	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Procurement Quantity *(Units in Each)*	-	-	-	-	-	-
Gross/Weapon System Cost *($ in Millions)*	-	5.184	7.812	-	-	-
Less PY Advance Procurement *($ in Millions)*	-	-	-	-	-	-
Net Procurement (P-1) *($ in Millions)*	-	5.184	7.812	-	-	-
Plus CY Advance Procurement *($ in Millions)*	-	-	-	-	-	-
Total Obligation Authority *($ in Millions)*	**-**	**5.184**	**7.812**	**-**	**-**	**-**
(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)						
Initial Spares *($ in Millions)*	-	-	-	-	-	-
Gross/Weapon System Unit Cost *($ in Millions)*	-	-	-	-	-	-

Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.

Cost Elements	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)
Hardware - WDA Cost																		
Non Recurring Cost																		
Hardware-Weather Service Cost	-	-	-	-	-	4.664	-	-	7.608	-	-	-	-	-	-	-	-	-
Subtotal: Non Recurring Cost	-	-	-	-	-	*4.664*	-	-	*7.608*	-	-	-	-	-	-	-	-	-
Subtotal: Hardware - WDA Cost	**-**	**-**	**-**	**-**	**-**	***4.664***	**-**	**-**	***7.608***	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Support - WDA Cost																		
PROGRAM MANAGEMENT ADMINISTRATION CONTRACTOR SERVICES	-	-	-	-	-	0.102	-	-	0.062	-	-	-	-	-	-	-	-	-
PROGRAM MANAGEMENT ADMINISTRATION OTHER GOVERNMENT SERVICES	-	-	-	-	-	0.418	-	-	0.142	-	-	-	-	-	-	-	-	-
Subtotal: Support - WDA Cost	**-**	**-**	**-**	**-**	**-**	***0.520***	**-**	**-**	***0.204***	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Gross/Weapon System Cost	**-**	**-**	**-**	**-**	**-**	**5.184**	**-**	**-**	**7.812**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Exhibit P-40a, Budget Item Justification For Aggregated Items: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F / 03 / 3	**P-1 Line Item Number / Title:** 833070 / Weather Observation Forecast	**Aggregated Items Title:** WDA-CER

Item Number / Title [DODIC]	ID CD	MDAP/ MAIS Code	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
			Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)
Hardware																				
Capital Equipment Replacement	A		-	-	-	-	-	-	-	-	17.227	-	-	9.391	-	-	-	-	-	9.391
Subtotal: Hardware			**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***17.227***	**-**	**-**	***9.391***	**-**	**-**	**-**	**-**	**-**	***9.391***
Total			**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**17.227**	**-**	**-**	**9.391**	**-**	**-**	**-**	**-**	**-**	**9.391**

Note: Subtotals or Totals in this Exhibit P-40a may not be exact or sum exactly, due to rounding.

Exhibit P-5, Cost Analysis: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F / 03 / 3	P-1 Line Item Number / Title: 833070 / Weather Observation Forecast	Item Number / Title [DODIC]: WDA-Inc 5
ID Code (A=Service Ready, B=Not Service Ready) : B	MDAP/MAIS Code:	

Resource Summary	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Procurement Quantity *(Units in Each)*	-	-	-	-	-	-
Gross/Weapon System Cost *($ in Millions)*	-	-	-	5.588	-	5.588
Less PY Advance Procurement *($ in Millions)*	-	-	-	-	-	-
Net Procurement (P-1) *($ in Millions)*	-	-	-	5.588	-	5.588
Plus CY Advance Procurement *($ in Millions)*	-	-	-	-	-	-
Total Obligation Authority *($ in Millions)*	**-**	**-**	**-**	**5.588**	**-**	**5.588**
(The following Resource Summary rows are for informational purposes only. The corresponding budget requests are documented elsewhere.)						
Initial Spares *($ in Millions)*	-	-	-	-	-	-
Gross/Weapon System Unit Cost *($ in Millions)*	-	-	-	-	-	-

Note: Subtotals or Totals in this Exhibit P-5 may not be exact or sum exactly due to rounding.

Cost Elements	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)
Hardware - WDA Cost																		
Non Recurring Cost																		
Hardware-Weather Service Cost	-	-	-	-	-	-	-	-	-	-	-	5.424	-	-	-	-	-	5.424
Subtotal: Non Recurring Cost	-	-	-	-	-	-	-	-	-	-	-	*5.424*	-	-	-	-	-	*5.424*
Subtotal: Hardware - WDA Cost	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***5.424***	**-**	**-**	**-**	**-**	**-**	***5.424***
Support - WDA Cost																		
Program Management Administration Contractor services	-	-	-	-	-	-	-	-	-	-	-	0.019	-	-	-	-	-	0.019
Program Management Administration Other Government Services	-	-	-	-	-	-	-	-	-	-	-	0.145	-	-	-	-	-	0.145
Subtotal: Support - WDA Cost	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***0.164***	**-**	**-**	**-**	**-**	**-**	***0.164***
Gross/Weapon System Cost	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**5.588**	**-**	**-**	**-**	**-**	**-**	**5.588**

Exhibit P-40a, Budget Item Justification For Aggregated Modification Items: PB 2020 Air Force		Date: February 2019
Appropriation / Budget Activity / Budget Sub Activity: 3080F / 03 / 3	P-1 Line Item Number / Title: 833070 / Weather Observation Forecast	Aggregated Modification Items Title: WOF

Item Number / Title	ID CD	MDAP/ MAIS Code	Prior Years			FY 2018			FY 2019			FY 2020 Base			FY 2020 OCO			FY 2020 Total		
			Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)
WOF2 / Numerical Weather Modeling (NWM)			-	-	0.000	-	-	18.342	-	-	9.022	-	-	3.128	-	-	-	-	-	3.128
Total			**-**	**-**	**0.000**	**-**	**-**	**18.342**	**-**	**-**	**9.022**	**-**	**-**	**3.128**	**-**	**-**	**0.000**	**-**	**-**	**3.128**

Item Number / Title	ID CD	MDAP/ MAIS Code	FY 2021			FY 2022			FY 2023			FY 2024			To Complete			Total Cost		
			Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)	Unit Cost ($ M)	Qty (Each)	Total Cost ($ M)
WOF2 / Numerical Weather Modeling (NWM)			-	-	3.921	-	-	1.146	-	-	2.264	-	-	0.537	-	-	-	-	-	38.360
Total			**-**	**-**	**3.921**	**-**	**-**	**1.146**	**-**	**-**	**2.264**	**-**	**-**	**0.537**	**-**	**-**	**0.000**	**-**	**-**	**38.360**

Note: Subtotals or Totals in this Exhibit P-40a may not be exact or sum exactly, due to rounding.

Modification Information:

Item Number / Title	Models of Systems Affected	Modification Type
WOF2 / Numerical Weather Modeling (NWM)	NWM	Capability Improvement