

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force **Date:** February 2018

Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 1203164F I NAVSTAR Global Positioning System (User Equipment) (SPACE)
---	--

COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	497.190	297.975	253.939	286.629	0.000	286.629	240.748	155.139	82.178	71.686	90.965	1,976.449
643833: MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP	497.190	297.975	253.939	286.629	0.000	286.629	240.748	155.139	82.178	71.686	90.965	1,976.449
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 447

A. Mission Description and Budget Item Justification

The Global Positioning System (GPS) is a space-based radio Positioning, Navigation, and Timing (PNT) distribution system. GPS User Equipment (UE) consists of standardized receivers, antennas, antenna electronics, and other related equipment, grouped together in sets to derive navigation and time information transmitted from GPS satellites. These receiver sets are used by the Department of Defense (DoD). Research, Development, Test and Evaluation (RDT&E) funds UE development, integration, test, and analysis for new PNT receiver capabilities in Navigation Warfare (NAVWAR) across all military platforms using GPS services.

The Military Global Positioning System User Equipment (MGUE) Increment 1 program is responsible for the development of standard modernized receiver form factors for the Service-nominated lead platforms. The MGUE Capability Development Document (CDD) was approved by the Joint Requirements Oversight Council (JROC) on 24 Jul 2014. MGUE Increment 1 is initiating a new family of modernized GPS receivers that will deliver significantly improved capability to counter current and emerging PNT threats and enable military operations in a NAVWAR environment where current legacy receiver performance would be compromised. MGUE Increment 1 received a Milestone A decision in April 2012. The program received direction in February 2014 from the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) to execute a new acquisition strategy, accelerating the program to provide test units faster to facilitate military end users. The MGUE program received a Milestone B decision in January 2017 and is in the Engineering and Manufacturing phase.

The MGUE Increment 2 effort will continue to employ Military Code (M-Code) receiver technology into additional applications (space receiver, precision guided munitions, and handheld receiver) to meet Service requirements. This effort leverages the MGUE Increment 1 technology to the maximum extent while addressing producibility of M-Code integrated circuits far into the future.

 Joint Service System Management Office (JSSMO)

GPS receivers enable precision navigation solutions for warfighters across the spectrum of land, sea and air domains. In 2006, Assistant Secretary of Defense for Networks and Information Integration (ASD (NII)) directed the Air Force to develop production ready M-Code components to meet Service needs. Public Law 111-383 913, effective 7 Jan 2011, prohibits procurement of GPS equipment unless it is M-Code capable after FY2017. The completion of card level compatibility and security certification will enable integration of M-Code capability into military GPS Receivers. Additionally, in 2010, the Federal Aviation Administration (FAA) published new Automatic Dependent Surveillance Broadcast (ADS-B) rules effective January 1, 2020.

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force				Date: February 2018		
Appropriation/Budget Activity		R-1 Program Element (Number/Name)				
3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 1203164F I NAVSTAR Global Positioning System (User Equipment) (SPACE)				
The ADS-B rule requires platform operators to have ADS-B avionics installed and operating in order to fly Mode S Identification Friend or Foe (IFF) Transponder equipped aircraft into FAA and/or International Civil Aviation Organization (ICAO) Mode S enabled Air-to-Air and Air-to-Ground, Surveillance airspace. DoD aircraft are not exempt from the FAA mandate.						
In FY 2018, JSSMO efforts transferred to Program Element (PE) 0604201F.						

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."						
This PE may include necessary civilian pay expenses required to manage, execute, and deliver MGUE capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in PEs 1206392F and 1206398F.						
This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.						
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget		278.147	253.939	195.528	0.000	195.528
Current President's Budget		297.975	253.939	286.629	0.000	286.629
Total Adjustments		19.828	0.000	91.101	0.000	91.101
• Congressional General Reductions		0.000	0.000			
• Congressional Directed Reductions		-4.000	0.000			
• Congressional Rescissions		0.000	0.000			
• Congressional Adds		34.900	0.000			
• Congressional Directed Transfers		0.000	0.000			
• Reprogrammings		0.000	0.000			
• SBIR/STTR Transfer		-11.072	0.000			
• Other Adjustments		0.000	0.000	91.101	0.000	91.101
Change Summary Explanation						
FY2017: -\$ 4.000M Early to Need for MGUE Program						

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)		R-1 Program Element (Number/Name) PE 1203164F I NAVSTAR Global Positioning System (User Equipment) (SPACE)		
FY2017: +\$34.900M Increase for JSSMO requirement				
FY2019: -\$17.000M Inc 1 improve funds management				
FY2019: -\$ 2.156M Inflation				
FY2019: +\$13.615M Fund MGUE Inc 2				
FY2019: +\$83.442M Fund MGUE Inc 1 to 2017 Independent Cost Estimate (ICE)				
FY2019: +\$13.200M Fund impact to MGUE from GPSIII Regional Military Protection (RMP)				
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2017	FY 2018	FY 2019
Title: MGUE Increment 1		122.989	114.861	89.723
Description: The MGUE Increment 1 program will develop standard modernized receiver form factors for the Service-nominated lead platforms in accordance with the MGUE Inc 1 CDD.				
FY 2018 Plans: Continue developmental test. Complete environmental and electromagnetic interface testing. Continue security certification efforts. Assist each lead platform office to integrate and test M-Code receivers in their respective platforms. Continue M-Code Application Specific Integrated Circuit (ASIC) producibility analysis, risk reduction, and early engineering. Continue to evaluate functional and performance capabilities. Continue Program Office and other related support activities that may include, but are not limited to studies, technical analysis, etc.				
FY 2019 Plans: Complete developmental test in 4Q FY2019. Complete security certification efforts. Continue to assist each lead platform office to integrate and test M-Code receivers in their respective platforms. Continue M-Code ASIC producibility analysis, risk reduction and early engineering, and integrate Regional Military Protection (RMP) capabilities. 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 2018 to FY 2019 Increase/Decrease Statement: FY 2019 decreased compared to FY 2018 by \$25.138M. Justification for this decrease is described in plans above.				
Title: MGUE Increment 2		5.200	1.500	89.647
Description: The MGUE Increment 2 effort will continue to develop M-Code receiver technology for additional applications (space receiver, precision guided munitions, and handheld receiver) to meet Service requirements. This effort leverages MGUE Increment 1 technology to the maximum extent while ensuring producibility of M-Code integrated circuits far into the future to support DoD PNT requirements.				
FY 2018 Plans:				

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>		R-1 Program Element (Number/Name) PE 1203164F I NAVSTAR Global Positioning System (User Equipment) (SPACE)		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2017	FY 2018	FY 2019
<p>Complete Increment 2 acquisition strategy. Complete Increment 2 ASIC and receiver requirement analysis and perform verification planning. Evaluate next generation ASIC and receiver design, engineering, and architecture with vendors, to include ASIC modeling and prototyping at new foundry. Conduct security certification planning activities. Begin preparations for ASIC fabrication and manufacturing. Start targeted risk reduction efforts by contractor(s) for M-Code Handheld. Continue Program Office and other related support activities that may include, but are not limited to studies, technical analysis, requirements analysis, contract documentation development, risk reduction activities, etc.</p> <p>FY 2019 Plans: Continue evaluation of next generation ASIC and receiver design, engineering, architecture and requirements review with vendors to include ASIC modeling, identify needed core ASIC technology (including but limited to: ASIC components, tools, design libraries and building blocks, etc.), characterize them for military purposes (e.g., temperatures, environments), design and prototype next generation ASIC at new foundry. Continue security certification planning activities and contract documentation preparation. Continue targeted risk reduction efforts by contractor(s) for M-Code Handheld. Begin preparations for ASIC fabrication and manufacturing. 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.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 increased compared to FY 2018 by \$88.147M. Justification for this increase is described in plans above.</p>				
<p>Title: Advanced Technology</p> <p>Description: Advanced Technology includes efforts to mature technology for future GPS receivers called out in the MGUE CDD. These efforts aim to find innovative solutions to increase resiliency in GPS performance and improve on size, weight, power, and cost of military receivers.</p> <p>FY 2018 Plans: Develop new technologies to augment U.S. military GPS receiver development. Continue initiative to standardize the GPS Modernized UE advanced cryptography. Develop new receiver capability and cryptography to take advantage of all available satellite navigation systems and signals. Investigate integrity of other Global Navigation Satellite Systems (GNSS) signals for delivering assured PNT. Continue development of key technologies for advanced modernization GPS simulators and clocks, advanced antennas and antenna electronics as part of targeted risk reduction efforts, and navigation warfare capabilities.</p> <p>FY 2019 Plans: Develop antenna technologies to protect receiver against jamming in the GNSS area of operation. Continue developing new technologies to augment U.S. military GPS receiver development. Continue initiative to standardize the GPS Modernized UE advanced cryptography. Continue developing receiver capability and cryptography to take advantage of all available satellite navigation systems and signals. Investigate integrity of other GNSS signals for delivering assured PNT. Continue development of</p>		7.940	8.150	9.270

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)		R-1 Program Element (Number/Name) PE 1203164F I NAVSTAR Global Positioning System (User Equipment) (SPACE)		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2017	FY 2018	FY 2019
key technologies for advanced modernization GPS simulators and clocks, advanced antennas and antenna electronics as part of targeted risk reduction efforts, and navigation warfare capabilities.				
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 increased compared to FY 2018 by \$1.120M. Justification for this increase is described in plans above.				
Title: System/Platform Integration and Performance Certification Description: Integration of MGUE Increment 1 receiver form factors into the Service-nominated lead platforms in support of developmental and operational test events. Conduct technical and operational modernization impact analysis for MGUE Service lead platform integration. FY 2018 Plans: Continue lead platform integration efforts in support of developmental and operational test events. Continue to assist DoD integration of M-Code GPS receivers for Joint Service non-lead platforms. Assist DoD Integration of M-Code GPS receivers for Joint Service non-lead platforms. FY 2019 Plans: Complete developmental test in support of lead platform integration. Continue lead platform integration efforts in support of operational test events. Continue to assist DoD integration of M-Code GPS receivers for Joint Service non-lead platforms. Assist DoD Integration of M-Code GPS receivers for joint Service non-lead platforms. FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 decreased compared to FY 2018 by \$9.327M. Justification for this decrease is described in plans above.		72.249	114.162	89.679
Title: Information Assurance, Security/Compatibility Certification, and Test/Evaluation Description: Develop, implement and maintain GPS security certification programs. Development of DoD Policy, Strategy & Resource Requirements for MGUE security certification and compatibility certification. Security certification, compatibility certification, and security approval ensures future military GPS receivers protect critical program information and continue working in all environments and concepts of operations called for by U.S. Strategic Command. FY 2018 Plans: Support lead platform integration and test activities. Continue Modernized Security Evaluations/Tests for Selective Availability Anti-Spoofing Module (SAASM) and other legacy GPS receiver equipment. Review, approve, and track SAASM, M-Code receivers, and legacy receiver certified platforms and integrated applications for all of DoD. Continue MGUE security planning activities to include security approval for non-lead platforms. Continue to enforce policy and other requirements related to receiver		17.417	15.266	8.310

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>		R-1 Program Element (Number/Name) PE 1203164F I NAVSTAR Global Positioning System (User Equipment) (SPACE)		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2017	FY 2018	FY 2019
compatibility accreditation with the GPS signal in space. Continue verification and validation required for security certification for all contractor's MGUE design. Continue security certification efforts for MGUE receivers. FY 2019 Plans: Complete security certification efforts for MGUE receivers. Support lead platform integration and test activities. Continue Modernized Security Evaluations/Tests for SAASM and other legacy GPS receiver equipment. Review, approve, and track SAASM, M-Code receivers, and legacy receiver certified platforms and integrated applications for all of DoD. Continue MGUE security planning activities to include security approval for non-lead platforms. Continue to enforce policy and other requirements related to receiver compatibility accreditation with the GPS signal in space. FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 decreased compared to FY 2018 by \$6.956M. Justification for this decrease is described in plans above.				
Title: JSSMO Embedded GPS/Inertial Navigation System(INS) (EGI) - Modernized (EGI-M) Description: Incorporates M-Code and ADS-B capability into EGI receivers while addressing parts obsolescence. FY 2018 Plans: Funds were transferred into JSSMO PE 1204201F FY 2019 Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: N/A		49.594	0.000	0.000
Title: JSSMO Miniaturized Airborne GPS Receiver (MAGR) 2K-M Description: Incorporates M-Code capability into MAGR 2K receivers while addressing parts obsolescence and providing a pathway to ADS-B Out implementation. FY 2018 Plans: Funds were transferred into JSSMO PE 1204201F FY 2019 Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: N/A		7.500	0.000	0.000
Title: JSSMO Government Reference Architecture (GRA)		4.000	0.000	0.000

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force								Date: February 2018			
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)					R-1 Program Element (Number/Name) PE 1203164F I NAVSTAR Global Positioning System (User Equipment) (SPACE)						
C. Accomplishments/Planned Programs (\$ in Millions)								FY 2017	FY 2018	FY 2019	
Description: Establish a GRA embodying open systems architecture concepts enabling robust, resilient GPS receiver designs which support future modifications at an accelerated pace and at lower cost than the current contractor proprietary architecture. FY 2018 Plans: Funds were transferred into JSSMO PE 1204201F FY 2019 Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: N/A											
Title: JSSMO Strategic Planning Description: Conduct strategic planning for GPS receiver modernization. FY 2018 Plans: Funds were transferred into JSSMO PE 1204201F FY 2019 Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: N/A								11.086	0.000	0.000	
Accomplishments/Planned Programs Subtotals								297.975	253.939	286.629	
D. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 GPSSPC: Navstar GPS Space	2.082	2.198	2.181	-	2.181	2.221	2.259	2.305	2.349	Continuing	Continuing
Remarks SPAF funding in this PE supports legacy SAASM efforts.											
E. Acquisition Strategy The MGUE program has developed a comprehensive acquisition strategy to provide modernized GPS capabilities to U.S. and Allied Forces by developing a competitive market driven approach. This strategy establishes the signal compatibility and security criteria along with a process for evaluating components to enable rapid movement											

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	
3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)	PE 1203164F I NAVSTAR Global Positioning System (User Equipment) (SPACE)	
<p>from development to fielding. The pillars of this effort are: (a) establishing time certain and low risk development; (b) bounding requirements to leverage mature technology to the maximum extent possible; (c) focusing on the development of form factors based on well-defined standards to support lead platform integration; and (d) implementing a proactive, collaborative MGUE platform integration activity to mitigate risk and reduce cost for DoD force structure modernization. The MGUE program awarded three sole source contracts for the Increment 1 Technology Development Phase effort in September 2012, as follow-on efforts to the competitively awarded Modernized User Equipment (MUE) contracts awarded in June 2006. The effort spans the Technology Maturation and Risk Reduction Phase through design and includes integration and test of M-Code receivers into Service-nominated lead platforms. This effort also includes the security and compatibility certification of GPS receiver cards as a part of the Integration effort. The Service lead platforms will select from the available vendors to integrate and perform operational testing with funding from the MGUE program. This supports compliance with Public Law 111-383, section 913.</p> <p>-----JSSMO-----</p> <p>Modifications to existing receivers designs will occur via Engineering Change Proposals (ECPs)/Task Orders on existing USAF contracts. There is associated procurement funding by aircraft platforms tied to this development activity.</p> <p>-----</p>		
F. Performance Metrics		
<p>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.</p>		

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force												Date: February 2018			
Appropriation/Budget Activity 3600 / 4						R-1 Program Element (Number/Name) PE 1203164F / NAVSTAR Global Positioning System (User Equipment) (SPACE)				Project (Number/Name) 643833 / MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
MGUE Increment 1 Technology Development (Rockwell)	C/CPIF	Rockwell Collins : Cedar Rapids, IA	88.996	29.200	Jan 2017	35.500	Nov 2017	21.849	Nov 2018	-		21.849	26.320	201.865	-
MGUE Increment 1 Technology Development (Raytheon)	C/CPIF	Raytheon : El Segundo, CA	93.591	30.035	Jan 2017	18.600	Nov 2017	12.455	Nov 2018	-		12.455	13.950	168.631	-
MGUE Increment 1 Technology Development (L3)	C/CPIF	L3 : Anaheim, CA	57.352	20.391	Jan 2017	27.400	Nov 2017	8.636	Nov 2018	-		8.636	9.326	123.105	-
MGUE Increment 1 Pre-Tech Development	C/CPAF	Various : Various	19.340	7.940	Jan 2017	8.150	Jan 2018	9.270	Jan 2019	-		9.270	14.900	59.600	-
MGUE Increment 1 MGUE Demonstrations	C/CPFF	Various : Various	24.000	-		-		-		-		-	0.000	24.000	-
MGUE Increment 1 Platform Integration	C/CPAF	Various : Various	71.826	67.067	Jan 2017	96.622	Nov 2017	71.709	Nov 2018	-		71.709	85.633	392.857	-
MGUE Increment 1 Compatibility Certification	C/CPAF	Various : Various	12.548	-		-		-		-		-	0.000	12.548	-
MGUE Increment 1 Information Assurance	C/CPAF	Various : Various	12.955	4.270	Jan 2017	4.370	Jan 2018	2.650	Jan 2019	-		2.650	8.350	32.595	-
MGUE Increment 1 Security Certification	C/CPAF	Various : Various	26.014	2.946	Jan 2017	3.026	Jan 2018	1.740	Jan 2019	-		1.740	6.152	39.878	-
MGUE Increment 2	C/TBD	Various : Various	-	5.200	Jul 2017	1.500	Jan 2018	89.647	Jan 2019	-		89.647	297.522	393.869	-
MGUE Technical Mission Analysis	MIPR	Various : El Segundo, CA	12.117	12.890	Oct 2016	13.000	Oct 2017	13.340	Oct 2018	-		13.340	29.430	80.777	-
MGUE Increment 1 Enterprise SE&I	C/CPAF	TASC : El Segundo, CA	14.382	17.110	Nov 2016	17.540	Nov 2017	17.970	Nov 2018	-		17.970	37.270	104.272	-
MGUE RMP	C/CPIF	Various : Various	-	-		-		13.200	Jan 2019	-		13.200	81.000	94.200	-
JSSMO EGI-M 1	SS/CPFF	Honeywell : Clearwater, FL	-	21.956	Dec 2016	-		-		-		-	0.000	21.956	-
JSSMO EGI-M 2	SS/CPFF	Northrop Grumman : Woodland Hills, CA	-	27.638	Dec 2016	-		-		-		-	0.000	27.638	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force												Date: February 2018			
Appropriation/Budget Activity 3600 / 4						R-1 Program Element (Number/Name) PE 1203164F / NAVSTAR Global Positioning System (User Equipment) (SPACE)				Project (Number/Name) 643833 / MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
JSSMO MAGR 2K-M	SS/CPFF	Raytheon : El Segundo, CA	-	7.500	Dec 2016	-		-		-		-	0.000	7.500	-
JSSMO GRA	TBD	Not specified. : TBD	-	4.000	Dec 2016	-		-		-		-	0.000	4.000	-
JSSMO Strat Planning	TBD	Not specified. : TBD	-	-		-		-		-		-	0.000	0.000	-
Subtotal			433.121	258.143		225.708		262.466		-		262.466	609.853	1,789.291	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
MGUE Increment 1 Test and Evaluation	Various	Various : San Diego, CA	10.133	7.450	Jan 2017	7.870	Jan 2018	3.920	Jan 2019	-		3.920	2.410	31.783	-
JSSMO Strategic Planning - Test	Various	Various : TBD	-	1.986		-		-		-		-	0.000	1.986	-
Subtotal			10.133	9.436		7.870		3.920		-		3.920	2.410	33.769	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
MGUE Increment 1 and FFRDC	Various	Aerospace : El Segundo, CA	27.583	6.420	Oct 2016	5.867	Dec 2017	4.450	Dec 2018	-		4.450	12.883	57.203	-
MGUE Increment 1 and FFRDC 2	Various	MITRE : El Segundo, CA	7.455	1.460	Dec 2016	1.360	Dec 2017	1.390	Dec 2018	-		1.390	2.890	14.555	-
MGUE Increment 1 and A&AS	Various	Various : Various	18.239	13.076	Dec 2016	12.815	Dec 2017	14.087	Dec 2018	-		14.087	12.016	70.233	-
MGUE Increment 1 and Other Support	Various	Various : Various	0.659	0.340	Dec 2016	0.319	Dec 2017	0.316	Dec 2018	-		0.316	0.664	2.298	-
JSSMO Management Services	Various	Various : Various	-	9.100	Dec 2016	-		-		-		-	0.000	9.100	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force												Date: February 2018		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 1203164F / NAVSTAR Global Positioning System (User Equipment) (SPACE)					Project (Number/Name) 643833 / MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP				

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
Subtotal			53.936	30.396		20.361		20.243		-		20.243	28.453	153.389	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	497.190	297.975	253.939	286.629	-	286.629	640.716	1,976.449	N/A

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force			Date: February 2018		
Appropriation/Budget Activity 3600 / 4		R-1 Program Element (Number/Name) PE 1203164F / NAVSTAR Global Positioning System (User Equipment) (SPACE)			Project (Number/Name) 643833 / MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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
MGUE Increment 1																												
MGUE Increment 1 Security Certification																												
MGUE Increment 1 Developmental Test																												
MGUE Increment 1 Milestone B																												
MGUE Increment 1 All Lead Platforms Operational Test																												
MGUE Increment 2																												
MGUE Increment 2 Next Gen ASIC Studies up to PDR																												

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 1203164F / NAVSTAR Global Positioning System (User Equipment) (SPACE)	Project (Number/Name) 643833 / MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>MGUE Increment 1</i>				
MGUE Increment 1 Security Certification	1	2017	1	2019
MGUE Increment 1 Developmental Test	3	2017	2	2020
MGUE Increment 1 Milestone B	2	2017	2	2017
MGUE Increment 1 All Lead Platforms Operational Test	2	2019	1	2022
<i>MGUE Increment 2</i>				
MGUE Increment 2 Next Gen ASIC Studies up to PDR	1	2017	2	2020

Note

JSSMO efforts transfer to PE 0604201F beginning in FY2018.

MGUE Increment 2 is a Pre-Major Defense Acquisition Program (MDAP). A draft acquisition strategy is in coordination.