Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force											Date: February 2019	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0305111F / *Weather Service*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	35.689	34.615	25.461	0.000	25.461	27.105	27.548	28.774	28.762	Continuing	Continuing
672738: *Weather Service*	-	35.689	34.615	25.461	0.000	25.461	27.105	27.548	28.774	28.762	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This budget activity funds operational development necessary to acquire, sustain, and modernize Air Force Weather Service (AFWS) capabilities in support of the 2018 National Defense Strategy (NDS) lines of effort. To improve readiness for a more lethal force, AFWS provides timely, accurate, resilient and relevant environmental information, to include space and terrestrial weather, for global battlespace situational awareness for Air Force (AF), Army, Special Operations Forces (SOF), combatant commands, and other government agencies. AFWS capabilities at home station and deployed provide critical support to the full spectrum of air and space combat operations. AFWS development enhances the lethality, effectiveness, and survivability of AF weapon systems and precision munitions by modernizing capability and seeking the military advantage to accurately predict friendly and foe environmental impacts to optimize mission execution and planning, targeting, weaponeering, battle damage assessment and space systems operations. To strengthen alliances and partnerships, AFWS development efforts integrate DoD, government agency, and commercial and international partner environmental data with AFWS information system equipment for processing, storing, exploiting and disseminating multi-domain weather information for analysis, forecasting, mission integration and greater interoperability. Funding for AFWS development also ensures greater performance and affordability through improvements to architecture and system efficiency, cybersecurity, C4ISR integration, migration to cloud computing, and expanding agile software development, delivery and integration practices.

AFWS aligns activities under four capability areas: Weather Data Collection, Weather Data Analysis and Dissemination, Weather Forecasting, and Product Tailoring/ Warfighter Applications. This alignment ensures an integrated and systems-oriented approach to program management decisions. Of these four capability areas, two (Weather Data Analysis and Dissemination and Weather Forecasting) are addressed by APPN 3600, BA 07, PE 0305111F, Project 672738 - Weather Service.

1. Weather Data Analysis and Dissemination provides command and control and mission planning integration; centralized, cybersecure weather web service capability; large-scale data ingest, processing, and warfighter product generation and visualization; Continuous Delivery/Continuous Integration for software development and deployment; global, regional, and mission execution forecasts; specific, mission-tailored weather data on demand; 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 and its follow-on increment, Weather Data Analysis Increment 5 (WDA and WDA-Inc 5).

2. Weather Forecasting provides advanced scientific numerical weather prediction capabilities for automated, high resolution forecast products for mission planning, rehearsal, and execution with an emphasis on clouds, theater scale weather, aerosol/chemical constituents, and space environment characterization. Weather Forecasting includes activities for Numerical Weather Modeling (NWM); Weather Services - Live, Virtual, Constructive (WS-LVC), and Space Weather Analysis and Forecast System (SWAFS).

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver Weather Services capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F, 0605833F, 1206392F, and 1206398F.

Activities include research and analysis to support current program planning. Management Service costs include Federally Funded Research and Development Centers (FFRDC) and Advisory and Assistance Service (A&AS).

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.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	26.654	29.942	27.497	0.000	27.497
Current President's Budget	35.689	34.615	25.461	0.000	25.461
Total Adjustments	9.035	4.673	-2.036	0.000	-2.036
• Congressional General Reductions	-0.107	-0.327			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	10.000	5.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.858	0.000			
• Other Adjustments	0.000	0.000	-2.036	0.000	-2.036

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: 672738: *Weather Service*		
Congressional Add: *Commercial Weather Data Pilot Program*	10.000	5.000
Congressional Add Subtotals for Project: 672738	10.000	5.000
Congressional Add Totals for all Projects	10.000	5.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305111F / *Weather Service*

Change Summary Explanation

FY18: Congressional add was a program increase to PE 1206422F that was moved to PE 0305111F via technical adjustment for proper funding alignment.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Weather Data Analysis (WDA) ***Description:*** WDA-Increment (Inc) 4 provides a net-centric infrastructure that assimilates worldwide sources of atmospheric and space weather data and produces decision-quality information for warfighters. ***FY 2019 Plans:*** - Implement and develop WDA Inc 4, Build D, Release 18D and Release 19A/B/C/D to enhance the capability to ingest, process, store, access, and disseminate meteorological/oceanographic data via upgrades to the web services architecture. - Continue to expand the Open Geospatial Consortium services and upgrade for the large-scale data processing to accommodate new environmental satellite and numerical weather modeling data as well as begin efforts to implement an Air Force Weather Weapon System Single Services Baseline. - AFW-WEBS builds will be on the same schedule with combined development and testing schedules. - Evolve AFW-WEBS into the single web interface optimized for accessing authoritative AF meteorological information and services in geospatially-enabled formats for direct integration into warfighter systems and decision cycles. ***FY 2020 Base Plans:*** - Finalize Inc 4 activities and transition to Inc 5. - Continue to expand the Open Geospatial Consortium services and upgrade for the large-scale data processing to accommodate new environmental satellite and numerical weather modeling data as well as begin efforts to implement an Air Force Weather Weapon System Single Services Baseline. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding decreased due to funds realigned to WDA Inc 5	10.238	9.567	4.757	0.000	4.757
Title: Weather Data Analysis Increment 5 (WDA Inc 5) ***Description:*** WDA-Inc 5 is the mechanism for the WDA Program to migrate to cloud-based computing through the implementation of Modular Open System Architecture (MOSA) guideline-compliant open architecture. Per MOSA guidelines, WDA Inc 5 will be modular, flexible, responsive, expandable, and cost effective, facilitating	0.000	1.000	5.388	0.000	5.388

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305111F / *Weather Service*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
easy "plug-and-play" of Government off-the-shelf (GOTS) and commercial off-the-shelf (COTS) hardware and software products in a virtual environment. WDA Inc 5 will ensure greater performance and affordability through the continued consolidation of servers and functions, elimination of duplication, and standardizing interfaces. WDA Inc-5 will transition from agile development to Continuous Delivery/Continuous Integration for software development and deployment efforts which will enable rapid updates to functionality and security measures. Finally, the program will provide both classified and unclassified production environments that communicate directly with C2 customers through (MOSA) guideline-compliant open architecture. All of this will be achieved using latest state-of-the-art technology. ***FY 2019 Plans:*** -Begin Inc 5 and continue server consolidation to expedite cloud transition, transition to Open System Architecture, and expand Secret/SCI enclave bandwidth/capability. - Continue to expand the Open Geospatial Consortium services and upgrade for the large-scale data processing to accommodate new environmental satellite and numerical weather modeling data as well as begin efforts to implement an Air Force Weather Weapon System Single Services Baseline. ***FY 2020 Base Plans:*** -Implement and develop WDA Inc 5, Build A, Release 20A/B/C/D to enhance the capability to ingest, process, store, access, and disseminate meteorological/oceanographic data via upgrades to the web services architecture. -Continue to expand the Open Geospatial Consortium services and upgrade for the large-scale data processing to accommodate new environmental satellite and numerical weather modeling data as well as begin efforts to implement an Air Force Weather Weapon System Single Services Baseline. - AFW-WEBS builds will be on the same schedule with combined development and testing schedules. - Evolve AFW-WEBS into the single web interface optimized for accessing authoritative AF meteorological information and services in geospatially-enabled formats for direct integration into warfighter systems and decision cycles. -Migrate to Continuous Delivery/Continuous Integration for software delivery and deployment. -Incorporate Impact Services for increased risk management and agile decision support. -Continue cloud computing transition with all new capabilities housed directly on a cloud platform. ***FY 2020 OCO Plans:***					

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305111F / *Weather Service*	

C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding increased due to WDA funding transitioning to WDA Inc 5					
Title: Numerical Weather Modeling (NWM) ***Description:*** NWM provides advanced scientific numerical weather prediction capabilities for automated, high resolution forecast products for mission planning, rehearsal, and execution. Will develop a Global Synthetic Weather Radar (GSWR) capability using artificial intelligence and machine learning techniques in order to mitigate gaps in NDS highlighted AORs. ***FY 2019 Plans:*** -Develop software to exploit dynamic aerosols. -Continue software development for exploitation of new meteorological satellite data sources. -Continue development of explicit numerical weather prediction (modeled) cloud forecasting capability. -Complete 3-year Land Information System (LIS) improvement and integration effort. -Will develop a Global Synthetic Weather Radar (GSWR) capability in order to mitigate gaps in the Central Command and other AORs. ***FY 2020 Base Plans:*** -Complete software development to exploit dynamic aerosols and transition to operations. -Continue software development for exploitation of new satellite data sources while continuing develop explicit NWP-based cloud forecasting capability. -Initiate new 3-year LIS improvement and integration project. -Finish Global Synthetic Weather Radar (GSWR) simulated radar mosaic capability development, begin transition to operations -Software development and deployment will be accomplished with Continuous Delivery/Continuous Integration methods ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding decreased due to no OCO funding for GSWR in FY20.	11.445	14.873	12.355	0.000	12.355
Title: Space Weather Analysis and Forecast System (SWAFS)	0.000	3.582	2.357	0.000	2.357

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305111F / *Weather Service*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total

Description: SWAFS is a software suite of 47 models/applications to Ingest, process, and store space environmental data, run space environmental models to specify and forecast the near-Earth environment, and run space effects characterization applications. SWAFS products support various operations including 1. Spacecraft tracking and health 2. Early Warning & Theater Warning Radar support 3. GPS & SATCOM user support 4. Intel Community support and 5. High Altitude & Space Flight support. The next development efforts include modernizing the SWAFS code and research and implementation of the Radiation Exposure model (RADEX) and the Energetic Charged Particle Hazard Assessment model (ECP HAS) that address space environment irregularities impacting satellite comm & anomaly assessments, precision navigation and timing, and early warning radar interference. This effort was previously called SWAFS-RadEX.

FY 2019 Plans:
- Expand upon the latest atmospheric radiation modeling, and extend capabilities (to include a future forecasting/ mission planning aspect) to support DoD warning thresholds and associated timeliness criteria in support of ECP HAS capability.
- Calculate a map of background cosmic radiation dosages between latitudes S80-N80 and altitudes 50-70 kft, expanding on the current High Flyer Model used by the U2s and in support of hypersonics.
- Investigate solutions for modernization and streamlining of SWAFS software code and migration to the cloud infrastructure.
-Initiate AFRL AoA work to assess existing ECP HAS and RADEX models.

FY 2020 Base Plans:
- Continue prototyping SWAFS code to modernize and migrate to a cloud infrastructure.
- Continue to perform and exploit new data ingest of space weather observations.
- Rapidly respond 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.

FY 2020 OCO Plans:
N/A

FY 2019 to FY 2020 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY20 funding decreased through A3W prioritization activities and transfer to PE604002F for BA4 activities. AFRL AoA ECP HAS and RADEX model selection and follow-on technology maturation effort moves to PE0604002F in FY20.					
Title: Weather Services-Live, Virtual Constructive (WS-LVC) ***Description:*** WS-LVC provides DoD Modeling and Simulation users a correlated and realistic natural environment. Tailorable scenarios are used to create specific effects for the warfighter. This effort was formerly called Environmental Data Cube System Support (EDCSS). ***FY 2019 Plans:*** -Continue to provide software enhancements to current meteorological capabilities in order to provide consistent weather behaviors/ environmental impacts across large scale exercises. -Optimize performance in the cloud computing environment, and focus on system stabilization to reduce its sustainment footprint. ***FY 2020 Base Plans:*** -Provide software enhancements through Continuous Delivery/Continuous Integration methods to current meteorological capabilities in order to provide consistent weather behaviors/ environmental impacts across large scale exercises. -Continue to optimize performance in the cloud computing environment, and focus on system stabilization to reduce its sustainment footprint. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A	0.744	0.593	0.604	0.000	0.604
Title: SWAFS GAIM-FP ***Description:*** Modification of Global Assimilation of Ionospheric Measurements GAIM Full Physics model (SWAFS GAIM-FP), to satisfy current requirements, including the development of other new models and science algorithms that do not currently exist and processing space weather data that is not currently available. Capabilities provided: Return to service; corrective, adaptive, and capability improvement maintenance for the operational software baseline SWAFS accepts space weather data and uses models and/or algorithms to create and disseminate specified space weather analysis and forecast products. Users: COCOMs, MAJCOMs, Space	3.262	0.000	0.000	0.000	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Defense Operations Center (SPADOC), NRO, Navy and Army. SWAFS GAIM-FP will reach full operational capability in FY2019. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	25.689	29.615	25.461	0.000	25.461

	FY 2018	FY 2019
Congressional Add: Commercial Weather Data Pilot Program	10.000	5.000
FY 2018 Accomplishments: -Contract awarded to begin acquisition of commercially available low altitude atmospheric weather data and ionospheric space weather data to evaluate if the data will improve existing numerical weather models to fill sensing gaps.		
FY 2019 Plans: -Purchase commercial satellite and other space-based sensor data to fill sensing gaps. -Accelerate space-based sensor prototypes into orbit. -Integrate data into numerical weather models and perform model performance verification.		
Congressional Adds Subtotals	10.000	5.000

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• OPAF 03 Line Item 833070: *Weather Observation Forecast*	40.116	48.362	31.855	-	31.855	35.613	33.010	33.605	-	Continuing	Continuing
• OPAF 03 Line Item 838010: *Comm Elect Mods*	10.155	0.000	0.000	-	0.000	0.000	0.000	0.000	-	Continuing	Continuing

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305111F / *Weather Service*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• OPAF 05 Line Item 86190A: *Spares and Repair Parts*	0.941	0.000	0.000	-	0.000	0.000	0.000	0.000	-	Continuing	Continuing

Remarks

E. Acquisition Strategy

AF Weather utilizes an AgileDevOps approach delivering capabilities rapidly and routinely using multiple contracts to support a family of ACAT III Programs of Record through development fielding and sustainment.

Cost Plus contracts are utilized for software development and sustainment and Fixed Firm Price contracts for COTS systems and Contract Logistics Support (CLS) efforts. Pre-competed GSA and Defense MicroElectronics Activity (DMEA) contract vehicles are leveraged when appropriate, and competitive and small-business awards are favored.

The Air Force Program Executive Officer for Digital (AFPEO Digital) and the Air Force Program Executive Officer for Space (AFPEO SP) are the PEOs for the AFWS. AFPEO Digital manages the ground-based atmospheric sensing and data analysis, atmospheric forecast systems, and product tailoring warfighter applications. AFPEO SP manages the ground-based segments of space weather collection platforms as well as the Space Weather Analysis and Forecasting System. Both the AFPEO Digital and AFPEO SP are their respective program's Milestone Decision Authority (MDA).

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305111F / *Weather Service*	Project (Number/Name) 672738 / *Weather Service*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
WDA 1, Develop centralized web service capability (WDA 4D)	C/CPIF	Northrop Grumman : Bellevue, NE	-	5.771	Dec 2017	3.312	Jul 2019	1.959	Nov 2019	-		1.959	Continuing	Continuing	-
WDA 1, Develop centralized web service capability (WDA-Inc 5)	C/CPAF	TBD : TBD	-	-		1.000	Sep 2019	4.612	Nov 2019	-		4.612	Continuing	Continuing	-
WDA 2, Development and integration of weather analysis software (AFW-WEBS)	C/CPFF	Raytheon : Long Beach, CA	-	2.868	Dec 2017	4.093	Jul 2019	1.923	Mar 2020	-		1.923	Continuing	Continuing	-
Commercial Weather Pilot Program	C/FFP	Various : Various	-	9.993	Aug 2018	4.835		-		-		-	Continuing	Continuing	-
NWM 1 - Perform software enhancements to the mesoscale production model	MIPR	NCAR : Boulder, CO	-	0.628	Feb 2018	0.649	Feb 2019	0.668	Feb 2020	-		0.668	Continuing	Continuing	-
NWM 2 - Improve land information system (LIS) application, providing earth surface boundary characterization for numerical modeling	MIPR	NASA : Greenbelt, MD	-	1.715	Feb 2018	1.766	Feb 2019	1.819	Feb 2020	-		1.819	Continuing	Continuing	-
NWM 3 - Develop model data assimilation application ensemble forecast procedures and convective scale resolution model capability.	C/CPIF	Northrop Grumman : Bellevue, NE	-	8.086	Jan 2018	8.874	Jun 2019	9.153	Jan 2020	-		9.153	Continuing	Continuing	-
NWM 4 - Deliver a Synthetic Weather Radar Capability mitigating gaps in the Central Command and other AORs.	MIPR	MIT Lincoln Labs : TBD, MA	-	-		3.000	Jan 2020	-		-		-	Continuing	Continuing	-
WS-LVC	C/CPIF	Northrop Grumman : Bellevue, NE	-	0.656	Apr 2018	0.502	Apr 2019	0.366	Apr 2020	-		0.366	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force			Date: February 2019
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SWAFS-2- perform verification and validation report on the GAIM-full physics model	C/CPAF	Northrop Grumman : Bellevue, NE	-	-		-		-		-		-	Continuing	Continuing	-
SWAFS development integration and sustainment of the GAIM-full physics version	C/CPIF	Northrop Grumman : Bellevue, NE	-	1.318	Apr 2018	-		-		-		-	Continuing	Continuing	-
SWAFS Magnetic Field Measuring AoA	PO	AFRL : Annapolis, MD	-	-		0.482	Oct 2018	-		-		-	Continuing	Continuing	-
SWAFS Magnetospheric Energized Charged Particle (ECP) Hazard Assessment System (HAS) Model Integration	PO	AFRL : Annapolis, MD	-	-		-		1.480	Oct 2019	-		1.480	Continuing	Continuing	-
SWAFS RadEx Analysis of Alternatives	PO	AFRL : Annapolis, MD	-	0.750	Sep 2018	0.486	May 2019	-		-		-	Continuing	Continuing	-
SWAFS Magnetospheric ECP HAS Analysis of Alternatives	PO	AFRL : Annapolis, MD	-	0.694	Sep 2018	0.486	May 2019	-		-		-	Continuing	Continuing	-
SWAFS Code Modernization and Cloud Migration	C/CPIF	TBD : TBD	-	-		1.573	May 2019	0.374	May 2020	-		0.374	Continuing	Continuing	-
		Subtotal	-	32.479		31.058		22.354		-		22.354	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
46th TS/JITC AFLCMC	WR	46 TS : Offutt AFB, NE	-	0.449	Nov 2017	0.514	Nov 2018	0.529	Nov 2019	-		0.529	Continuing	Continuing	-
		Subtotal	-	0.449		0.514		0.529		-		0.529	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force			Date: February 2019
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration AFLCMC	C/CPFF	AFLCMC : Hanscom AFB, MA	-	2.261	Oct 2017	2.488	Oct 2018	2.075	Oct 2019	-		2.075	Continuing	Continuing	-
FFRDC SMC	RO	Aerospace Corp : El Segundo, CA	-	0.500	Oct 2017	0.555	Oct 2018	0.503	Oct 2019	-		0.503	Continuing	Continuing	-
		Subtotal	-	2.761		3.043		2.578		-		2.578	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	35.689		34.615		25.461		-		25.461	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305111F / *Weather Service*	**Project (Number/Name)** 672738 / *Weather Service*

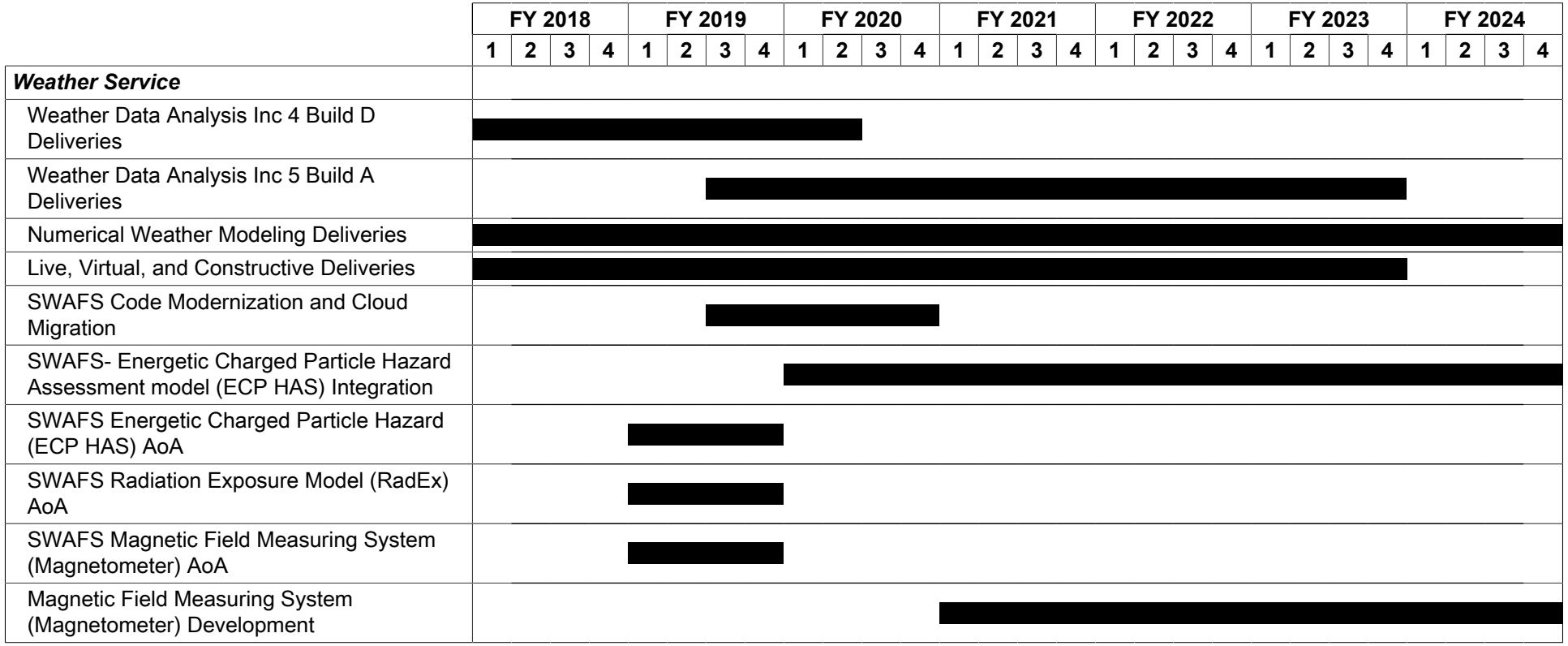

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305111F / *Weather Service*	**Project (Number/Name)** 672738 / *Weather Service*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Weather Service				
Weather Data Analysis Inc 4 Build D Deliveries	1	2018	2	2020
Weather Data Analysis Inc 5 Build A Deliveries	3	2019	4	2023
Numerical Weather Modeling Deliveries	1	2018	4	2024
Live, Virtual, and Constructive Deliveries	1	2018	4	2023
SWAFS Code Modernization and Cloud Migration	3	2019	4	2020
SWAFS- Energetic Charged Particle Hazard Assessment model (ECP HAS) Integration	1	2020	4	2024
SWAFS Energetic Charged Particle Hazard (ECP HAS) AoA	1	2019	4	2019
SWAFS Radiation Exposure Model (RadEx) AoA	1	2019	4	2019
SWAFS Magnetic Field Measuring System (Magnetometer) AoA	1	2019	4	2019
Magnetic Field Measuring System (Magnetometer) Development	1	2021	4	2024