

Exhibit R-2, RDT&E Budget Item Justification	DATE February 2008
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BUDGET ACTIVITY 07 Operational System Development	PE NUMBER AND TITLE 0401119F C-5 Airlift Squadrons
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Cost (\$ in Millions)	FY 2007 Actual	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	Cost to Complete	Total
Total Program Element (PE) Cost	137.565	178.990	125.063	28.136	20.065	10.007	0.000	0.000	1,987.009
4495 Avionics Modernization Program	0.000	12.525	1.830	0.000	0.000	0.000	0.000	0.000	409.396
4835 Reliability Enhancement & Reengining Program	137.565	166.465	123.233	28.136	20.065	10.007	0.000	0.000	1,577.613

(U) A. Mission Description and Budget Item Justification

674495: Avionics Modernization Program (AMP): Phase I of an Air Force planned two-phase modernization effort for the C-5 [Phase II is the Reliability Enhancement and Re-engining Program (RERP)] . AMP implements Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) [formerly, Global Air Traffic Management (GATM)], navigation/safety capability, and the All Weather Flight Control System (AWFCS). It installs Deputy Secretary of Defense (DepSecDef) directed navigation/safety equipment: Terrain Awareness, Warning System (TAWS), and Traffic Alert and Collision Avoidance System (TCAS). This reduces the threat of controlled flight into terrain and mid-air collisions. CNS/ATM capability requirements will be incorporated into the aircraft to meet current and future International Civil Aviation Organization (ICAO)/Federal Aviation Administration (FAA) requirements and to progress towards free flight capability. The AWFCS portion of AMP replaces low reliability Line Replaceable Units (LRUs) in the automatic flight control system and replaces aging, non-supportable mechanical instruments in the engine and flight systems. Connectivity to mobility command and control capabilities will also be incorporated in the AMP design. TCAS was accelerated ahead of AMP mod and was completed 31 Oct 02. Two AMP RDT&E test articles were funded in FY99 for installation and flight test in FY02/03/04/05. AMP first flight occurred in Dec 02. The final software build completed Jun 05, and operational testing completed Jul 06. This project is comprised of low technical risk efforts supporting fielded weapons systems and, therefore, was assigned to Budget Activity 7, Operational Systems Development. AMP requirements have been expanded to incorporate updates to the new avionics architecture, to include security enhancements to the Global Positioning System. Equipment DMS issues will be resolved to support continued operations through studies, bridge buys, life of type buys, development and redesign efforts.

674835: Reliability Enhancement and Re-engining Program (RERP): Phase II of an Air Force planned two-phase modernization effort for the C-5. It improves aircraft reliability, maintainability, and availability. RERP will enable the C-5 to achieve wartime mission requirements by increasing fleet availability (mission capable rate, departure reliability) while reducing Total Ownership Cost (TOC). This effort centers around replacing TF39 engines with a more reliable, Commercial Off-the-Shelf (COTS) turbofan engine with increased takeoff thrust and stage three noise compliance. These new engines (along with new pylons, wing attach fittings and upgrades, and thrust reversers) increase payload capability and access to Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) airspace. The modification also decreases aircraft time to climb, increases engine-out climb gradient for takeoff, improves transportation system throughput, and decreases engine removals. Additionally, numerous other system modifications will be performed (e.g., auxiliary power units, electrical, hydraulics, fuel system, fire suppression system, pressurization/air conditioning system, landing gear, and airframe) to increase fleet availability and reduce TOC. RDT&E funded three test articles for installation and flight test. RERP's Preliminary Design Review (PDR) completed in Jan 03 and the Air Vehicle Critical Design Review (CDR) completed in Mar 04. First Flight of the first test article occurred in Jun 06, followed by first flight of second and third test articles in Nov 06 and Mar 07, respectively. This project is comprised of low technical risk efforts supporting fielded weapons systems and, therefore, was assigned to Budget Activity 7. Increased costs due to development delays; budget adjustments; and production cost increases associated with engines, pylons, reliability enhancements items, and Lockheed Martin labor

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have led to a review of total program requirements. SecAF notified Congress on 27 Sep 07 of critical Nunn-McCurdy (NM) breaches for Average Procurement Unit Cost (APUC) and Procurement Acquisition Unit Cost (PAUC). An out-of-cycle Selected Acquisition Report (SAR) was submitted to Congress on 14 Nov 07. C-5 RERP remains in NM review at this time. These documents reflect the Program of Record prior to the declaration of the NM breach, but incorporate fact-of-life changes. After NM decisions are made, the results will be provided to the defense committees. These adjustments will be reflected in the FY10 PBR. Equipment DMS issues will be resolved to support continued operations through studies, bridge buys, life of type buys, development and redesign efforts.

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

	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
(U) Previous President's Budget	150.638	203.585	28.276
(U) Current PBR/President's Budget	137.565	178.990	125.063
(U) Total Adjustments	-13.073	-24.595	
(U) Congressional Program Reductions		-25.053	
Congressional Rescissions		-1.142	
Congressional Increases		1.600	
Reprogrammings	-8.840		
SBIR/STTR Transfer	-4.233		

(U) Significant Program Changes:

C-5 RERP remains in NM review at this time. These documents reflect the Program of Record prior to the declaration of the NM breach, but incorporate fact-of-life changes. After NM decisions are made, the results will be provided to the defense committees. These adjustments will be reflected in the FY10 PBR.

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BUDGET ACTIVITY 07 Operational System Development				PE NUMBER AND TITLE 0401119F C-5 Airlift Squadrons			PROJECT NUMBER AND TITLE 4495 Avionics Modernization Program			
Cost (\$ in Millions)		FY 2007 Actual	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	Cost to Complete	Total
4495	Avionics Modernization Program	0.000	12.525	1.830	0.000	0.000	0.000	0.000	0.000	409.396
	Quantity of RDT&E Articles	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

674495: Avionics Modernization Program (AMP): Phase I of an Air Force planned two-phase modernization effort for the C-5 (Phase II is the Reliability Enhancement and Re-engining Program (RERP)). AMP implements communication, navigation, surveillance/air traffic management (CNS/ATM) [formerly, Global Air Traffic Management (GATM)] and navigation/safety capability and the All Weather Flight Control System (AWFCS). It installs Deputy Secretary of Defense (DepSecDef) directed navigation/safety equipment: Terrain Awareness, Warning System (TAWS), and Traffic Alert and Collision Avoidance System (TCAS). This reduces the threat of controlled flight into terrain and mid-air collisions. CNS/ATM capability requirements will be incorporated into the aircraft to meet current and future International Civil Aviation Organization (ICAO)/Federal Aviation Administration (FAA) requirements and to progress towards free flight capability. The AWFCS portion of AMP replaces low reliability line replaceable units (LRUs) in the automatic flight control system and replaces aging, non-supportable mechanical instruments in the engine and flight systems. Connectivity to mobility command and control capabilities will also be incorporated in the AMP design. TCAS was accelerated ahead of AMP mod and was completed 31 Oct 02. Two AMP RDT&E test articles were funded in FY99 for installation and flight test in FY02/03/04/05. AMP's first flight occurred in Dec 02. The final software build completed Jun 05, and operational testing completed Jul 06. This project is comprised of low technical risk efforts supporting fielded weapons systems and, therefore, was assigned to Budget Activity 7, Operational Systems Development. AMP requirements have been expanded to incorporate updates to the new avionics architecture, to include security enhancements to the Global Positioning System. Equipment DMS issues will be resolved to support continued operations through studies, bridge buys, life of type buys, development and redesign efforts.

(U) B. Accomplishments/Planned Program (\$ in Millions)

	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
(U) System Engineering/Program Management		1.372	0.200
(U) AMP Avionics Design/Development/Contractor Test		6.583	0.962
(U) Prototype Fabrication/Install		1.188	0.174
(U) Mission Support		1.628	0.238
(U) Government Flight Test Cost		1.754	0.256
(U) Total Cost	0.000	12.525	1.830

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

	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</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>Complete</u>	
(U) AF RDT&E									
(U) Other APPN									
(U) Aircraft Procurement, AF, BA-5,	52.171	88.477	95.170	78.828	75.297	77.454	75.303	29.701	958.591

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PROJECT NUMBER AND TITLE

4495 Avionics Modernization Program

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

C-5 Mods, Avionics

Modernization Program, BP-11

(U) Aircraft Procurement, AF, BA-5,

C-5 Mods, Avionics

23.584

7.429

4.970

1.510

37.493

Modernization Program, BP-19

(U) Aircraft Procurement, AF, BA-5,

C-5 Mods, Reliability

Enhancement and Re-engining

92.372

199.802

438.579

837.909

955.184

926.932

931.983

5,166.286

9,553.756

Program, BP-11 (to include

Advance Procurement)

(U) **D. Acquisition Strategy**

Avionics Modernization Program: Program acquisition strategy establishes a single integrating contractor (Lockheed Martin) to modify and qualify integrated Commercial Off-the-Shelf (COTS) Line Replaceable Units (LRUs) and software to meet C-5 performance and Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) requirements; update existing C-5 engineering and technical data; develop interface control specifications based on performance requirements; prototype the new system; and support flight testing. AMP contract awarded to Lockheed Martin on 22 January 1999. \$9.7M in FY99 procurement was added in the FY00 PB to accelerate Traffic Alert and Collision Avoidance System (TCAS) installations ahead of the rest of AMP. The AMP modification is planned for the entire C-5 fleet.

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Exhibit R-3, RDT&E Project Cost Analysis

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07 Operational System Development				0401119F C-5 Airlift Squadrons					4495 Avionics Modernization Program				
(U) Cost Categories (Tailor to WBS, or System/Item Requirements) (\$ in Millions)	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior to FY 2007 Cost</u>	<u>FY 2007 Cost</u>	<u>FY 2007 Award Date</u>	<u>FY 2008 Cost</u>	<u>FY 2008 Award Date</u>	<u>FY 2009 Cost</u>	<u>FY 2009 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>	
(U) <u>Product Development</u>													
Lockheed Martin Aeronautics Co	CPAF		351.230	0.000		9.143	Apr-08	1.336	Nov-08	0.000	361.709	361.709	
N/A											0.000		
Subtotal Product Development			351.230	0.000		9.143		1.336		0.000	361.709	361.709	
Remarks:	Engineering complete.												
(U) <u>Support</u>													
730 ACSG, Robins AFB, GA			10.837								10.837	10.837	
716 AESG, Wright-Patterson AFB, OH			13.611			1.628		0.238			15.477	15.477	
N/A											0.000		
Subtotal Support			24.448	0.000		1.628		0.238		0.000	26.314	26.314	
Remarks:	Engineering complete.												
(U) <u>Test & Evaluation</u>													
418 Test Squadron		Edwards AFB	19.363			1.754	Jun-08	0.256	Apr-09		21.373	21.373	
N/A											0.000		
Subtotal Test & Evaluation			19.363	0.000		1.754		0.256		0.000	21.373	21.373	
Remarks:	Engineering complete.												
(U) <u>Management</u>													
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	0.000	
Remarks:	Engineering complete.												
(U) Total Cost			395.041	0.000		12.525		1.830		0.000	409.396	409.396	

Exhibit R-4, RDT&E Schedule Profile

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07 Operational System Development

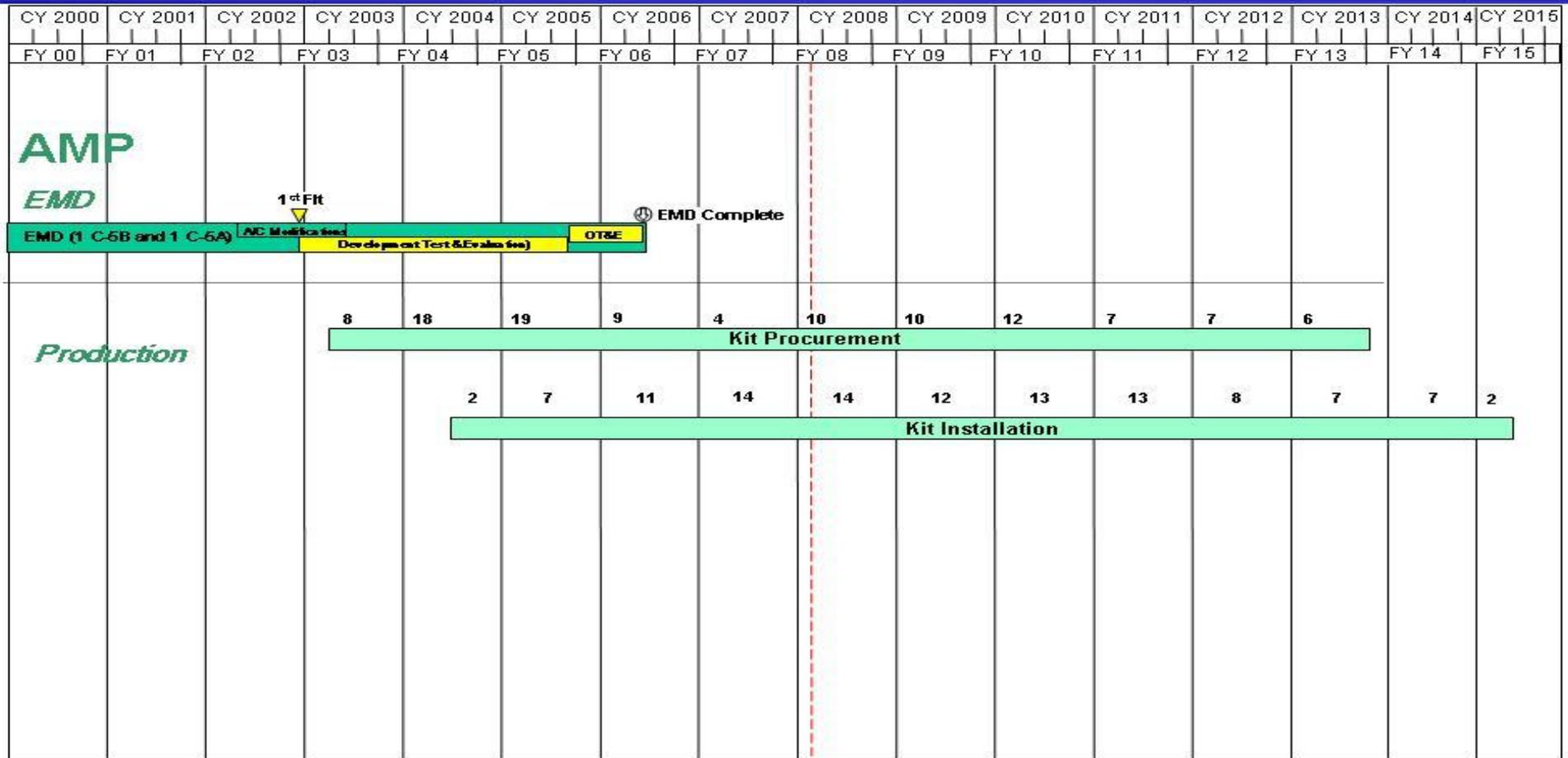
PE NUMBER AND TITLE
0401119F C-5 Airlift Squadrons

PROJECT NUMBER AND TITLE
4495 Avionics Modernization Program



**C-5 Summary Schedule
Avionics Modernization Program (AMP)**

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Exhibit R-4a, RDT&E Schedule Detail		DATE February 2008
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(U) <u>Schedule Profile</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
(U) Aircraft is in production	1-4Q	1-4Q	1-4Q

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BUDGET ACTIVITY 07 Operational System Development				PE NUMBER AND TITLE 0401119F C-5 Airlift Squadrons			PROJECT NUMBER AND TITLE 4835 Reliability Enhancement & Reengining Program		
Cost (\$ in Millions)	FY 2007 Actual	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	Cost to Complete	Total
4835 Reliability Enhancement & Reengining Program	137.565	166.465	123.233	28.136	20.065	10.007	0.000	0.000	1,577.613
Quantity of RDT&E Articles	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

674835: Reliability Enhancement and Re-engining Program (RERP): Phase II of an Air Force planned two-phase modernization effort for the C-5. It improves aircraft reliability, maintainability, and availability. RERP will enable the C-5 to achieve wartime mission requirements by increasing fleet availability (mission capable rate, departure reliability) while reducing Total Ownership Cost (TOC). This effort centers around replacing TF39 engines with a more reliable, Commercial Off-the-Shelf (COTS) turbofan engine with increased takeoff thrust and stage three noise compliance. These new engines (along with new pylons, wing attach fittings and upgrades, and thrust reversers) increase payload capability and access to Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) airspace. The modification also decreases aircraft time to climb, increases engine-out climb gradient for takeoff, improves transportation system throughput, and decreases engine removals. Additionally, numerous other system modifications will be performed (e.g., auxiliary power units, electrical, hydraulics, fuel system, fire suppression system, pressurization/air conditioning system, landing gear, and airframe) to increase fleet availability and reduce TOC. RDT&E funded three test articles for installation and flight test. RERP's Preliminary Design Review (PDR) completed in Jan 03 and the Air Vehicle Critical Design Review (CDR) completed in Mar 04. First Flight of the first test article occurred in Jun 06, followed by first flight of second and third test articles in Nov 06 and Mar 07, respectively. This project is comprised of low technical risk efforts supporting fielded weapons systems and, therefore, was assigned to Budget Activity 7. Increased costs due to development delays; budget adjustments; and production cost increases associated with engines, pylons, reliability enhancements items, and Lockheed Martin labor have led to a review of total program requirements. SecAF notified Congress on 27 Sep 07 of critical Nunn-McCurdy (NM) breaches for Average Procurement Unit Cost (APUC) and Procurement Acquisition Unit Cost (PAUC). An out-of-cycle Selected Acquisition Report (SAR) was submitted to Congress on 14 Nov 07. C-5 RERP remains in NM review at this time. These documents reflect the Program of Record prior to the declaration of the NM breach, but incorporate fact-of-life changes. After NM decisions are made, the results will be provided to the defense committees. These adjustments will be reflected in the FY10 PBR. Equipment DMS issues will be resolved to support continued operations through studies, bridge buys, life of type buys, development and redesign efforts.

(U) B. Accomplishments/Planned Program (\$ in Millions)

	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
(U) Systems Engineering/Program Management	9.777	19.322	6.942
(U) RERP Design/Development/Contractor Test	76.264	121.659	78.351
(U) Prototype Fabrication/Install	34.913	0.000	0.000
(U) Mission Support	7.691	5.654	8.996
(U) Government Test Support	8.920	17.830	7.024
(U) Aircrew & Maintenance Trainer	0.000	2.000	21.920
(U) Total Cost	137.565	166.465	123.233

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BUDGET ACTIVITY 07 Operational System Development	PE NUMBER AND TITLE 0401119F C-5 Airlift Squadrons	PROJECT NUMBER AND TITLE 4835 Reliability Enhancement & Reengining Program
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(U) C. Other Program Funding Summary (\$ in Millions)

	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</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>Complete</u>	
(U) AF RDT&E									
(U) Other APPN									
(U) Aircraft Procurement, AF, BA-5, C-5 Mods, Reliability Enhancement and Re-engining Program, BP-11 (to include Advance Procurement)	92.372	199.802	438.579	837.909	955.184	926.932	931.983	5,166.286	9,553.756
(U) Aircraft Procurement, AF, BA-5, C-5 Mods, Avionics Modernization Program, BP-11	52.171	88.477	95.170	78.828	75.297	77.454	75.303	29.701	958.591
(U) Aircraft Procurement, AF, BA-5, C-5 Mods, Avionics Modernization Program, BP-19		23.584	7.429	4.970	1.510				37.493

(U) D. Acquisition Strategy

Reliability Enhancement and Re-engining Program (RERP): The approved FY02 acquisition strategy and the updated FY06 acquisition strategy called for the modification of the entire C-5 aircraft fleet starting with the B-models first. System Development & Demonstration (SDD) includes 1 C-5A and 2 C-5Bs. The program acquisition strategy is to consider every opportunity to use commercially available components and processes to modernize C-5 products and processes to meet or exceed required system performance and support, so as to renew the weapon system until 2040. Lockheed Martin has been selected as the prime contractor through a sole source arrangement. Lockheed has selected General Electric (Powerplant), Goodrich (Pylon), and Honeywell (Avionics) as the major subcontractors. SecAF notified Congress on 27 Sep 07 of critical Nunn-McCurdy (NM) breaches for Average Procurement Unit Cost (APUC) and Program Acquisition Unit Cost (PAUC). An out-of-cycle Selected Acquisition Report (SAR) was submitted to Congress on 14 Nov 07 and the NM recertification is ongoing.

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Exhibit R-3, RDT&E Project Cost Analysis

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BUDGET ACTIVITY				PE NUMBER AND TITLE					PROJECT NUMBER AND TITLE			
07 Operational System Development				0401119F C-5 Airlift Squadrons					4835 Reliability Enhancement & Reengining Program			
(U) Cost Categories (Tailor to WBS, or System/Item Requirements) (\$ in Millions)	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior to FY 2007 Cost</u>	<u>FY 2007 Cost</u>	<u>FY 2007 Award Date</u>	<u>FY 2008 Cost</u>	<u>FY 2008 Award Date</u>	<u>FY 2009 Cost</u>	<u>FY 2009 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
(U) <u>Product Development</u>												
Lockheed Martin Aeronautics Co (Pre-EMD)	FFP									0.000	0.000	
Lockheed Martin Aeronautics Co (SDD)	CPAF		1,023.607	120.954	Oct-06	140.981	Oct-07	85.293	Oct-08	25.288	1,396.123	1,396.123
											0.000	
Subtotal Product Development			1,023.607	120.954		140.981		85.293		25.288	1,396.123	1,396.123
Remarks:												
(U) <u>Support</u>												
730.ACSG, Robins AFB, GA			17.045	2.300		2.500		2.675		0.000	24.520	24.520
716 AESG, Wright-Patterson AFB, OH			29.317	9.053		3.142		6.321		0.000	47.833	47.833
N/A											0.000	
Subtotal Support			46.362	11.353		5.642		8.996		0.000	72.353	72.353
Remarks:												
(U) <u>Test & Evaluation</u>												
418 Test Squadron (Edwards AFB)			22.173	8.920		17.830		7.024		3.577	59.524	59.524
N/A											0.000	
Subtotal Test & Evaluation			22.173	8.920		17.830		7.024		3.577	59.524	59.524
Remarks:												
(U) <u>Management</u>												
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Remarks:												
(U) <u>Aircrew & Maintenance Trainer</u>												
Subtotal Aircrew & Maintenance Trainer			0.000	0.000		2.000		21.920		25.693	49.613	49.613
Remarks:						2.000		21.920		25.693	49.613	49.613
(U) Total Cost			1,092.142	141.227		166.453		123.233		54.558	1,577.613	1,577.613

Exhibit R-4, RDT&E Schedule Profile

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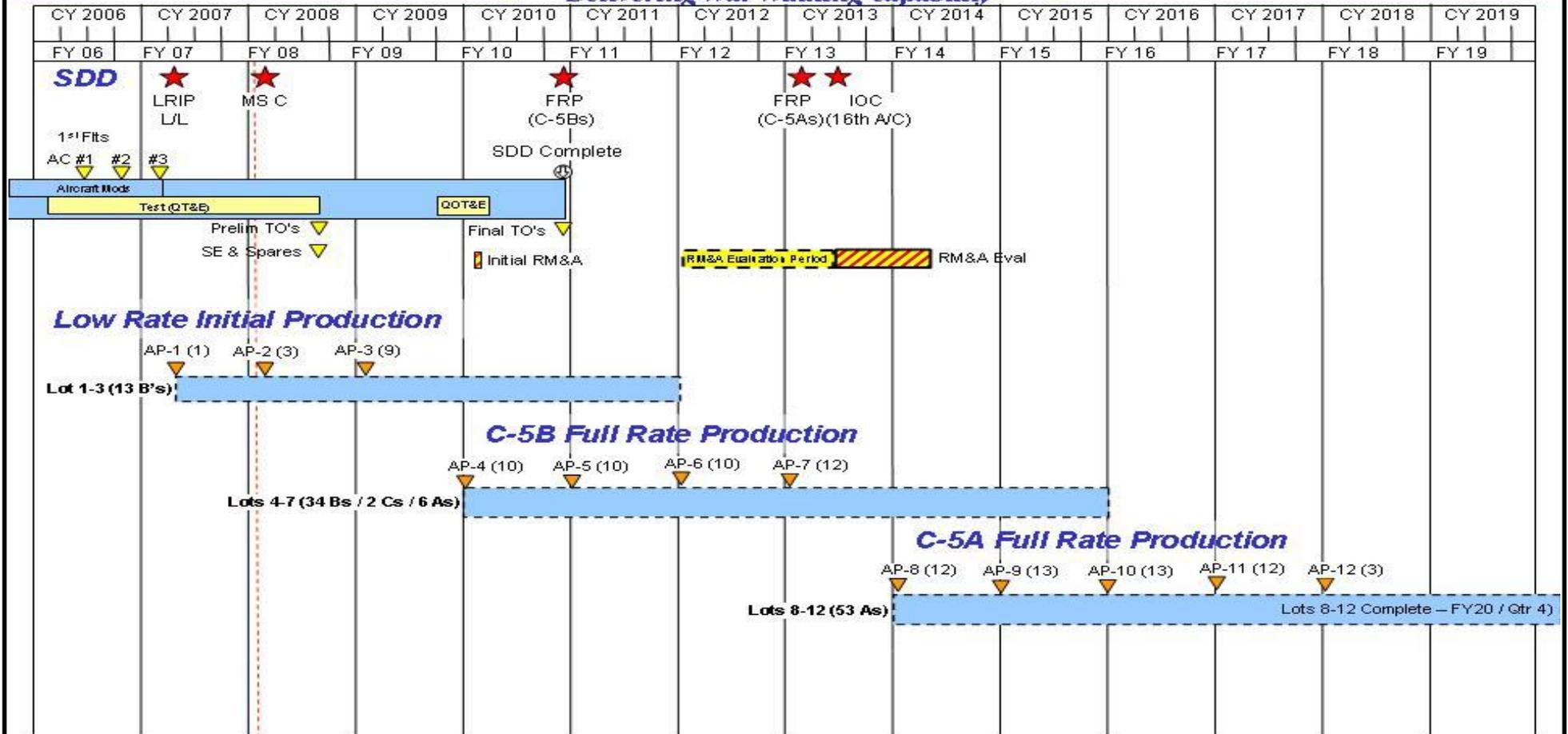
PROJECT NUMBER AND TITLE
4835 Reliability Enhancement & Reengining Program



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C-5 Summary Schedule Reliability Enhancement & Reengining (RERP)

Delivering war-winning capability



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	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
(U) <u>Schedule Profile</u>			
(U) LRIP Long-Lead procurement for Lot 1 (1 aircraft)	3Q		
(U) Milestone C (FY08/2)		2Q	