Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force											Date: February 2015	
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 2014**	**FY 2015**	**FY 2016 Base**	**FY 2016 OCO**	**FY 2016 Total**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**Cost To Complete**	**Total Cost**
Total Program Element	-	19.950	20.102	29.955	-	29.955	26.564	26.834	27.396	27.939	Continuing	Continuing
672738: *Weather Service*	-	19.950	20.102	29.955	-	29.955	26.564	26.834	27.396	27.939	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 enhance segments of the Air Force Weather Weapon System (AFWWS). Activities also include studies and analysis to support both current program planning and execution and future program planning. Program Management Administration costs include Federally Funded Research and Development Centers and Advisory and Assistance Service. AFWWS provides timely, accurate, consistent and relevant space and atmospheric (a.k.a. terrestrial) weather information for global battlespace situational awareness. AFWWS supports worldwide operations of Air Force and Army warfighters, Special Operation Forces, and other government agencies with weather observing and forecasting capabilities at in-garrison, and deployed locations as well as centralized, reach-back capabilities. AFWWS activities align 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.

Weather Data Collection provides automated atmospheric and space environmental sensing capabilities at fixed and deployed locations worldwide. Projects include Next Generation Radar (WSR-88D) and Upper Air Observing Follow-On. FY16 funding will enhance system technical performance based upon state-of-the-art signal processor technology for enhanced discrimination of precipitation types, severe weather detection, and rainfall amount estimations and will continue operationalizing new upper air sounding capability that uses laser technology.

Weather Data Analysis and Dissemination provides a net-centric infrastructure that assimilates worldwide sources of atmospheric and space weather data and produces decision-quality information for warfighters. Improved analysis of real-time weather information supports DoD's Warfighting and Enterprise Information Environment Mission Areas as well as DoD's role in transformation of the National Airspace System through the Next Generation Air Transportation System and enhances Air Force energy security plans. In FY16 Air Force Weather-Web Services (AFW-WEBS) moved into this capability area from Weather Forecasting to better align its function of integration of net-centric capabilities. FY16 funding will continue development of incremental software enhancements and integration of (1) improved analysis capabilities, including processing of data from new environmental sensing satellite sources and (2) Open Geospatial Consortium services, comprised of Web Map Services (WMS), Web Coverage Services (WCS), and Web Feature Services (WFS); which provide more impact-based information and are tailored towards specific missions/use cases.

Weather Forecasting provides advanced scientific numerical weather prediction capabilities for automated, high resolution forecast products for mission execution, rehearsal, and planning. Weather Forecasting includes projects for Numerical Weather Modeling; Weather Services - Live, Virtual, Constructive (WS-LVC, formerly Environmental Data Cube System Support), and the Space Weather Analysis and Forecast System. FY16 funding will continue development of software to integrate advanced atmospheric and space weather forecast capabilities to improve models for warfighter operations. Additionally, Weather Forecasting capabilities will

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force	Date: February 2015
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be expanded to both integrate and exploit data from new environmental sensing satellite sources and expanded weather products/services for Live, Virtual, and Constructive events for DoD Modeling and Simulation (M&S) users within Data Center 14866.

Product Tailoring/Warfighter Applications provide timely, local, and regional target-scale weather information to operational commanders for a given Area of Responsibility and at tactical levels they provide front-line weather information to warfighters, including weather forces, conducting combat operations. This supports the 'train as you fight' concept by assuring fixed and deployable systems have an equivalent operator look and feel. No FY16 funding is requested.

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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	20.643	25.102	34.205	-	34.205
Current President's Budget	19.950	20.102	29.955	-	29.955
Total Adjustments	-0.693	-5.000	-4.250	-	-4.250
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-5.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.693	-			
• Other Adjustments	-	-	-4.250	-	-4.250

Change Summary Explanation

- FY15 appropriation reduced by $5M due to availability of prior year execution balances.
- FY16 reduction due higher Air Force priorities.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: Next Generation Radar (NEXRAD)	0.189	0.191	0.200	-	0.200
Description: NEXRAD is a tri-agency program that manages a nation-wide doppler weather radar network to provide radar data and products for flight operations and resource protection. This effort was formerly included in "Weather Data Collection."					
FY 2014 Accomplishments:					

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force		Date: February 2015
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Participated with National Weather Service and Federal Aviation Administration to develop signal processing initiatives such as CLEAN-AP (Clutter Environment Analysis using Adaptive Parameters) and SPRT (Staggered Pulse Repetition Time). ***FY 2015 Plans:*** Participate with National Weather Service and Federal Aviation Administration to fine tune and develop differential reflectivity (ZDR) calibration methods. ***FY 2016 Base Plans:*** Will participate with National Weather Service and Federal Aviation Administration to develop hail size discriminator algorithms. ***FY 2016 OCO Plans:*** N/A					
Title: Upper Air Follow-On ***Description:*** Will provide measurements of environmental conditions up to 40K feet, including factors such as wind speed and direction, pressure, temperature, and humidity, to support warfighter operations. This effort formerly included in "Weather Data Collection." ***FY 2014 Accomplishments:*** N/A ***FY 2015 Plans:*** N/A ***FY 2016 Base Plans:*** Will begin developmental efforts to operationalize technology to gather upper air environmental data. ***FY 2016 OCO Plans:*** N/A	-	-	1.000	-	1.000
Title: Weather Data Analysis (WDA) ***Description:*** WDA provides a net-centric infrastructure that assimilates worldwide sources of atmospheric and space weather data and produces decision-quality information for warfighters. In FY15, this effort included AF Weather Web Services (AFW-WEBS) which was formerly included in "Weather Forecasting."	5.309	5.500	9.750	-	9.750

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force		Date: February 2015
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
FY 2014 Accomplishments: Enhanced the capability to ingest, process, store, access, and disseminate a new generation of environmental satellite data via upgrades to the large-scale data processing, product generation, presentation system, user interface, and web services architecture. ***FY 2015 Plans:*** Enhance the capability to ingest, process, store, access, and disseminate meteorological oceanographic data via upgrades to the web services architecture to expand the Open Geospatial Consortium services and improve the presentation system. ***FY 2016 Base Plans:*** Will enhance the capability to ingest, process, store, access, and disseminate meteorological/oceanographic data via upgrades to the web services architecture to expand the Open Geospatial Consortium services and upgrade the large-scale data processing to accommodate new environmental satellite and numerical weather modeling data. ***FY 2016 OCO Plans:*** N/A					
Title: Numerical Weather Modeling (NWM) ***Description:*** Provides advanced scientific numerical weather prediction capabilities for automated, high resolution forecast products for mission planning, rehearsal, and execution. This effort was formerly titled "Weather Forecasting" and included efforts that are now identified separately. ***FY 2014 Accomplishments:*** Continued integration of advanced atmospheric and space weather forecast capabilities, including exploitation of a new generation of environmental sensing satellites. ***FY 2015 Plans:*** Continue integration of advanced atmospheric and space weather forecast capabilities, including continued development and integration of the unified cloud detection capabilities and evaluation of satellite radiances for inclusion in atmospheric models. ***FY 2016 Base Plans:***	6.193	4.312	14.255	-	14.255

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force		Date: February 2015
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Will continue integration of advanced atmospheric weather forecast capabilities to include improved cloud forecasting techniques and enhancement of aerosol modeling algorithms. ***FY 2016 OCO Plans:*** N/A					
Title: Space Weather Analysis and Forecast System (SWAFS) ***Description:*** The overall program objective for SWAFS is to enhance and sustain a single integrated space weather software baseline operating in a net-centric environment at all security levels within the AFWA enterprise architecture. SWAFS is now in Spiral 2 development and focuses on new or improved capabilities identified through user feedback on SWAFS's operational capability, existing or planned near-term additional satellite and ground station space weather data sources, and existing and planned near-term models and science-based algorithms that have reached appropriate levels of technical validation. Spiral 3 is currently planned to begin in FY 14 and will focus on advanced capabilities, such as the Full Physics-Global Assimilation of Ionospheric Measurements (FP-GAIM) model, to satisfy future 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, SPADOC, NRO, Navy & Army ***FY 2014 Accomplishments:***	4.064	6.483	4.000	-	4.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force		Date: February 2015
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- The FY14 SWAFS Development Delivery will include tasks for the Spiral 2 software development release. Spiral 2 is continued incremental development of capabilities to ingest, process, store, and disseminate space environmental data. - For the SWAFS Spiral 2 software release, the SWAFS program will further develop the Net-Centric capability with enhance the storing capability of all data needed to support current and anticipated SWAFS data processing. In addition, this will help SWAFS to distribute net-centric data to AFWA Web Service. Also, SWAFS will make updates to the software to ensure it can ingest new data such as RDATA and Deep Space Climate Observatory data. Finally SWAFS will investigate the feasibility of ingesting ionosphere parameter values into GAIM-FP. ***FY 2015 Plans:*** The SWAFS program FY15 development will focus on integration of Global Assimilation of Ionospheric Measurements (GAIM-Full Physics model to improve ionospheric specifications and forecasts; add to the net centric data delivery of space weather to AFW-WEBS to ensure warfighter access to authoritative, deliverable, resilient, and timely space weather data/products. We will also continue to apply new data ingests of COSMIC2/SSAEM, GOES-R, RINEX, and GPS particle data to provide necessary data for scintillation/ionospheric modeling and and satellite anomaly attribution; and model upgrades for the auroral oval, HF comm coverage maps and point-to-point forecasts. ***FY 2016 Base Plans:*** - The SWAFS program will continue with the Net-Centric data transition as well as SPOSCINDA 2.0 integration. SWAFS will also start working on GAIM-FP enhancements. - Provide return to service; corrective, adaptive, and capability improvement maintenance for the operational software baseline ***FY 2016 OCO Plans:*** N/A					
Title: Weather Services-Live, Virtual, and Constructive (WS-LVC) ***Description:*** WS-LVC provides environmental representations to the DoD Modeling and simulation community. This effort was formerly previously called Environmenal Data Cube System Support (EDCSS) and included in "Weather Forecasting." ***FY 2014 Accomplishments:***	0.500	0.690	0.750	-	0.750

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force		Date: February 2015
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Continued incremental development of a correlated and realistic natural environment for use in tailorable scenarios to create specific effects for warfighter models and simulations. ***FY 2015 Plans:*** Continue development of platform specific data and effects for Air Force assets integration into operational systems. ***FY 2016 Base Plans:*** Will continue incremental development of Air and Space Natural Environment data and associated effects for use in tailorable scenarios within warfighter models and simulations. ***FY 2016 OCO Plans:*** N/A					
Title: Joint Environmental Toolkit (JET) ***Description:*** JET provides timely, local and regional target-scale weather information to operational commanders for a given Area of Responsibility, and at tactical levels provides weather information to front-line warfighters in support of combat operations. This effort was formerly titled "Product Tailoring/Warfighter Applications." ***FY 2014 Accomplishments:*** Developed and fielded enhanced software to support weather warnings, pilot briefings, and weather forecaster continuity of operations for regional and tactical weather operations, as well as improved integration with warfighter C4I systems. ***FY 2015 Plans:*** Continue software development and integration of regional and tactical weather systems and integration with warfighter command and control systems. ***FY 2016 Base Plans:*** N/A ***FY 2016 OCO Plans:*** N/A	3.695	2.926	-	-	-
Accomplishments/Planned Programs Subtotals	19.950	20.102	29.955	-	29.955

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force	Date: February 2015
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D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• OPAF: BA07: Line Item # 833070: *Weather Observation Forecast*	16.171	16.309	21.561	-	21.561	20.759	23.902	21.524	21.905	Continuing	Continuing
• OPAF: BA07: Line Item # 837100: *Tactical C-E Equipment*	-	-	-	-	-	-	-	-	-	Continuing	Continuing
• OPAF: BA07: Line Item # 838010: *Comm Elect Mods*	6.912	12.075	8.492	-	8.492	11.421	10.134	8.905	9.064	Continuing	Continuing
• OPAF: BA07: Line Item # 86190A: *Spares and Repair Parts*	1.146	1.605	0.278	-	0.278	0.990	0.939	0.803	0.817	Continuing	Continuing

Remarks

E. Acquisition Strategy

AF Weather employs an incremental development strategy with a series of incremental Initial Operational Capabilities (IOCs) and software releases to enable rapid development and fielding of capabilities using full and open competition.

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 2016 Air Force		Date: February 2015
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 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SWAFS, WDA, NWM. Development and integration of weather forecast software	C/CPAF	Northrop Grumman : Bellevue, NE	-	5.635	Mar 2014	-		-		-		-	Continuing	Continuing	-
SWAFS, WDA, NWM. Continued development and integration of weather forecast software	C/CPIF	Northrop Grummand : Bellevue, NE	-	-		6.579	Mar 2015	4.000	Mar 2016	-		4.000	Continuing	Continuing	-
WDA. Development and integration of weather analysis software	C/CPFF	Raytheon : Long Beach, CA	-	2.732	May 2014	2.836	Feb 2015	9.750	Dec 2015	-		9.750	Continuing	Continuing	-
JET. Integrate weather systems with warfighter C4I systems	C/CPIF	Raytheon : Omaha, NE	-	2.878	Apr 2014	1.702	Jan 2015	-		-		-	Continuing	Continuing	-
NWM. Improve numerical weather prediction	MIPR	NCAR : Boulder, CO	-	4.100	Feb 2014	1.598	Feb 2015	-		-		-	Continuing	Continuing	-
NWM. Improve weather forecast capabilities	MIPR	NASA : Greenbelt, MD	-	0.700	Feb 2014	0.670	Feb 2015	-		-		-	Continuing	Continuing	-
NWM. Enhance weather forecast output	TBD	Not specified. : ,	-	-		-		14.255	Jan 2016	-		14.255	Continuing	Continuing	-
Various	Various	Various : Various,	-	1.846	Feb 2014	3.353	Feb 2015	0.750	Feb 2016	-		0.750	Continuing	Continuing	-
		Subtotal	-	17.891		16.738		28.755		-		28.755	-	-	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force			Date: February 2015
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Various	MIPR	Various : ,	-	0.581	Jan 2014	0.828	Jan 2015	1.200	Jan 2016	-		1.200	Continuing	Continuing	-
		Subtotal	-	0.581		0.828		1.200		-		1.200	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration AFLCMC	Various	AFLCMC : Hanscom AFB, MA	-	1.063	Oct 2013	2.121	Oct 2014	-		-		-	Continuing	Continuing	-
Program Management Administration SMC	Various	SMC : Los Angeles AFB, CA	-	0.415	Oct 2013	0.415	Oct 2014	-		-		-	Continuing	Continuing	-
		Subtotal	-	1.478		2.536		-		-		-	-	-	-

	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	19.950		20.102		29.955		-		29.955	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305111F / *Weather Service*	**Project (Number/Name)** 672738 / *Weather Service*

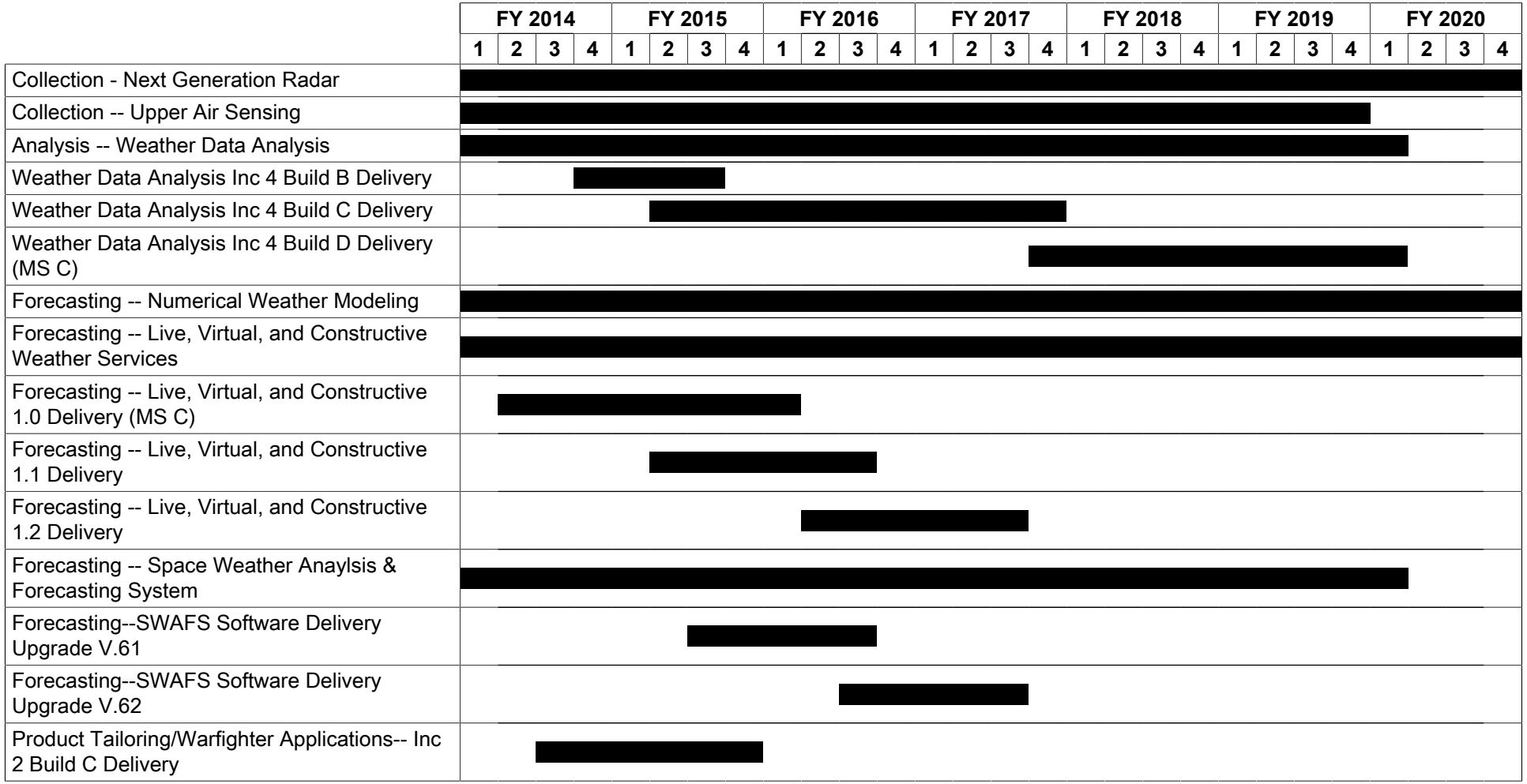

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force		Date: February 2015
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Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Collection - Next Generation Radar	1	2014	4	2020
Collection -- Upper Air Sensing	1	2014	4	2019
Analysis -- Weather Data Analysis	1	2014	1	2020
Weather Data Analysis Inc 4 Build B Delivery	4	2014	3	2015
Weather Data Analysis Inc 4 Build C Delivery	2	2015	4	2017
Weather Data Analysis Inc 4 Build D Delivery (MS C)	4	2017	1	2020
Forecasting -- Numerical Weather Modeling	1	2014	4	2020
Forecasting -- Live, Virtual, and Constructive Weather Services	1	2014	4	2020
Forecasting -- Live, Virtual, and Constructive 1.0 Delivery (MS C)	2	2014	1	2016
Forecasting -- Live, Virtual, and Constructive 1.1 Delivery	2	2015	3	2016
Forecasting -- Live, Virtual, and Constructive 1.2 Delivery	2	2016	3	2017
Forecasting -- Space Weather Anaylsis & Forecasting System	1	2014	1	2020
Forecasting--SWAFS Software Delivery Upgrade V.61	3	2015	3	2016
Forecasting--SWAFS Software Delivery Upgrade V.62	3	2016	3	2017
Product Tailoring/Warfighter Applications-- Inc 2 Build C Delivery	3	2014	4	2015