

UNCLASSIFIED

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

DATE

February 2003

BUDGET ACTIVITY

07 - Operational System Development

PE NUMBER AND TITLE

0303601F MILSATCOM Terminals

PROJECT

2487

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
2487 MILSATCOM Terminals	38,751	71,293	173,831	241,906	238,037	174,566	218,886	229,486	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	0

(U) **A. Mission Description**

The MILSATCOM Terminals program develops equipment enabling users to communicate via Milstar, Advanced Extremely High Frequency (AEHF), Ultra High Frequency (UHF), Wideband Gapfiller Satellite (WGS), Defense Satellite Communication System (DSCS), and other military satellites, as well as commercial satellites, to support tactical Air and Space Expeditionary Force (AEF) requirements and maintain essential connectivity for strategic forces. Program RDT&E currently supports the following efforts:

- 1) Concept development work to identify commercial/military technology solutions to improve MILSATCOM terminal capabilities for the warfighters. Focus includes increasing throughput, facilitating sustainability, reducing footprint on user platform and supporting network centrality.
- 2) Ground Multi-band Terminal (GMT) development. In addition to supporting the Air and Space Expeditionary Force (AEF) requirement for increased information, GMT will replace Air Force Ground Mobile Force (GMF) terminals with higher-capacity military communications to provide tactical ground forces with connectivity via the X- and Ka-band WGS, X-band DSCS, and commercial C- and Ku-band satellites to significantly increase throughput for inter- and intra-theater tactical force information such as air tasking orders, battle damage assessments, and reconnaissance data.
- 3) Family of Advanced Beyond-Line-of-Sight Terminals (FAB-T) development. FAB-T will develop robust, secure, survivable EHF voice and data satellite communications terminals for nuclear and conventional forces. FAB-T variants will provide ground and airborne command posts and other aircraft with connectivity to Milstar and AEHF satellites, while providing an open architecture terminal to support future increments for WGS, EHF payloads on polar and UHF Follow-on (UFO) satellites, Global Broadcast Service payloads and Transformational Communications satellites.
- 4) High Data Rate (HDR) Radio Frequency (RF) Terminals. Develops High Data Rate (HDR) RF terminals to operate with increased RF capacity on Wideband Gapfiller System (WGS) and Advanced Wideband System (AWS) satellite providing 2-way Ka-band satellite communications for High Altitude Endurance (HAE) aircraft and to support the Distributed Common Ground System (DCGS) receipt of data rates up to 274 Mbps to satisfy Intelligence, Surveillance, and Reconnaissance (ISR) requirements.
- 5) Lasercom Development. Develops a laser communications terminal to support Beyond Line-of-Sight (BLOS) and Line-of-Sight (LOS) communications for High Altitude Endurance (HAE) Intelligence, Surveillance and Reconnaissance (ISR) aircraft (Global Hawk & U-2) and command and control aircraft (MC2A); supports transformational communications initiatives which require laser transmission of sensor data at rates above 1 Gbps over Transformational Communications satellites.
- 6) Joint Terminal Engineering Office (JTEO) provides tri-service coordination of terminal development, acquisition and fielding activities.
- 7) Wideband Antenna development. Provides a multi-beam, multi-band phased array antenna enabling simultaneous connectivity to more than one satellite for aircraft.

Project 2487

Page 1 of 7 Pages

Exhibit R-2 (PE 0303601F)

1565

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 2003
BUDGET ACTIVITY 07 - Operational System Development	PE NUMBER AND TITLE 0303601F MILSATCOM Terminals	PROJECT 2487

(U) **A. Mission Description Continued**
Addresses limited aircraft external surface area, historically high antenna integration costs, and aerodynamic and low observability restrictions. Eliminates the need to develop separate solutions for each platform to meet unique power and data rate requirements and provides advancements to avoid jamming.

(U) **FY 2002 (\$ in Thousands)**

(U) \$0	Accomplishments/Planned Program
(U) \$3,449	Continued concept/prototype demo/MILSATCOM Terminals roadmap/SATCOM testing
(U) \$24,799	Continued Ground Multi-band Terminal (GMT) development
(U) \$10,503	Began Family of Advanced Beyond-line-of-sight Terminals (FAB-T) development.
(U) \$38,751	Total

(U) **FY 2003 (\$ in Thousands)**

(U) \$0	Accomplishments/Planned Program
(U) \$1,047	Continue concept/prototype demo/MILSATCOM Terminals roadmap/SATCOM testing
(U) \$52,318	Continue Family of Advanced Beyond-line-of-sight Terminals (FAB-T) development
(U) \$3,628	Continue Ground Multi-band Terminal (GMT) development
(U) \$5,550	Begin JSTARS development to assume Airborne Battlefield Command and Control Center (ABCCC) role
(U) \$5,100	Begin initial development of High Data Rate (HDR) RF Terminals
(U) \$3,650	Begin initial development for Lasercom Terminals
(U) \$71,293	Total

(U) **FY 2004 (\$ in Thousands)**

(U) \$0	Accomplishments/Planned Program
(U) \$3,307	Continue concept/prototype demo/MILSATCOM Terminals roadmap/SATCOM testing
(U) \$96,596	Continue Family of Advanced Beyond-Line-of-Sight Terminals (FAB-T) development
(U) \$7,077	Continue Ground Multi-band Terminal (GMT) development
(U) \$31,940	Continue High Data Rate (HDR) RF Terminals development
(U) \$7,322	Continue Joint Terminal Engineering Office (JTEO) Support (Funding transferred from PEs 0603430F and 0603854F)
(U) \$14,401	Continue Lasercom Terminals development.
(U) \$13,188	Initiate Wideband Antenna Development.
(U) \$173,831	Total

Project 2487
Page 2 of 7 Pages
Exhibit R-2 (PE 0303601F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE February 2003																																																								
BUDGET ACTIVITY 07 - Operational System Development				PE NUMBER AND TITLE 0303601F MILSATCOM Terminals			PROJECT 2487																																																								
<p>(U) <u>B. Budget Activity Justification</u> This effort is funded in Budget Activity 7, Operational System Development, because some of its programs have completed Milestone C reviews and are in production.</p>																																																															
<p>(U) <u>C. Program Change Summary (\$ in Thousands)</u></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: right;"><u>FY 2002</u></th> <th style="text-align: right;"><u>FY 2003</u></th> <th style="text-align: right;"><u>FY 2004</u></th> <th style="text-align: right;"><u>Total Cost</u></th> </tr> </thead> <tbody> <tr> <td>(U) Previous President's Budget</td> <td style="text-align: right;">40,431</td> <td style="text-align: right;">72,712</td> <td style="text-align: right;">125,932</td> <td style="text-align: right;">TBD</td> </tr> <tr> <td>(U) Appropriated Value</td> <td style="text-align: right;">41,763</td> <td style="text-align: right;">72,712</td> <td></td> <td></td> </tr> <tr> <td>(U) Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> a. Congressional/General Reductions</td> <td style="text-align: right;">-1,332</td> <td style="text-align: right;">-994</td> <td></td> <td></td> </tr> <tr> <td> b. Small Business Innovative Research</td> <td style="text-align: right;">-1,591</td> <td></td> <td></td> <td></td> </tr> <tr> <td> c. Omnibus or Other Above Threshold Reprogram</td> <td></td> <td style="text-align: right;">-425</td> <td></td> <td></td> </tr> <tr> <td> d. Below Threshold Reprogram</td> <td style="text-align: right;">100</td> <td></td> <td></td> <td></td> </tr> <tr> <td> e. Rescissions</td> <td style="text-align: right;">-189</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(U) Adjustments to Budget Years Since FY 2003 PBR</td> <td></td> <td></td> <td style="text-align: right;">47,899</td> <td></td> </tr> <tr> <td>(U) Current Budget Submit/FY 2004 PBR</td> <td style="text-align: right;">38,751</td> <td style="text-align: right;">71,293</td> <td style="text-align: right;">173,831</td> <td style="text-align: right;">TBD</td> </tr> </tbody> </table> <p>(U) <u>Significant Program Changes:</u> Increased FY04 funds are for High Data Rate (HDR) Radio Frequency (RF) Terminals development; Lasercom Terminals development; Wideband Antenna Development and incorporation of Joint Terminal Engineering Office support from PEs 0603430F and 0603854F into this PE.</p>										<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>Total Cost</u>	(U) Previous President's Budget	40,431	72,712	125,932	TBD	(U) Appropriated Value	41,763	72,712			(U) Adjustments to Appropriated Value					a. Congressional/General Reductions	-1,332	-994			b. Small Business Innovative Research	-1,591				c. Omnibus or Other Above Threshold Reprogram		-425			d. Below Threshold Reprogram	100				e. Rescissions	-189				(U) Adjustments to Budget Years Since FY 2003 PBR			47,899		(U) Current Budget Submit/FY 2004 PBR	38,751	71,293	173,831	TBD
	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>Total Cost</u>																																																											
(U) Previous President's Budget	40,431	72,712	125,932	TBD																																																											
(U) Appropriated Value	41,763	72,712																																																													
(U) Adjustments to Appropriated Value																																																															
a. Congressional/General Reductions	-1,332	-994																																																													
b. Small Business Innovative Research	-1,591																																																														
c. Omnibus or Other Above Threshold Reprogram		-425																																																													
d. Below Threshold Reprogram	100																																																														
e. Rescissions	-189																																																														
(U) Adjustments to Budget Years Since FY 2003 PBR			47,899																																																												
(U) Current Budget Submit/FY 2004 PBR	38,751	71,293	173,831	TBD																																																											
<p>(U) <u>D. Other Program Funding Summary (\$ in Thousands)</u></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: right;"><u>FY 2002</u></th> <th style="text-align: right;"><u>FY 2003</u></th> <th style="text-align: right;"><u>FY 2004</u></th> <th style="text-align: right;"><u>FY 2005</u></th> <th style="text-align: right;"><u>FY 2006</u></th> <th style="text-align: right;"><u>FY 2007</u></th> <th style="text-align: right;"><u>FY 2008</u></th> <th style="text-align: right;"><u>FY 2009</u></th> <th style="text-align: right;"><u>Cost to</u></th> <th style="text-align: right;"><u>Total Cost</u></th> </tr> <tr> <th></th> <th style="text-align: right;"><u>Actual</u></th> <th style="text-align: right;"><u>Estimate</u></th> <th style="text-align: right;"><u>Estimate</u></th> <th style="text-align: right;"><u>Estimate</u></th> <th style="text-align: right;"><u>Estimate</u></th> <th style="text-align: right;"><u>Estimate</u></th> <th style="text-align: right;"><u>Estimate</u></th> <th style="text-align: right;"><u>Estimate</u></th> <th style="text-align: right;"><u>Complete</u></th> <th></th> </tr> </thead> <tbody> <tr> <td>(U) Aircraft Procurement, Air Force, BPAC 119992 (Budget Activity 5, P-27 and P-61, PE 0303601F only) (1)</td> <td style="text-align: right;">32,902</td> <td style="text-align: right;">33,356</td> <td style="text-align: right;">36,145</td> <td style="text-align: right;">21,120</td> <td style="text-align: right;">14,785</td> <td style="text-align: right;">129,791</td> <td style="text-align: right;">152,914</td> <td style="text-align: right;">195,123</td> <td style="text-align: right;">Continuing</td> <td style="text-align: right;">TBD</td> </tr> <tr> <td>(U) Other Procurement, Air Force, 'MILSATCOM Space', BPAC 836780 (Budget Activity 3, P-66, PE</td> <td style="text-align: right;">15,221</td> <td style="text-align: right;">13</td> <td style="text-align: right;">18,482</td> <td style="text-align: right;">127,749</td> <td style="text-align: right;">107,732</td> <td style="text-align: right;">88,175</td> <td style="text-align: right;">83,925</td> <td style="text-align: right;">102,174</td> <td style="text-align: right;">Continuing</td> <td style="text-align: right;">TBD</td> </tr> </tbody> </table>										<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) Aircraft Procurement, Air Force, BPAC 119992 (Budget Activity 5, P-27 and P-61, PE 0303601F only) (1)	32,902	33,356	36,145	21,120	14,785	129,791	152,914	195,123	Continuing	TBD	(U) Other Procurement, Air Force, 'MILSATCOM Space', BPAC 836780 (Budget Activity 3, P-66, PE	15,221	13	18,482	127,749	107,732	88,175	83,925	102,174	Continuing	TBD											
	<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) Aircraft Procurement, Air Force, BPAC 119992 (Budget Activity 5, P-27 and P-61, PE 0303601F only) (1)	32,902	33,356	36,145	21,120	14,785	129,791	152,914	195,123	Continuing	TBD																																																					
(U) Other Procurement, Air Force, 'MILSATCOM Space', BPAC 836780 (Budget Activity 3, P-66, PE	15,221	13	18,482	127,749	107,732	88,175	83,925	102,174	Continuing	TBD																																																					
Project 2487			Page 3 of 7 Pages			Exhibit R-2 (PE 0303601F)																																																									

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE February 2003		
BUDGET ACTIVITY 07 - Operational System Development					PE NUMBER AND TITLE 0303601F MILSATCOM Terminals			PROJECT 2487	

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

	<u>FY 2002</u> <u>Actual</u>	<u>FY 2003</u> <u>Estimate</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>								
0303601F only)																		
(1) Spares included																		
<p>NOTE: Related RDT&E costs for MILSATCOM satellite systems to which terminal development is linked can be found RDT&E Budget Item Justification Sheets for the following Program Elements (PEs):</p> <ul style="list-style-type: none"> PE 0303110F Defense Satellite Communications System PE 0603430F Advanced EHF PE 0603845F Advanced Wideband System (AWS) PE 0603432F Polar MILSATCOM (Space) PE 0603854F Wideband Gapfiller Satellite (Space) PE 0604479F Milstar LDR/MDR Satellite Communications PE 0604240F B-2 RDT&E PE 0101113F B-52 RDT&E PE 0305207F RC-135 RDT&E PE 0207581F Joint STARS RDT&E 																		
<p>(U) <u>E. Acquisition Strategy</u></p> <p>The FAB-T contract initiates development of a family of common MILSATCOM terminals to work with next generation space segments including Advanced EHF (AEHF), Wideband Gapfiller Satellite (WGS), and Advanced Polar. In FY03 AF initiates development of High Data Rate (HDR) RF terminals and Lasercom Terminals to operate with Wideband Gapfiller Satellite (WGS) and Transformational Communications satellites. In FY04 AF initiates the development of the Wideband Antenna Program.</p>																		
<p>(U) <u>F. Schedule Profile</u></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%; text-align: center;"><u>FY 2002</u></th> <th style="width: 25%; text-align: center;"><u>FY 2003</u></th> <th style="width: 25%; text-align: center;"><u>FY 2004</u></th> </tr> </thead> <tbody> <tr> <td style="height: 100px;"></td> <td></td><td></td><td></td> </tr> </tbody> </table>												<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>				
	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>															

Project 2487
Page 4 of 7 Pages
Exhibit R-2 (PE 0303601F)

UNCLASSIFIED

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

DATE

February 2003

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

07 - Operational System Development

0303601F MILSATCOM Terminals

2487

(U) F. Schedule Profile Continued

	<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) FAB-T Development (Contract Award)				*										
(U) JSTARS development of ABCCC communications capability						X								
(U) Begin initial development of HDR RF Terminals						X								
(U) Begin initial development of Lasercom Terminals						X								
(U) Dual Contract Award for early prototyping for Lasercom terminal									X					
(U) Wideband Antenna Development										X				
* Completed event														
X Planned event														

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)							DATE February 2003			
BUDGET ACTIVITY					PE NUMBER AND TITLE			PROJECT		
07 - Operational System Development					0303601F MILSATCOM Terminals			2487		
(U) <u>A. Project Cost Breakdown (\$ in Thousands)</u>										
						<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>		
(U)	Concept/Prototype Demo/SATCOM testing					3,449	1,047	3,307		
(U)	Ground Multi-band Terminal (GMT)					24,799	3,628	7,077		
(U)	Family of Advanced Beyond-Line-of-Sight Terminals (FAB-T) development					10,503	52,318	96,596		
(U)	Development of ABCCC communication capability for Joint Stars					0	5,550	0		
(U)	High Data Rate (HDR) RF Terminal					0	5,100	31,940		
(U)	Lasercom Terminals					0	3,650	14,401		
(U)	Joint Terminal Engineering Office (JTEO) prior to FY04 funding resided in PEs 0603430F & 0603854F							7,322		
(U)	Wideband Antenna Program					0	0	13,188		
(U)	Total					38,751	71,293	173,831		
(U) <u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>										
(U) <u>Performing Organizations:</u>										
<u>Contractor or Government</u>	<u>Contract Method/Type</u>	<u>Award or Obligation</u>	<u>Performing Activity</u>	<u>Project Office</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>Performing Activity</u>	<u>Vehicle</u>	<u>Date</u>	<u>EAC</u>	<u>EAC</u>						
<u>Product Development Organizations</u>										
Raytheon	FPIF/FFP	Jun 85	888,552	888,552	888,552	0	0	0	0	888,552
Rockwell	CPIF	Aug 93	43,068	43,068	43,068	0	0	0	0	43,068
ViaSat	C/FFP	Oct 95	3,076	3,076	3,076	0	0	0	0	3,076
Harris	CPAF	Jun 01	38,100	38,100	5,600	22,446	2,650	5,500	Continuing	TBD
Boeing Corp	CPAF	Sep 02	266,842	266,842	0	3,670	45,307	89,233	Continuing	TBD
Miscellaneous	Various	Various	N/A	N/A	652,799	102	0	0	0	652,901
ESC/JS	AF-616	N/A	N/A	N/A	0	0	5,550	0	0	5,550
Harris - Assoc.Contract Agreement for HDR/RF Terminal Study	ACA		750	750	0	0	750	0	0	750
Project 2487					Page 6 of 7 Pages			Exhibit R-3 (PE 0303601F)		

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)								DATE February 2003			
BUDGET ACTIVITY				PE NUMBER AND TITLE					PROJECT		
07 - Operational System Development				0303601F MILSATCOM Terminals					2487		
(U) <u>Performing Organizations Continued:</u>											
<u>Product Development Organizations</u>											
Boeing - Assoc. Contract		ACA	750	750	0	0	750	0	0	750	
Agreement for HDR RF Terminal Study											
TBD (High Data Rate (HDR) RF terminals)		TBD	TBD	N/A	0	0	0	23,128	Continuing	TBD	
TBD (Lasercom Terminals)		TBD	TBD	N/A	0	0	0	8,714	Continuing	TBD	
TBD (Wideband Antenna Program)		TBD	TBD	N/A	0	0	0	9,814	Continuing	TBD	
TBD (MUOS)		TBD	TBD	N/A	0	0	0	0	69,850	69,850	
<u>Support and Management Organizations</u>											
MITRE		CPAF	Various	N/A	N/A	110,934	10,043	11,160	17,231	Continuing	TBD
Support Contractors - System Engineering & Technical Assistance		Various	Various	N/A	N/A	161,144	1,590	2,872	12,915	Continuing	TBD
Tecolote (Starting in FY04 these costs will be included in Support Contractor line above)		Various	Various	N/A	N/A	3,013	0	325	0	Continuing	TBD
Miscellaneous		Various	Various	N/A	N/A	20,575	500	1,629	6,996	Continuing	TBD
<u>Test and Evaluation Organizations</u>											
AF Research Lab		AF-616	N/A	N/A	N/A	24,603	0	0	0	Continuing	TBD
Miscellaneous		Various	N/A	N/A	N/A	5,507	400	300	300	Continuing	TBD
						<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>Subtotals</u>											
Subtotal Product Development						1,593,095	26,218	55,007	136,389	TBD	TBD
Subtotal Support and Management						295,666	12,133	15,986	37,142	TBD	TBD
Subtotal Test and Evaluation						30,110	400	300	300	TBD	TBD
Total Project						1,918,871	38,751	71,293	173,831	TBD	TBD
Project 2487				Page 7 of 7 Pages				Exhibit R-3 (PE 0303601F)			

Project 2487

Page 7 of 7 Pages

Exhibit R-3 (PE 0303601F)