Exhibit P-40, BUDGET ITEM JUSTIFICATION

DATE: **February 2004**

APPROPRIATION/BUDGET ACTIVITY
Aircraft Procurement, Navy/APN-5 Aircraft Modifications

P-1 ITEM NOMENCLATURE
H-46 Series Helicopter

Program Element for Code B Items:

Other Related Program Elements

	Prior Years	ID Code	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	To Complete	Total
QTY		A									
COST (In Millions)	**479.9**	A	**65.3**	**86.4**	**71.2**	**52.0**	**47.2**	**5.5**		**14.8**	**822.2**

This line item funds modifications to the H-46 aircraft. The H-46 is a twin-turbine powered dual-piloted tandem-rotor helicopter. The cabin contains provisions for accommodating 25 troops and crew members. The cabin also contains an integral cargo and rescue system. The overall goal of the modification budget in FY2005 is to keep the H-46 a viable platform until a replacement aircraft can be fielded by upgrading flight critical dynamic components, the engine control system, the electrical system, and the T58-16 engine; installing on-board vibration monitoring equipment; and replacing the existing steel plate armor with lighter weight armor. H-46 helicopters are used by the Marine Corps for troop transport and by the Navy for vertical replenishment of ships. There are currently 250 aircraft (226 active + 24 reserve) in the inventory. USMC: (226) CH-46E + (6) HH-46D; USN: (1) CH-46D + (15) HH-46D + (2) UH-46D. (24) CH-46E's are reserve aircraft. The Navy is in the process of retiring the H-46D inventory as replacement H-60R aircraft are delivered. Original Design Service Life was 10,000 hours. It was subsequently extended to 12,500 hours 18 Dec 1992 and 15,000 hours 16 Feb 1996. Aircraft will continue to be flown past 15,000 flight hours on an Age Exploration program.

(TOA, $ in Millions)

OSIP No.	Description	Prior Years	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Complete	To Total
25-91	Dynamic Component Upgrade	402.5	2.6	2.1	1.6						**408.8**
25-97	Safety Improvement Program	14.9	0.9	2.9	1.9	2.1	1.7	1.1		0.2	**25.8**
28-99	Engine Control System Retrofit	31.5	7.1	6.5	2.1	0.1					**47.4**
29-99	Electrical System Upgrade	4.4	1.1	1.3	2.6	2.8	2.6	0.3		6.9	**21.9**
15-01	T-58 Engine Reliability Improv	26.6	48.7	64.7	56.4	42.8	41.6	4.1		4.5	**289.5**
10-03	Aircraft Integrated Maintenanc		4.9	2.9	6.6	4.2	1.2			3.2	**23.0**
20-04	Lightweight Armor			6.0							**6.0**
	Total	**479.9**	**65.3**	**86.4**	**71.2**	**52.0**	**47.2**	**5.5**		**14.8**	**822.2**

Note: Totals may not add due to rounding.

	H-46 Series Reserves		0.2	0.2	0.2	0.2					

Exhibit P-3a

Individual Modification

MODIFICATION TITLE: Dynamic Component Upgrade (OSIP 25-91)

MODELS OF SYSTEMS AFFECTED: H-46

TYPE MODIFICATION: Safety (HONA Category A)

DESCRIPTION/JUSTIFICATION: The H-46 helicopter is nearing the end of its originally planned service life. Several dynamic components failed between 1988 and 1990 due to fatigue. Engineering Change Proposal (ECP)-556 incorporates design improvements to the critical safety items which have been identified by in-service failure and flight strain survey. The changes increase thickness of critical sections and make other specific changes to increase resistance to fatigue damage. The major components include the forward and aft rotor heads, the forward and aft transmissions, the mixbox, aft vertical rotor shaft, the swashplates, synchronizing shafts, and accessory gear box. ECP-558 changes configuration of the Aircraft Flight Control System (AFCS) which reduces flight loads on critical components. The H-46 presently uses the MD-1 and AHRS gyroscopes for pitch and roll rate input to the AFCS. These gyroscopes were originally designed for indication systems only and do not provide adequate input for pitch and roll rate to the AFCS. DCU was directed by Chief of Naval Operations (CNO) letter 13100 serial 504E/OU603293 dated 30 Aug 90 and approved by ASN (RDA) by Program Management Proposal (PMP) 90-7 on 18 Jan 91.

DEVELOPMENT STATUS/MAJOR DEVELOPMENT MILESTONES: The dynamic component fatigue testing commenced in Jan 91 and completed in Dec 97. DCU ECP-556 delivered in Dec 91, and the AFCS ECP 558 delivered in Aug 93. The DCU validation completed in Sep 1995. The DCU flight testing started in Nov 95 and completed in May 97, and production installations are ongoing. The AFCS modification program is complete.

FINANCIAL PLAN: (TOA, $ in Millions)

	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY2009		To Complete		Total	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$
RDT&E																				
PROCUREMENT																				
Installation Kits																				
ECP #556 Kit	312	213.6																		
ECP #558 Kit	315	12.6																		
XXX Kit																				
Installation Kits N/R	4	84.9																		
Installation Equipment																				
GFE		0.5																		
Installation Equipment N/R																				
Engineering Change Orders																				
Moisture Debris Covers		*																		
Wear Plate Blade Atch Fitting		0.2																		
Accessory Gear Box		1.2																		
Horiz. Hinge Pin Bearing		0.2																		
Pitch Link Assembly		0.9																		
Fuzz Burn-off		0.2																		
Data		2.0																		
Training Equipment	2	1.8																		
Support Equipment		9.1																		
ILS																				
Other Support		23.5		0.8		0.9		0.9												
Interim Contractor Support		2.7																		
Installation Cost	120	49.3	72	1.7	71	1.2	49	0.7												
Total Procurement		**402.5**		**2.6**		**2.1**		**1.6**												

Notes:

1. Totals may not add due to rounding
2. Asterisk indicates amount less than $50K

Exhibit P-3a

MODELS OF SYSTEMS AFFECTED: **H-46**

MODIFICATION TITLE: **Dynamic Component Upgrade (DCU) (OSIP 25-91)**

INSTALLATION INFORMATION: All components will be modified at NADEP Cherry Point to DCU configuration concurrent with component overhaul/repair. Installation cost includes consumable material used during component overhaul/repair. Most DCU configuration components are installed in aircraft at O-level, except AFC-433 Parts 2 & 12, which are being installed in aircraft by depot level FMT. The quantities reflected in the tables below are aircraft installation quantities, and dollar figures in the tables include component modification, GFM, and aircraft installation.

METHOD OF IMPLEMENTATION: **Aircraft to be modified by Government Owned Contractor Operated (GOCO) Field Mod Teams**

ADMINISTRATIVE LEADTIME: N/A Months

PRODUCTION LEADTIME: N/A Months

CONTRACT DATES: FY 2003: N/A FY 2004: N/A FY 2005: N/A

DELIVERY DATE: FY 2003: N/A FY 2004: N/A FY 2005: N/A

($ in Millions)

Cost:	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY 2009		To Complete		TOTAL	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	**$**
FY 2002 & PY (312) kits	120	49.3	72	1.7	71	1.2	49	0.7												
FY 2003 ( ) kits																				
FY 2004 ( ) kits																				
FY 2005 ( ) kits																				
FY 2006 ( ) kits																				
FY 2007 ( ) kits																				
FY 2008 ( ) kits																				
FY 2009 ( ) kits																				
To Complete ( ) kits																				
TOTAL	**120**	**49.3**	**72**	**1.7**	**71**	**1.2**	**49**	**0.7**												

Installation Schedule

	FY 2002	FY 2003				FY 2004				FY 2005				FY 2006				FY 2007			
	& Prior	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
In	120	18	18	18	18	18	18	18	17	17	16	16									
Out	101	19	18	18	18	18	18	18	18	17	17	16	16								

	FY 2008				FY 2009				To	
	1	2	3	4	1	2	3	4	Complete	TOTAL
In										
Out										

Exhibit P-3a | Individual Modification

MODIFICATION TITLE: Safety Improvement Program (OSIP 25-97)

MODELS OF SYSTEMS AFFECTED: H-46 | TYPE MODIFICATION: Safety (HONA Category A)

DESCRIPTION/JUSTIFICATION:

The Safety Improvement Program was directed by Chief of Naval Operations (CNO) letter 7100 serial N880F/7U660758 dated 10 Jan 97, and approved as an Abbreviated Acquisition Program (AAP) by the Program Executive Officer (PEO) on 24 Oct 97. This program contains the following Engineering Change Proposals (ECP):

1. HYDRAULIC SYSTEM UPGRADE and UTILITY HYDRAULIC SYSTEM REDESIGN: This ECP was completed in FY2000, but the fleet has experienced ongoing problems with the hydraulic system following installation of the modification. The Utility Hydraulic System Redesign will assess the overall configuration of the hydraulic system and correct deficiencies to improve system performance. This modification will be installed in 210 CH-46E aircraft (186 active + 24 reserve).
2. LOWER DUAL BOOST ACTUATOR (LDBA): The housing for the actuator is highly susceptible to stress corrosion cracking . The material wear and housing cracks have resulted in LDBA malfunction. The pilot can not control the drive direction of the helicopter, a potentially life threatening situation. This program will procure redesigned actuator housing that eliminate the failure mode in the LDBA. This modification will be installed concurrent with Fleet Exchange (FE) repairs.
3. NIGHT VISION GOGGLE (NVG) COMPATIBLE COCKPIT and NVG COMPATIBLE COCKPIT DOME LIGHT: The NVG Compatible Cockpit ECP was completed in FY2000, but did not convert the cockpit dome light. An additional ECP is funded in FY2004 to convert the cockpit dome light to be NVG compatible. Inadvertent activation of the cockpit dome light switch during NVG operations can result in severe degradation of NVGs, loss of outside reference, and potential loss of aircraft and personnel. This program will modify the configuration of 65 H-46D aircraft (all active, no reserves) and 226 CH-46E aircraft (202 active + 24 reserve).
4. RUNNING ENGINE WASH: The poor T58-16/402 engine performance is due to dirt and oil residue in the compressor section. Maintenance requires daily wash after over-shipboard operations to remove salt encrustation. Improved nozzle design better atomizes cleaning fluid, allows engine wash to be performed with the engine running, and is environmentally friendly. This program will modify the configuration of 65 H-46D aircraft (all active, no reserves) and 226 CH-46E aircraft (202 active + 24 reserve).
5. SLIDING RESCUE HATCH (HELL HOLE DOOR): This ECP is complete.

DEVELOPMENT STATUS/MAJOR DEVELOPMENT MILESTONES:

1. UTILITY HYDRAULIC SYSTEM REDESIGN: The nonrecurring engineering is in work. Preliminary design and prototyping scheduled for FY2004, VAL/VER in FY2005 and production installation concurrent with SDLM in FY2006.
2. LOWER DUAL BOOST ACTUATOR: Redesign of LDBA manifold in work. Procurement of improved manifolds scheduled for 3rd QTR FY2004.
3. NVG COMPATIBLE COCKPIT DOME LIGHT: Design of NVG compatible lighting complete. ECP approved and kits procured and are delivering. Squadron level installation scheduled to begin 2nd QTR FY2004.
4. T58-16/402 RUNNING ENGINE WASH: The H-46D model ECP was approved in Nov 97, and the CH-46E model ECP was approved in Dec 1997. Kit installations were originally planned to be at O-Level. However, significant problems were encountered installing and operating the wash system, so the H-46 FST re-designed the modification and submitted a new ECP that was approved in May 2000. The revised modification installs an airframe and engine modification kit at the D-level. Production installs are ongoing. This ECP is being installed concurrent with the H-46 Engine Control System Retrofit (OSIP 28-99).
5. SLIDING RESCUE HATCH (HELL HOLE DOOR): This upgrade is complete.

FINANCIAL PLAN: (TOA, $ in Millions)

	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY2009		To Complete		Total	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$
RDT&E																				
PROCUREMENT																				
Installation Kits																				
Hydraulic Sys Upgrade (D)	81	1.1																		
Hydraulic Sys Upgrade (E)	229	3.3																		
Utility Hydraulic Sys Redesign (E)					47	0.2	56	0.2												
Lower Dual Boost Actuat (E)					47	0.4	56	0.5												
NVG Compatible Cockpit (D)	81	3.0																		
NVG Cockpit Dome Light (D/E)					291	0.3														
T58 Running Engine Wash																				
PPC-165 (D Engine)	81	0.1																		
AFC-477 (D Aircraft)	65	0.1																		
PPC-165 (E Engine)	687	0.8																		
AFC-492 (E Aircraft)	123	0.2	71	0.2																
Sliding Rescue Hatch (D & E)	66	0.8																		
Installation Kits N/R		1.3		0.1		0.7														
Installation Equipment																				
XXX Equip																				
Installation Equipment N/R																				
Engineering Change Orders																				
XXX Kit ECO XXX																				
XXX Equip ECO XXX																				
Data		0.3				0.4														
Training Equipment	5	*																		
Support Equipment		*																		
ILS		0.3																		
Other Support		1.0		0.4		0.7		0.5												
Interim Contractor Support																				
Installation Cost	509	2.5	59	0.2	72	0.2	47	0.8												
Total Procurement		**14.9**		**0.9**		**2.9**		**1.9**												

Notes:

1. Totals may not add due to rounding
2. Asterisk indicates amount less than $50K

Exhibit P-3a

MODELS OF SYSTEMS AFFECTED: **H-46**

MODIFICATION TITLE: Safety Improvement Program (Running Engine Wash modification)

INSTALLATION INFORMATION:

METHOD OF IMPLEMENTATION: **Government Owned Contractor Operated (GOCO) Field Mod Team (FMT)**

ADMINISTRATIVE LEADTIME: 5 Months

PRODUCTION LEADTIME: 5 Months

CONTRACT DATES: FY 2003: Feb-03 FY 2004: N/A FY 2005: N/A

DELIVERY DATE: FY 2003: Jul-03 FY 2004: N/A FY 2005: N/A

($ in Millions)

Cost:	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY 2009		To Complete		TOTAL	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	**$**
FY 2002 & PY (569) kits	509	2.5	59	0.2	1	*														
FY 2003 (71) kits					71	0.2														
FY 2004 ( ) kits																				
FY 2005 ( ) kits																				
FY 2006 ( ) kits																				
FY 2007 ( ) kits																				
FY 2008 ( ) kits																				
FY 2009 ( ) kits																				
To Complete (32) kits																				
TOTAL	**509**	**2.5**	**59**	**0.2**	**72**	**0.2**														

Note: Prior year figures include several D-level modifications including NVG Compatible Cockpit, Running Engine Wash, Sliding Rescue Hatch, and EEDS Removal. FY02 and out figures only include the Running Engine Wash modification.

Installation Schedule

	FY 2002	FY 2003				FY 2004				FY 2005				FY 2006				FY 2007			
	& Prior	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
In	509	15	15	15	14	18	18	18	18												
Out	492	17	15	15	15	14	18	18	18	18											

	FY 2008				FY 2009				To	
	1	2	3	4	1	2	3	4	Complete	TOTAL
In										
Out										

Exhibit P-3a

MODELS OF SYSTEMS AFFECTED: **CH-46E**

MODIFICATION TITLE: Safety Improvement Program (Utility Hydraulic System Redesign & Lower Dual Boost Actuator modifications)

INSTALLATION INFORMATION:

METHOD OF IMPLEMENTATION: **Government Owned Contractor Operated (GOCO) Field Mod Team (FMT)**

ADMINISTRATIVE LEADTIME: 3 Months

PRODUCTION LEADTIME: 12 Months

CONTRACT DATES: FY 2003: N/A FY 2004: Dec-03 FY 2005: Dec-04

DELIVERY DATE: FY 2003: N/A FY 2004: Dec-04 FY 2005: Dec-05

($ in Millions)

Cost:	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY 2009		To Complete		TOTAL	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	**$**
FY 2002 & PY ( ) kits																				
FY 2003 ( ) kits																				
FY 2004 (47) kits							47	0.8												
FY 2005 (56) kits																				
FY 2006 () kits																				
FY 2007 () kits																				
FY 2008 ( ) kits																				
FY 2009 ( ) kits																				
To Complete ( ) kits																				
TOTAL							**47**	**0.8**												

Installation Schedule

	FY 2002	FY 2003				FY 2004				FY 2005				FY 2006				FY 2007			
	& Prior	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
In											15	16	16								
Out												15	16								

	FY 2008				FY 2009				To	
	1	2	3	4	1	2	3	4	Complete	TOTAL
In										
Out										

Exhibit P-3a Individual Modification

MODIFICATION TITLE: Engine Control System (ECS) Retrofit (OSIP 28-99)

MODELS OF SYSTEMS AFFECTED: H-46 TYPE MODIFICATION: Safety (HONA Category A)

DESCRIPTION/JUSTIFICATION: The current H-46 Engine Condition Control System (ECCS) has several failure modes which cause engines to shut down in flight; this presents a significant safety hazard to the fleet. Three bulletins have been issued by NAVAIR to inspect for system deficiencies. A formal system safety analysis utilizing historical failure data defines this as a Category One hazard and predicts six to seven failures per year. In the last three and a half years there have been 35 hazard reports (HAZREPs) issued documenting this failure mode, and it is estimated that 20 more have occurred which have not been reported through the HAZREP system. The aircraft has a limited single engine operating envelope and is vulnerable to engine failure while flying and hovering over water. There have been five aircraft lost at sea in which pilots reported engine failure as the cause of the mishap. The aircraft were not recovered, and therefore, the specific engine failure mode could not be determined, but it is likely that ECCS caused some of the engine failures and ultimately led to the loss of aircraft. The proposed solution to this safety problem is to convert to an alternative Engine Control System (ECS) utilized by the commercial variant of the H-46. The proposed ECS will eliminate the safety failure modes, has a proven track record, needs only slight modification for military use, increases reliability, and will increase aircraft capability through increased engine responsiveness. Implementation will require configuration changes to the airframe and the engine. This is an urgent safety issue that must be resolved to eliminate future loss of crew and aircraft. This modification is being installed on 65 H-46D aircraft (all active); and on 226 CH-46E aircraft (202 active + 24 reserve).

DEVELOPMENT STATUS/MAJOR DEVELOPMENT MILESTONES: The contract for Proof of Concept, validation and verification (val/ver) kits for this Non-Development Item (NDI) was awarded May 1999, and the Engineering Change Proposal (ECP) was approved Jun 2000. Validation installation for D-model was completed 2nd quarter FY2001, followed immediately by Electromagnetic Interface (EMI) testing and Verification installation in 3rd quarter FY2001. Production installations in Navy D-models are complete. The CH-46E Validation/Verification installation and Electromagnetic Compatibility (EMC) testing are complete, and production E-model installations are in process.

FINANCIAL PLAN: (TOA, $ in Millions)

	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY2009		To Complete		Total	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$
RDT&E																				
PROCUREMENT																				
Installation Kits																				
A-Kit D-Model Airframe Kit	63	0.4																		
A-Kit E-Model Airframe Kit	122	1.4	71	0.9	32	0.4														
B-Kit D&E-Model Airframe Kit	185	11.2	23	1.3	32	1.8														
B-Kit (RILOP)					37	*	26	*												
Overspeed Kit (D/E-Model)	370	1.6	142	0.7	64	0.3														
QEC-3 (D-Aircraft)	130	0.5																		
QEC-4 (E-Aircraft)	246	0.6	142	0.2	64	0.1														
Fuel Line Assy Kit (D-Aircraft)	63	0.1																		
Fuel Priming System (D-Aircraft)		0.1																		
Installation Kits N/R	3	4.8																		
Installation Equipment																				
Control Boxes	79	0.3																		
Engine Condition Actuator						0.1														
Installation Equipment N/R																				
Engineering Change Orders		0.2		0.5																
Actuator Mod																				
XXX Equip ECO XXX																				
Data		1.0		*		0.1														
Training Equipment	8	0.5																		
Support Equipment		0.5																		
ILS		1.3		0.3		0.3														
Other Support		3.0		1.0		0.7		0.4												
Interim Contractor Support																				
Installation Cost	117	4.0	72	2.3	72	2.8	32	1.6												
Total Procurement		**31.5**		**7.1**		**6.5**		**2.1**												

Notes:

1. Totals may not add due to rounding
2. Asterisk indicates amount less than $50K

Exhibit P-3a

MODELS OF SYSTEMS AFFECTED: **H-46 (OSIP 28-99)**

MODIFICATION TITLE: **ENGINE CONTROL SYSTEM RETROFIT**

INSTALLATION INFORMATION:

METHOD OF IMPLEMENTATION: **Government Owned Contractor Operated (GOCO) Field Mod Team**

ADMINISTRATIVE LEADTIME: 3 Months

PRODUCTION LEADTIME: 7 Months

CONTRACT DATES: FY 2003: May-03 FY 2004: Dec-03 FY 2005: N/A

DELIVERY DATE: FY 2003: Dec-03 FY 2004: Jul-04 FY 2005: N/A

($ in Millions)

Cost:	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY 2009		To Complete		TOTAL	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	**$**
FY 2002 & PY (190) kits	117	4.0	72	2.3	1															
FY 2003 (71) kits					71	2.8														
FY 2004 (32) kits							32	1.6												
FY 2005 ( ) kits																				
FY 2006 ( ) kits																				
FY 2007 ( ) kits																				
FY 2008 ( ) kits																				
FY 2009 ( ) kits																				
To Complete ( ) kits																				
TOTAL	**117**	**4.0**	**72**	**2.3**	**72**	**2.8**	**32**	**1.6**												

Installation Schedule

	FY 2002	FY 2003				FY 2004				FY 2005				FY 2006				FY 2007			
	& Prior	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
In	117	18	18	18	18	18	18	18	18	16	16										
Out	97	20	18	18	18	18	18	18	18	18	16	16									

	FY 2008				FY 2009				To	
	1	2	3	4	1	2	3	4	Complete	TOTAL
In										
Out										

Exhibit P-3a

Individual Modification

MODIFICATION TITLE: Electrical System Upgrade (OSIP 29-99)

MODELS OF SYSTEMS AFFECTED: CH-46E

TYPE MODIFICATION: Safety (HONA Category A)

DESCRIPTION/JUSTIFICATION: This program contains the following Engineering Change Proposals:
1. GENERATOR CONTROL UNIT: The power generation system has been the cause of ten hazard reports (HAZREP) over the past three years. The causal factor has been traced back to the generators and the voltage control system. Two incidents resulted in dual generator failure, and seven incidents resulted in aircraft smoking/fires. (One of those fires was caused by flammable fluid ingestion into the generator that turned a hydraulic leak into a massive fire that consumed the entire aircraft in a Class A mishap.) A formal system safety analysis utilizing historical failure data defines this hazard as a potential Category One hazard and predicts two to three failures per year. This is an urgent safety problem that must be alleviated to eliminate loss of life and aircraft. The proposed solution is to modify the power generation system to eliminate the safety problem, provide cleaner power to sensitive avionics components, and improve performance of the generator to meet the power demand for future electrical installation in the aircraft. This modification will be installed in 224 CH-46E aircraft (200 active + 24 reserve).
2. GENERATOR UPGRADE: The aircraft generator has been identified by NAVAIRSYSCOM System Safety Office as having a Hazard Risk Index of 6 to 8. Generator failures compounded with hydraulic fluid leakage / misting, chafing or failed lines, pose an in-flight fire hazard. Procuring lightweight modern generators is expected to mitigate this safety hazard and save approximately 40 pounds for the CH-46E.

DEVELOPMENT STATUS/MAJOR DEVELOPMENT MILESTONES:
1. GENERATOR CONTROL UNIT: The contract for development and qualification of a new generator control panel awarded in Jun 2000. Preliminary Design Reviews (PDR) have been completed as well as breadboard and bench testing. Validation / Verification installations and environmental testing are complete. Production modification kits deliveries began delivering in Sep 2002, and installations are ongoing.
2. GENERATOR UPGRADE: This modification is programmed to begin in FY2005.

FINANCIAL PLAN: (TOA, $ in Millions)

	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY2009		To Complete		Total	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$
RDT&E																				
PROCUREMENT																				
Installation Kits																				
A- Kit							15	0.8												
XXX Kit																				
XXX Kit																				
Installation Kits N/R		0.7						1.0												
Installation Equipment																				
Main Generator Control Unit (GCU)	138	0.4	104	0.3	128	0.3														
Auxiliary Power GCU	69	0.2	52	0.1	64	0.2														
Generator								0.2												
Installation Equipment N/R	6	0.8																		
Engineering Change Orders																				
XXX Kit ECO XXX																				
XXX Equip ECO XXX																				
Data						0.1														
Training Equipment	6	0.6																		
Support Equipment	12	0.1	12	0.1																
ILS		0.2		0.3		0.2		0.2												
Other Support		1.5		0.4		0.5		0.4												
Interim Contractor Support																				
Installation Cost																				
Total Procurement		**4.4**		**1.1**		**1.3**		**2.6**												

Notes:
1. Totals may not add due to rounding
2. Asterisk indicates amount less than $50K

Exhibit P-3a

MODELS OF SYSTEMS AFFECTED: **CH-46E**

MODIFICATION TITLE: Electrical System Upgrade (Generator Upgrade)

INSTALLATION INFORMATION:

METHOD OF IMPLEMENTATION: **To be installed concurrent with SDLM / IMC at NADEP Cherry Pt**

ADMINISTRATIVE LEADTIME: 9 Months

PRODUCTION LEADTIME: 6 Months

CONTRACT DATES: FY 2003: N/A FY 2004: N/A FY 2005: Jun-05

DELIVERY DATE: FY 2003: N/A FY 2004: N/A FY 2005: Dec-05

($ in Millions)

Cost:	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY 2009		To Complete		TOTAL	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	**$**
FY 2002 & PY ( ) kits																				
FY 2003 ( ) kits																				
FY 2004 ( ) kits																				
FY 2005 (15) kits																				
FY 2006 () kits																				
FY 2007 () kits																				
FY 2008 ( ) kits																				
FY 2009 ( ) kits																				
To Complete () kits																				
TOTAL																				

Installation Schedule

	FY 2002	FY 2003				FY 2004				FY 2005				FY 2006				FY 2007			
	& Prior	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
In																					
Out																					

	FY 2008				FY 2009				To	
	1	2	3	4	1	2	3	4	Complete	TOTAL
In										
Out										

Exhibit P-3a

Individual Modification

MODIFICATION TITLE: T-58 Engine Reliability Improvement Program (ERIP) (OSIP 15-01)

MODELS OF SYSTEMS AFFECTED: CH-46E (T58-GE-16 Engine)

TYPE MODIFICATION: Safety (HONA Category A)

DESCRIPTION/JUSTIFICATION: T58-GE-16 reliability and performance trends are unacceptable, and are severely impacting Fleet safety, readiness and war fighting capability. The T58-GE-16 Mean Time Between Repairs (MTBR) is projected to fall below 320 hours by FY2002 and will require 309 major repairs per year. The NAVAIR System Safety Team has determined that the current Hazard Risk Index (HRI) for the T58-GE-16 is "IIC" (critical, occasional) and trending towards "IIB" (critical, probable). The CH-46E Helicopter must be logistically supported until at least 2012, however T58-GE-16 support costs are being driven to unaffordable levels. This program will drastically improve Fleet operating safety and readiness, while providing tremendous reductions in maintenance man-hours and Operations & Support (O&S) costs. Funds support production and procurement of a T58-GE-16 engine core or "Gas Path", depot overhaul of key engine accessories, incorporation of all approved engine Component Improvement Program (CIP) changes, and depot final assembly of manufacturer delivered "Gas Path" with accessory components. This program is projected to restore a 900-hour (MTBR), improve performance to the original power specification, and reduce the major engine repairs per year to 70 in FY2006. This modification will be installed in 223 aircraft (199 active + 24 reserve).

DEVELOPMENT STATUS/MAJOR DEVELOPMENT MILESTONES: Congress approved $3M plus-up in FY2001 for risk mitigation, prototypes and non-recurring engineering; the contract for these efforts awarded in Jan 2001. The prototype engine gas path modules were delivered in Apr 2002, and the engine prototypes were completed in Jul 2002. An Low Rate Initial Production (LRIP) contract was awarded in Aug 2002, and gas path module deliveries started in Jan 2003. Approval for Full Rate Production (FRP) was granted and a production lot was ordered in Mar 2003. Installations are ongoing.

FINANCIAL PLAN: (TOA, $ in Millions)

	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY2009		To Complete		Total	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$
RDT&E																				
PROCUREMENT																				
Installation Kits																				
Gas Path Module Kit	30	15.2	77	38.2	102	47.5	86	38.7												
Accessory Kit	41	0.4	101	0.8	113	0.9	44	0.4												
T-5 Harness Kit	20	*	23	0.1	31	0.1	27	0.1												
Installation Kits N/R	3	4.6		2.7																
Installation Equipment																				
XXX Equip																				
Installation Equipment N/R																				
Engineering Change Orders																				
Preplanned Product Improvement																				
Erosion Blade Coating NRE				0.4		0.4														
Erosion Blade Coating Prod Cut-In					56	2.6	86	3.6												
Erosion Blade Coating Retrofit Kits					33	2.1	77	5.0												
Start Bleed Valves				0.2																
Data		0.6		0.2		0.7		0.9												
Training Equipment				0.2		1.0		1.0												
Support Equipment		1.3	3	2.1	4	3.5		1.4												
ILS																				
Other Support		2.9		2.6		4.3		4.3												
Interim Contractor Support																				
Installation Cost	1	1.7		1.3	3	1.6	4	1.0												
Total Procurement		**26.6**		**48.7**		**64.7**		**56.4**												

Notes:

1. Totals may not add due to rounding
2. Asterisk indicates amount less than $50K

Exhibit P-3a

MODELS OF SYSTEMS AFFECTED: CH-46E (T58-GE-16 Engine)

MODIFICATION TITLE: T-58 Engine Reliability Improvement Program (Engine Modification)

INSTALLATION INFORMATION:

METHOD OF IMPLEMENTATION: Modify engine and engine accessories concurrent with repair at NADEP Cherry Point

ADMINISTRATIVE LEADTIME: 2 Months

PRODUCTION LEADTIME: 7 Months

CONTRACT DATES: FY 2003: Mar-03 FY 2004: Nov-03 FY 2005: Nov-04

DELIVERY DATE: FY 2003: Sep-03 FY 2004: Jun-04 FY 2005: May-05

($ in Millions)

Cost:	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY 2009		To Complete		TOTAL	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	**$**
FY 2002 & PY (22) kits	9	1.7	8	1.3	5	0.8														
FY 2003 ( ) kits																				
FY 2004 ( ) kits																				
FY 2005 ( ) kits																				
FY 2006 ( ) kits																				
FY 2007 ( ) kits																				
FY 2008 ( ) kits																				
FY 2009 ( ) kits																				
To Complete ( ) kits																				
TOTAL	**9**	**1.7**	**8**	**1.3**	**5**	**0.8**														

Note: Installation funding includes: 1. Modification of prototype T58-16A engine, and 2. modification of (8) accessory shipsets in FY02 + (8) accessory shipsets in FY03 + (5) accessory shipsets in FY04.

Installation Schedule

	FY 2002	FY 2003				FY 2004				FY 2005				FY 2006				FY 2007			
	& Prior	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
In	9	2	2	2	2	2	2	1													
Out	6	3	2	2	2	2	2	2	1												

	FY 2008				FY 2009				To	
	1	2	3	4	1	2	3	4	Complete	TOTAL
In										
Out										

Exhibit P-3a

MODELS OF SYSTEMS AFFECTED: **CH-46E (T58-GE-16 Engine)**

MODIFICATION TITLE: T-58 Engine Reliability Improvement Program (Automated Data Acquisition System-ADAS- and Test Cell Modification)

INSTALLATION INFORMATION:

METHOD OF IMPLEMENTATION: **Contractor Field Mod Team**

ADMINISTRATIVE LEADTIME: 4 Months

PRODUCTION LEADTIME: 4 Months

CONTRACT DATES: FY 2003: Feb-04 FY 2004: Feb-04 FY 2005: N/A

DELIVERY DATE: FY 2003: May-04 FY 2004: Jun-04 FY 2005: N/A

($ in Millions)

Cost:	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY 2009		To Complete		TOTAL	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	**$**
FY 2002 & PY ( ) kits																				
FY 2003 (3) kits					3	0.8														
FY 2004 (4) kits							4	1.0												
FY 2005 ( ) kits																				
FY 2006 ( ) kits																				
FY 2007 ( ) kits																				
FY 2008 ( ) kits																				
FY 2009 ( ) kits																				
To Complete ( ) kits																				
TOTAL					**3**	**0.8**	**4**	**1.0**												

Installation Schedule

	FY 2002	FY 2003				FY 2004				FY 2005				FY 2006				FY 2007			
	& Prior	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
In									3	2	2										
Out										3	2	2									

	FY 2008				FY 2009				To	
	1	2	3	4	1	2	3	4	Complete	TOTAL
In										
Out										

Exhibit P-3a

Individual Modification

MODIFICATION TITLE: Aircraft Integrated Maintenance System (AIMS) (OSIP 10-03)

MODELS OF SYSTEMS AFFECTED: CH-46E

TYPE MODIFICATION: R&M (HONA Category B)

DESCRIPTION/JUSTIFICATION: AIMS is a Commercial Off The Shelf (COTS) vibration monitoring system to be permanently installed in the aircraft. AIMS is a comprehensive set of aircraft monitoring hardware and support software. The purpose of the system is to build support equipment functions into the aircraft as a permanent installation. Thus, AIMS will eliminate most H-46 peculiar support equipment requirements. This equipment will provide aircrews immediate feedback on aircraft condition and engine performance, which enhances the ability to predict catastrophic failures and reduces maintenance costs. In 1997, PMA226 fielded new vibration equipment to a small sample of H-46 aircraft and implemented a 100 hour vibration monitoring check. Since implementation, vibration monitoring has been instrumental in predicting (and preventing) impending component failures. For example, vibration data was received from an aircraft that had undergone three aft transmission removals for input pinion seal leakage. Analysis of the vibration monitoring data revealed a major problem with the #2 engine. Further investigation of the engine revealed impending failure of the right angle drive bearings. Failure of the engine may have resulted in damage or loss of the aircraft. Another example is an aircraft that, while performing a 100 hour vibration check, experienced aft transmission vertical vibration levels that exceeded acceptable limits. Further investigation revealed impending failure of the electrical generator. Without vibration monitoring, the problem with the generator would have gone undetected until catastrophic failure. Failure of the generator may have resulted in an electrical fire and/or collateral damage to the aircraft. This modification will be installed in 154 aircraft (130 active + 24 reserve).

DEVELOPMENT STATUS/MAJOR DEVELOPMENT MILESTONES: Contracts to integrate the COTS into the H-46 aircraft, design an installation kit, modify Control Data Navigation Unit (CDNU) software, and prepare technical data were awarded in Jun 2003. Prototype delivery scheduled in Feb 2004, Critical Design Review (CDR) in Apr 2004, Validation / Verification scheduled for July 2004 . The first production lot is scheduled to be ordered in Jul 2004.

FINANCIAL PLAN: (TOA, $ in Millions)

	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY2009		To Complete		Total	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$
RDT&E																				
PROCUREMENT																				
Installation Kits																				
A- Kit					15	0.8	68	3.9												
XXX Kit																				
XXX Kit																				
Installation Kits N/R			4	4.0																
Installation Equipment																				
XXX Equip																				
Installation Equipment N/R																				
Engineering Change Orders																				
XXX Kit ECO XXX																				
XXX Equip ECO XXX																				
Data						0.1		0.2												
Training Equipment					2	0.1		*												
Support Equipment					8	0.1	34	0.3												
ILS																				
Other Support				0.9		1.6		1.2												
Interim Contractor Support																				
Installation Cost					4	0.2	44	1.0												
Total Procurement				**4.9**		**2.9**		**6.6**												

Notes:

1. Totals may not add due to rounding
2. Asterisk indicates amount less than $50K

Exhibit P-3a

MODELS OF SYSTEMS AFFECTED: **CH-46E**

MODIFICATION TITLE: Aircraft Integrated Maintenance System (AIMS) (OSIP 10-03)

INSTALLATION INFORMATION:

METHOD OF IMPLEMENTATION: **Government Owned Contractor Operated (GOCO) Field Mod Teams**

ADMINISTRATIVE LEADTIME: 2 Months

PRODUCTION LEADTIME: 8 Months

CONTRACT DATES: FY 2003: Jun-03 FY 2004: Jul-04 FY 2005: Nov-04

DELIVERY DATE: FY 2003: Feb-04 FY 2004: Mar-05 FY 2005: Jul-05

($ in Millions)

Cost:	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY 2009		To Complete		TOTAL	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	**$**
FY 2002 & PY ( ) kits																				
FY 2003 (4) kits					4	0.2														
FY 2004 (17) kits							17	0.4												
FY 2005 (68) kits							27	0.6												
FY 2006 () kits																				
FY 2007 ( ) kits																				
FY 2008 ( ) kits																				
FY 2009 ( ) kits																				
To Complete () kits																				
TOTAL					**4**	**0.2**	**44**	**1.0**												

Installation Schedule

	FY 2002	FY 2003				FY 2004				FY 2005				FY 2006				FY 2007			
	& Prior	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
In							2		2		8	18	18								
Out								2		2		8	18								

	FY 2008				FY 2009				To	
	1	2	3	4	1	2	3	4	Complete	TOTAL
In										
Out										

Exhibit P-3a

Individual Modification

MODIFICATION TITLE: Light Weight Armor Replacement System (LWARS) OSIP 20-04

MODELS OF SYSTEMS AFFECTED: CH-46E

TYPE MODIFICATION: Safety (HONA Category A)

DESCRIPTION/JUSTIFICATION: The efficiency of the CH-46E to perform the medium lift assault support mission largely depends on aircraft payload. The empty weight of the aircraft has increased significantly over the aircraft's more than 39 years of service, limiting payload and range, and degrading mission performance. The CH-46E aircraft has engine protective metallic armor plates on the aft pylon and around the flight control closet that are capable of protecting the aircraft from small arms fire (.30 cal; 7.62 mm round). Non-developmental armor systems exist to replace the existing steel plate armor with a lighter weight substitute, providing the same or better ballistic protection and a 35% weight reduction from the existing armor system. Reducing the empty weight of the aircraft is an extremely viable means of restoring mission effectiveness.

DEVELOPMENT STATUS/MAJOR DEVELOPMENT MILESTONES: The request for proposal (RFP) was issued in Dec 2003, and the contract is expected to be awarded in Apr 2004. The prototype system is expected to deliver and undergo fit-check in 4th quarter 2004, to be immediatley followed by exercise of the production option. This system will be installed by the Fleet as an Organizational Level maintenance change.

FINANCIAL PLAN: (TOA, $ in Millions)

	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY2009		To Complete		Total	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$
RDT&E																				
PROCUREMENT																				
Installation Kits					147	0.3														
Provision Kit																				
XXX Kit																				
XXX Kit																				
Installation Kits N/R						0.2														
Installation Equipment																				
Armor Equip					147	3.5														
Installation Equipment N/R						0.3														
Engineering Change Orders																				
XXX Kit ECO XXX																				
XXX Equip ECO XXX																				
Data						0.1														
Training Equipment					4	0.1														
Support Equipment						0.1														
ILS						0.3														
Other Support						1.1														
Interim Contractor Support																				
Installation Cost																				
Total Procurement						**6.0**														

Notes:

1. Totals may not add due to rounding
2. Asterisk indicates amount less than $50K

Exhibit P-3a

MODELS OF SYSTEMS AFFECTED: **CH-46E**

MODIFICATION TITLE: Light Weight Armor (LWARS) OSIP 20-04

INSTALLATION INFORMATION:

METHOD OF IMPLEMENTATION: **Fleet O-Level Maintenance Activity**

ADMINISTRATIVE LEADTIME: 6 Months

PRODUCTION LEADTIME: 4 Months

CONTRACT DATES: FY 2003: N/A FY 2004: Apr-04 FY 2005: N/A

DELIVERY DATE: FY 2003: N/A FY 2004: Aug-04 FY 2005: N/A

($ in Millions)

Cost:	Prior Years		FY 2003		FY 2004		FY 2005		FY 2006		FY 2007		FY 2008		FY 2009		To Complete		TOTAL	
	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	$	Qty	**$**
FY 2002 & PY ( ) kits																				
FY 2003 (4) kits																				
FY 2004 (17) kits																				
FY 2005 (68) kits																				
FY 2006 () kits																				
FY 2007 ( ) kits																				
FY 2008 ( ) kits																				
FY 2009 ( ) kits																				
To Complete () kits																				
TOTAL																				

Installation Schedule

	FY 2002 & Prior	FY 2003				FY 2004				FY 2005				FY 2006				FY 2007			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
In									1			30	30								
Out									1				30								

	FY 2008				FY 2009				To Complete	TOTAL
	1	2	3	4	1	2	3	4		
In										
Out										