PE NUMBER: 0603845F
PE TITLE: Transformational SATCOM (TSAT)

Exhibit R-2, RDT&E Budget Item Justification	DATE February 2006
BUDGET ACTIVITY 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE 0603845F Transformational SATCOM (TSAT)

	Cost ($ in Millions)	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
	Total Program Element (PE) Cost	443.960	429.244	867.102	1,536.032	2,051.074	2,308.315	2,588.254	Continuing	TBD
4944	ADVANCED WIDEBAND SYSTEM	443.960	429.244	867.102	1,536.032	2,051.074	2,308.315	2,588.254	Continuing	TBD

(U) A. Mission Description and Budget Item Justification

The Transformational Satellite Communications (TSAT) System will provide DoD with high data rate Military Satellite Communications (MILSATCOM) and Internet-like services as defined in the Transformational Communications Architecture (TCA). TSAT is essential to global net-centric operations. As the spaceborne element of the Global Information Grid (GIG), it will extend the GIG to users without terrestrial connections providing improved connectivity and data transfer capability, vastly improving satellite communications for the warfighter. The TSAT's Internet Protocol (IP) routing will connect thousands of users through networks rather than limited point-to-point connections. Additionally, TSAT will enable high data rate connections to Space and Airborne Intelligence, Surveillance, and Reconnaissance (SISR, AISR) platforms.

The TSAT program consists of a five satellite constellation (a sixth satellite will be procured to ensure mission availability), TSAT satellite operations centers (TSOC) for on-orbit control, TSAT Mission Operations Systems (TMOS) to provide network management, and ground gateways. The TMOS single contract was awarded in January 2006. In FY07 the TMOS contractor will refine TSAT network requirements in support of the TSAT System Design Review and in support of the release of the TSAT space segment Request For Proposal, refine and coordinate a Network Architecture for the entire TSAT program, support development of the TSAT inter-segment Interface Control Documents, develop/coordinate the TSAT Network Integration and Test Plans, and develop TMOS Segment Design Description and Segment/Element Specification.

TSAT will incorporate radio frequency (RF) and laser communications links to meet defense and intelligence community requirements for high data rate, protected communications. The space segment will make use of key technology advancements that have proven mature by independent testing of integrated subsystem brass boards to achieve a transformational leap in SATCOM capabilities. These technologies include but are not limited to: single and multi-access laser communications (to include wide field-of-view technology), Internet protocol based packet switching, bulk and packet encryption/decryption, communications-on-the-move antennas, dynamic bandwidth and resource allocation techniques, and protected bandwidth efficient modulation. Technology maturation activities are on schedule with the prime contractors and numerous directed technology development contractors. FY06/FY07 will verify competing contractor approach readiness with subsystem hardware testing in an independent Government testing facility at Massachusetts Institute of Technology's Lincoln Laboratory to ensure that technologies are mature. This level of independent verification testing and applied design reviews (System Design Review level, 3QFY07) will all be accomplished before the selection of the single space segment contractor which lowers program risk going forward. The space segment contract will be awarded in 1QFY08. First launch is 4QFY14.

Fully successful Interim Space Segment Design Reviews were held in June 2005 and key testing was accomplished in August 2005 (Optical Standards Validation Suite testing and Laser comm interoperability testing). As a result of key risk reduction activities, the Technology Readiness Level (TRL) for three of the six key technologies were taken to TRL-6.

Exhibit R-2, RDT&E Budget Item Justification	DATE February 2006
BUDGET ACTIVITY 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE 0603845F Transformational SATCOM (TSAT)

In an effort to reduce overall program risk, the Department of Defense restructured the TSAT program to a block delivery approach. This strategy reduces risk in the product development phase by implementing a more incremental fielding approach that reduces the complexity/capacity of the two driving technologies (i.e., lasercom and next-generation processor router) on the first two satellites (Block 1). Capacities for the remaining three satellites (Block 2) are higher, resulting in a constellation that meets all Key Performance Parameter requirements. Additionally, the Department of Defense is funding TSAT at an 80/20% cost confidence level vice prior 50/50% cost confidence level.

Funds are in Budget Activity 4, Advanced Component Development and Prototypes, since it funds TSAT technology development and engineering design activities including risk reduction and system definition.

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

		FY 2005	FY 2006	FY 2007
(U)	Previous President's Budget	467.163	835.769	1,068.213
(U)	Current PBR/President's Budget	443.960	429.244	867.102
(U)	Total Adjustments	-23.203	-406.525	
(U)	Congressional Program Reductions	-0.361	-400.302	
	Congressional Rescissions		-6.223	
	Congressional Increases			
	Reprogrammings	-10.000		
	SBIR/STTR Transfer	-12.842		

(U) Significant Program Changes:

Due to the FY06 reduction and risk concerns, the program was restructured to a block approach and funding reduced resulting in a first launch delay from 2QFY13 to 4QFY14.

Exhibit R-2a, RDT&E Project Justification			DATE: February 2006
BUDGET ACTIVITY: 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE: 0603845F Transformational SATCOM (TSAT)	PROJECT NUMBER AND TITLE: 4944 ADVANCED WIDEBAND SYSTEM	

Cost ($ in Millions)		FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
4944	ADVANCED WIDEBAND SYSTEM	443.960	429.244	867.102	1,536.032	2,051.074	2,308.315	2,588.254	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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In an effort to reduce overall program risk, the Department of Defense restructured the TSAT program to a block delivery approach. This strategy reduces risk in the

Exhibit R-2a, RDT&E Project Justification		DATE February 2006
BUDGET ACTIVITY 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE 0603845F Transformational SATCOM (TSAT)	PROJECT NUMBER AND TITLE 4944 ADVANCED WIDEBAND SYSTEM

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Funds are in Budget Activity 4, Advanced Component Development and Prototypes, since it funds TSAT technology development and engineering design activities including risk reduction and system definition.

(U)	**B. Accomplishments/Planned Program ($ in Millions)**	FY 2005	FY 2006	FY 2007
(U)	Continue System Definition and technology development for key areas to include laser communications (including enhanced wide field-of-view multi access laser comm), antenna design, encryption technologies, dynamic bandwidth and resource allocation, bandwidth efficient modulation, network operations, and networking protocols.	97.006	91.579	153.295
(U)	Provide Technical Support	34.485	33.430	37.600
(U)	Provide Program Support	5.947	6.668	9.904
(U)	Initiated engineering design activities including risk reduction and system definition for the first TSAT satellite.	238.872		
(U)	Continue engineering design activities including risk reduction, and complete system design review for the first TSAT satellite.		198.044	459.811
(U)	Continue TSAT Mission Operations System ground segment and network management/operations management software.	33.275	68.615	154.473
(U)	Continue systems engineering and integration support	34.375	30.908	52.019
(U)	Total Cost	443.960	429.244	867.102

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

		FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total Cost
(U)	RDT&E, AF									
(U)	PE 0603854F, Project 644870, CCS-C, R-52	22.550	3.627	6.659	5.186	5.728	5.809	6.286	Continuing	TBD
(U)	PE 0603854F, Project 644811, WGS, R-52	31.863	88.660	31.013						314.976
(U)	Other APPN									
(U)	MPAF, PE 0303600F, WGS, P-19,20	35.370	72.026	414.351	323.670	22.629	36.222	41.595	Continuing	TBD
(U)	OPAF, PE 0303600F, CCS-C	3.328	0.286							17.137

Exhibit R-2a, RDT&E Project Justification		DATE February 2006
BUDGET ACTIVITY **04 Advanced Component Development and Prototypes (ACD&P)**	PE NUMBER AND TITLE **0603845F Transformational SATCOM (TSAT)**	PROJECT NUMBER AND TITLE **4944 ADVANCED WIDEBAND SYSTEM**

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

(U) OPAF, PE 0303600F, WGS	21.528	7.172					55.448
(U) MILCON, PE 0303602F, TSAT			5.322	50.212	Continuing		TBD

(U) D. Acquisition Strategy

On 20 January 2004, the TSAT program entered Phase B, Risk Reduction and Design Development. Phase B space segment contracts (Cost Plus Fixed Fee) were awarded to Lockheed Martin and Boeing in late January 2004. TMOS Program Research and Development Agreement (PRDA) contracts were awarded to Raytheon, Lockheed Martin, and Northrop Grumman in November 2003. In January 2006, after a full and open competition, a single TSAT Mission Operations System (TMOS) development contract was awarded to Lockheed Martin. In early FY08, after a full and open competition, the final space segment development contractor will be selected.

In an effort to account for risk that is historically encountered in complex development programs, the Department of Defense is funding TSAT at an 80/20% cost confidence level.

Exhibit R-3, RDT&E Project Cost Analysis

DATE: **February 2006**

BUDGET ACTIVITY: **04 Advanced Component Development and Prototypes (ACD&P)**

PE NUMBER AND TITLE: **0603845F Transformational SATCOM (TSAT)**

PROJECT NUMBER AND TITLE: **4944 ADVANCED WIDEBAND SYSTEM**

(U) Cost Categories (Tailor to WBS, or System/Item Requirements) ($ in Millions)	Contract Method & Type	Performing Activity & Location	Total Prior to FY 2005 Cost	FY 2005 Cost	FY 2005 Award Date	FY 2006 Cost	FY 2006 Award Date	FY 2007 Cost	FY 2007 Award Date	Cost to Complete	Total Cost	Target Value of Contract
(U) Product Development												
Architecture Studies	CPAF	Various	14.900								14.900	
Lockheed Martin: Technology Maturation/Risk Reduction & Program System Definition	CPFF	Sunnyvale, CA	42.180	119.436	Oct-04	99.022	Oct-05	229.905	Nov-06		490.543	
Boeing: Technology Maturation/Risk Reduction & Program System Definition	CPFF	El Segundo, CA	42.180	119.436	Oct-04	99.022	Oct-05	229.905	Nov-06		490.543	
Booz Allen Hamilton: System Engineering & Integration	Time & Materials w/ IF	El Segundo, CA	27.405	34.375	Oct-04	30.908	Oct-05	52.019	Nov-06	Continuing	TBD	
TMOS PRDAs	FFP	Various	19.179	33.275	Oct-04	2.700	Dec-05				55.154	
TMOS: Lockheed Martin Integrated Systems and Solutions	CPAF	San Jose, CA				65.915	Jan-06	154.473	Nov-06	Continuing	TBD	
Risk Reduction: Technology Maturation	Various	Various	187.421	97.006	Oct-04	91.579	Nov-05	153.295	Nov-06	Continuing	TBD	
Risk Reduction: Technology Maturation (Space Segment) Lockheed Martin	CPFF	Sunnyvale, CA	27.651								27.651	
Risk Reduction: Technology Maturation (Space Segment) Boeing	CPFF	El Segundo, CA	27.651								27.651	
Subtotal Product Development			388.567	403.528		389.146		819.598		Continuing	TBD	0.000
Remarks:												
(U) Support												
Technical Support	Various		33.985	34.485		33.430	Nov-05	37.600	Nov-06	Continuing	TBD	
Program Support	Various		11.756	5.947		6.668	Nov-05	9.904	Nov-06	Continuing	TBD	
Subtotal Support			45.741	40.432		40.098		47.504		Continuing	TBD	0.000
Remarks:												
(U) Test & Evaluation												
None											0.000	
Subtotal Test & Evaluation			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Remarks:												
(U) Management												
None											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Remarks:												
(U) Total Cost			434.308	443.960		429.244		867.102		Continuing	TBD	0.000

Exhibit R-4, RDT&E Schedule Profile		DATE February 2006
BUDGET ACTIVITY 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE 0603845F Transformational SATCOM (TSAT)	PROJECT NUMBER AND TITLE 4944 ADVANCED WIDEBAND SYSTEM

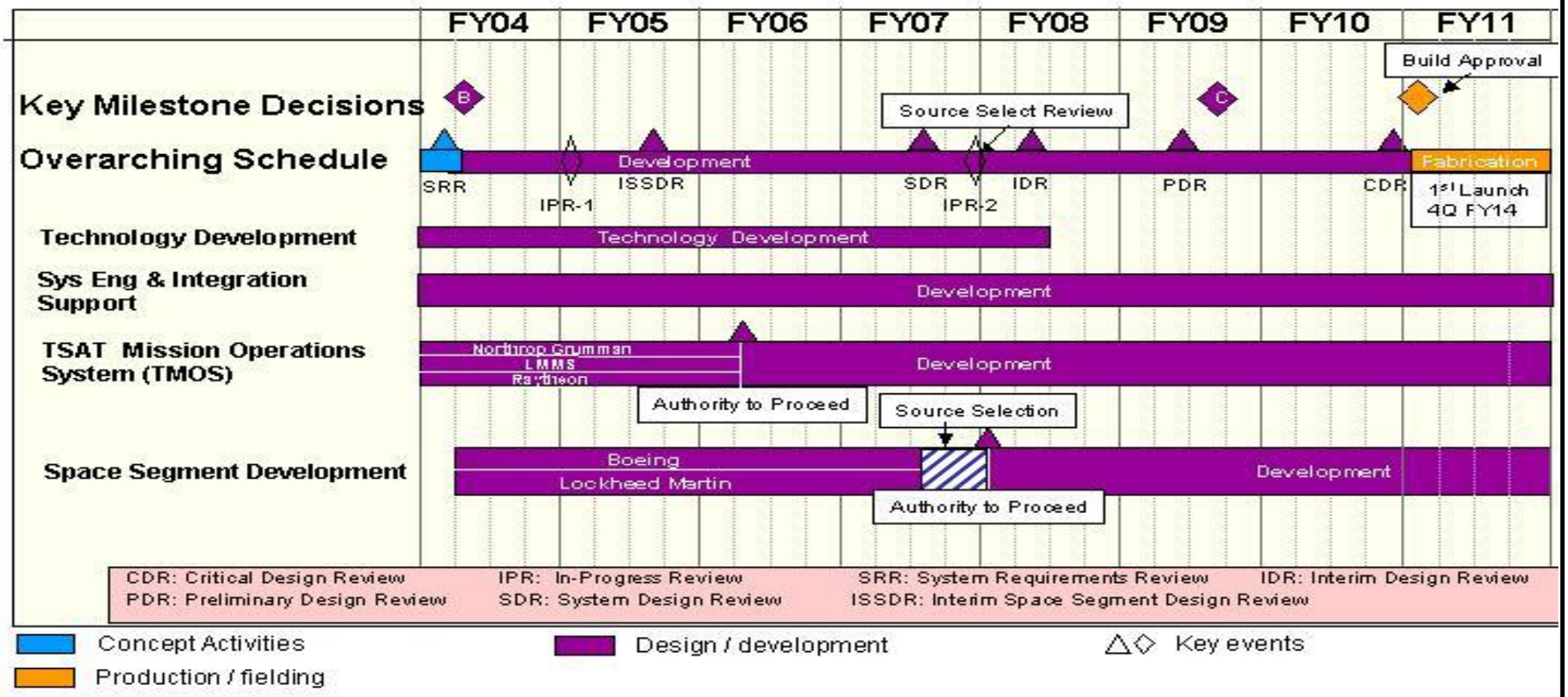

Exhibit R-4a, RDT&E Schedule Detail		DATE February 2006
BUDGET ACTIVITY **04 Advanced Component Development and Prototypes (ACD&P)**	PE NUMBER AND TITLE **0603845F Transformational SATCOM (TSAT)**	PROJECT NUMBER AND TITLE **4944 ADVANCED WIDEBAND SYSTEM**

(U) **Schedule Profile**	FY 2005	FY 2006	FY 2007
(U) Interim Program Review I	1Q		
(U) TMOS Segment Design Development Contract Award		2Q	
(U) Technology Maturation -- Processor Router and Lasercom to Technology Readiness Level 6 (last of key critical technologies)			3Q
(U) System Design Review			3Q
(U) Interim Program Review II			4Q