

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
----------------------------------------------------------------	------------------------------

BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0305164F Navstar Global Pos Sys (User Eq) (Space)	PROJECT 3028
---------------------------------------------------------------------	--------------------------------------------------------------------------------------------------	-------------------------------

COST (\$ In Thousands)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
3028 Navstar GPS	43,141	36,234	53,963	41,471	14,951	15,517	16,125	16,497	Continuing	Continuing
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, antennae, 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. The three tenets of Navwar are to protect U.S. military and allies' use of GPS, prevent hostile exploitation of GPS, and preserve civil use of GPS outside the area of responsibility (AOR).

(U) FY 1998 (\$ in Thousands):

- (U) \$ 800 Continued aircraft integration development testing
- (U) \$ 935 Continued development and product improvement testing and evaluation
- (U) \$ 5,248 Continued ACTD - Protection
- (U) \$ 3,350 Continued ACTD - Prevention
- (U) \$ 6,956 Continued Navigational Warfare (NAVWAR) Evaluation Team (NET) support
- (U) \$ 1,855 Completed NAVWAR Industry Studies
- (U) \$ 3,210 Continued NAVWAR modeling & simulation efforts
- (U) \$ 5,409 Continued Selective Availability Anti-Spoofing Module (SAASM) development
- (U) \$ 2,700 Continued support contract
- (U) \$ 2,207 Continued in-house support
- (U) \$ 1,025 Continued classified requirement
- (U) \$ 3,299 Continued GPS Modernization studies
- (U) \$ 146 Continued Defense Advanced GPS Receiver (DAGR) study effort
- (U) \$ 6,001 Began GPS Receiver Applications Module (GRAM) SAASM development
- (U) \$43,141 Total

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0305164F Navstar Global Pos Sys (User Eq) (Space)	PROJECT 3028

(U) FY 1999 (\$ in Thousands):

- (U) \$ 731 Continue aircraft integration development testing
- (U) \$ 3,206 Continue development and product improvement testing and evaluation
- (U) \$ 2,108 Continue ACTD - Protection
- (U) \$ 1,800 Continue ACTD - Prevention
- (U) \$ 365 Continue NAVWAR modeling & simulation efforts
- (U) \$ 185 Continue NAVWAR NET support
- (U) \$ 1,762 Continue support contract
- (U) \$ 15,158 Continue GRAM-SAASM development
- (U) \$ 4,350 Continue SAASM development
- (U) \$ 276 Complete DAGR study effort
- (U) \$ 4,315 Begin Advanced User Equipment Technology efforts
- (U) \$ 1,293 Continue in-house support
- (U) \$ 685 Identified as a source for SBIR
- (U) \$ 36,234 Total

DATE
February 1999

BUDGET ACTIVITY
7 - Operational System Development

PE NUMBER AND TITLE
**0305164F Navstar Global Pos Sys (User Eq)
(Space)**

(U) FY 2000 (\$ in Thousands):

- (U) \$ 900 Continue aircraft integration development testing
- (U) \$ 6,200 Continue development and product improvement testing and evaluation
- (U) \$ 4,500 Continue ACTD - Protection
- (U) \$ 300 Continue ACTD - Prevention
- (U) \$ 700 Continue NAVWAR modeling & simulation efforts
- (U) \$ 11,000 Continue classified requirement
- (U) \$ 2,800 Continue SAASM development
- (U) \$ 2,500 Complete GRAM-SAAM development
- (U) \$ 2,029 Continue in-house support
- (U) \$ 1,934 Continue support contract
- (U) \$ 2,900 Continue Signal Structure studies
- (U) \$ 7,500 Continue receiver technology effort
- (U) \$ 4,700 Continue Anti-jam filter technology
- (U) \$ 6,000 Continue Beamsteering Miniaturize Antenna effort
- (U) \$ 53,963 Total

(U) FY 2001 (\$ in Thousands):

- (U) \$ 900 Continue aircraft integration development testing
- (U) \$ 2,300 Continue development and product improvement testing and evaluation
- (U) \$ 5,500 Continue ACTD - Protection
- (U) \$ 200 Continue ACTD - Prevention
- (U) \$ 500 Continue NAVWAR modeling & simulation efforts
- (U) \$ 7,100 Continue SAASM development
- (U) \$ 1,755 Continue in-house support
- (U) \$ 2,116 Continue support contract
- (U) \$ 5,750 Continue receiver technology effort
- (U) \$ 5,250 Continue Beamsteering Miniaturize Antenna effort
- (U) \$ 8,000 Continue classified requirement
- (U) \$ 2,100 Begin technology Insertion

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1999		
BUDGET ACTIVITY 7 - Operational System Development				PE NUMBER AND TITLE 0305164F Navstar Global Pos Sys (User Eq) (Space)				PROJECT 3028		
(U) D. Other Program Funding Summary (\$ in Thousands)										
	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Compl</u>	<u>Total Cost</u>
(U) Operations and Maintenance (PE 0305164F, BA 1 - Operating Forces, SAG 13D)	765	1,948	3,157	2,293	2,223	2,350	6,820	6,821	Cont	Cont
(U) Aircraft Procurement (PE 0305164F, BA 7, Aircraft Support Equipment, BP19, P-74)	42,421	36,005	36,237	55,287	96,878	131,187	134,328	136,835	Cont	Cont
(U) Other Procurement (PE 0305164F, BP 63 - Electronics & Telecommunications Equipment, WSC 6730, P-62)	1,495	1,458	3,774	3,763	4,471	4,300	4,816	4,524	Cont	Cont
(U) OSD RDT&E (ACTD Funding: PE 0603750D)	3,900	300								
<u>Related RDT&E:</u>										
(U) PE 0305165F, NAVSTAR GPS (Space/Grd Segments)										
(U) PE 0604480F, GPS Block IIF										
(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. The Navwar Advanced Concept Technology Demonstration (ACTD) will develop open system like architecture for a GPS receiver based on the GPS Receiver Application Module (GRAM) concept. The GRAM-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.										
Project 3028			Page 5 of 11 Pages				Exhibit R-2 (PE 0305164F)			

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)											DATE February 1999					
BUDGET ACTIVITY 7 - Operational System Development					PE NUMBER AND TITLE 0305164F Navstar Global Pos Sys (User Eq) (Space)							PROJECT 3028				
(U) F. <u>Schedule Profile</u>																
		<u>FY 1998</u>				<u>FY 1999</u>				<u>FY 2000</u>				<u>FY 2001</u>		
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(U) GPS ORD coordination starts				*												
(U) GPS ORD validation						x										
(U) GPS OIPT					*	x		x								
(U) Advance UE Technology (ie Receiver, Antenna, Filter, Prevention efforts					*	x	x	x	x	x	x	x	x	x	x	x
(U) Navwar AOA completion						x										
(U) GPS Program review							x									
(U) GRAM-SAASM study				*												
(U) GRAM-SAASM ICD Complete										x						
(U) GRAM-SAASM preproduction prototypes deliveries							x	x	x							
(U) Technology Insertion													x	x	x	x

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0305164F Navstar Global Pos Sys (User Eq) (Space)	PROJECT 3028

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

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>
(U) Technical Support for Aircraft Integration	800	731	900	900
(U) Development & Product Improvement Testing	935	3,206	6,200	2,300
(U) ACTD - Protection	5,248	2,108	4,500	5,500
(U) ACTD - Prevention	3,350	1,800	300	200
(U) Support Contracts	2,700	1,762	1,934	2,116
(U) In-House Support	2,207	1,293	2,029	1,755
(U) SAASM	5,409	4,350	2,800	7,100
(U) NET	6,956	185	0	0
(U) NAVWAR Industry Studies	1,855	0	0	0
(U) NAVWAR modeling & simulation	3,210	365	700	500
(U) Classified Requirement	1,025	0	11,000	8,000
(U) GPS Modernization/Stewardship	3,299	0	0	0
(U) GRAM-SAASM Development	6,001	15,158	2,500	0
(U) DAGR study effort	146	276	0	0
(U) Advance UE Technology efforts	0	4,315	0	0
(U) Signal Structure studies	0	0	2,900	0
(U) Receiver technology efforts	0	0	7,500	5,750
(U) Anti-jam Filter technology	0	0	4,700	0
(U) Beamsteering Miniaturize Antenna efforts	0	0	6,000	5,250
(U) Technology Insertion	0	0	0	2,100
(U) Identified as a source for SBIR	0	685	0	0
(U) Total	43,141	36,234	53,963	41,471

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE February 1999	
BUDGET ACTIVITY 7 - Operational System Development					PE NUMBER AND TITLE 0305164F Navstar Global Pos Sys (User Eq) (Space)					PROJECT 3028	
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>											
Performing Organizations:											
Contractor or Government Performing Activity Identified as a source for SBIR	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	Budget FY 1998	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
							685				685
<u>Product Development Organizations</u>											
Rockwell (MAGR)	FPIF/FFP/CPAF	Various	19,293	19,293	19,293	0	0	0	0	0	19,293
DOE Sandia (SAASM)	MIPR	Feb 94	13,332	13,332	5,569	2,413	2,750	2,600	0	0	13,332
NAWC (SAASM)	MIPR	Oct 95	760	760	599	0	0	0	0	0	599
Various (SAASM)	Various	Various	Cont	Cont	1,263	2,778	1,600	200	7,100	Cont	Cont
Alliant Techsys Inc (SAASM)	CPFF	Oct 95	4,632	4,632	4,414	218	0	0	0	0	4,632
Multiple (NAVWAR PRDAs)	CPAF	Aug 96	13,440	13,440	11,585	1,855	0	0	0	0	13,440
Holloman AFB (Integration)	Project Order	N/A	Cont	Cont	1,749	800	731	900	900	Cont	Cont
General Dynamics (Various)	Time and Materials	Jan 96	1,810	1,810	1,810	0	0	0	0	0	1,810
Project 3028					Page 8 of 11 Pages				Exhibit R-3 (PE 0305164F)		

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE February 1999	
BUDGET ACTIVITY 7 - Operational System Development					PE NUMBER AND TITLE 0305164F Navstar Global Pos Sys (User Eq) (Space)					PROJECT 3028	
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	Budget FY 1998	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
Various (ACTD Prevention)	Various	Various	9,065	8,565	2,915	3,350	1,800	300	200	0	8,565
Various (ACTD Protection)	Various	Various	19,551	19,551	2,195	5,248	2,108	4,500	5,500	0	19,551
Various (NET)	Various	Various	10,413	10,413	3,272	6,956	185	0	0	0	10,413
Various (Classified Requirement)	Various	Various	26,752	26,752	6,727	1,025	0	11,000	8,000	0	26,752
Various (GPS Modernization)	Various	Various	TBD	TBD	1,779	3,299	0	0	0	TBD	TBD
Various (Navwar M&S)	Various	Various	4,775	4,775	0	3,210	365	700	500	0	4,775
CeCom (DAGR study)	MIPR	Dec 97	422	422	0	146	276	0	0	0	422
Various (GRAASM)	PRDA	Jul 98	23,659	23,659	0	6,001	15,158	2,500	0	0	23,659
<u>Support and Management Organizations</u>											
Overlook Sys (DUSD/Space)	C/CPFF	Dec 95	Cont	Cont	12,566	2,700	1,762	1,934	2,116	Cont	Cont
Aerospace Corp (Technical Supt)	CPFF	Various	928	928	860	68	0	0	0	0	928
SMC/FMB (Shared Prg Cost)	Various	Various	Cont	Cont	3,997	587	750	750	750	Cont	Cont

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE February 1999	
BUDGET ACTIVITY 7 - Operational System Development					PE NUMBER AND TITLE 0305164F Navstar Global Pos Sys (User Eq) (Space)					PROJECT 3028	
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	Budget FY 1998	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
PRC (Technical Supt)	Time and Materials	Dec 95	714	714	714	0	0	0	0	0	714
Miscellaneous (In-house support)	Various	Various	Cont	Cont	1,473	1,552	543	1,279	1,005	Cont	Cont
Advanced UE Tech Invest (Tech Supt)	Various	Various	4,315	4,315	0	0	4,315	0	0	0	4,315
Signal Structure studies(Tech Spt)	Various	Various	2,900	2,900	0	0	0	2,900	0	0	2,900
Receiver Tech (Tech Spt)	Various	Various	Cont	Cont	0	0	0	7,500	5,750	Cont	Cont
Anti-jam Filter Tech (Tech Spt)	Various	Various	4,700	4,700	0	0	0	4,700	0	0	4,700
Beamsteering Miniaturize Antenna (Tech Spt)	Various	Various	Cont	Cont	0	0	0	6,000	5,250	Cont	Cont
Technology Insertion (Tech Spt)	Various	Various	Cont	Cont	0	0	0	0	2,100	Cont	Cont
Various (Other Navwar Studies)	Various	Various	2,375	2,375	2,375	0	0	0	0	0	2,375
<u>Test and Evaluation Organizations</u>											
46th TG (SAASM/Test)	Project Order	Various	31,987	31,987	31,987	0	0	0	0	0	31,987

Project 3028

Page 10 of 11 Pages

Exhibit R-3 (PE 0305164F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE February 1999	
BUDGET ACTIVITY					PE NUMBER AND TITLE					PROJECT	
7 - Operational System Development					0305164F Navstar Global Pos Sys (User Eq)					3028	
(Space)											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	Budget FY 1998	Budget FY 1999	Budget FY 2000	Budget FY 2001	Budget to Complete	Total Program
46th TG (UE develop & product testing)	Project Order	Various	Cont	Cont	534	935	3,206	6,200	2,300	Cont	Cont
Government Furnished Property:											
(U) Not Applicable.											
Identified as a source for SBIR							685				685
Subtotal Product Development					63,170	37,299	24,973	22,700	22,200	Cont	Cont
Subtotal Support & Management					21,985	4,907	7,370	25,063	16,971	Cont	Cont
Subtotal Test and Evaluation					32,521	935	3,206	6,200	2,300	Cont	Cont
Total Project					117,676	43,141	36,234	53,963	41,471	Cont	Cont

THIS PAGE INTENTIONALLY LEFT BLANK