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PE NUMBER: 0305164F

PE TITLE: NAVSTAR Global Positioning System User Equipment Space

Exhibit R-2, RDT&E Budget Item Justification								DATE February 2004	
BUDGET ACTIVITY 07 Operational System Development				PE NUMBER AND TITLE 0305164F NAVSTAR Global Positioning System User Equipment Space					
Cost (\$ in Millions)	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	Cost to Complete	Total
Total Program Element (PE) Cost	80.500	99.449	104.114	92.697	89.204	76.032	73.975	Continuing	TBD
3028 Navstar GPS	80.500	99.449	104.114	92.697	89.204	76.032	73.975	Continuing	TBD

(U) **A. Mission Description and Budget Item Justification**

The Global Positioning System (GPS) is a space-based radio positioning, navigation, and time distribution system. GPS User Equipment (UE) consists of standardized receivers, antennas, antenna electronics, etc., grouped together in sets to derive navigation and time information transmitted from GPS satellites. These receiver sets are used by all Services and DoD. RDT&E funds UE development and testing, studies and engineering to assist UE aircraft integration, software upgrades, product improvement studies, commercial GPS UE test and evaluation, and mission support. Due to increasing military GPS dependence and emerging Electronic Warfare (EW) threat, Navigation Warfare (Navwar) program was established to address EW solutions for GPS. Key elements of GPS Modernization include protecting U.S. military and allies' use of GPS, preventing hostile exploitation of GPS, and preserving civil use of GPS outside the area of operations (AOO).

This program element is in Budget Activity 7 - Operational System Development, because UE passed Milestone IIB in January 1992.

(U) **B. Program Change Summary (\$ in Millions)**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
(U) Previous President's Budget	85.241	100.589	104.387
(U) Current PBR/President's Budget	80.500	99.449	104.114
(U) Total Adjustments	-4.741	-1.140	
(U) Congressional Program Reductions		-1.140	
Congressional Rescissions			
Congressional Increases			
Reprogrammings	-2.350		
SBIR/STTR Transfer	-2.391		
(U) <u>Significant Program Changes:</u>			
No significant program changes.			

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BUDGET ACTIVITY 07 Operational System Development				PE NUMBER AND TITLE 0305164F NAVSTAR Global Positioning System User Equipment Space			PROJECT NUMBER AND TITLE 3028 Navstar GPS			
Cost (\$ in Millions)		FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	Cost to Complete	Total
3028	Navstar GPS	80.500	99.449	104.114	92.697	89.204	76.032	73.975	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

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This program element is in Budget Activity 7 - Operational System Development, because UE passed Milestone IIB in January 1992.

(U) B. Accomplishments/Planned Program (\$ in Millions)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
(U) Continue Advanced UE Technology efforts	27.025	17.739	15.117
(U) Continue SAASM/GRAM-SAASM development	15.963	9.613	7.726
(U) Continue Integration, Test and Evaluation	4.659	5.890	6.241
(U) Continue System Engineering and program support	25.648	26.031	21.030
(U) Continue Modernization efforts (M-Code Development)	7.205	40.176	54.000
(U) Total Cost	80.500	99.449	104.114

(U) C. Other Program Funding Summary (\$ in Millions)

	<u>FY 2003</u> <u>Actual</u>	<u>FY 2004</u> <u>Estimate</u>	<u>FY 2005</u> <u>Estimate</u>	<u>FY 2006</u> <u>Estimate</u>	<u>FY 2007</u> <u>Estimate</u>	<u>FY 2008</u> <u>Estimate</u>	<u>FY 2009</u> <u>Estimate</u>	<u>Cost to</u> <u>Complete</u>	<u>Total Cost</u>
(U) AF RDT&E									
(U) Other APPN Operations and Maintenance									
(U) (PE 0305164F, BA 1 - Operating Forces, SAG 13D)	1.145	2.160	2.250	2.265	2.257	2.403	2.388	Continuing	TBD
(U) Aircraft Procurement (PE 0305164F, BA 7, Aircraft)	16.654	29.326	28.469	27.646	23.861	35.309	36.482	Continuing	TBD

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(U) **C. Other Program Funding Summary (\$ in Millions)**

Support Equipment, BP19)
 Other Procurement (PE
 0305164F, BP 63 - Electronics
 & Telecommunications
 Equipment, WSC 6730, P-70);
 BP 86 - Spares & Repair Parts,
 WSC 190A, P-111)

	4.301	10.255	10.272	8.186	5.308	4.826	3.918	Continuing	TBD
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(U) **D. Acquisition Strategy**

Several ongoing and planned concept definition and technology risk reduction programs will define and mature GPS technologies needed for GPS Modernization. Air Force strategy is to develop an open system architecture for a GPS receiver based on the GPS Receiver Applications Module (GRAM) concept. The GRAM-Selective Availability Anti-Spoofing Module (SAASM) program is a further risk reduction effort to integrate the GPS receiver operations internally between GRAM and SAASM. Also, several anti-jam technology risk reduction efforts will be pursued to mature technologies and prepare for technology insertion. GPS UE continues to work with platforms/users to identify requirements and upgrade paths for GPS enhancements. In addition, to combat the potential threat that U.S. forces may be denied the use of GPS signals, the Advanced Digital Antenna Production (ADAP) program (a follow-on to the GPS Antenna System (GAS-1)), is being developed.

The Modernized User Equipment (MUE) program will develop controlled, non-proprietary specifications and interface control documents (ICDs), to enable the Services to acquire affordable M-Code UE through their program offices and/or the GPS JPO. An assurance plan will verify compliance. The program will use a phased approach:

- Cost Plus Fixed Fee (CPFF) Program and Research Development Announcement (PRDA) contracts for program concept development are intended to reduce risk and advance the technology required for future development (awarded 3QFY03).
- A follow-on contract for engineering development of single form factors (aviation) as well as integration and test is scheduled for contract award in FY05.

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Exhibit R-3, RDT&E Project Cost Analysis

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(U) <u>Cost Categories</u> (Tailor to WBS, or System/Item Requirements) (\$ in Millions)	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total</u> Prior to FY 2003 Cost	<u>FY</u> 2003 Cost	<u>FY</u> 2003 Award Date	<u>FY</u> 2004 Cost	<u>FY</u> 2004 Award Date	<u>FY</u> 2005 Cost	<u>FY</u> 2005 Award Date	<u>Cost to Complete</u>	<u>Total</u> Cost	<u>Target</u> Value of Contract
(U) <u>Product Development</u>												
Rockwell (MAGR)	C/FPIF/FFP/ CPAF		19.293	0.000		0.000		0.000		0.000	19.293	
DOE Sandia (SAASM)	MIPR	Kirtland AFB, NM	20.432	6.441	Dec-02	6.150	Feb-04	6.750	Jan-05	Continuing	TBD	
NAWC (SAASM)	MIPR		0.599	0.000		0.000		0.000		0.000	0.599	
Various (SAASM)	Various	Various	18.593	9.522		3.463		0.976		Continuing	TBD	
Various (M-Code)	Various	Various	18.112	7.205		40.176		54.000		Continuing	TBD	
Alliant Techsys Inc (SAASM) & Multiple NAVWAR PRDAs	C/CPFF & C/CPAF		18.222	0.000		0.000		0.000		0.000	18.222	
Holloman AFB (Integration)	Project Order	46th TG, Holloman AFB, NM	4.804	0.596	Nov-02	0.409	Jan-04	0.656	Jan-05	Continuing	TBD	
General Dynamics (Various)	Time and Materials		1.810	0.000		0.000		0.000		0.000	1.810	
Completed technology development efforts	Various		85.634	0.000		0.000		0.000		0.000	85.634	
Allan Osborne, Alliant Tech, Rockwell Collins, and Raytheon (DAGR)	PRDA	Various	17.524	8.429		0.000		0.000		Continuing	TBD	
Various (GRAM-SAASM)	PRDA		30.494	0.000		0.000		0.000		0.000	30.494	
Advanced UE Tech Invest Receiver Technology	Various		4.646	0.000		0.000		0.000		0.000	4.646	
	MIPR	AFRL - WPAFB, OH & KAFB, NM	5.963	4.250	Feb-03	5.207	Nov-03	2.100	Dec-04	Continuing	TBD	
Anti-jam Filter Technology	Various	Various	2.045	5.802		2.882		1.182		Continuing	TBD	
Advanced Antenna Technology	Various	Various	11.052	8.544		9.650		11.835		Continuing	TBD	
Subtotal Product Development			259.223	50.789		67.937		77.499		Continuing	TBD	0.000
Remarks:												
(U) <u>Support</u>												
Overlook Sys (OASD/C3I)	C/CPFF	OASD, Arlington, VA	24.536	2.537	Jan-03	0.000		0.000		0.000	27.073	
Aerospace Corp (Technical Supt)	CPFF	Aerospace, Los Angeles, CA	5.835	3.651	Dec-02	5.482	Jan-04	3.162	Dec-05	Continuing	TBD	

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PRC (Technical Supt)	Time and Materials			0.714	0.000	0.000	0.000	0.000	0.714	
Miscellaneous (Program Spt)	Various	Various		15.112	19.460	20.549	17.868	Continuing	TBD	
Various (Other Navwar Studies)	Various			7.883	0.000	0.000	0.000	0.000	7.883	
Subtotal Support				54.080	25.648	26.031	21.030	Continuing	TBD	0.000
Remarks:										
(U) <u>Test & Evaluation</u>										
46th TG (SAASM/Test)	Project Order			31.987	0.000	0.000	0.000	0.000	31.987	
46th TG/UE development & production Testing	Project Order / Various	Holloman AFB, NM / Various		8.627	4.063	5.481	5.585	Continuing	TBD	
N/A									0.000	
Subtotal Test & Evaluation				40.614	4.063	5.481	5.585	Continuing	TBD	0.000
Remarks:										
(U) <u>Management</u>										0.000
Subtotal Management				0.000	0.000	0.000	0.000	0.000	0.000	0.000
Remarks:										
(U) Total Cost				353.917	80.500	99.449	104.114	Continuing	TBD	0.000

Exhibit R-4, RDT&E Schedule Profile

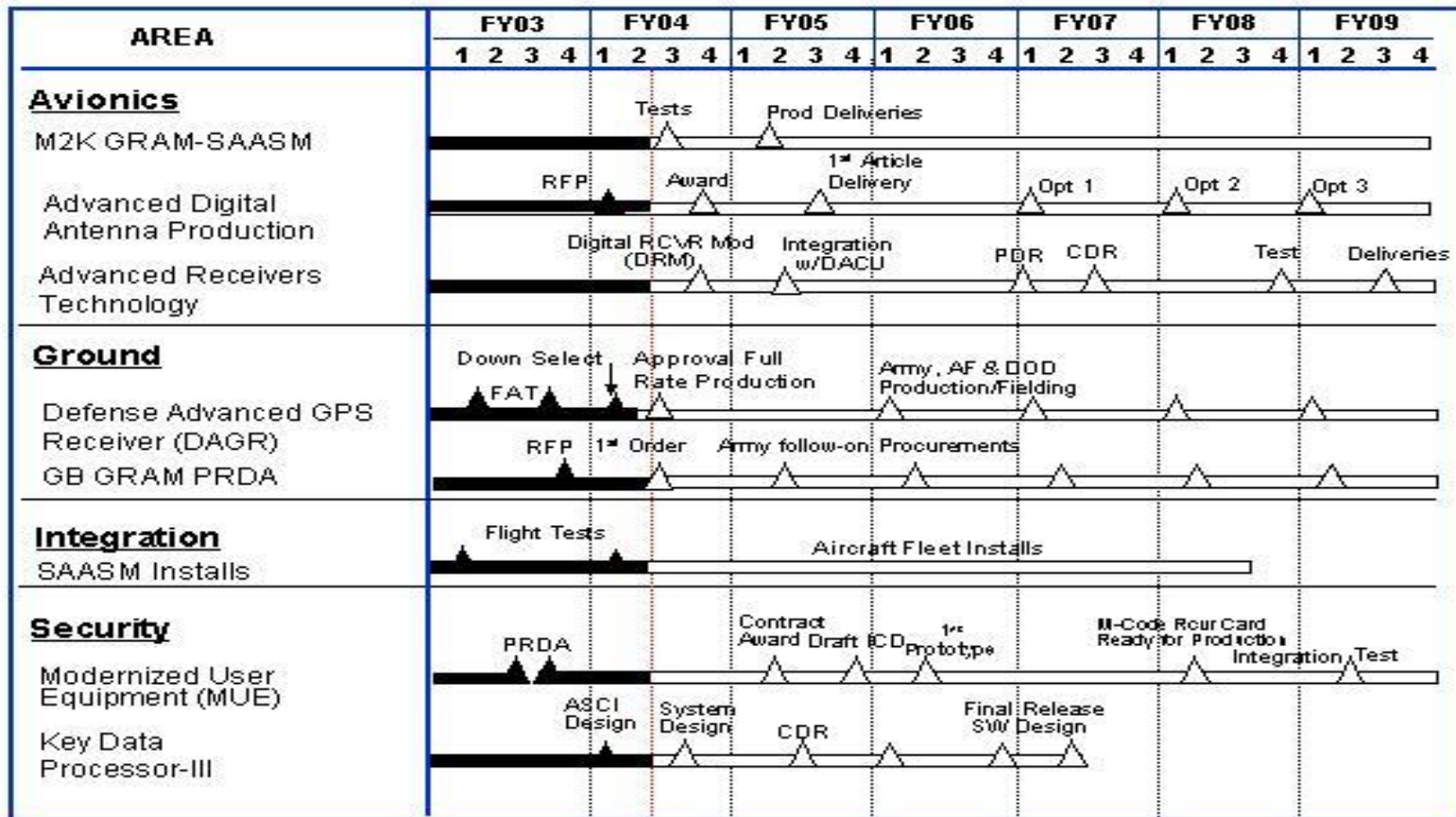
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07 Operational System Development

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M2K - Miniaturized Airborne GPS Rcvr 2000
GRAM - GPS Receiver Applications Module
SAASM - Selective Avail Anti Spoof Module
ICD - Interface Control Document

M-Code - Military Code
PDR - Preliminary Design Review
CDR - Critical Design Review
DACU - Digital Antenna Control Unit

RFP - Request for Proposal
FAT - First Article Test Unit
PRDA - Program Research & Dev Announcement

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Exhibit R-4a, RDT&E Schedule Detail	DATE February 2004
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(U) <u>Schedule Profile</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
(U) Adv UE Technology - Digital AE upgrade CDR	2Q		
(U) GB GRAM-SAASM preproduction prototypes deliveries		1Q	
(U) Begin Micro-Electro Mechanical Sensor (MEMS) NRE effort		3Q	
(U) Adv Digital Antenna Production (ADAP) Contract Award		3Q	
(U) GRAM-SAASM Avionics Development Complete		3Q	
(U) M-Code Receiver Requirements Definition		4Q	
(U) Begin Digital Receiver Module Delivery		4Q	
(U) Digital Antenna Control Unit (DACU) Integration/Test			2Q
(U) Multi Beam Steering Antenna Electronics Requirement Dev			2Q
(U) MUE Single Contractor Award			2Q
(U) Advanced Digital Antenna Production (ADAP) First Article Delivery			3Q