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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Air Force										Date: May 2017		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)					R-1 Program Element (Number/Name) PE 0604201F I Integrated Avionics Planning and Development							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	101.203	0.000	101.203	58.971	16.908	0.000	0.000	Continuing	Continuing
651030: GPS Receiver Development	-	0.000	0.000	101.203	0.000	101.203	58.971	16.908	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2018, specific efforts initiated under PE 0305164F, NAVSTAR Global Positioning System (User Equipment) (Space), Project 643833, Military Global Positioning System User Equipment were transferred to PE 0604201F, Integrated Avionics Planning & Development, Project 651030, Aircraft Receiver Development, to realign resources with the execution responsibilities supporting aircraft weapon system platforms along with increased transparency to stakeholders.

A. Mission Description and Budget Item Justification

Positioning, Navigation and Timing (PNT) solutions are critical to defense operations by enabling delivery of precision fires, safe aerial navigation and time coordination across multiple platforms and subsystems. PNT must be maintained in the face of emerging and continuously evolving electronic and cyber threats, requiring increased system resiliency and rapid adaptability similar to that historically required of electronic warfare systems. Evolving threats will drive upgrades such as Global Positioning System (GPS) receiver modernization, development of standard navigational system formats/interfaces, increased use of open system architecture design principles, incorporation of alternative navigation sources into navigational solutions, advanced anti-jam antennas, and precision clock improvements to maintain current force capabilities.

Efforts transferred from PE 0305164F and now conducted under PE 0604201F, Project 651030 to include Embedded GPS/Inertial Navigation System (INS) Modernization (EGI-M), Miniaturized Airborne GPS Receiver 2000 Modernization (MAGR 2K-M), Defense Advanced GPS Receiver (DAGR), Resilient EGI (R-EGI) development, anti-jam antenna development, Situational Awareness devices and other advanced PNT solutions. Activities also include, but are not limited to, both current program planning and execution and future program planning. Funds may be used to address emerging and short-notice Diminishing Manufacturing and Material Shortage (DMSMS) issues.

This program is in Budget Activity 5, Engineering and Manufacturing 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. Production funding for modernized airborne receivers is not covered in this PE and will be requested by using platform when necessary.

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B. Program Change Summary (\$ in Millions)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	
Previous President's Budget		0.000	0.000	0.000	0.000	0.000	
Current President's Budget		0.000	0.000	101.203	0.000	101.203	
Total Adjustments		0.000	0.000	101.203	0.000	101.203	
• Congressional General Reductions		0.000	0.000				
• Congressional Directed Reductions		0.000	0.000				
• Congressional Rescissions		0.000	0.000				
• Congressional Adds		0.000	0.000				
• Congressional Directed Transfers		0.000	0.000				
• Reprogrammings		0.000	0.000				
• SBIR/STTR Transfer		0.000	0.000				
• Other Adjustments		0.000	0.000	101.203	0.000	101.203	
Change Summary Explanation							
In FY2018 increase a result of specific efforts transferred to PE 0604201F, Integrated Avionics Planning & Development, Project 651030, Aircraft Receiver Development from PE 0305164F, NAVSTAR Global Positioning System (User Equipment) (Space), Project 643833, Military Global Positioning System User Equipment							
C. Accomplishments/Planned Programs (\$ in Millions)					FY 2016	FY 2017	FY 2018
Title: Embedded GPS/INS - Modernized (EGI-M)					0.000	0.000	66.300
Description: Upgrades EGI design to enhance resiliency against existing and emerging navigational warfare threats, incorporating design features (such as interface standardization and software modularity) to reduce DoD cost and timelines to respond to any newly identified threats. Incorporates M-Code and potential ADS-B compliance capability into EGI receivers while addressing parts obsolescence, reducing configuration count from 260+ to approximately 16.							
FY 2016 Accomplishments: N/A							
FY 2017 Plans: N/A							
FY 2018 Plans: Conduct the EGI-M Preliminary Design Review, complete Milestone B and award the EMD contracts. Conduct the Critical Design Review and initiate box level vendor testing.							
Title: MAGR 2K-M					0.000	0.000	23.850

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
Description: Increases MAGR-2K resiliency against existing and emerging navigational warfare threats while reducing cost and timelines to respond to newly identified threats. Incorporates M-Code capability into MAGR 2K receivers while addressing parts obsolescence and providing a pathway to ADS-B Out implementation. Performs appropriate trade studies and incorporates additional resiliency features, such as alternate navigation inputs, where cost effective. FY 2016 Accomplishments: N/A FY 2017 Plans: N/A FY 2018 Plans: Conduct MAGR 2K-M CDR, complete box level bench testing, conduct environmental testing and initiate performance testing. Provide test articles platform testing and integration.				
Title: DAGR Description: Improves DAGR receiver by improving resiliency and meeting threat evolution. Integrates software and hardware capability enhancements into DAGR receivers, providing improved resistance to current and emerging operational threats for navigational capability for ground personnel and vehicles. FY 2016 Accomplishments: N/A FY 2017 Plans: N/A FY 2018 Plans: Initiate trade studies to further define requirements and award development contract.		0.000	0.000	3.653
Title: Resilient EGI (R-EGI) Description: Design and develop improved EGI resiliency to counter navigational warfare threats through transition of science and technology efforts to EGI-M. Establish a Government Reference Architecture (GRA) embodying open systems architecture concepts and enabling future resilient PNT DoD systems. Provide upgrade paths to flow new technologies into EGI-M hardware and software wherever practical. FY 2016 Accomplishments:		0.000	0.000	7.400

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C. Accomplishments/Planned Programs (\$ in Millions)							FY 2016	FY 2017	FY 2018		
N/A											
FY 2017 Plans: N/A											
FY 2018 Plans: Begin development of hardware standards and software navigation/communication protocols. Develop simulation capability and implement prototyping to include ability to demonstrate and test capabilities prior to development. Develop programmatic plans with insertion points for potential hardware and software upgrades to EGI-M.											
Accomplishments/Planned Programs Subtotals							0.000	0.000	101.203		
D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RDTE: BA 04: PE	0.000	20.166	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0305164F: <i>Navstar GPS</i>											
Remarks In FY2018, PE 0305164F, NAVSTAR Global Positioning System (User Equipment) (Space), Project 643833, Military Global Positioning System User Equipment specific efforts are being transferred to PE 0604201F, Integrated Avionics Planning & Development, Project 651030, Aircraft Receiver Development for transparency and to realign resources with execution responsibilities that support various aircraft weapon system platforms.											
E. Acquisition Strategy Modifications to existing receivers designs will occur via Engineering Change Proposals (ECPs)/Task Orders on existing USAF contracts. The GRA and open standards associated with R-EGI will be developed in cooperation with an industry consortium.											
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.											

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Air Force												Date: May 2017			
Appropriation/Budget Activity 3600 / 5						R-1 Program Element (Number/Name) PE 0604201F / Integrated Avionics Planning and Development				Project (Number/Name) 651030 / GPS Receiver Development					
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
EGI-M	SS/CPFF	Honeywell : Clearwater, FL	-	0.000		0.000		25.775	Jan 2018	0.000		25.775	Continuing	Continuing	-
EGI - M	SS/CPFF	Northrop Grumman : Woodland Hills, CA	-	0.000		0.000		30.375	Jan 2018	0.000		30.375	Continuing	Continuing	-
MAGR-2K-M	SS/CPFF	Raytheon : El Segundo, CA	-	0.000		0.000		20.000	Dec 2017	0.000		20.000	Continuing	Continuing	-
DAGR	SS/CPFF	Rockwell Collins : Des Moines, IA	-	0.000		0.000		3.653	Jul 2018	0.000		3.653	Continuing	Continuing	-
R-EGI	TBD	TBD : TBD	-	0.000		0.000		7.400	May 2018	0.000		7.400	Continuing	Continuing	-
Subtotal			-	0.000		0.000		87.203		0.000		87.203	-	-	-
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
EGI-M FFRDC	Various	MITRE : TBD	-	0.000		0.000		4.100	Oct 2017	0.000		4.100	Continuing	Continuing	-
EGI-M Lab	PO	ISF : TBD	-	0.000		0.000		1.100	Jan 2018	0.000		1.100	Continuing	Continuing	-
Subtotal			-	0.000		0.000		5.200		0.000		5.200	-	-	
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
EGI-M	Various	Various : TBD	-	0.000		0.000		1.100	Jan 2018	0.000		1.100	Continuing	Continuing	-
Subtotal			-	0.000		0.000		1.100		0.000		1.100	-	-	-

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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Strategic Planning/PMA	TBD	TBD : TBD	-	0.000		0.000		7.700	Nov 2017	0.000		7.700	Continuing	Continuing	-
Subtotal			-	0.000		0.000		7.700		0.000		7.700	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		0.000		101.203		0.000		101.203	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Air Force			Date: May 2017
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	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
EGI-M TMRR																												
EGI EMD																												
MAGR-2K-M EMD																												
MAGR-2K-M Testing																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Air Force			Date: May 2017
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
EGI-M TMRR	1	2016	2	2018
EGI EMD	1	2018	4	2019
MAGR-2K-M EMD	4	2016	4	2020
MAGR-2K-M Testing	2	2016	4	2022