Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	33.563	35.461	23.640	0.000	23.640	27.507	28.722	28.707	29.234	Continuing	Continuing
672738: *Weather Service*	-	33.563	35.461	23.640	0.000	23.640	27.507	28.722	28.707	29.234	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 environment and terrestrial weather, for global battlespace situational awareness for Air Force (AF), Army, Special Operations Forces (SOF), combatant commands, the intelligence community, 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 decreases the risk to mission and risk to force by increasing the lethality, effectiveness, and survivability of DoD weapon systems. The AF Weather Enterprise Cloud migration effort modernizes key capabilities providing the military advantage to accurately predict environmental impacts optimizing mission planning ,targeting, weaponeering, mission execution, battle damage assessment, and space systems operations. To strengthen alliances and partnerships, AFWS development efforts integrate DoD, government agency, 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 ensures greater performance and affordability through improvements to architecture and system efficiency, cybersecurity, joint all-domain command and control (JADC2)/advanced battle management system (ABMS)/sensing grid integration, migration to cloud computing, artificial intelligence and machine learning (AI/ML) initiatives, 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 (PTWA). 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. In FY2021, a portion of the APPN 3600 funding and activities from Weather Data Analysis and Dissemination and Weather Forecasting will begin to migrate to the PTWA capability area to better address development of applications, software, C2 systems, and web interfaces that directly impact the warfighter.

1. Weather Data Analysis and Dissemination provides cloud-computing-based Continuous Delivery/Continuous Integration (CD/CI) for software development and deployment; command and control and mission planning integration; centralized, cybersecure weather web service capability; large-scale data ingest, processing, and warfighter product generation and visualization; 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 Increment 4 (WDA Inc-4) and its follow-on increment, Weather Data Analysis Increment 5 (WDA Inc-5). WDA Inc-4 was previously referred to as WDA.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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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).

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Weather Service weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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).

This requirement supports performance of a full financial audit as required by title 10 U.S.C. Chapter 9A, SEC 240-D.

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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	34.615	25.461	27.105	0.000	27.105
Current President's Budget	33.563	35.461	23.640	0.000	23.640
Total Adjustments	-1.052	10.000	-3.465	0.000	-3.465
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	10.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.052	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-3.465	0.000	-3.465

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2019	FY 2020
Project: 672738: *Weather Service*		
Congressional Add: *Commercial Weather Data Pilot (CWDP) Program*	5.000	5.000
Congressional Add: *Research on Atmospheric Rivers*	0.000	2.000
Congressional Add: *Enhanced Weather Prediction*	0.000	3.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2019	FY 2020
Congressional Add Subtotals for Project: 672738	5.000	10.000
Congressional Add Totals for all Projects	5.000	10.000

Change Summary Explanation

FY19: $1.052M reprogrammed at end of FY19 to account for actuals

FY20: Conf:[+$10.0M] +$3.0M program increase: enhanced weather prediction; +$2.0M program increase: research on atmospheric rivers; +$5.0M program increase: commercial weather data pilot

C. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Weather Data Analysis Increment 4 (WDA Inc-4)	14.080	4.871	0.000
Description: WDA Inc-4 provides a net-centric infrastructure that assimilates worldwide sources of atmospheric and space environment data and produces decision-quality information for warfighters. ***FY 2020 Plans:*** - Finalize WDA Inc-4 development activities and transition to WDA Inc-5 cloud computing activities and capital equipment replacement (CER) functions for hardware components of the data center as the AF Weather Enterprise cloud migration occurs. - 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 AFWWS Single Services Baseline. ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding decrease due to program transitioning to WDA Inc-5.			
Title: Weather Data Analysis Increment 5 (WDA Inc-5)	1.000	4.457	11.798
Description: WDA Inc-5 will institute a cloud computing-based platform enabling a transition from agile development to a CD/CI pipeline for software development and deployment efforts which will enable rapid updates to functionality and security measures. The WDA Inc-5 cloud computing platform will also provide an enterprise big data analytics capability and ML platform, as well as supporting and funding development and deployment of WDA Inc-5 web service and customer-facing applications. Finally, the program will provide both classified and unclassified production cloud computing platforms that communicate directly with C2 customers			

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
FY 2020 Plans: - Institute a cloud computing platform; migrate applications from agile to a CD/CI pipeline. - 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 series and upgrade for the large-scale data process to accommodate new weather satellite and NWM data. - Implement a cloud computing-based AFWWS Single Services Baseline by developing a cloud-native AFW-WEBS as the single web interface for accessing authoritative AF meteorological information and services in geospatially-enabled formats for direct integration into warfighter systems and decision cycles. - Develop and release a cloud-native Impact Services for increased risk management and agile decision support. ***FY 2021 Plans:*** -Funding for applications, software, C2 systems, and web interfaces previously aligned under WDA Inc-5 will begin to transition to a different Program of Record under the PTWA capability area; remaining RDT&E funding in WDA Inc-5 will support AI/ML integration and development improvements to the AF Weather Virtual Private Cloud platform. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding increase due to completion of WDA Inc-4 activities.			
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. NWM includes AI/ML initiatives such as Global Synthetic Weather Radar (GSWR) that will be used to mitigate gaps in weather radar coverage in NDS highlighted AORs. ***FY 2020 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 Land Information System (LIS) improvement and integration project. - Finish GSWR simulated radar mosaic capability development, begin transition to operations. - Migrate software development and deployment to CD/CI methods. ***FY 2021 Plans:*** - Complete integration and transition of hydrology streamflow model into operations. - Continue LIS enhancement and integration, field annual update.	9.218	13.172	9.657

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
- Continue meteorological satellite (METSAT) integration and exploitation efforts for cloud forecasting applications through the Cloud Analysis and Forecast contract. - Continue explicit cloud data assimilation (DA) and modeling collaboration and development activities. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Space Weather Analysis and Forecast System (SWAFS)	3.621	2.357	2.185
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. SWAFS's current main thrusts include modernizing SWAFS software code and transitioning SWAFS code to the cloud which will enable construction of a service-based architecture and enhance cycle times and the overall user experience. Furthermore, the program is working to deliver the Magnetospheric Energetic Charged Particle Hazard Assessment System (ECP HAS) that is designed to inform satellite operators of hazards and the impacts to their spacecraft and will provide the warfighter with the environmental awareness to safely sustain their respective orbits and missions. ***FY 2020 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 2021 Plans:*** - Continue prototyping SWAFS code to modernize and transition to a cloud infrastructure which is essential in providing a modern, stable, and sustainable platform on which all SWAFS software will run to achieve a service-based architecture. - Transition the first of five components of the hazard assessment system to a cloud infrastructure. This phase of the ECP HAS will provide the warfighter with a modern user interface to determine the hazards to space vehicles. - 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 to FY 2021 Increase/Decrease Statement:*** Funding decrease is due to requirements reprioritization at ACC.			
Title: Weather Services-Live, Virtual Constructive (WS-LVC)	0.644	0.604	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
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 2020 Plans:*** -Provide software enhancements through CD/CI methods to current meteorological capabilities in order to provide consistent weather behaviors and environmental impacts across large scale exercises. -Continue to optimize performance in the cloud computing environment to reduce its sustainment footprint. ***FY 2021 Plans:*** -FY2021, WS-LVC will begin to transition to a different Program of Record under the PTWA capability area ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding decrease due to no development efforts scheduled.			
Accomplishments/Planned Programs Subtotals	28.563	25.461	23.640

	FY 2019	FY 2020
Congressional Add: Commercial Weather Data Pilot (CWDP) Program	5.000	5.000
FY 2019 Accomplishments: - 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. ***FY 2020 Plans:*** - Verify military utility and operational use cases for commercial satellite and space-based sensor data. Validate and incorporate ML into nowcasting and forecasting capabilities using commercial data sources. - Explore and enhance new satellite technologies to mature technical readiness levels (TRL) to be launched into orbit for data collection. - Integrate commercial data into NWM and perform comparative analysis with DoD satellite data.		
Congressional Add: Research on Atmospheric Rivers	0.000	2.000
FY 2019 Accomplishments: N/A ***FY 2020 Plans:*** - Fund man-days and dropsondes in support of AF Reserve, Hurricane Hunters' research on atmospheric rivers.		

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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	FY 2019	FY 2020
- Conduct research and development to improve modeling capability of atmospheric rivers.		
Congressional Add: Enhanced Weather Prediction ***FY 2019 Accomplishments:*** N/A ***FY 2020 Plans:*** - Fund collaborative research with community partners to enhance weather prediction capabilities such as modeling, DA, validation, verification, AI/ML, product development, and post-processing.	0.000	3.000
Congressional Adds Subtotals	5.000	10.000

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPAF 03 Line Item 833070: *Weather Observation Forecast*	52.113	31.447	33.021	-	33.021	32.730	35.270	33.902	34.522	Continuing	Continuing
• RDTE 04 0604002F: *Air Force Weather Services Research*	0.000	0.772	0.869	-	0.869	1.000	0.803	0.831	0.846	Continuing	Continuing

Remarks

E. Acquisition Strategy

AF Weather is adopting a CD/CI approach to 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 PTWA. AFPEO SP manages the ground-based segments of space environment collection platforms as well as SWAFS. Both the AFPEO Digital and AFPEO SP are their respective program's Milestone Decision Authority (MDA), unless delegated.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force		Date: February 2020
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 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	-	3.995	Jul 2019	1.959	Dec 2019	-		-		-	Continuing	Continuing	-
WDA 1, Develop centralized web service capability (WDA-Inc 5)	C/CPAF	TBD : TBD	-	1.000	Sep 2019	4.612	Nov 2019	12.844	Nov 2020	-		12.844	Continuing	Continuing	-
WDA 2, Development and integration of weather analysis software (AFW-WEBS)	C/CPFF	Raytheon : Long Beach, CA	-	-		1.923	Mar 2020	0.000		-		0.000	Continuing	Continuing	-
Commercial Weather Pilot Program	C/FFP	Various : Various	-	5.000	Feb 2020	5.000		-		-		-	Continuing	Continuing	-
Research on Atmospheric Rivers	Various	Various : Various	-	-		2.000		-		-		-	Continuing	Continuing	-
Enhanced Weather Prediction	Various	Various : Various	-	-		3.000		-		-		-	Continuing	Continuing	-
NWM 1 - Perform software enhancements to the mesoscale production model	MIPR	NCAR : Boulder, CO	-	0.649	Feb 2019	0.668	Feb 2020	0.701	Mar 2021	-		0.701	Continuing	Continuing	-
NWM 2 - Improve land information system (LIS) application, providing earth surface boundary characterization for numerical modeling	MIPR	NASA : Greenbelt, MD	-	1.766	Feb 2019	1.819	Feb 2020	2.462	Jan 2021	-		2.462	Continuing	Continuing	-
NWM 3 - Develop model data assimilation application ensemble forecast procedures and convective scale resolution model capability.	C/CPIF	Northrop Grumman : Bellevue, NE	-	11.031	Jun 2019	9.153	Jan 2020	2.787	May 2021	-		2.787	Continuing	Continuing	-
NWM 4 - Deliver a Synthetic Weather Radar Capability mitigating gaps	MIPR	MIT Lincoln Labs : TBD, MA	-	3.000	Jan 2020	-		-		-		-	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force		Date: February 2020
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
in the Central Command and other AORs.															
WS-LVC	C/CPIF	Northrop Grumman : Bellevue, NE	-	0.495	Apr 2019	0.366	Apr 2020	-		-		-	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	-	-		1.857	Oct 2019	1.067	Jan 2021	-		1.067	Continuing	Continuing	-
SWAFS RadEx Analysis of Alternatives	PO	AFRL : Annapolis, MD	-	0.486	May 2019	-		-		-		-	Continuing	Continuing	-
SWAFS Magnetospheric ECP HAS Analysis of Alternatives	PO	AFRL : Annapolis, MD	-	0.486	May 2019	-		-		-		-	Continuing	Continuing	-
SWAFS Cloud Transition Prep	C/FFP	Perspecta : Herndon, VA	-	1.573	May 2019	-		0.418	Oct 2020	-		0.418	Continuing	Continuing	-
		Subtotal	-	29.963		32.357		20.279		-		20.279	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
46th TS/JITC AFLCMC	WR	46 TS : Offutt AFB, NE	-	0.347	Nov 2018	0.529	Jan 2020	0.581	Nov 2020	-		0.581	Continuing	Continuing	-
		Subtotal	-	0.347		0.529		0.581		-		0.581	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force			Date: February 2020
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration AFLCMC	C/CPFF	AFLCMC : Hanscom AFB, MA	-	2.698	Oct 2018	2.075	Oct 2019	2.280	Oct 2020	-		2.280	Continuing	Continuing	-
FFRDC SMC	RO	Aerospace Corp : El Segundo, CA	-	0.555	Oct 2018	0.500	Jan 2020	0.500	Jan 2021	-		0.500	Continuing	Continuing	-
		Subtotal	-	3.253		2.575		2.780		-		2.780	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	33.563		35.461		23.640		-		23.640	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305111F / *Weather Service*	**Project (Number/Name)** 672738 / *Weather Service*

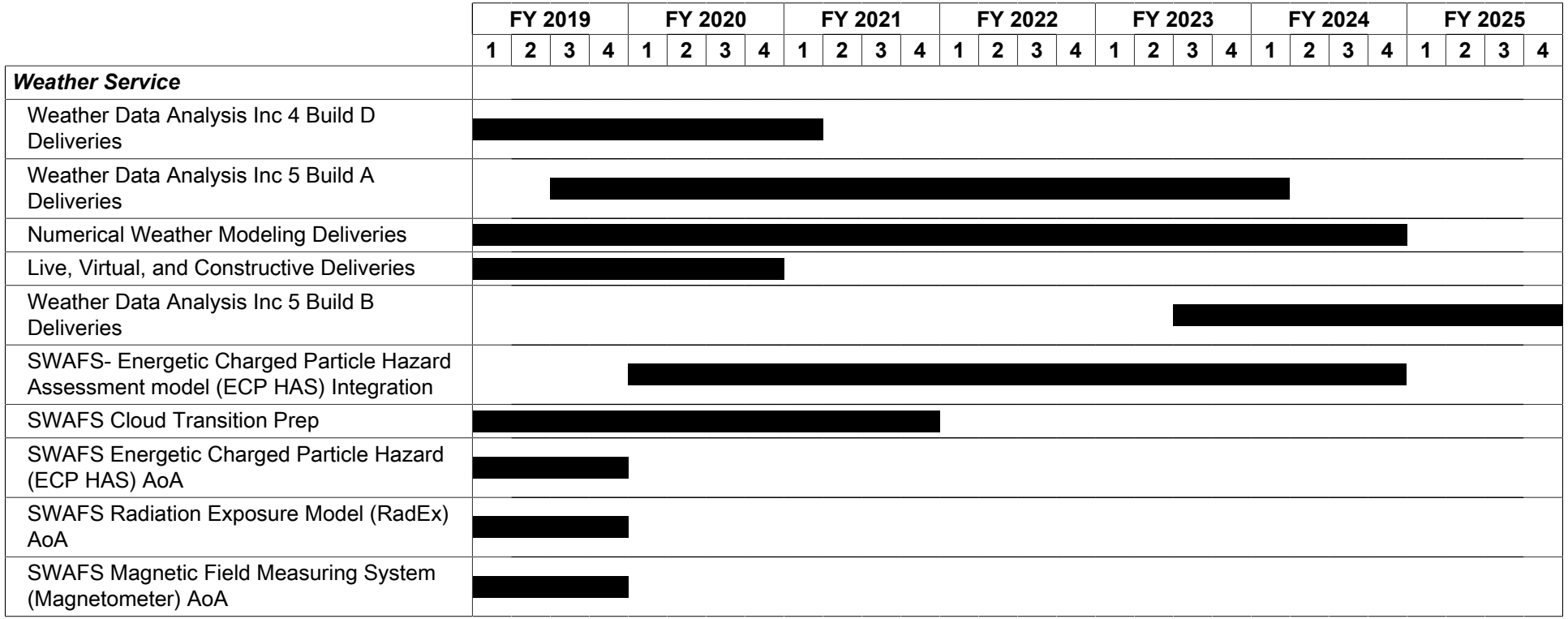

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305111F / *Weather Service*	**Project (Number/Name)** 672738 / *Weather Service*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Weather Service				
Weather Data Analysis Inc 4 Build D Deliveries	1	2019	1	2021
Weather Data Analysis Inc 5 Build A Deliveries	3	2019	1	2024
Numerical Weather Modeling Deliveries	1	2019	4	2024
Live, Virtual, and Constructive Deliveries	1	2019	4	2020
Weather Data Analysis Inc 5 Build B Deliveries	3	2023	4	2025
SWAFS- Energetic Charged Particle Hazard Assessment model (ECP HAS) Integration	1	2020	4	2024
SWAFS Cloud Transition Prep	1	2019	4	2021
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