

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 2003

BUDGET ACTIVITY

07 - Operational System Development

PE NUMBER AND TITLE

0305164F NAVSTAR Global Positioning System User Equipment Space

PROJECT

3028

COST (\$ in Thousands)	FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	Cost to Complete	Total Cost
3028 Navstar GPS	47,822	85,241	100,589	104,387	92,949	89,387	76,067	73,860	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	0

(U) A. Mission Description

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).

(U) FY 2002 (\$ in Thousands)

(U) \$0	Accomplishments/Planned Program
(U) \$14,387	Continued Advanced UE Technology efforts
(U) \$10,491	Continued Selective Availability Anti-Spoofing Module (SAASM)/GPS Receiver Application Module (GRAM)-SAASM development
(U) \$5,793	Continued Integration, Test and Evaluation
(U) \$5,677	Continued System Engineering and support
(U) \$9,150	Continued Modernization efforts (M-Code Development)
(U) \$2,324	Completed classified requirement
(U) \$47,822	Total

(U) FY 2003 (\$ in Thousands)

(U) \$0	Accomplishments/Planned Program
(U) \$29,008	Continue Advance UE Technology efforts
(U) \$17,946	Continue SAASM/GRAM-SAASM development
(U) \$6,896	Continue Integration, Test and Evaluation
(U) \$19,391	Continue System Engineering and support

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(U) A. Mission Description Continued(U) FY 2003 (\$ in Thousands) Continued

(U) \$12,000 Continue Modernization efforts (M-Code Development)

(U) \$85,241 Total

(U) FY 2004 (\$ in Thousands)

(U) \$0 Accomplishments/Planned Program

(U) \$21,868 Continue Advance UE Technology efforts

(U) \$12,055 Continue SAASM/GRAM-SAASM development

(U) \$7,000 Continue Integration, Test and Evaluation

(U) \$17,666 Continue System Engineering and support

(U) \$42,000 Continue Modernization (M-Code Development)

(U) \$100,589 Total

(U) B. Budget Activity Justification

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

(U) C. Program Change Summary (\$ in Thousands)

	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>Total Cost</u>
(U) Previous President's Budget	52,541	86,799	60,981	TBD
(U) Appropriated Value	53,093	86,799		
(U) Adjustments to Appropriated Value				
a. Congressional/General Reductions	-786	-1,186		
b. Small Business Innovative Research				
c. Omnibus or Other Above Threshold Reprogram		-372		
d. Below Threshold Reprogram	-4,485			
e. Rescissions				
(U) Adjustments to Budget Years Since FY 2003 PBR			39,608	
(U) Current Budget Submit/FY 2004 PBR	47,822	85,241	100,589	TBD

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(U) C. Program Change Summary (\$ in Thousands) Continued(U) Significant Program Changes:

FY04: \$39,608K to develop increased anti-jam capabilities on GPS User Equipment and M-code UE development.

(U) D. Other Program Funding Summary (\$ in Thousands)

	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>Cost to</u>	<u>Total Cost</u>
	<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	
(U) AF RDT&E										
(U) Other APPN										
(U) Operations and Maintenance (PE 0305164F, BA 1 - Operating Forces, SAG 13D)	1,775	1,838	2,183	2,585	2,050	2,141	2,303	2,674	Continuing	TBD
(U) Aircraft Procurement (PE 0305164F, BA 7, Aircraft Support Equipment, BP19)	29,006	16,654	29,924	33,032	28,030	23,887	35,291	36,392	Continuing	TBD
(U) Other Procurement (PE 0305164F, BP 63 - Electronics & Telecommunications Equipment, WSC 6730, P-62); BP 86 - Spares & Repair Parts, WSC 190A, P-106)	4,159	4,301	10,332	10,326	8,208	5,306	4,806	3,888	Continuing	TBD
(U) Related RDT&E:										
(U) PE 0305165F, NAVSTAR GPS (Space/Ground Segments)										
(U) PE 0603421, NAVSTAR GPS (GPS III)										

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(U) **D. Other Program Funding Summary (\$ in Thousands)**

	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>Cost to</u>	<u>Total Cost</u>
	<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	
(U) PE 0305176F, Combat Survivor/Evader Locator										

(U) **E. Acquisition Strategy**

Several ongoing and planned concept definition and technology risk reduction programs will define and mature required GPS technologies needed for GPS Modernization. Our strategy will 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. Continue to work with platforms/users to identify requirements and upgrade paths to insert GPS enhancements.

The Military-code User Equipment (M-Code UE) program will provide an industrial base for future warfighter requirements. By developing controlled, non-proprietary specifications and interface control documents (ICDs), the program will enable the Services to acquire affordable M-Code UE through their program offices and/or the GPS JPO. A certification plan will verify compliance. The program will use a phased approach:

- A Program and Research Development Announcement (PRDA) contract for program concept development is intended to reduce risk and advance the technology required for future development. The government contemplates a Cost Plus Fixed Fee (CPFF) type contract for the PRDA scheduled for release in 3QFY03.
- A follow-on contract for engineering development of three form factors (handheld, munition, and aviation) as well as integration and test of at least one form factor is schedule for contract award in FY05.

(U) **F. Schedule Profile**

	<u>FY 2002</u>				<u>FY 2003</u>				<u>FY 2004</u>			
	1	2	3	4	1	2	3	4	1	2	3	4
(U) GB GRAM-SAASM Interface Control Document (ICD) complete			*									
(U) GB GRAM-SAASM preproduction prototypes deliveries					*							
(U) M-Code Receiver Requirements Definition												
(U) Adv UE Technology - Digital AE upgrade CDR							X					
(U) Adv UE Tech - Small antenna prototype development completion							X					
(U) Begin Handheld (Defense Advance GPS Receiver (DAGR)) NRE					*							

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(U) <u>F. Schedule Profile Continued</u>												
					<u>FY 2002</u>				<u>FY 2003</u>		<u>FY 2004</u>	
					1	2	3	4	1	2	3	4
(U) Complete Handheld study							*					
(U) KC-10/F-15 SAASM Non-Recurring Engineering (NRE)											X	
(U) GRAM-SAASM Avionics Development Complete										X		
(U) Begin Micro-Electro Mechanical Sensor (MEMS) NRE effort											X	
* = Completed, X = Scheduled												

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

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(U) A. Project Cost Breakdown (\$ in Thousands)

	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>
(U) Advanced UE Technology effort	14,387	29,008	21,868
(U) SAASM/GRAM-SAASM development	10,491	17,946	12,055
(U) Integration, Test and Evaluation	5,793	6,896	7,000
(U) System engineering and support	5,677	19,391	17,666
(U) Modernization (M-Code Development)	9,150	12,000	42,000
(U) Classified Requirement	2,324	0	0
(U) Total	47,822	85,241	100,589

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)(U) Performing Organizations:

<u>Contractor or Government Performing Activity</u>	<u>Contract Method/Type or Funding Vehicle</u>	<u>Award or Obligation Date</u>	<u>Performing Activity EAC</u>	<u>Project Office EAC</u>	<u>Total Prior to FY 2002</u>	<u>Budget FY 2002</u>	<u>Budget FY 2003</u>	<u>Budget FY 2004</u>	<u>Budget to Complete</u>	<u>Total Program</u>
<u>Product Development Organizations</u>										
Rockwell (MAGR)	C/FPIF/FFP/CPAF	Various	19,293	19,293	19,293	0	0	0	0	19,293
DOE Sandia (SAASM)	MIPR	Feb 94	N/A	N/A	19,945	487	5,110	8,500	Continuing	TBD
NAWC (SAASM)	MIPR	Oct 95	599	599	599	0	0		0	599
Various (SAASM)	Various	Various	N/A	N/A	16,521	2,072	12,836	3,555	Continuing	TBD
Various (M-Code)	Various	Dec 00	N/A	N/A	8,962	9,150	12,000	42,000	Continuing	TBD
Alliant Techsys Inc (SAASM)	C/CPFF	Oct 95	4,782	4,782	4,782	0	0	0	0	4,782
Multiple (NAVWAR PRDAs)	C/CPAF	Aug 96	13,440	13,440	13,440	0	0	0	0	13,440
Holloman AFB (Integration)	Project Order	N/A	N/A	N/A	4,519	285	596	600	Continuing	TBD
General Dynamics (Various)	Time and Materials	Jan 96	1,810	1,810	1,810	0	0	0	0	1,810

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(U) <u>Performing Organizations Continued:</u>										
<u>Product Development Organizations</u>										
ACTD (Prevention/Protection)	Various	Various	7,428	7,428	7,428	0	0	0	0	7,428
ACTD (Protection)	Various	Various	20,186	20,186	20,086	0	0	0	0	20,086
Adv UE Protection Dev	Various	Various	20,691	20,691	9,513	4,037	0	0	0	13,550
Various (NET)	Various	Various	10,334	10,334	10,334	0	0	0	0	10,334
Various (Classified Requirement)	Various	Various	17,786	17,786	22,279	2,324	0	0	0	24,603
Various (GPS Modernization)	Various	Various	TBD	TBD	5,785	0	0	0	0	5,785
Various (Navwar M&S)	Various	Various	3,575	3,575	3,575	0	0	0	0	3,575
CeCom (DAGR study)	MIPR	Dec 97	273	273	273	0	0	0	0	273
Allan Osborne, Alliant Tech, Rockwell Collins, and Raytheon (DAGR)	PRDA	Jan 01	13,645	13,645	10,622	6,902	10,000	0	Continuing	TBD
Various (GRAM-SAASM)	PRDA	Jul 98	27,469	27,469	26,599	3,895	0	0	0	30,494
Advanced UE Tech Invest	Various	Various	4,646	4,646	4,646	0	0	0	0	4,646
Receiver Technology	Various	Various	N/A	N/A	4,238	1,725	3,800	3,180	Continuing	TBD
Anti-jam Filter Technology	Various	Various	N/A	N/A	600	1,445	4,208	2,688	Continuing	TBD
Advanced Antenna Technology	Various	Various	N/A	N/A	6,737	4,315	11,000	16,000	Continuing	TBD
<u>Support and Management Organizations</u>										
Overlook Sys (OASD/C3I)	C/CPFF	Dec 95	N/A	N/A	22,297	2,239	2,500	0	0	27,036
Aerospace Corp (Technical Supt)	CPFF	Various	N/A	N/A	5,152	683	3,900	4,200	Continuing	TBD
SMC/FMB (Shared Prg Cost)	Various	Various	N/A	N/A	6,509	818	907	964	Continuing	TBD
PRC (Technical Supt)	Time and Materials	Dec 95	714	714	714	0	0	0	0	714
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(U) <u>Performing Organizations Continued:</u>										
<u>Support and Management Organizations</u>										
Miscellaneous (In-house support)	Various	Various	N/A	N/A	5,848	1,937	12,084	12,502	Continuing	TBD
Various (Other Navwar Studies)	Various	Various	2,375	2,375	2,375	5,508	0	0	0	7,883
<u>Test and Evaluation Organizations</u>										
46th TG (SAASM/Test)	Project Order	Various	31,987	31,987	31,987	0	0	0	0	31,987
46th TG (UE develop & product testing)	Project Order	Various	N/A	N/A	8,627	0	6,300	6,400	Continuing	TBD
(U) <u>Government Furnished Property:</u>										
	<u>Contract</u>									
	<u>Method/Type</u>	<u>Award or</u>								
<u>Item</u>	<u>or Funding</u>	<u>Obligation</u>	<u>Delivery</u>		<u>Total Prior</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget to</u>	<u>Total</u>
<u>Description</u>	<u>Vehicle</u>	<u>Date</u>	<u>Date</u>		<u>to FY 2002</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>Complete</u>	<u>Program</u>
<u>Product Development Property</u>										
N/A										
<u>Support and Management Property</u>										
N/A										
<u>Test and Evaluation Property</u>										
N/A										
					<u>Total Prior</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget to</u>	<u>Total</u>
<u>Subtotals</u>					<u>to FY 2002</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>Complete</u>	<u>Program</u>
Subtotal Product Development					222,586	36,637	59,550	76,523	TBD	TBD
Subtotal Support and Management					42,895	11,185	19,391	17,666	TBD	TBD
Subtotal Test and Evaluation					40,614	0	6,300	6,400	TBD	TBD
Total Project					306,095	47,822	85,241	100,589	TBD	TBD
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