

UNCLASSIFIED

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

DATE

February 2003

BUDGET ACTIVITY

**04 - Advanced Component Development and Prototypes
(ACD&P)**

PE NUMBER AND TITLE

**0603434F National Polar-Orbiting Operational
Environmental Satellite System (NPOESS)**

PROJECT

4056

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
4056 National Polar-orbiting Operational Env. Sat. Syst.	151,135	232,082	267,716	297,668	236,563	224,503	103,626	85,921	271,450	2,145,146
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	2	2

This table represents only a portion of the Air Force share of the NPOESS program, which is 50/50 funded by the Departments of Defense and Commerce. Total program funding is listed in section D, Other Program Funding Summary.

(U) **A. Mission Description**

Presidential Decision Directive/NSTC-2 (May 1994) directs the Department of Defense (DoD), Department of Commerce (DOC), and the National Aeronautics and Space Administration (NASA) to establish a converged national polar-orbiting weather satellite program. The Air Force (DoD) and NOAA (DOC) fund NPOESS 50/50 (by year) at the total program level. However, apportionment of DoD and DOC funds to specific activities does not have to be 50/50 and is at the program office discretion. The converged program, the National Polar-orbiting Operational Environmental Satellite System (NPOESS), will combine the follow-on to DoD's Defense Meteorological Satellite Program (DMSP) and the DOC's Polar-orbiting Operational Environmental Satellite (POES) program. A tri-agency Integrated Program Office (IPO) was established on 1 Oct 94 to manage the acquisition and operations of the converged system. NPOESS will provide operational military commanders and civilian leaders timely, quality weather and environmental information to effectively employ weapon systems and protect national resources. The converged program will be the nation's primary source of global weather and environmental data for operational military and civil use. It will provide visible and infrared cloud cover imagery and other atmospheric, oceanographic, terrestrial, and space environmental information. NPOESS will require a combination of satellites in sun synchronous 450 nautical miles (nm) polar-orbit at all times (sun synchronous means the satellites cross the equator at the same local sun time on each of their 14 orbits/day). The first two satellites will be incrementally funded with RDT&E funding. The remaining satellites will be fully funded with Missile Procurement funding. NPOESS successfully completed Milestone I on 17 March 1997. On 23 August 2002, NPOESS entered Key Decision Point C/Acquisition and Operations (A&O) phase. In FY03, the design of the Global Positioning System Occultation Sensor (GPSOS) will be funded with NOAA Procurement, Acquisition, and Construction (PAC) funding.

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

- (U) \$0 Accomplishments/Planned Program
- (U) \$907 Continued program office support for Program Definition and Risk Reduction (PDRR) efforts.
- (U) \$40,000 Completed system architecture studies and continue system definition contracts and ground system risk reduction to include competitive contracts between TRW and Lockheed Martin to definitize the NPOESS space and ground segment architectures.
- (U) \$104,728 Continued critical Visible Infrared Imager Radiometer Suite (VIIRS), Conical-scanning Microwave Imager Sounder (CMIS), Cross-track

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Exhibit R-2 (PE 0603434F)

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BUDGET ACTIVITY 04 - Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE 0603434F National Polar-Orbiting Operational Environmental Satellite System (NPOESS)		PROJECT 4056																									
<p>(U) <u>A. Mission Description Continued</u></p> <p>(U) <u>FY 2002 (\$ in Thousands) Continued</u></p> <div style="margin-left: 40px;"> Infrared Sounder (CrIS), Ozone Mapping and Profile Suite (OMPS), and GPS Occultation Sensor (GPSOS) and associated algorithm development efforts and sensor design and fabrication for risk reduction missions and then transition them to the Shared System Performance Responsibility (SSPR) contract to continue A&O (which includes production). </div> <p>(U) \$5,500 Initiated System A&O effort including ground and space system development, design and fabrication for risk reduction missions.</p> <p>(U) \$151,135 Total</p> <p>(U) <u>FY 2003 (\$ in Thousands)</u></p> <p>(U) \$0 Accomplishments/Planned Program</p> <p>(U) \$925 Continue DoD funded program office support for Acquisition and Operations (A&O) efforts.</p> <p>(U) \$231,157 Continue System A&O effort including ground and space system development, design and fabrication for risk reduction missions.</p> <p>(U) \$232,082 Total</p> <p>(U) <u>FY 2004 (\$ in Thousands)</u></p> <p>(U) \$0 Accomplishments/Planned Program</p> <p>(U) \$944 Continue DoD funded program office support for A&O efforts.</p> <p>(U) \$266,772 Continue System A&O effort including ground and space system development, design and fabrication for risk reduction missions.</p> <p>(U) \$267,716 Total</p> <p>(U) <u>B. Budget Activity Justification</u></p> <p>Currently, this PE is in Budget Activity 4 (Advance Component Development and Prototypes) because it supported sensor and satellite bus development. In Aug 02, the NPOESS program was approved to enter KDP-C A&O phase at the Defense Space Acquisition Board (DSAB). KDP-C is equivalent to a DoD 5000 milestone B. As a result, the BA is in the process of being changed to BA05.</p> <p>(U) <u>C. Program Change Summary (\$ in Thousands)</u></p> <table style="width: 100%; margin-left: 40px;"> <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;">155,834</td> <td style="text-align: right;">237,199</td> <td style="text-align: right;">306,532</td> <td style="text-align: right;">1,925,328</td> </tr> <tr> <td>(U) Appropriated Value</td> <td style="text-align: right;">157,394</td> <td style="text-align: right;">237,199</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 style="padding-left: 20px;">a. Congressional/General Reductions</td> <td style="text-align: right;">-2,301</td> <td style="text-align: right;">-2,508</td> <td></td> <td style="text-align: right;">-4,068</td> </tr> </tbody> </table>					<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>Total Cost</u>	(U) Previous President's Budget	155,834	237,199	306,532	1,925,328	(U) Appropriated Value	157,394	237,199			(U) Adjustments to Appropriated Value					a. Congressional/General Reductions	-2,301	-2,508		-4,068
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(U) C. Program Change Summary (\$ in Thousands) Continued

	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>Total Cost</u>
b. Small Business Innovative Research	-9,458			-9,458
c. Omnibus or Other Above Threshold Reprogram		-2,609		-2,609
d. Below Threshold Reprogram	5,500			5,500
e. Rescissions				-741
(U) Adjustments to Budget Years Since FY 2003 PBR			-38,816	228,585
(U) Current Budget Submit/FY 2004 PBR	151,135	232,082	267,716	2,145,146

(U) Significant Program Changes:

Adjustments are due to 6 month delay in A&O contract downselect, addition of Aerosol sensor, improved estimate of software development costs, and program restructure to delay delivery of the first NPOESS satellite.

(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) Related NOAA PAC Funding: Polar Convergence*	157,400	237,250	276,700	317,246	358,185	318,649	249,856	237,400	909,011	3,334,133
(U) Total NPOESS Air Force	151,135	232,082	267,716	297,668	246,805	330,093	390,381	232,511	1,206,740	3,629,613
(U) Related NPOESS MPAF: PE0305178F					10,242	30,590	286,755	71,590	469,490	868,667
(U) Related EELV MPAF: PE0305953F**						75,000	0	75,000	225,000	375,000
(U) Other operations and sustainment funding***									240,800	240,800

* National Oceanic and Atmospheric Administration Procurement, Acquisition, and Construction (NOAA PAC) appropriation. The Air Force (DoD) and NOAA (DoC) fund NPOESS 50/50. Total cost includes prior-year amount of \$272,436K. Total NPOESS program cost is the sum of NPOESS RDT&E AF0603434F, MPAF 0305178F, NPOESS portion of Evolved Expendable Launch Vehicle (EELV) MPAF 0305953F, and Polar Convergence NOAA PAC. The actual share of funding for specific program expenses is determined in the year of execution based on the availability of DoD and DOC funds.

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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>	

** NPOESS Launch vehicle funding is budgeted entirely in EELV PE 0305953F, and represents a portion of the DoD's 50% funding contribution in specific years.

*** Operations and sustainment (O&S) after Initial Operational Capability (IOC) may be funded as either Operations & Maintenance AF, NOAA Operations Research and Facilities (ORF) or other appropriations depending on the concept selected for post IOC O&S. Prior to IOC, O&S funding will be through a combination of RDT&E (AF) and NOAA PAC. These funds will be transferred to the specific appropriation as the budget enters the FYDP.

(U) **E. Acquisition Strategy**

The guiding tenets for NPOESS acquisition include accomplishing substantial risk reduction with a focus on payload development, enhancing data utility to users, deferring major system decisions as long as reasonable, and protecting maximum flexibility to ensure the best overall system design. The program pursues a significant investment in the development and on-orbit testing of selected payload sensors while deferring individual sensor selections among competing international, NASA, military, and industry alternatives to assess and determine the optimum technical performance potential of each candidate sensor. NPOESS is currently pursuing two missions to reduce sensor development and data user segment risk. The WindSat/Coriolis mission will prove technologies to be used for the NPOESS Conical-Scanning Microwave Imager/Sounder (CMIS) sensor. The NPOESS Preparatory Project will fly and test-out four of NPOESS's most complex sensors: the Visible/Infrared Imager Radiometer Suite (VIIRS), the Cross Track Infrared Sounder (CrIS), the Advanced Technology Microwave Sounder (ATMS), and the Ozone Mapper/Profiler Suite (OMPS). Overall system prime contractor selection was deferred until 2002 to minimize system level preliminary costs, allow sensor complement maturation, and delay the commitment to full system acquisition until approximately six years before the first satellite need date. The first two satellites will be incrementally funded with RDT&E funding. The rest will be fully funded with Missile Procurement funding.

(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) Key Decision Point C decision/DSAB				*								
(U) Award of A&O/Production				*								
(U) Sensors Critical Design Reviews		*	*			X	X					
(U) System Delta Preliminary Design Review											X	
(U) Initial Baseline Review						X						
(U) Executive Committee Review							X					
(U) NPP Milestone Review						X						

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<div style="display: flex; justify-content: space-between;"><div style="width: 40%;"><p>(U) <u>F. Schedule Profile Continued</u></p><p>(U) * = Completed Event X = Planned Event</p></div><div style="width: 55%; text-align: center;"><table style="margin: auto;"><tr><th colspan="4"><u>FY 2002</u></th><th colspan="4"><u>FY 2003</u></th><th colspan="4"><u>FY 2004</u></th></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>1</td><td>2</td><td>3</td><td>4</td><td>1</td><td>2</td><td>3</td><td>4</td></tr></table></div></div>									<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>FY 2002</u>				<u>FY 2003</u>				<u>FY 2004</u>																								
1	2	3	4	1	2	3	4	1	2	3	4																					
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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)							DATE February 2003				
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04 - Advanced Component Development and Prototypes (ACD&P)					0603434F National Polar-Orbiting Operational Environmental Satellite System (NPOESS)				4056		
(U) A. Project Cost Breakdown (\$ in Thousands)											
					FY 2002		FY 2003		FY 2004		
(U)	Program Office Support for PDRR/A&O efforts				907		925		944		
(U)	System Architecture Studies/Definition/Ground System Risk Reduction				40,000		0		0		
(U)	Government Led Risk Reduction/ Technology efforts				0		0		0		
(U)	Sensor/Algorithm Development and Design/Fabrication for Risk Reduction Missions/Program Support				104,728		0		0		
(U)	Acquisition & Operations effort				5,500		231,157		266,772		
(U)	Total				151,135		232,082		267,716		
(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>											
Syst. Arch. Studies		C/CPFF	Sep 96	12,820	12,820	12,820					12,820
TRW (PDRR)		C/FFP	Dec 99	27,700	27,700	13,450	14,250				27,700
Lockheed Martin (PDRR)		C/FFP	Dec 99	38,700	38,700	12,950	25,750				38,700
Lockheed Martin		C/CPAF	Dec 94	4,489	4,489	4,489					4,489
Raytheon (VIIRS & CrIS)		C/CPFF	Jul 97	28,716	28,716	28,716					28,716
Ball Aerospace (CMIS & OMPS)		C/CPFF	Jul 97	29,746	29,746	29,746					29,746
Ball Aerospace (OMPS)		C/CPAF	May 99	35,730	35,730	19,617	16,113				35,730
ITT Aerospace (VIIRS & CrIS)		C/CPFF	Jul 97	30,475	30,475	30,475					30,475
Boeing (formerly Hughes) Space and Communications		C/CPFF	Jul 97	27,195	27,195	27,195					27,195
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(U) Performing Organizations Continued:Product Development Organizations

(CMIS)

Orbital Sciences (OMPS)	C/CPFF	Jul 97	2,578	2,578	2,578					2,578
SAAB Ericsson (GPSOS)	C/CPFF	Jul 97	2,786	2,786	2,786					2,786
SAAB Ericsson (GPSOS)	SS/FFP	Aug 99	8,507	8,507	3,330	5,177				8,507
ITT Aerospace (CrIS)	C/CPAF	Aug 99	40,500	40,500	10,700	29,800				40,500
Raytheon (VIIRS)	C/CPAF	Nov 00	51,170	51,170	13,053	38,117				51,170
Boeing (CMIS)	C/CPAF	Jul 01	15,521	15,521		15,521				15,521
Northrop Grumman (A&O)	C/CPAF	Aug 02	1,723,160	1,723,160		5,500	231,157	266,772	1,219,731	1,723,160
Other Contracts	MISC	Various	21,975	21,975	21,975					21,975
Government Led Studies	Gov. Orgs.	Various	26,302	26,302	26,302					26,302

Support and Management Organizations

Integrated Program Office	Various	Various	17,076	17,076	14,300	907	925	944		17,076
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(IPO) Support

Test and Evaluation Organizations

Included in IPO Support

(U) Government Furnished Property:ContractMethod/TypeAward orItemor FundingObligationDeliveryTotal PriorBudgetBudgetBudgetBudget toTotalDescriptionVehicleDateDateto FY 2002FY 2002FY 2003FY 2004CompleteProgramProduct Development Property

NOT APPLICABLE

Support and Management Property

NOT APPLICABLE

Test and Evaluation Property

NOT APPLICABLE

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		<u>Total Prior</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget to</u>
		<u>to FY 2002</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>Complete</u>
<u>Subtotals</u>						<u>Total</u>
Subtotal Product Development		260,182	150,228	231,157	266,772	1,219,731
Subtotal Support and Management		14,300	907	925	944	17,076
Subtotal Test and Evaluation						
Total Project		274,482	151,135	232,082	267,716	1,219,731
						2,145,146