NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

EXAMINATION OF THE FLYING HOUR PROGRAM (FHP) BUDGETING PROCESS AND AN ANALYSIS OF COMMANDER NAVAL AIR FORCES PACIFIC (CNAP) FHP UNDERFUNDING

by

Peter J. Keating
David A. Paulk

December 1998

Thesis Advisor:	Lawrence R. Jones
Associate Advisor:	John E. Mutty

Approved for public release; distribution is unlimited

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	December 1998	Master's Thesis

4. TITLE AND SUBTITLE
Examination of the Flying Hour Program (FHP) Budgeting Process and an Analysis of Commander Naval Air Forces Pacific (CNAP) FHP Underfunding

5. FUNDING NUMBERS

6. AUTHOR
Keating, Peter J. and Paulk, David A.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey, CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
N/A

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT (maximum 200 words)

This thesis examines the Commander Naval Air Forces Pacific (CNAP) Flying Hour Program (FHP) budget process and analyzes the issues causing underfunding in that program. The Department of the Navy Flying Hour Program (FHP) is used to fund requirements and justify the resources required to train aviation crews and maintain Navy / Marine Corps aircraft. The thesis begins with a comprehensive overview of the FHP, including how flying hour requirements are determined and how the funding process operates. It then analyzes the major factors contributing to CNAP perennial FHP underfunding and resource variability. Information to explain FHP underfunding is widely distributed. The thesis provides a single source reference to help CNAP FHP managers and budget personnel better understand the FHP budgeting process, including historical and current causes of program underfunding.

This research concludes that key causes of CNAP FHP underfunding and related problems are: 1) Budget process dynamics, including limited resources and competing priorities, 2) Unplanned and unfunded requirements, 3) Deficiencies in FHP forecasting methodology, particularly the failure to incorporate the cost of previous year program funding shortfalls, 4) Poor AVDLR component reliability, 5) Integrated Logistics Support (ILS) deficiencies, and 6) Variability in AVDLR pricing methodology and NWCF surcharges.

The final chapter provides conclusions to address CNAP FHP underfunding and related problems. It also includes analysis of alternative budget reform concepts intended to minimize defense resource variability and increase budgeting efficiency. Finally, it suggests areas for further research.

14. SUBJECT TERMS
Flying Hour Program, DoD Budgeting and Execution, Planning Programming and Budgeting System, Naval Aviation Supply and Maintenance

15. NUMBER OF PAGES
260

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18 298-102

Approved for public release; distribution is unlimited

EXAMINATION OF THE FLYING HOUR PROGRAM (FHP) BUDGETING PROCESS AND AN ANALYSIS OF COMMANDER NAVAL AIR FORCES PACIFIC (CNAP) FHP UNDERFUNDING

Peter J. Keating
Major, United States Marine Corp
B.S., Long Island University, 1986

David A. Paulk
Lieutenant Commander, United States Navy
B.S., Trinity University, 1981

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December 1998

Author: Peter J. Keating

Author: David A. Paulk

Approved by: Lawrence R. Jones, Thesis Advisor

John E. Mutty, Associate Advisor

Reuben T. Harris, Chairman
Department of Systems Management

ABSTRACT

This thesis examines the Commander Naval Air Forces Pacific (CNAP) Flying Hour Program (FHP) budget process and analyzes the issues causing underfunding in that program. The Department of the Navy Flying Hour Program (FHP) is used to fund requirements and justify the resources required to train aviation crews and maintain Navy / Marine Corps aircraft. The thesis begins with a comprehensive overview of the FHP, including how flying hour requirements are determined and how the funding process operates. It then analyzes the major factors contributing to CNAP perennial FHP underfunding and resource variability. Information to explain FHP underfunding is widely distributed. The thesis provides a single source reference to help CNAP FHP managers and budget personnel better understand the FHP budgeting process, including historical and current causes of program underfunding.

This research concludes that key causes of CNAP FHP underfunding and related problems are: 1) Budget process dynamics, including limited resources and competing priorities, 2) Unplanned and unfunded requirements, 3) Deficiencies in FHP forecasting methodology, particularly the failure to incorporate the cost of previous year program funding shortfalls, 4) Poor AVDLR component reliability, 5) Integrated Logistics Support (ILS) deficiencies, and 6) Variability in AVDLR pricing methodology and NWCF surcharges.

The final chapter provides conclusions to address CNAP FHP underfunding and related problems. It also includes analysis of alternative budget reform concepts intended to minimize defense resource variability and increase budgeting efficiency. Finally, it suggests areas for further research.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

I. INTRODUCTION

A. BACKGROUND

The purpose of this section is to introduce the Navy Flying Hour Program (FHP) and highlight the strategic importance of U.S. Naval Aviation. Since the FHP receives funding through the Defense budget process, an assessment of the current Defense budgeting environment is presented as well. Prior to transitioning to the purpose and scope of the thesis outlined in section B, the basis and focus of the research will be explained.

> Naval Aviation plays a central role in every naval mission, from establishing battlespace dominance to power projection ashore. In a world in which the United States has vital interests overseas, Navy and Marine Corps forces provide key forward-presence, crisis-response, and warfighting capabilities to our nation's leaders and joint commanders. Thus, forward-deployed naval forces and Naval Aviation are a superb means of signaling U.S. capabilities and resolve to friends and foes alike [Ref. 1].

This passage taken from the Navy and Marine Corps document, *Naval Aviation...Forward Air Power...From the Sea*, underscores the importance of Naval Airpower as one of the key instruments in facilitating the objectives outlined in the current National Military Strategy Document (NMSD). To effectively translate these words into actual capabilities, Congress appropriates Operations and Maintenance (O&M) funding to the Navy on an annual basis. On average, approximately $3.2 billion dollars are allocated by the Secretary of the Navy (SECNAV) and Chief of Naval Operations (CNO) to operate and maintain the Navy's aviation capability on an annual basis. The system used to determine the annual flying hour requirements and the necessary level of funding, is the Department of the Navy (DoN) Flying Hour Program (FHP). The overarching objective and purpose of the Flying Hour Program is 1) to produce highly trained proficient aircrews who are capable of executing the operational requirements of the unified commanders (CINCs), and 2) to maintain and improve material readiness of the Navy-Marine Corps aircraft inventory. As a budgeting mechanism, the Flying Hour Program is the Navy's means to forecast, budget and justify the fiscal resources required for operating and maintaining all Navy and Marine Corps aircraft. The FHP budget process is extremely complex because it incorporates a wide range of warfare communities, levels of command (extending from the squadron to the CNO), agencies and functional areas of responsibility. The FHP is also subject to many variable factors, which compound its complexity. These variable factors range from budget process dynamics, funding uncertainty, unplanned events, aircraft inventory changes, aircraft component modifications, cost increases and an environment of limited resources and competing priorities. The current Operating TEMPO and a shrinking defense budget have also impacted the DoN Flying Hour Program.

Since the end of the Cold War, the defense budget and force structure have been cut dramatically. Downsizing and a decreasing defense budget are not necessarily problematic as long as cuts are done prudently and correspond with a reduction in mission. However, this has not been the case as evidenced by the following data regarding Navy and Marine Corps utilization around the globe:

> During the Cold War from 1946-1989, the Navy-Marine Corps team responded to some 190 crises, about one crises-response operation every 11 weeks. In about eighty percent of these situations, the focus of the U.S. response was an aircraft carrier battle group, an amphibious ready group and/or land-based naval air power. In the 1990-1997 period, the Navy and Marine Corps have been called upon to respond to crises and combat in over 75 instances or one crisis response every 3.5 weeks – more than double the Cold-War rate [Ref. 1].

Defense spending has decreased, but mission frequency has not. Today's military is forced to operate in a high OPTEMPO environment constrained by scarce fiscal resources. In terms of financial management, it is not only difficult to justify requirements during the budget process, it is particularly challenging for fleet comptrollers to meet readiness requirements while staying within assigned budget controls during execution.

A declining defense budget is not a new phenomenon and is consistent with the "boom and bust cycle" of defense spending as explicated by (Jones and Bixler 1992, pp. 9-11). Wildavsky also notes this budget instability and offers further insight as to what parts of the defense budget are consistently decreased.

> Both the services and Congress have strong incentives to cut. When Congress must make cuts, they are made along the path of least resistance. Traditionally, this means that when defense is cut the burden falls on the readiness [O&M] and manpower accounts of the services...since these accounts are quick money, resulting in an immediate decrease in outlays. When Congress is looking for an immediate way to cut a budget, these fast spend-out accounts produce quick results. In the environment of defense budgeting famine is expected to follow feast. When the famine hits, defense will most likely cut readiness and manpower, knowing that these funds are easiest to restore and quicker to build than major procurements. As a bonus to Congress and the military, manpower and readiness can be spread to preserve the force structure [Ref. 2].

Other factors contributing to the decline of defense spending are the stipulations outlined in the series of deficit reduction legislation (e.g. Gramm-Rudman-Hollings Act (GRH), and the Budget Enforcement Act (BEA, 1990)), and the fact that during peace, Congress and the general public perceive the defense budget as more discretionary. Despite severe cuts, the defense budget is still viewed by many citizens as a "cash cow". This perception is also a result of concern over the fiscal demands for resolving domestic social issues and the budget deficit (at least until FY98). Congress too has influenced public opinion on defense spending due to publicized debate over the size and efficiency of military departments [Ref. 5, pp. 87-126]. Another significant factor that leads to defense budget instability is the annualarity of the budget process itself. This short-term planning and execution cycle lends itself to excessive congressional oversight, control and hence, further reductions in appropriation accounts.

As noted earlier, the decreasing trend of defense funding has impacted the DoN Flying Hour Program as well, particularly since the utilization of Naval Aviation has not been proportionately decreased. Figure 1.1 depicts this trend from 1992 through 1997.

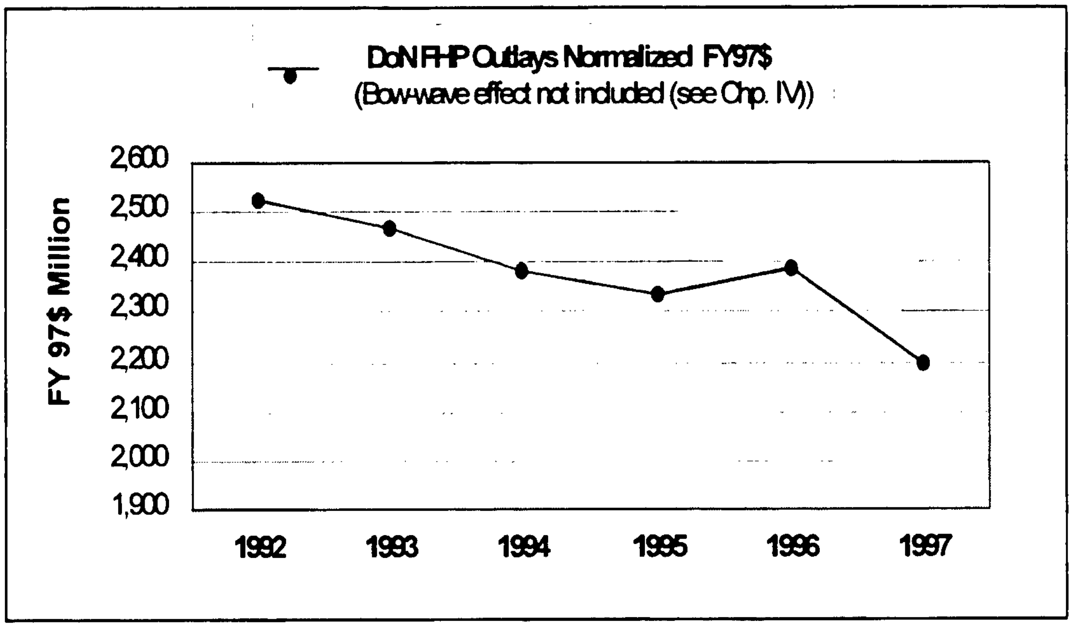

Figure 1.1. DoN FHP Funding Trend [Ref. 3]

This downward trend in funding has been compounded by increasing program costs and a budgeting environment of scarce resources and competing priorities. Due to rising FHP costs and this constrained fiscal environment, FHP supervisors and budget analysts are subject to increased pressure to ensure that flying hour requirements are accurately forecasted and allocated funds efficiently executed. However, the dynamics of the program often make these tasks extremely difficult. As a result, the FHP has been subject to a great deal of scrutiny. In fact Congress and the DoD have frequently studied the Flying Hour Program. Congress alone has directed the General Accounting Office (GAO) on four separate occasions (1976, 1979, 1983, and 1989) to investigate the efficacy of the Navy's processes in determining flying hour requirements. Today, DoD and congressional scrutiny persist, especially due to the trend in rising costs coupled with a decreasing level of aviation readiness. The most significant category of cost increase is the Aviation Depot Level Repairable (AVDLR). AVDLRs, which will be discussed further in Chapter IV, constitute approximately 51% of the DoN FHP budget and have been rising at an average annual cost of 7.5% since 1991. However, the rising cost of AVDLRs is only one cause of the increase in FHP costs and subsequent underfunding. As of this writing, several Navy and Marine Corps working groups have been convened to analyze the phenomena of rising costs, funding shortfalls and other related aviation logistic problems. The current effort has been directed by the CNO and is called the Aviation Maintenance and Supply Readiness group (AMSR). This study group is a Navy-Marine Corps wide effort to examine shortfalls in the Flying Hour Program, AVDLR concerns and recommend specific action to increase readiness and reduce aviation maintenance and supply costs. Several issues the AMSR group is studying are directly or indirectly related to the sources and factors that contribute to FHP underfunding. Therefore the AMSR forms the basis of the analysis in Chapters III and IV. Since the study evolved from funding shortfalls and related logistic problems experienced by fleet aviation units under the cognizance of CINCPACFLT, the Commander Naval Air Forces Pacific (CNAP) is the focus of this study. It is at this level that the FHP is initially managed and funds allocated to the aviation units who execute the program. Additionally, it is at the Air Type Commander level where the impact of program underfunding and variability must be managed.

In summary, this section highlighted the importance of Naval Aviation, introduced the DoN Flying Hour Program and briefly explained some of the variable factors that contribute to its complexity. The DoD budget environment and funding trends were presented to indicate the FHP is formulated and negotiated in a constrained fiscal setting. Finally, the basis and focus of this thesis was explained. The next section will state the objectives and scope of the thesis.

B. OBJECTIVES AND SCOPE

The primary purpose of this thesis is to explain the FHP budgeting process and examine the issues causing underfunding in the Commander Naval Air Forces Pacific (CNAP) Flying Hour Program. Since 1986, there have been several Naval Postgraduate School theses written about the DoN Flying Hour Program. These theses have examined portions of the budgeting process and various program costs and have proposed statistical models to improve forecasting requirements. Yet, none of this research has systematically examined the myriad of factors which cause the variability and underfunding of the program. Further, there is very little written that explains in any one document what constitutes the FHP, how the funding process works, and what problems can be expected during budget execution. Therefore, the objective of this thesis is to create a single source document that new FHP personnel may use to obtain a quick overview of the FHP, how the funding process works, and insight to some of the factors contributing to program underfunding and variability, during both budget formulation and execution. When the term variability is used, the authors are referring to unpredictable events or uncertainty. Specific examples include the unexpected failure of aircraft repair components before their planned failure rate and/or the funding uncertainty that may result from having to reprogram money for unplanned events during execution.

The final objective is to present alternative budget reform concepts, intended to minimize defense resource variability and increase budgeting effeciency.

C. RESEARCH QUESTIONS

The following research questions are addressed in the body of the thesis:

1. Primary Research Question

What variable factors and decisions ocurr during FHP budget formulation and execution that explain the historical and current underfunding of the Commander Naval Air Forces Pacific Flying Hour Program?

2. Secondary Research Questions

The secondary research questions are:

a. What is the purpose of the DoN Flying Hour Program (FHP) and how does the FHP budgeting and funding process work? Is the methodology for determining FHP requiremtnts adequate and valid?

b. What factors cause Cost Per Hour (CPH) increases and variance in CNAP FHP, and is the CPH an adequate metric for assigning program costs?

c. What are some of the reasons causing AVDLR cost increases?

d. To what extent is the Navy Working Capital Fund Surcharge and escalation rates impacting current year execution funds?

D. METHODOLOGY

The primary data source used in developing this thesis were personal interviews with current FHP managers, comptrollers and senior budgeting analysts from CNAP, Commander in Chief Pacific Fleet (CINCPACFLT), Naval Supply Systems Command (NAVSUP), Naval Supply Inventory Control Point Philadelphia (NAVICP-P), Assistant Chief of Naval Operations for Air Warfare (N-88), FMB, and DoD. To obtain the most objective information, several interviews were also conducted with personnel that formerly held these positions. Supplemental data were obtained through historical Flying Hour Cost Reports, Operation Plan 20's, previous theses, books, articles, federal publications and Navy policy documents and instructions. Professional briefing documents and working papers obtained from various Naval agencies and commands were also used.

E. THESIS OUTLINE

This thesis is organized in the following manner: Chapter I presents the introduction, purpose and scope of the thesis. This chapter also outlines the research questions, methodology, limitations and benefit of the study. FHP background information and a brief look at the current defense budgeting environment is provided.

Chapter II provides an overview of the Flying Hour Program budgeting and funding process. Since very little material is written on this complex process, it is our intent to create a comprehensive reference document that new FHP managers, and related personnel can read to gain insight into the FHP procedures and budgeting processes. The chapter is divided into six general sections. Section one begins with an overview of the DoD Resource Allocation Process (RAP), to include a summary of the Planning, Programming, and Budgeting Process (PPBS). Sections two and three will briefly describe the FHP funding structure and chain of command. Sections four and five provide a detailed explanation of the roles and functions of the FHP managers and budgeting personnel, from the squadron to the Major Claimant level, i.e. Commander in Chief Pacific Fleet (CINCPACFLT). Section six will conclude the overview of FHP budgeting with an analysis of the role and activities performed by the Navy's Special Assistant for the Flying Hour Program (N-88F), the Assistant Secretary of the Navy, (Financial Management and Comptroller) and OSD/OMB. An understanding of the intricate FHP budgeting process and the roles of participating budget players will help the reader comprehend the programs complexity and provide insight into the potential causes of underfunding. This Chapter will also explain the unique FHP terminology, cost components, source inputs/outputs and how requirements are determined.

Chapters III and IV are the main focus of the thesis and they analyze the primary issues contributing to CNAPs FHP underfunding. Chapter III is divided into four sections and analyzes budget formulation and other issues that may result in FHP underfunding. The first section describes budget process dynamics. The next section analyzes the impact of competing priorities and limited fiscal resources manifested in budget formulation and program trade-off decisions. Section three then analyzes the FHP funding methodology and issues to assess whether the process is valid for determining FHP funding levels. Various program cost categories and FHP components are also analyzed. The last section begins with a summary of the Navy's AMSR effort to correct some of the FHP problems and associated causes of underfunding.

Chapter IV describes and analyzes some of the perennial problems that have contributed to CNAPs FHP underfunding during budget execution. The source of program problems and underfunding are not attributable to any one factor. Rather, it is the result of a myriad of budgeting and execution decisions, unplanned events and changing factors that occur in an environment of conflicting commitments and limited resources. To our knowledge, there is no single document that explains the primary sources and potential causes of FHP underfunding and variability. Therefore, the intent of this chapter is similar to the reference nature of Chapter II, in that the goal is to create a document that chronicles some of the historical and current causes of program variability and underfunding, since many of these factors are experienced each year during budget execution.

Chapter V summarizes the answers to the thesis questions presented in Chapter I and identifies areas for further research. This chapter presents alternative concepts that may minimize FHP underfunding and improve defense budgeting effeciency. Appendix A is a list of Aircraft Other Maintenance (AOM) and Aircraft Flight Operations (AFM), Appendix B shows Top 95 AVDLR Cost Drivers, and Appendix C provides a list of programs within the Special Interest Category, Funding Other (FO) account.

F. LIMITATIONS

Understanding the complexities of the Flying Hour Program and the causes of underfunding is a massive challenge. Not only does it require detailed comprehension of the budgeting process and functional relationships, it requires thorough understanding of several interrelated areas such as, supply, maintenance, logistics, aviation operations, training, readiness, pricing, accounting and FHP management policies. Needless to say, several months of research and scores of interviews were not sufficient to master the intricacies of all these broad areas. The goal was to learn as much as possible in a short period, sift out systemic problems and address the primary causes of program variability and underfunding.

G. BENEFITS OF THESIS

This study will benefit CNAP and newly assigned FHP personnel to help understand the complexities of the Flying Hour Program, the funding process and some of the historical and current factors contributing to program underfunding. Since many other functional areas and personnel are involved with FHP management and funding (whether directly or indirectly), this thesis will serve as a beneficial reference manual.

II. FLYING HOUR PROGRAM (FHP) OVERVIEW AND FUNDING PROCESS

A. INTRODUCTION

The Navy Flying Hour Program (FHP) is the method used by The Department of the Navy (DoN) to budget and allocate annual funding for the operation and maintenance of all Navy and Marine Corps aircraft. The FHP provides a systematic approach for Fleet Commanders and Resource Sponsors to construct defensible budget exhibits that justify the resources required to attain aviation mission readiness goals for combat, support, and training aircraft. Attainment of aviation readiness goals contributes directly to the successful execution of the National Military Strategy. In simplest terms, the FHP budgeting methodology seeks to forecast and align a specific number of flight hours with the associated dollar amounts necessary to achieve those hours. The process is complex and not easily understood. Further, the research conducted for this thesis determined that there is no formal training provided for CNAP's newly assigned FHP managers and other personnel working with the FHP. Additionally, the authors were unable to locate any single source document that methodically "lays out" the intricacies of the program and the myriad of budgeting players that are involved with the FHP process. Therefore, the purpose of this chapter and one of the objectives of this thesis is to create a reference document of sufficient detail that will enable new FHP managers and related budget personnel to better understand how FHP requirements are determined. Additionally, the roles and responsibilities of the key FHP budget players are explained to facilitate a greater understanding of the entire FHP process.

This chapter is divided into three sections. The first section begins with an explanation of the Department of Defense (DoD) budget process to understand the budgeting framework in which the FHP requirements and funding are determined. Next, an outline of the FHP funding composition and financial / operational chains of command are described. The last section presents a comprehensive overview of the budgeting organizations and players involved with the FHP budgeting and execution process. This discussion will include a detailed explanation of how the FHP requirement is determined.

B. DOD BUDGETING: RESOURCE ALLOCATION PROCESS (RAP)

The Flying Hour Program Budgeting Process is confusing, but it appears to be consistent with the greater Department of Defense (DoD) budgeting environment. Perhaps Wildavsky says it best:

> I would be surprised if anyone claims to comprehend fully defense budgeting. Huge dollar figures, long lead times for weapons built out of complex technologies, feast and famine in resources, a rapidly changing world scene, all combine to create confusion [Ref. 2].

Resource allocation is the process in which financial resources are made available to all federal agencies. A basic knowledge of this process provides a foundation from which Navy Flight Hour Program Managers can begin to understand the many challenges faced in "resourcing" the program, as well as to help identify some of the inherent problems in the RAP.

Resources for all activities in the Department of Defense, whether weapons, personnel or infrastructure and maintenance, are provided through the RAP. There are six phases of the RAP:

- Phases 1 - 3: Planning, Programming, and Budgeting System (PPBS)
- Phase 4: Enactment
- Phase 5: Apportionment
- Phase 6: Execution

1. Phase I, II, III: Planning, Programming and Budgeting System (PPBS)

The Planning, Programming, and Budgeting System (PPBS) is the process which ultimately produces the DoD portion of the President's Budget. The PPBS process originally introduced to DoD in 1962 by Secretary of Defense Robert McNamara, provides a formal and systematic framework designed to assist the Secretary of Defense in making policy and strategy decisions, and the development of forces and capabilities to accomplish required missions. The objective of PPBS is to translate national security interests into military missions and construct budgetary requirements to be presented to Congress for funding consideration. This action attempts to outfit military operational commanders with the "best" mix of equipment, forces and support, within the confines of limited resources available. A model depicting PPBS is shown below: [Ref. 4:p. C-2]

Threat Assessment→ Strategy → Requirements → DoD Programs → Budget

PPBS assesses U.S. security threats, develops a strategic plan to address threats and develops requirements to support that strategy. Requirements are then translated into specific DoD programs developed to execute that strategy and ultimately create budgets to deliver program funding.

The PPBS consists of three phases to achieve its objective. They are: 1) The Planning Phase, 2) The Programming Phase, and 3) The Budgeting Phase. Planning addresses the capabilities required to carry out the U.S. national military security strategy and the resources available for defense. Programming translates the results of DoD planning into a logical six-year defense program within available resources. Budgeting converts the program into the congressional appropriation structure, focusing on building justifiable budgets while ensuring compliance with high level guidance from the President and Office of Management and Budget (OMB).

a. Planning

The planning phase begins with a review of national security objectives and ends with development of the Defense Planning Guidance (DPG). The Under Secretary Defense (USD) for Policy along with Joint Chiefs of Staff (JCS), The Office of

Secretary of Defense (OSD) and numerous high-level military and defense agencies evaluate the national security objectives, the posture of the United States, and the military's capability to support those objectives. Their focus in planning is to:

- Define the National Military strategy needed to maintain U.S. security and support U.S. foreign policy 2 to 7 years in the future.
- Plan military force structure necessary to accomplish that strategy.
- Develop a comprehensive framework and roadmap for DoD that combines priorities and missions within fiscal resource limitations.
- Provide decision options to the Secretary of Defense (SECDEF) to help him assess the role of national defense in the formulation of national security policy and related decisions.

The output of the planning phase includes two documents, The National Military Strategy Document (NMSD) and the DPG. The NMSD builds on the President's security objectives, identifies strategy, provides advice to the President, and is the input basis for the DPG. It is important to note that the NMSD is not fiscally constrained.

After a series of reviews is completed, a draft DPG is published and the unified force commanders are given the opportunity to provide inputs and recommendations. This provides each of the services with a flavor of the strategic priorities and their roles in future years. The DPG is the first output document in the planning process that is fiscally constrained and guides the services in developing their programs for a six year period. As explained by Jones and Bixler, "*The Guidance indicates annually the assets, forces, and other resources needed to satisfy U.S. security objectives. The DPG provides the basis for subsequent service – branch and OSD programming and budgeting*" [Ref. 5:p. 21]. When finalized, the DPG is signed by the SECDEF, which indicates the planning process is completed and the programming phase begins [Ref. 4:p. C-6]. Figure 2.1 shows an overview of the Planning process.

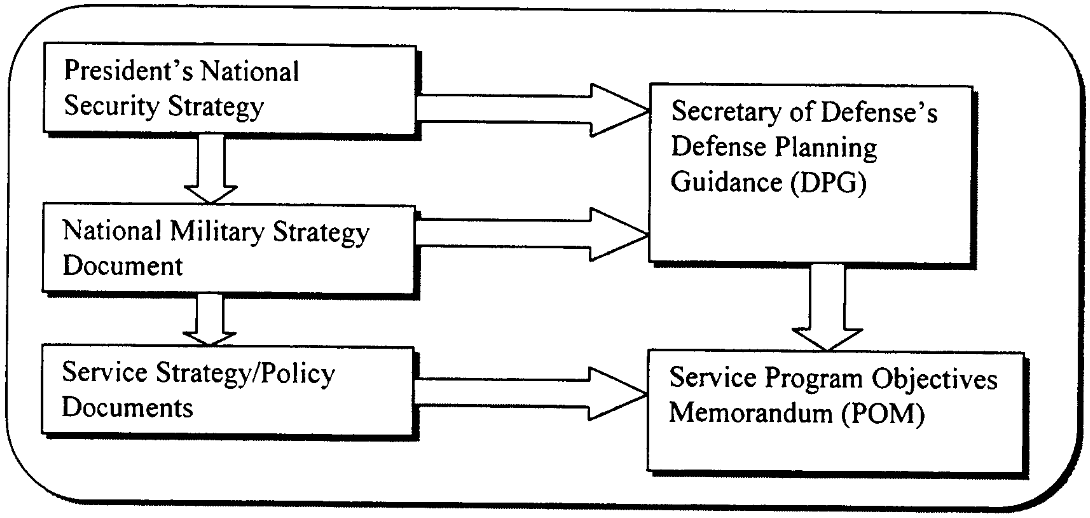

Figure 2.1. PPBS: Planning Process [Ref. 4: p. C-5].

b. Programming

PPBS brings together long-term strategic planning with the programming process. The programming process is the procedure for distributing available resources equitably across many competing DoD programs [Ref. 4:p. C-4]. Additionally, the programming phase attempts to bridge the gap between the broad policy guidance produced in planning and the line by line pricing that is developed during the budgeting phase. Programming translates planning efforts into a 6-year fiscal program for forces, manpower, and material. Programming begins with the issuance of the draft DPG in the beginning of the budget cycle, and ends with the submission of each service's Program Objectives Memorandum (POM) to OSD, in mid-summer. The POM is best described, as each service's plan for the resources needed to accomplish the programs and missions forecasted for the next six years. Every two years during the even years, the POM is updated to reflect: 1) new missions, 2) new objectives, 3) alternative solutions, 4) allocation of the resources, 5) ongoing DoD activities and 6) the forecasted costs of each program. For the Navy, the POM is the SECNAV's recommendation to the SECDEF on the best use of the assets and resources allocated to the Navy.

There are two elements of the POM in the programming phase. They are POM Development and POM Review. In POM development, each service develops a six-year plan for allocating their financial resources. The first two years of the POM are then used as the basis for budget. During the POM review, OSD reviews each component's POM inputs and implements policy changes as needed.

The POM is then reviewed by the Joint Chiefs of Staff (JCS) for accuracy and program risk assessment based on the capability of the U.S. Armed Forces to execute the strategy approved during the planning phase. Finally, a program review is conducted and the results are issued in Program Decision Memoranda (PDMs) after final review by the SECDEF. Final approval also captures all POM decisions regarding manpower, costs, procurement, and stores them in the Future Years Defense Program (FYDP) database. The FYDP database contains the SECDEF's approved list of DoD programs spread over a six year horizon displayed by program elements and appropriations [Ref. 4:p. C-7].

c. Budgeting

The final phase of the PPBS process is the budgeting phase. The purpose of the budgeting phase is to allocate dollars to the DoD programs approved in the PPBS framework. PPBS budget formulation as pointed out by Jones and Bixler has five elements: 1) issuing budget preparation guidance, 2) estimating specific program costs, 3) holding hearings to justify budget submissions, 4) ensuring submissions adhere to "both policy and financial guidelines", and finally, 5) the series of negotiations that take place to achieve the requested amount of program dollars projected to be available for the next two fiscal years and four outyears [Ref. 5:p. 24].

Formulation begins when OMB issues Circular A-11 to all federal agencies. The A-11 provides general guidelines, instructions and schedules for budget submission [Ref. 6:p. 34]. When DoD receives the A-11, each service formulates its own policy guidance document, which provides more detailed budgeting guidance. For the

Navy, this is known as the Navy Comptroller (NAVCOMPT) Notice 7111 and is issued by the Navy's Office of Budget (FMB). This notice provides Navy resource sponsors detailed budget formulation guidance, forecasted inflation rates, deadlines for submission, and dollar limits for each budget year (called "control numbers"). This signals the beginning of the budget process, commonly known as the "budget call" [Ref. 4:p. B-15, 16]. Upon receipt of this policy guidance, each service constructs detailed budget estimate submissions (BESs) based on the Program Decision Memoranda (PDM) and forwards their budget request in September to OSD. These BESs are reviewed by each of the respective service's financial managers (FM) and are forwarded to the USD Comptroller for review and modification. Final decisions on the respective services BESs are made via Program Budget Decisions (PBDs). Once changes are made and approved, the BESs are then submitted as "the DoD budget" to the Office of Management and Budget (OMB) for incorporation into the President's Budget (PB) for submission to Congress in February.

During the budget review process, cost estimates in the POM are updated with the latest pricing information, funding shortfalls are addressed and budget exhibits are prepared to justify dollar requirements. As the budget exhibits are submitted through the chain of command, a formal review process is initiated. The review process includes budget reviews held at FMB, followed by a review at OSD, and finally a joint OSD/Office of Management and Budget (OMB) review. This joint review is done to ensure the DoD budget supports the national security strategy. During the review process, budget analysts hold hearings to review and carefully scrutinize each budget line item submitted. The analysts can take three courses of action: 1) approve exhibits as presented, 2) disapprove portions of exhibits by issuing a "mark" or 3) approve additional funds where shortfalls are detected. In the current budget environment, "marks" are by far the most common budget review actions taken within DoD. If an item is marked, the sponsor of the budget is given 48-72 hours to question the marks by submitting a "reclama". Reclamas are detailed appeals to the marks made by the budget analyst and explain the impact of any invalid assumptions made by the analysts. If reclamas are approved, the marks are removed. If not, the marks "stand" and the budgeted line item is reduced. Naturally, this process is somewhat subjective and it is important to note that budget analysts represent part of the checks and balance mechanism within the budget process. Their role and job is to apply DoD and congressional resource policy guidance to the various budget requests submitted. Since the budgeting environment is constrained by the availability of limited resources, budget analysts are tasked to ensure budget authority is provided to the most needed and defensible programs [Ref. 7: p.51-53]. Jones and Bixler describe this budgeting environment: *"Budgeting is a highly constrained exercise in pricing the executability of programs within the parameters of affordability and political feasibility"* [Ref. 5:p. 25]. FHP managers should be cognizant of this as they prepare their FHP budget exhibits. Figure 2.2 summaries all three phases of the PPBS process.

Phases Of PPBS		
Planning	**Programming**	**Budgeting**
• Assess threat • Develop strategy	• Develop 6-year Plan	• Emphasize first 2 years of 6-yr plan
OUTPUTS ➢ National Military Strategy Document (NMSD) ➢ Defense Planning Guidance (DPG)	OUTPUTS ➢ Program Objective Memoranda (POM) ➢ Future Years Defense Planning (FYDP) ➢ Program Decision Memoranda (PDM)	OUTPUTS ➢ Budget Estimate Submission (BES's) ➢ Program Budget Decisions (PBDs) ➢ President's Budget (PB)

Figure 2.2. PPBS [Ref. 4:p. 4-18]

2. Phase IV: Enactment

Enactment is the process in which Congress reviews the President's Budget, conducts hearings and passes legislation. The process begins when the President submits the annual budget to Congress in February and is concluded when the President signs the annual Authorization and Appropriation bills normally prior to October. Authorization legislation validates each of the Federal agencies programs and operations and specifies the maximum funding amount to be made available. The appropriations process creates the budget authority, which permits each federal agency to incur obligations throughout the year [Ref. 7:p. 54]. Figure 2.3 depicts Phase IV.

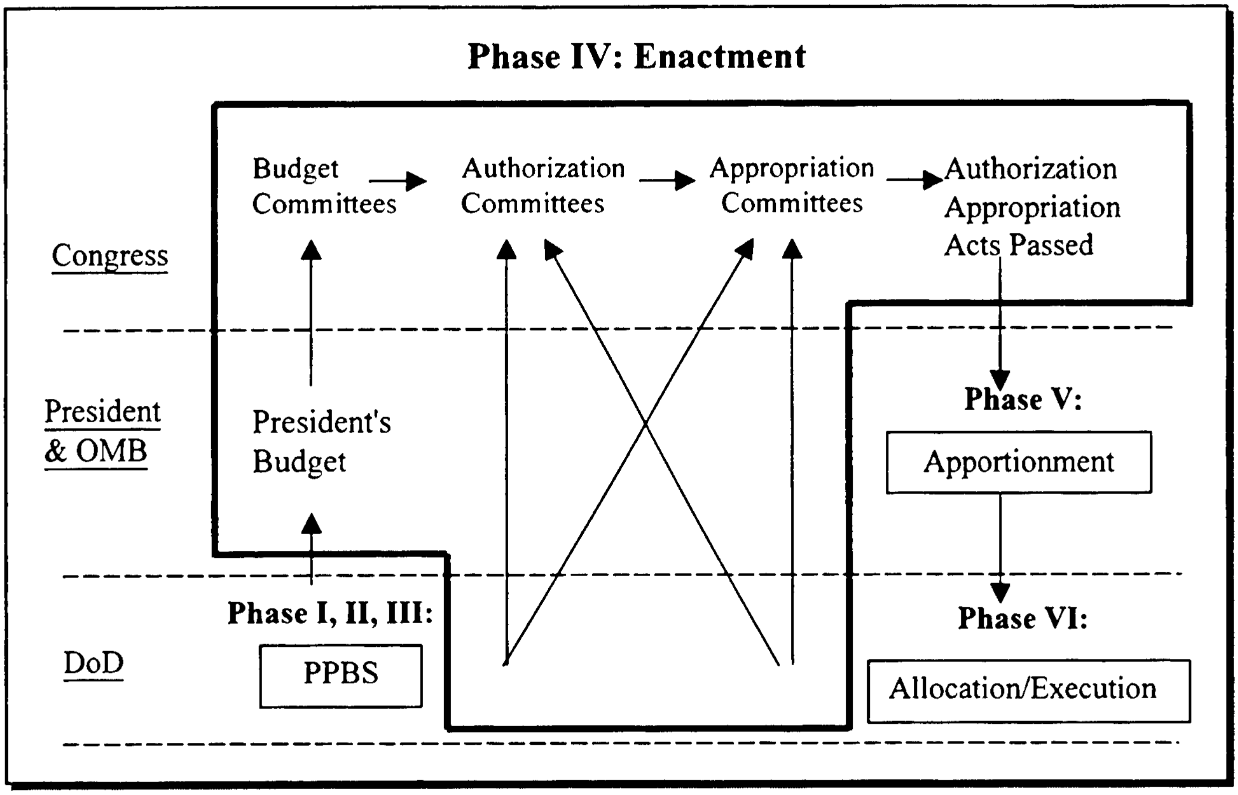

Figure 2.3. Resource Allocation Process [Ref. 7:p. 52]

3. Phase V: Apportionment

After the President signs the authorization and appropriation legislation into law, funds are made available for DoD and other federal agencies. Apportionment occurs when OMB provides the funds to the agencies. Funds are distributed throughout DoD from the USD Comptroller to each service's comptroller and ultimately to the end user [Ref. 7:p. 53].

4. Phase VI: Execution

Execution occurs when appropriated funds are obligated and spent (outlayed) by the authorized agencies. An obligation is a legal commitment to provide funds to pay for services, weapons or supplies. When the "check" is written and cashed, an outlay (transfer) of money from the U.S. Treasury to the recipient is made [Ref. 7:p. 52].

This concludes the discussion of DoD's unique budgeting process. The process is complicated and not easily understood in a single reading. Also, it is further complicated by the political nature of congressional oversight and interest in management of DoD's spending. As Jones and Bixler explain:

> ...the long-range policy development and resource planning process for defense is characterized by complexity and plurality. [Furthermore], while the program budgeting method was discontinued for other federal agencies 20 years ago, this budgeting method continues to be employed within DoD because it meets the policy – development and participating demands of multi-source budget advocacy while providing a long-range perspective on programs and spending.' In the end, 'DoD budgeting is subjected to a highly participatory Congress that employs inevitable strategic budget gaming efforts in the review and decisions made on the defense plan and its budget' [Ref. 5:p. 31-32].

Since the FHP is part of this larger DoD framework, it to is subject to "gaming efforts". This observation will be further explained in Chapter III. The purpose of this section is to briefly introduce the reader to the DoD resource allocation process. Understanding this process is a necessary building block to comprehending the FHP funding and allocation process as well as development of a working knowledge of the dynamics and issues that affect the FHP environment. The next section explains how appropriated resources fund the Navy's Flying Hour Program (FHP).

C. FLYING HOUR PROGRAM (FHP) FUNDING COMPOSITION

1. DoD Budget

The Department of Defense's annual budget for FY 98 was approximately $248 billion, and represented over 15% of the nation's annual budget. Of this amount, the Navy's annual Operations and Maintenance, Navy (O&M, N) account was nearly $22 billion and the FHP represented over $3.2 billion from that appropriation [Ref. 8:p. 3].

With budget levels of this magnitude, it is not surprising that funding for DoD programs has increasingly come under congressional scrutiny in the post Cold War environment. Congressional scrutiny has also been applied to the Navy's FHP.

This section briefly explains how the Navy FHP is organized and how resources flow to the user.

2. FHP Funding Structure

Congress provides funds to the Navy through appropriations. Appropriations are categorized by purpose: operations and maintenance, military personnel, procurement, research and development, military construction and others [Ref. 4:p. A-6].

The Navy Flying Hour Program receives funding through the Operations and Maintenance Navy (O&M, N) appropriation account. Funding for the DoN FHP is further categorized via Major Force Program (MFP). MFPs are major categories of forces, manpower and Total Obligation Authority (TOA) within the DoD budget function. There are 11 Major Force Programs (MFPs) and the DoN Flying Hour Program currently uses four of these MFPs to program O&M funds. These four MFPs are Strategic Forces, General Purpose Forces, Intelligence and Communications, and Guard & Reserves. (See Figure 2.4 for the complete appropriation / MFP relationship). It is important to be familiar with the MFPs because they form the basis of two very important FHP documents discussed later in this chapter.

The following example shows some of the aircraft types and mission activities funded within the various O&M, N MFPs.

- Strategic Forces (01): VQ-3 (E-6A), VAQ-129 (TC-18F)
- General Purpose (02): All TACAIR/ASW, Fleet Replacement Squadron (FRS), USMC, Vertical On-board Delivery (VOD), Carrier On-board Delivery (COD), and Staff Activities. Aircraft examples: CH-53E, F/A-18C, P-3C, UC-12B etc.
- Intelligence & Communications (03): UP-3A, EP-3A
- Guard & Reserve (05): All reserve squadrons.

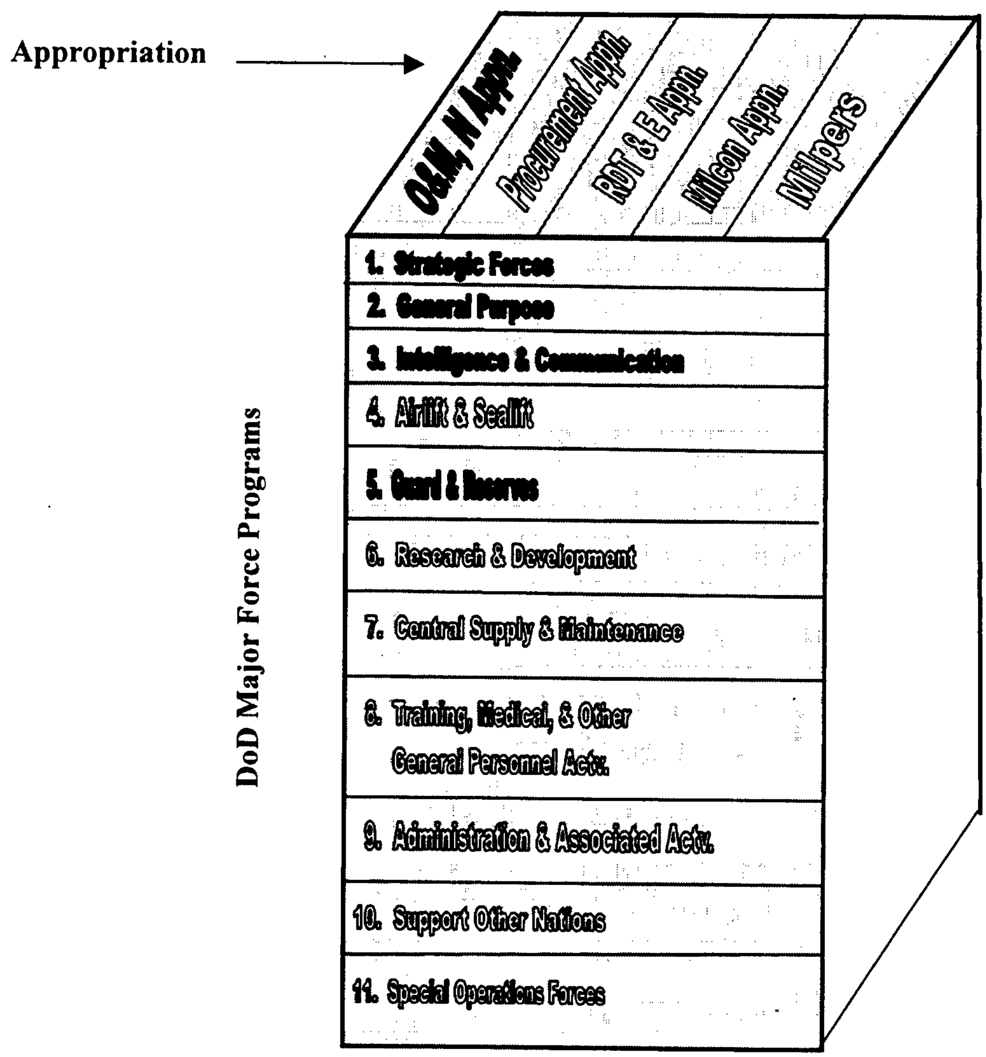

Figure 2.4. FHP Program/Appropriations Relationship [Ref. 9:p. 7]

As illustrated in Figure 2.4, FHP funding composition comes from the O&M, N appropriation account. The O&M, N appropriation is then divided into budget activities. The FHP falls under the "Operating Forces" (BA1) budget activity. Operating Forces are further subdivided by Activity Groups (AGs) and Sub-activity Groups (SAGs). AGs and SAGs are codes, which reflect the activity and principle functional areas responsible for administering the FHP. The primary flight hour program AGs are "Air Operations" (1A00), and "Combat and Operations/Support" (1COO). Since over 90% of the FHP resources fall under the Air Operations AG, those corresponding SAGs are illustrated in Figure 6. FHP funding is divided into two major areas, which correspond, to the SAGs. These are Aircraft Flight Operations (AFO) and Aircraft Operations Maintenance (AOM). The squadrons receive AFO funding, known as Operational Target Functional Category (OFC-01) or "01 OPTAR". The 01 OPTAR (AFO) is further comprised of two fund codes, 7B (fuel) and 7F (flight equipment). The air stations, which support the squadrons, receive AOM funding, known as OFC-50, referred to as an "Operating Budget". The air station's OFC-50 (AOM) account is broken down into Aviation Fleet Maintenance (AFM) – fund code 7L (consumables), and Aviation Depot Level Repairables (AVDLRs) – fund code 9S (repairables). The CVs and other air platform ships (LPH and LHA) also receive AOM (OFC-50) funding when the air wing and squadrons are embarked onboard. This funding is issued to the CVs as an "OPTAR" rather than an Operating Budget. This distinction is made because financial management regulations differ for shore and afloat activities. The CVs OPTAR is further subdivided just like the air station, by AFM and AVDLR [Ref. 4:p. B-12].

This concludes discussion of the FHP funding structure. The next section presents an overview of the Navy FHP chain of command.

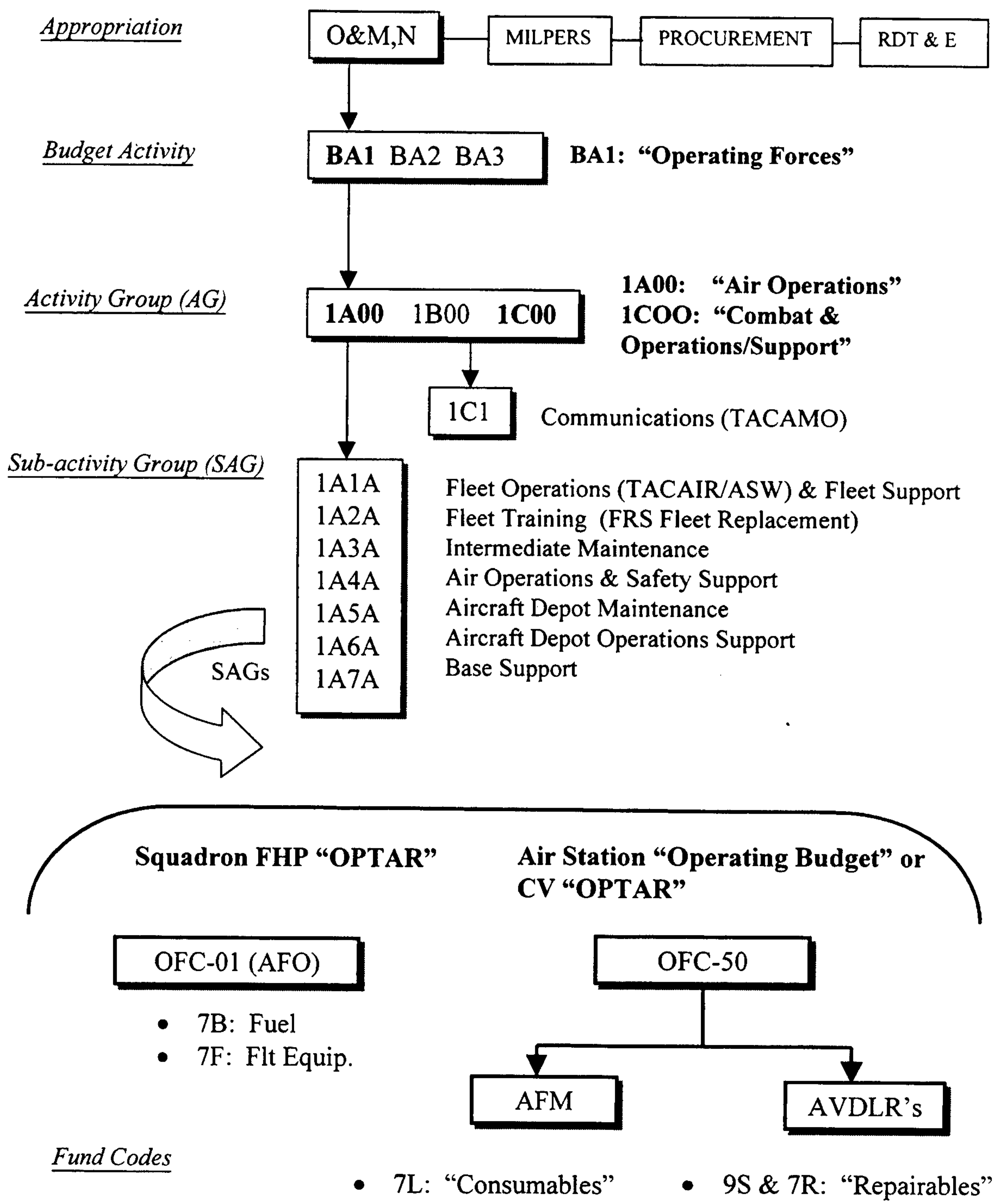

Figure 2.5. FHP Funding Composition

D. FHP CHAIN OF COMMAND AND ROLES

This section has two purposes. The first is to provide a display of the two functional FHP chains of command, and second to introduce the budgeting phases within the FHP process.

1. FHP Chain of Command

The dynamic environment of the FHP demands the participation and cooperation of multiple Navy and DoD organizations. There are two main functional chains of command that oversee the financing and operation of the FHP. The operational chain, (depicted in Figure 2.6 for the Pacific Fleet), provides the guidance and direction for the daily mission tasking for all Navy aircraft. This chain illustrates the flow of authority from the President to the squadron commander. Although the members of the operational chain provide input for consideration in budget formulation, they have a minimal role in formal budget development. The financial chain, depicted in Figure 2.7, illustrates the flow of the budget process. Before describing the roles and activities of the FHP budget players, a basic overview of the budgeting framework is provided. Budgeting from the perspective of the Executive Branch (excluding Congress) consists of four basic phases: budget formulation (preparation), submission, allocation and execution. An introduction to these budgeting phases provides the reader with an understanding of the budgeting terms and processes used in the following sections.

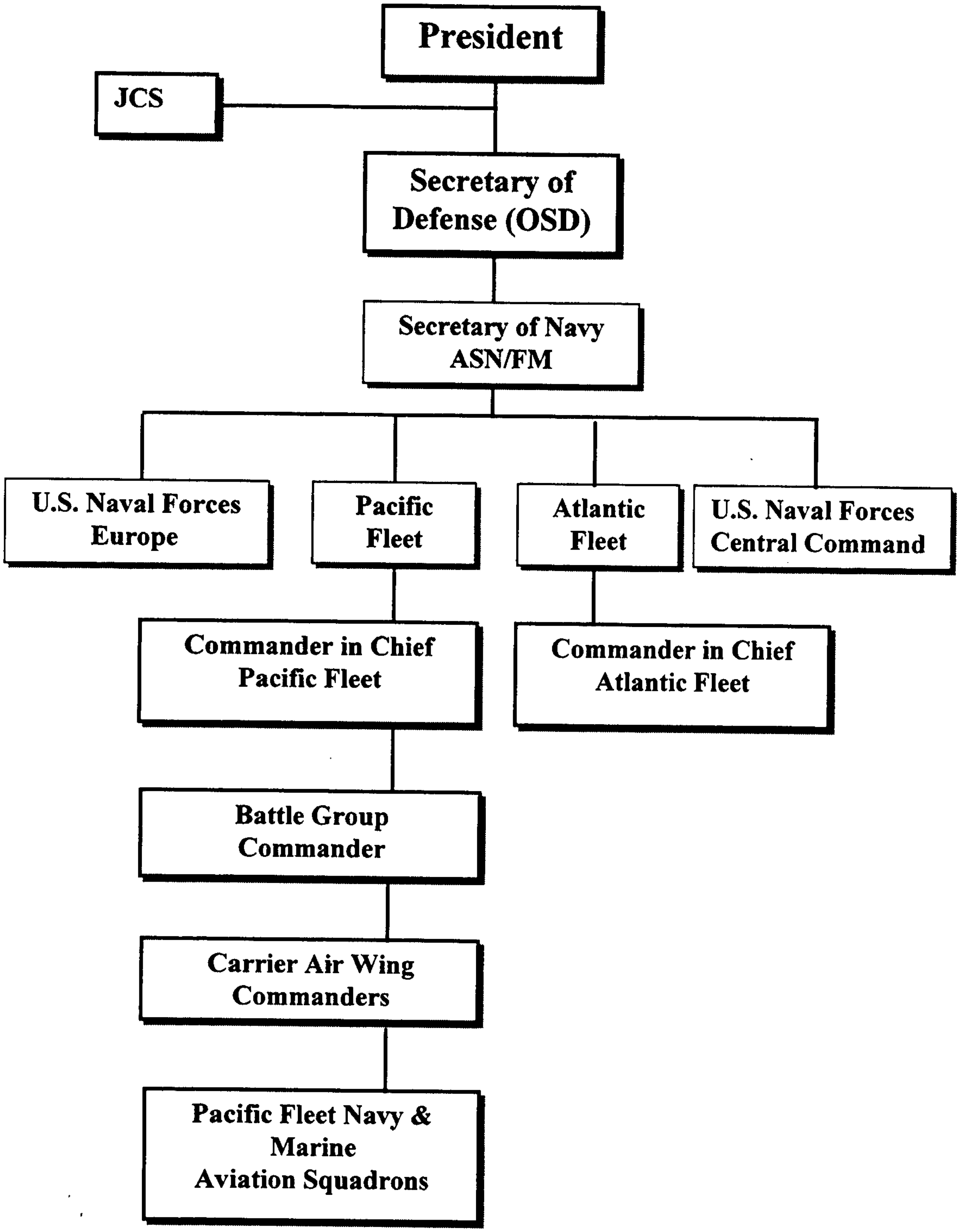

Figure 2.6. Pacific Fleet FHP Operational Chain Of Command.

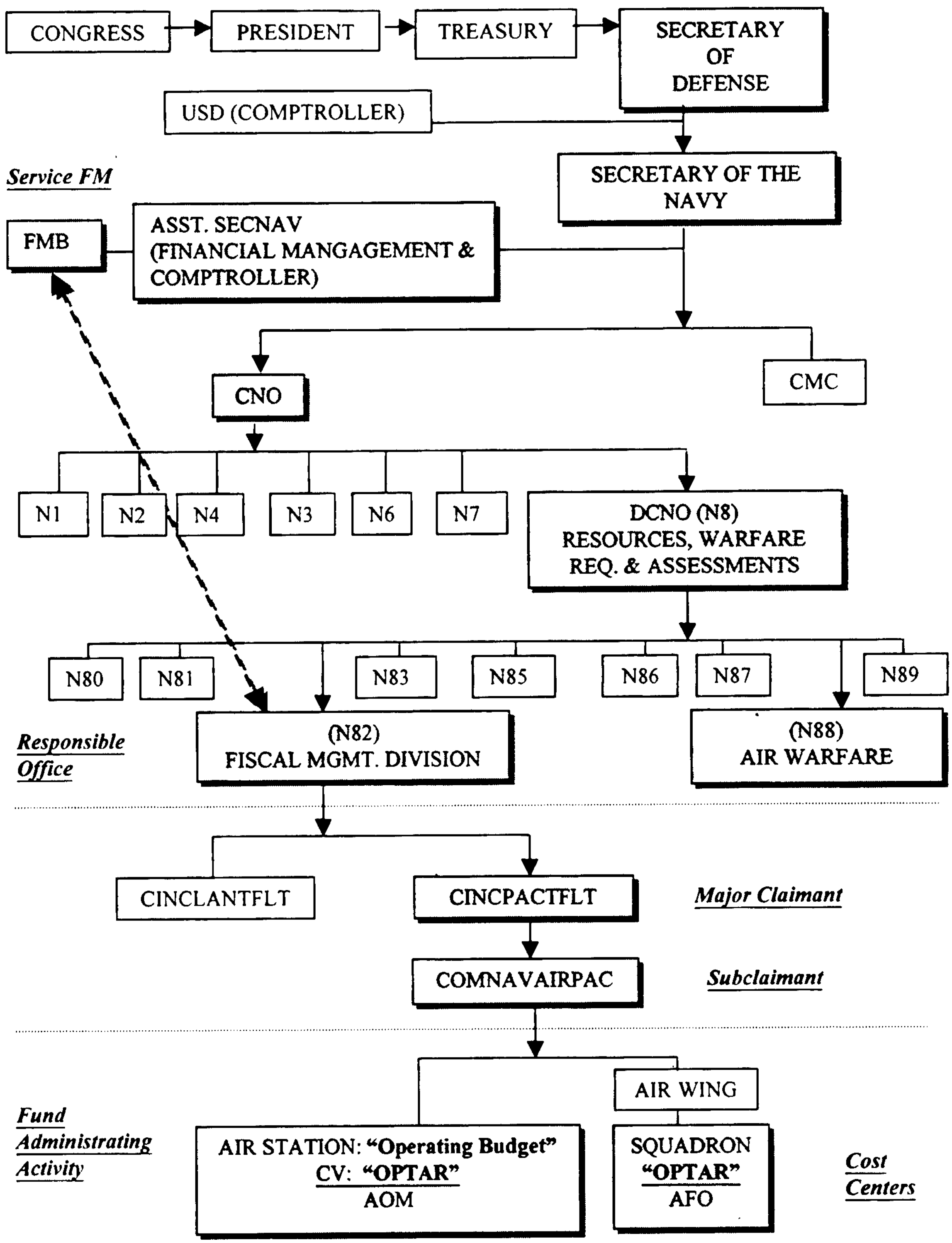

Figure 2.7. DoD FHP Financial Organizational & Resource Allocation Flow

2. Basic FHP Budget Phases

a. Budget Formulation and Submission

Budget formulation and submission is the process of requesting and justifying the resources required for operating and maintaining the fleet's aircraft. This is done using budget exhibits designed to justify specific levels of funding required for each aircraft type. The primary FHP budget exhibit is called the Operational Plan 20, (OP-20). Assembling the OP-20 is the overall responsibility of the Chief of Naval Operations (CNO). The CNO delegates this responsibility to the Deputy Chief of Naval Operations (DCNO) for Resources, Warfare Requirements and Assessments (N-8), who in turn tasks the assistant CNO for Air Warfare (N-88) to construct the necessary FHP budget exhibits. The N-88 staff works closely throughout the year with the Major Claimants and Type Commanders in receiving the necessary budget inputs required in assembling and justifying the annual budget funding requirements. Figure 2.8 displays these budget inputs in relation to the financial organization. It will be helpful in understanding the formulation steps and sequence of budget events, which are discussed in more detail later in this chapter. This figure also shows three input mechanisms (all discussed later in more detail) used at the squadron, air station level, and N-88F level, they are: 1) The Budget OPTAR Report (BOR), 2) The Flight Hour Cost Report (FHCR) and the Operation Plan 20 FHP budget exhibit.

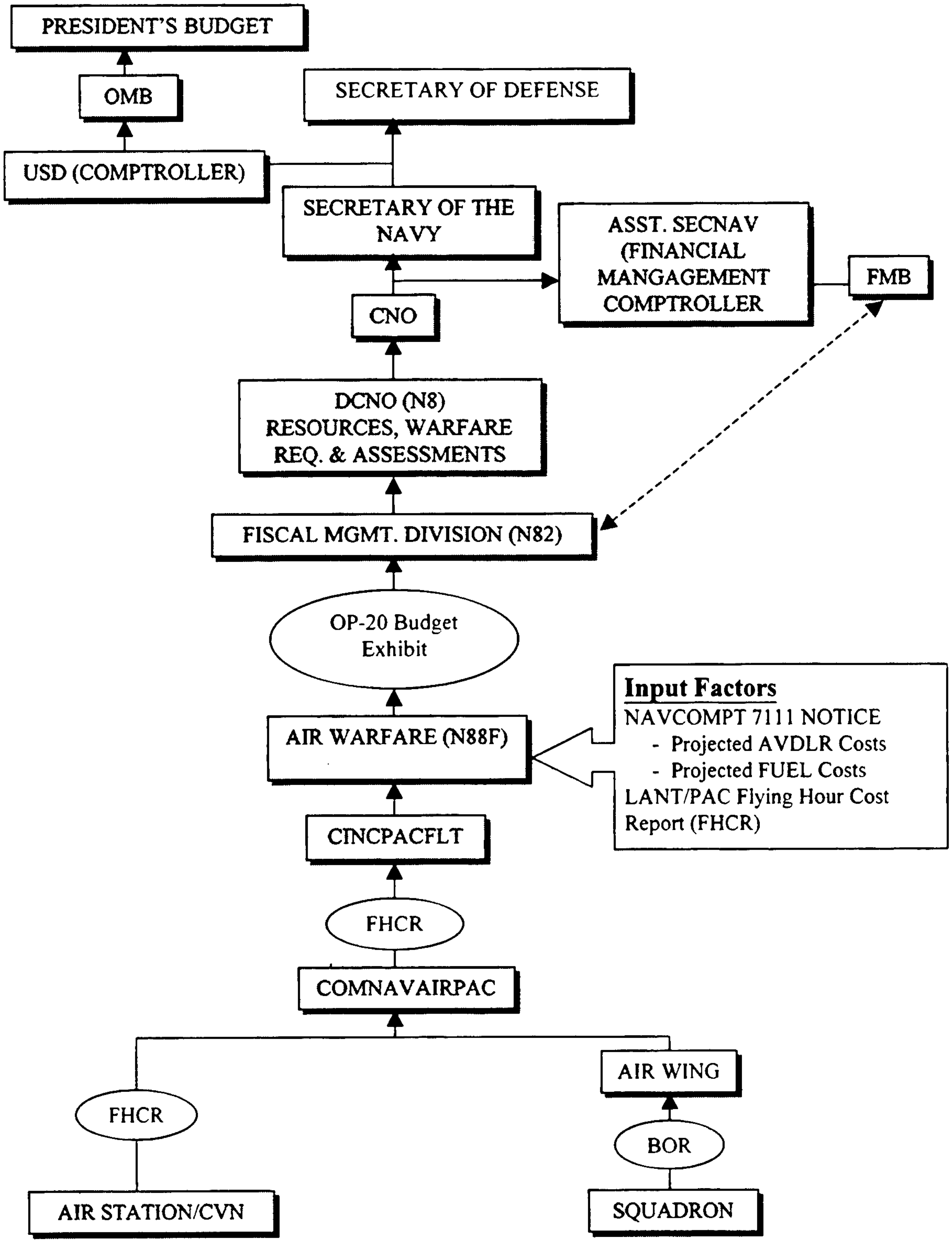

Figure 2.8. DoN FHP Budget Formulation

b. Resource Allocation and Execution

Resource allocation indicates the presentation, and analysis of, and the decisions on the distribution of funds from Congress all the way down to the squadron commanders. Execution is the spending of congressionally provided funds. As shown in Figure 2.7, after Congress approves the DoD budget and the President signs it, the Treasury Department issues an Appropriation Warrant to OMB. OMB in turn, apportions funds via the DoD Comptroller to the Office of the Assistant Secretary of the Navy Financial Management and Comptroller (ASN (FM & C)), specifically the Office of Budget (FMB), who allocates funds to the major claimants. FHP funding is released quarterly from FMB to Commander in Chief Pacific Fleet (CINCPACFLT), and on to Commander Naval Air Forces Pacific (CNAP), and finally to the air stations and squadron commanders.

During the execution of FHP funds, several opportunities exist to shift or reprogram FHP dollars within each step of the chain. This occurs due to changing priorities, and insufficient funding levels for other programs, among other reasons. Reprogramming is designed to give operational and financial commanders increased flexibility to meet unforeseen program changes that may occur during budget execution. Moving funds within one appropriation account is authorized as long as the funds remain within specific program elements for which they were appropriated and within the authorized reprogramming threshold and other congressional requirements. However, reprogramming FHP funds may create problems and cause future underfunding as budget analysts often perceive reprogrammed money as excess funds not required for the FHP. The consequences and the outcome of reprogramming FHP funds is examined in more detail during Chapters III and IV. The next section will explain the roles and responsibilities of the players involved in the FHP budgeting process.

E. THE FHP BUDGETING PLAYERS

This section explains the budgeting actions performed by each of the members in the FHP financial chain of command, beginning at the aviation squadron, through the CINCPACFLT level. Sections F and G describe the FHP funding process at the higher levels. While technically the FHP budgeting process begins at CNAP's level, it is important to first discuss and understand how FHP funds are allocated and executed at the user levels to provide a better understanding of all FHP budget actions.

1. Squadron Level and Air Station/CV

a. Funding Allocation – Squadron

The Navy Operations and Maintenance, (O&M, N) appropriation, provides the funds necessary for the day to day operations of the Navy's FHP. Funding is made available on an annual basis but is provided to the fleet quarterly. Beginning with the new fiscal year on October 1st, each Navy and Marine squadron and their supporting air station or ship, if deployed, receives one quarter's worth of flight operations funding from their respective Carrier Air Wing Commander (CAG) or directly from Commander Naval Forces Pacific (CNAP). These quarterly funds are called Operational Target Functional Categories (OFCs) or commonly known as Operating Targets (OPTARS). An OPTAR represents the anticipated funding level needed to support the costs of a squadron's flight operations. Receipt of the OPTAR, called an "OPTAR grant", gives the squadron authorization to place obligations against CNAP's FHP funds up to the amount of the issued OPTAR grant.

The squadron OPTAR (see Figure 2.9) is comprised of two cost expense accounts, Aircraft Flight Operations (AFO or OFC-01) and Aircraft Operations Maintenance (AOM or OFC-50). The OFC-01 and OFC-50 accounts are designed to show how FHP funds are spent and record the type of materials purchased. (Note: For a complete listing of all OFC-01 and OFC-50 authorized expenditures see Appendix A

- (OFC-01) Aircraft Flight Operations (AFO). OFC-01 funding consists of fuel, oil and lubricants (POL) used during flight operations and any required flight equipment used in the operation of the aircraft. These funds are accounted under the 7F (fuel) and 7B (Administrative and flight equipment) fund codes.

- (OFC-50) Aircraft Operations Maintenance (AOM). The AOM account is broken down into Aviation Depot Level Repairable (AVDLR) and Aviation Fleet Maintenance (AFM).

- *AVDLR*. AVDLRs represent the largest portion of funding within the OFC-50 account and FHP budget. AVDLRs are depot level repairable aircraft components, financed under the Navy Working Capital Fund (NWCF) system. Under this system, squadron OFC-50 accounts finance the depot level repair and procurement of these repairable components. Although the squadron usually initiates the repair demands, the supporting Intermediate Maintenance Activity (IMA) has primary control over whether these transactions would result in an AVDLR charge. Charges are incurred if components are ordered during AVDLR repair at the IMA and if the AVDLR must be sent "off-station" for depot level repair. Thus, the supporting IMA and air station retains control of the AVDLR funds and associated accounting responsibilities [Ref. 10:p. 12.3.7].

- *AFM*. The AFM portion of the squadron's OFC-50 (AOM) account is typically spent on "consumables" - inexpensive parts used in support of flight operations such as paint, wiping rags, towel service, cleaning agents, compounds used in the corrosion control of aircraft and, consumable repair parts [Ref. 10:p. 12.3.7].

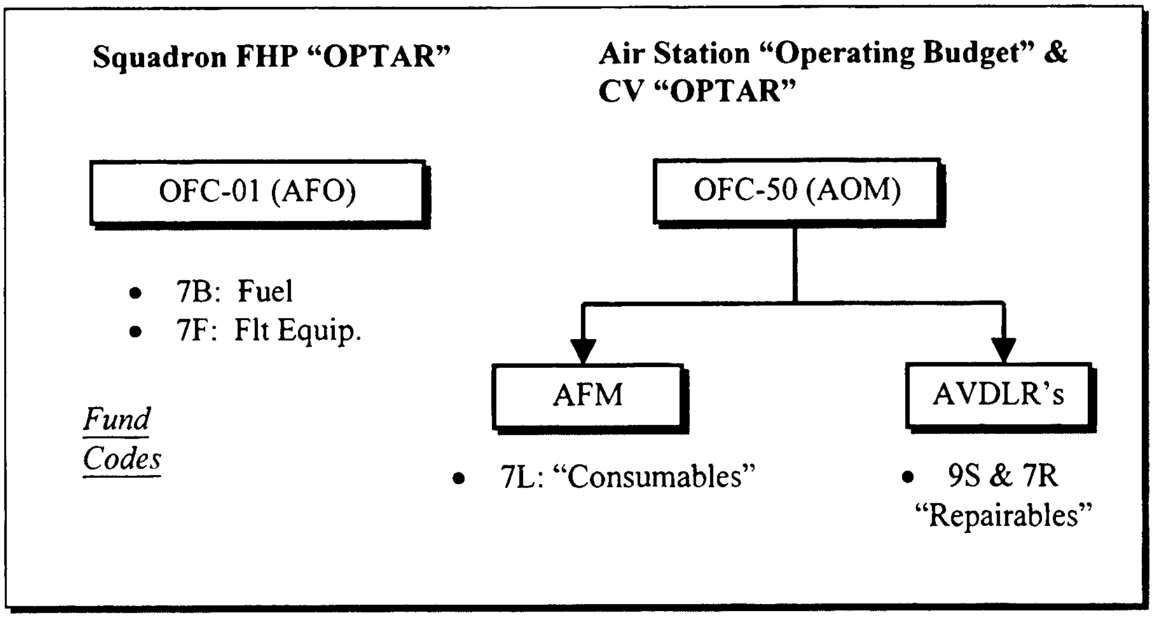

Figure 2.9. FHP Funding Composition

b. Funding Allocation - Air Station/CV

Like the squadrons, supporting air stations also receive a quarterly FHP operating budget from CNAP at the beginning of the new fiscal year (see Figure 2.9). This operating budget, called a "dash 1" (in reference to the document it is received on - NAVCOMPT FORM 2168-1). The "dash 1" provides OFC-50 (AOM) AVDLR and AFM funding needed to support the repair of AVDLRs for all tenant squadrons. The OFC-50 (AOM) funds are controlled by the air station's IMA and comptroller office. This is done because, as noted earlier, the air station's IMA is both the repair and disposition authority for all squadron AVDLRs. Additionally, this separation of OFC-50 (AOM) funds between the squadron and air station is done for three reasons: 1) gives the squadron commanding officers direct financial control over flight operational costs impacting their squadrons' safety and administration, 2) avoids the shifting of OFC-50 (AOM) funds and financial management as squadrons rotate from shore to ship, and 3) helps to simplify cost reporting procedures by allowing squadrons to report both OFC-50 (AOM) and OFC-01 (AFO) costs through a one source document called a budget OPTAR report (BOR) explained in the next section. As explained earlier, the CVs also receive AOM funding when the air wing and squadrons are embarked onboard. The only distinctions being the ships receive an OPTAR vice an Operating Budget. This is because financial management regulations differ between shore-based activities and afloat units.

c. *Funding Execution – Squadron*

Throughout the fiscal year squadron commanders are required to keep track of all FHP expenses and must carefully monitor their OPTAR account to ensure they stay within their quarterly FHP OPTAR. The accounting procedures used for obligating FHP funds at the squadron are performed using the Aviation Storekeeper Information Tracking System (ASKIT). ASKIT is a computer program that records and tracks all OPTAR grants obligations by 7B and 7F fund codes. ASKIT also provides several required reports: 1) 15 day air wing commander 7F and 7B obligation transmittal, 2) 30 day CNAP 7F transmittal, and 3) a monthly Budget OPTAR Report (BOR). The air wing transmittal assists in monitoring squadron fuel obligations, while the 30-day transmittal is used in conjunction with the BOR to account for all squadron expenses [Ref. 11]. The BOR, along with the Flight Hour Cost Report (FHCR), described in the next section, are the primary financial management inputs used at CNAP to administer and track the FHP obligations during the fiscal year. These reports also collectively form the data used by N-88F to build new OP-20 budget exhibits. The BOR categorizes obligations by aircraft type and includes the following [Ref. 10:p. 12.3.7]:

- Obligation totals by fund code for OFC-01 and OFC-50 for that month.
- Total gallons and type of fuel (e.g. JP-4/5) consumed for the month and fiscal year to date (FYTD).
- Flight hours flown for the month and FYTD.
- Number of aircraft assigned by Type/Model/Series (T/M/S) and Type Equipment Code (TEC).

- Remaining OPTAR grant balance for the squadron.

During any given budget year, if the squadron is unable to obligate all of its OPTAR funds before the end of the fiscal year, these funds are returned to CNAP for reallocation. Most squadrons are able to obligate their OFC-01 (fuel) funds by increasing their flight operations, and depleting their remaining OFC-50 (AOM) funds by purchasing needed materials and supplies.

d. Funding Execution - Air Station/CV

The air station/CV, like the squadrons they support, are also required to track and report a record of their monthly OPTAR (OFC-50) expenses to CNAP. This tracking and reporting is the responsibility of the air station IMA and comptroller shop. The means by which they perform this responsibility is through a report called the Flight Hour Cost Report (FHCR). The FHCR reports reflect the amount of all OFC-50 funds obligated by the air station/CV in direct support of each squadron. The FHCR records costs by:

- Type Equipment Code (TEC)
- Organization code – which squadron incurred the obligation
- Obligations by repairable and consumable fund codes
- Posting the remaining OFC-50 balance

The FHCR is submitted automatically via the Standard Accounting and Reporting System – Field Level (STARS-FL) database. The STARS receives its input from the air station/CV I-level Naval Aviation Logistics Command Management Information System (NALCOMIS) and supply Shipboard Uniform Automated Data Processing System (SUADPS). At the end of each month, after the STARS database summarizes the total obligated funds, CNAP comptroller personnel review the FHCR to monitor all cost, obligation and execution rates for the FHP [Ref. 12].

2. Carrier Air Wing Commander (CAG) – Allocation/Execution

The carrier air wing commanders, called CAGs, play a limited role in FHP allocation and execution. This next section briefly describes their role. For most fleet-going squadrons quarterly OPTAR funding is issued by their controlling CAG. For non-deploying squadrons and a few other exceptions, the OPTAR grant is directly issued by CNAP or by the Type Wing Commander. The CAG's primary role during allocation and execution is that of monitoring and distribution the execution of funds. This is done to ensure each squadron has sufficient OFC-01 (fuel) funds to perform their respective missions. If one squadron within an Air Wing requires additional funding within the fiscal year, the Air Wing Operations Officer will distribute funds from one squadron to another. Distribution is done to alleviate shortfalls or funding surpluses brought on by unforeseen operating schedules within the air wing. If funding is not available in the Air Wing, then the CAG will solicit funding directly from CNAP.

The other role CAGs perform during FHP execution is monitoring FHP obligations. The air wing staff performs a cursory role in monitoring by receiving and tracking squadron 15-day fuel (7B) obligations and the monthly BORs. The CAG staff primary ensures the BORs are submitted to CNAP in a timely and accurate manner. [Ref. 11]

3. Commander Naval Air Forces Pacific (CNAP)

a. Budget Formulation

Commander, Naval Air Forces Pacific Fleet (Type Commander), plays an active and important role in the FHP budget formulation process by representing the flying hour users' needs and articulating the difficulties to the resource sponsor (N-88) in executing the FHP budget. The CNAP budget formulation role consists of two activities: 1) collecting and reporting FHP execution data and 2) developing FHP program and budget submissions.

FHP execution data come from two sources, the BOR and the FHCR. The

BOR and FHCR data provide the basis for constructing all FHP OP-20 budget exhibits. Therefore, the accuracy of these reports is extremely important to ensure sufficient future FHP funding levels. To ensure this accuracy, CNAP closely monitors and audits the BORs and FHCRs on a monthly basis. After reviewing these reports, CNAP then ensures this information is forwarded electronically to N-88F where it is collected in the Flying Hour Projection System (FHPS) database (see section F) [Ref. 9:p.53 & 57].

CNAP has several roles in FHP formulation. The three most significant are the submission of: 1) POM Issue Papers, 2) The OP-32 and OP-5 Budget Exhibit Reports and 3) The OM-6 Detail of Unfunded Requirements [Ref. 13].

Each year as part of the POM process, CNAP submits POM Issue Papers. POM Issue Papers are narrative descriptions from CNAP and CINCPACFLT to address funding shortfalls and added mission requirements. Typically, POM "Papers" consist of a list of underfunded or unfunded FHP requirements that CNAP builds throughout the year. With the help of the CNAP Operations Officer, and the respective CNAP aircraft class desks, the CNAP FHP manager writes POM issue papers to identify new or changing fleet flying hour needs that require additional FHP funding in order to successfully execute the flying mission. The POM Papers offer a brief explanation of these requirements, what is needed to meet the requirements and the impact on fleet readiness if funding is not received. After the POM Papers are written, CNAP then forwards them to CINCPACFLT where they are reviewed, approved or rejected. If the issues in POM Papers are approved, CINCPACFLT then prioritizes and forwards them to the Resource Sponsor, N-88 for further review and incorporation into the PPBS process. A recent POM example submitted by CNAP was a result of the Navy's expanded EA-6B aircraft mission. Navy EA-6B aircraft were recently tasked to establish permanent overseas detachments and to perform electronic countermeasure missions previously performed by Air Force EF-111 aircraft. Since this mission was not previously budgeted for during the PPBS process the operating costs were borne by CNAPs existing FHP budget. Hence, CNAP requested additional funding via a POM Issue Paper.

Most CNAP POM issues are forwarded to the CNO for consideration, though some are not. Due to overwhelming additional cost requirements and fiscal constraints, CINCPACFLT will often place dollar thresholds and limit the number of issues CNAP may submit. These limits occur for two reasons. CINCPACFLT is limited to a total of 25 POM issues for all programs under their authority and because the FHP resource sponsor has limited funding. Imposing a limit on POM inputs at the CINC level is intended by design to identify and unify the TYCOMs and the CINCs most significant issues. However, due to CINCPACFLT's many other funding priorities and conflicting commitments, some CNAP FHP issues are not incorporated into major claimants POM Issue Papers [Ref. 13].

The OP-32 (Summary of Price and Program Changes) and the OP-5 (Detail by Activity/Subactivity Group (AG/SAG)) budget exhibits are additional mechanisms for CNAP to influence FHP funding levels. The "OP-32 is the cornerstone for all other budget exhibits, and it must match the OP-5 in pricing and program adjustments between current and budget years" [Ref. 4:p. B-19]. The OP-32 budget exhibit is submitted each year to CINCPACFLT and forms the basis to justify all O&M, N budget exhibits. The OP-32 exhibits, provide a detailed summary of how CNAP is planning to spend its FHP funds by type of purchase from the current year through the next two budget years. At CNAP, FHP staff members prepare the OP-32 by means of an Excel spreadsheet provided by CINCPACFLT. The spreadsheet updates fuel, AVDLR and maintenance costs. The companion document to the OP-32 is the OP-5. The OP-5 supports all changes noted on the OP-32 detailed by AG/SAG and provides detailed financial and narrative explanations and justifications for each budget activity. It compares one OP-20 FHP budget exhibit against another for price changes, flight hours and any type / model / series aircraft changes. The final intent of the OP-32 and OP-5 are to track all budget and funding changes between the prior year, current, and next two budget years, as well as, to highlight funding differences, thereby allowing budget analysts to present and support the OP-20 budget exhibit during budget formulation hearings [Ref. 4:p. B-19 and Ref. 13].

The last event in CNAP budget formulation is the submission of the OM-6. The OM-6 is a detailed list of all unfunded requirements (UFR) and submitted by CNAP after the new budget is received – usually March. In essence, the OM-6 summarizes, prioritizes and prices the list of all CNAP unfunded requirements and provides a detailed "Narrative" and "Impact" Statement to explain the consequences on mission readiness if funds are not provided. As explained by one CNAP staff member, the OM-6 posses the question to the fleet, "Now that your new budget is out, can you live with it or not?" [Ref. 13]. After CNAP completes the OM-6, it is forwarded to the CINC for further consideration in the expectation that additional funding will be provided [Ref. 6:p. B-22 and Ref. 13].

Two other events that CNAP participates in during the formulation process are the CNO Flying Hour Conference and the FMB OPTEMPO Review.

The CNO Flying Hour Conference takes place once a year. The purpose of this meeting is to provide an opportunity for CNAP, CNAL and other high level FHP budget players to voice concerns regarding the overall FHP program funding and to gain added resource sponsor understanding and support. These meetings are chaired by N-88F, the resource sponsor for the FHP, and they are typically characterized by open and frank discussion. These discussions often center around the FHP program funding and the numerous difficulties experienced by CNAP in executing the FHP [Ref. 13].

In April, FMB analysts for the Flying Hour Branch conduct an OPTEMPO review of the FHP budget. This meeting is conducted at CINCPACFLT and attended by both the CINC and CNAP FHP managers. There are three goals of this meeting: 1) to determine if the dollars allocated within the FHP are providing sufficient funds for execution, 2) to review the current fiscal year FHP obligation rates and 3) to gather "fleet inputs" that help FMB budget analysts support and defend the proposed OP-20 budget exhibit, prior to and during OSD budget submission and review. FMB analysts in past years would evaluate the program and provide reprogrammed funds to the FHP budget.

However, because of dwindling DoD budgets, front-end reprogramming of additional funds into the FHP has stopped [Ref. 13].

b. Funding Allocation and Execution

CNAP serves as the focal point for allocating, executing and monitoring flight hour funding for all Navy and Marine Corps Pacific fleet squadrons. The TYCOM's primary goal and responsibility during allocation and execution is to achieve a specific level of readiness for each squadron within the constraints of the resources available. Because of the scope of activities that occur in these phases, a separate discussion of each will follow.

(1) **Allocation**. The allocation of FHP funding begins with the new fiscal year when FMB distributes the quarterly allocation of the congressionally and DoD approved FHP funding to CNAP in the form of an Operating Budget (OB). The FHP OB, in theory, should provide the necessary resources to execute CNAP's flying mission. Because of reduced DoD budgets and numerous competing priorities, financial resources are scarce. Hence, the funds requested during budget formulation seldom actually match those required by CNAP to successfully execute the FHP program. Hence, CNAP's greatest challenge during allocation is to distribute these funds in a manner that will allow squadrons to achieve mission readiness while avoiding over obligation of FHP funds.

CNAP's primary method for distributing flight hour funds is through the Navy Operational Plan 20 (OP-20). The OP-20, as noted earlier, serves as both a budgeting formulation document and an execution-monitoring tool. The OP-20 (discussed in more detail in sections F and G) serves two purposes. First, during budgeting, the OP-20 displays funding requirements by aircraft type, model, series (T/M/S) and becomes the Navy's primary budget exhibit displaying the FHP funding requirements during submission and review to OSD and OMB. Second, when funding is approved, the OP-20 document then provides local commanders with a means to allocate squadron OPTAR grants by:

- The annual number of flight hours that may be flown by each T/M/S aircraft
- The dollar amounts budgeted for each flight hour by T/M/S
- The total dollar amounts authorized for the three OPTAR cost components (fuel, AVDLR and maintenance).

By using the OP-20 document, the CNAP FHP manager and comptroller decide how to allocate flight hours to each squadron, air wing, and aircraft-owning activity; taking into account deployment schedules, and training requirements.

In distributing OPTAR funds to squadrons and air stations, the OP-20 serves as a "jumping off" point. At CNAP the distribution of FHP funds is shared by two offices, the Flying Hour Program Division (N01F3) and the Aviation Flight Hour Operations Office (N-3F). The FHP manager (N01F3) is charged with the overall management of the program, but shares this responsibility with N-3F. N-3F, (also called the FHP Operations Officer (Ops-O)), is responsible for ensuring the squadrons are allocated the proper number of flight hours and associated funding levels required to meet CNO's mission readiness goals for aircraft [Ref. 14]. To determine how many hours to allocate each squadron the CNAP Ops-O uses five major documents: 1) Status of Resources and Training System (SORTS) Report, 2) Required Operational Capability/Projected Operational Environment (ROC/POE) 3) Aviation Training and Readiness Matrix, 4) OP-20, and 5) the Secretary of the Navy's Department of the Navy Consolidated Planning and Programming Guidance (DNCPPG). A discussion of each of these documents follows.

The SORTS manual defines specific mission proficiency requirements necessary to achieve the various combat readiness ("C") ratings, which are subsequently reported to the CNO and Joint Chiefs of Staff (JCS). It is in effect, a percentage measurement of how mission ready a unit is to operate in a combat environment. The ROC/POE delineates general combat capabilities and mission areas for each T/M/S expected during wartime. The Training and Readiness Matrix (T & R Matrix) is a detailed Joint CNAP/CLANT instruction that provides guidance by T/M/S, mission, and specific goals for air crew competency levels necessary to achieve a particular "C" rating in the SORTS Report. Lastly, the DNCPPG establishes a measure termed Primary Mission Readiness (PMR) which serves as a subjective means to distribute a limited number of flight hour funds among the various activities. PMR, simply stated, is the number of flight hours required to complete all events scheduled on the T & R Matrix. Completing all events is known as 100% PMR. However, since funding has been ratcheted down by Congress and DoD historically over the last 20 years, Navy leadership has been forced to lower this number. PMR is currently maintained at a Navy wide rate of 83% plus 2% of the flying hours-performed in aircraft simulators [Ref. 13].

The first three documents, SORTS, ROC/POE and T &R Matrix are tools used by squadron CO's in determining how to allocate their flying hours. At CNAP, the Ops O takes these documents into consideration but, because of the complexity in trying to balance the requirements of all four documents, he primarily relies on the OP-20 and the 83% PMR goal to distribute flight hours by T/M/S. Specifically, the OP-20 assists in the allocation of funds to the fleet because it is broken down into three schedules to reflect different mission areas. This is done because each T/M/S is funded to a slightly different level of hours and dollar amounts due to differences in operating expenses, e.g., jets versus helicopters. These schedules thus serve as a rough guideline for flight hour OPTAR distribution throughout the fleet. More detail on these schedules is addressed in section F. For purposes of understanding CNAPs role, they are introduced as follows [Ref. 15]:

General Purpose Forces:

- TACAIR/ASW – Carrier air wings, Marine air wings, land and sea based units committed to combat operations = funded at 83% PMR (1A1A fund code).

- FLEET AIR TRAINING (FAT) – Squadrons that are dedicated to training fleet aircrews in each particular type aircraft = funded at 100% student throughput (1A2A fund code).

- FLEET AIR SUPPORT (FAS) – Squadrons which perform combat support functions = Funding based on Naval Center for Cost Analysis (NCCA) methodologies and historical execution (1A1A fund code).

In concert with the OP-20 budget exhibit, final distribution of funding to fleet squadrons is achieved by matching squadron flying "activity levels" with the CNO PMR goal of 83%. An activity level denotes where a squadron is during its typical 18 month "turn-around deployment cycle". A turn-around cycle is simply the eighteen-month period used for scheduling aircraft deployments, along with all the requisite aircraft and air wing training in preparation for those deployments. The three phases of this turn-around are deployment, turn-around, carrier preparation and deployment. Given the fact that flight hour requirements vary at each stage of the turn-around cycle, CONUS based air wings are typically funded at the levels shown below:

- Month 1: Personnel turnover and leave — 40% PMR
- Months 2-6: Turn-around training — 65% PMR
- Months 7-10: Turn-around training — 75% PMR
- Months 11-16: Pre-deployment training — 95% PMR
- Month 17: Pre-deployment Stand down — 50% PMR
- Deployment Month 1: — 70% PMR
- Deployment Months 2-5: — 115% PMR
- Deployment Month 6: — 60% PMR

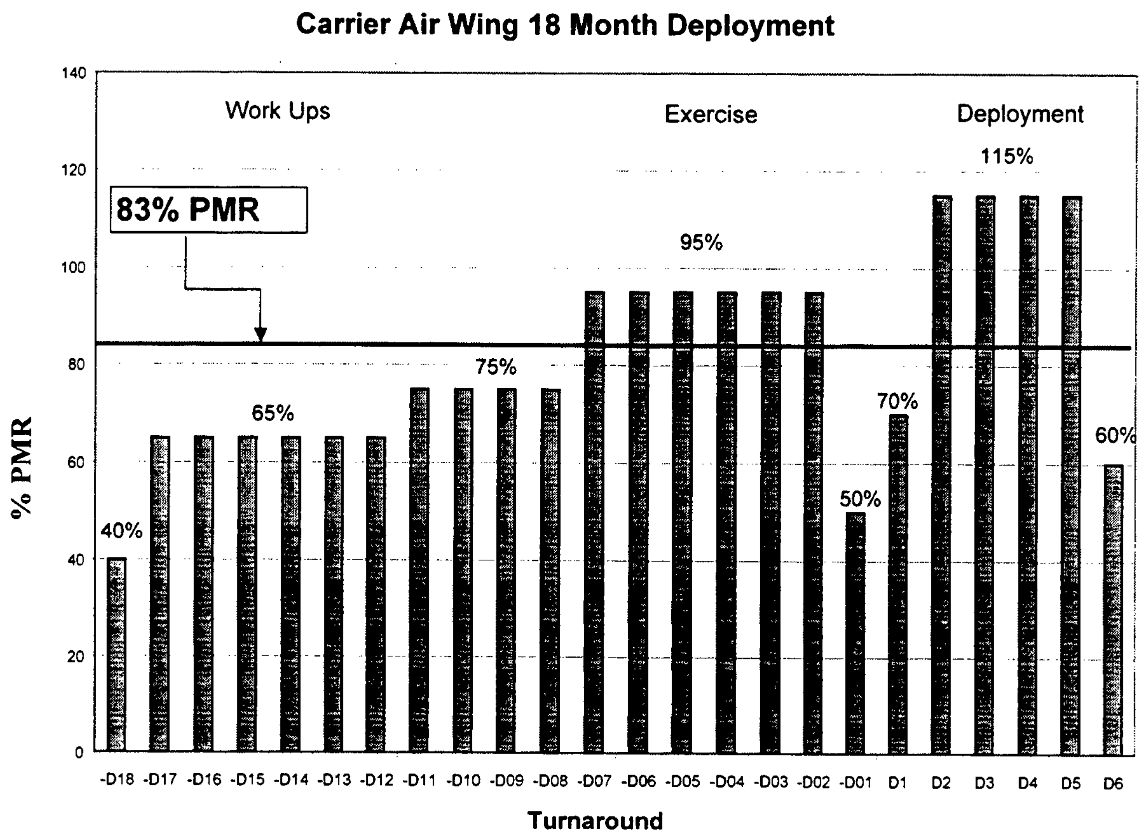

Figure 2.10. CNAP 18 Month Carrier Air Wing Deployment Cycle [Ref. 16]

Using the 83% PMR goal as guidance, the CNAP Ops-O uses the OP-20 schedule and builds a quarterly master flight hour execution plan for each air wing once CINCPACFLT passes the "controls" (fiscal FHP dollar limits) to CNAP. The objective is to attain an overall PMR goal of 83% while at the same time ensuring squadrons receive the necessary funding to fly enough flight hours to meet training requirements. As illustrated in Figure 2.10, the level of funding and flight hours required varies from the 83% PMR baseline depending on squadron location within the turnaround cycle. However, in the aggregate, an 83% PMR level is achieved. In addition to achieving the 83% PMR goal, the Ops-O also must take care to avoid any over obligation of FHP funds and a resulting 1517 Antideficiency violation.

After the master flight hour execution plan is endorsed by the air wing commanders, and approved at CNAP, the Flight Hour Manager's staff then distributes the quarterly OPTAR grants to the air wings, squadrons and air stations by naval message. Receipt of this message provides authority for these activities to obligate FHP funds.

(2) **Execution**. CNAPs monitoring role in FHP execution is to closely track and review all squadron and air station obligations. This is achieved through the FHCR and BOR costing information reports. These reports serve to:

- Prevent over expenditure of allocated funds
- Ensure funds are used for approved purposes only
- Compare squadron, air wing and air station readiness training and support activities to current on-hand FHP funds
- Identify excess funds for redistribution to other units
- Measure ship/station/squadron budget execution performance
- Support and provide justification for subsequent fiscal year budget inputs and decisions
- Prepare required FHP management control reports

The FHCRs and BORs provide both a feedback mechanism to the TYCOM on the status of funds for each unit, as well as a check and balance to ensure over obligation or inappropriate obligations of funds does not occur. The FHCR delineates fiscal year to date information on the amount of flight hours flown and the obligations for fuel, maintenance and AVDLR expenses. By continuing to monitor the FHCR and BOR inputs against the OP-20 cost per hour guidance, any anomalies are immediately addressed by the CNAP FHP Manager. When funding shortfalls occur, the FHP Manager is then required to reallocate funds between the squadrons and the air stations or through a request for additional funding from CINCPACFLT and N-88, the resource sponsor. Critical shortfalls are common within the FHP and it has become customary to address these shortfalls through the distribution of "contingency funds".

There are two types of Contingency Funds; those that are appropriated by Congress to offset costs of ongoing known operations, and those that are appropriated through emergency supplemental bills to cover unforeseen contingencies. An example of "known" contingency funds, are those used to fund the continuing military operations in Bosnia. These funds were not budgeted for in PPBS, but were appropriated and set-aside during the normal congressional appropriations cycle. These funds are held by FMB and provided to CNAP only in the event that fleet operations – in direct support of "contingencies", exceed the appropriated FHP budget.

An example of "unknown" contingency funds, were the funds passed in July 1998 to cover the unplanned costs of deploying a second aircraft carrier to the Persian Gulf. The appropriation of these funds occurs when it becomes apparent through mid-year budget reviews that continued fleet operations would exhaust set-aside contingency funds. CNAP has received and depended on the release of contingency funds to help meet PMR goals and cover the increased cost requirements not adequately funded during annual budgeting [Ref.13].

Overseeing the distribution of flight hour funds within CINPACFLT requires a tremendous management effort between the squadrons, air stations, air wing commanders, and the resource sponsor. This is a challenging task, and at any given point in time, the FHP managers are closely monitoring the execution of nearly five air wings, a dozen air stations, and over 100 squadrons. The final objectives and challenges of these task are to spread the limited FHP funding across all activities while achieving mission readiness goals and to ensure the proper execution of all allocated funds by the end of the fiscal year.

4. Commander in Chief United States Pacific Fleet (CINCPACFLT)

The primary responsibility and function of CINCPACFLT as the Major Claimant for the Flight Hour Program (FHP) is to support and act as an interface between CNAP, FMB and the resource sponsor, N-88F. These budget responsibilities and functions are grouped into two areas, budget formulation, and budget allocation and execution. A discussion of these functions and responsibilities follows.

a. Budget Formulation

During the FHP budget formulation process, CINCPACFLT receives three input documents, they are: FHP fiscal control limits, the budget policy and formulation guidance, both from the FMB analyst, and a copy of the proposed OP-20 FHP budget exhibit as developed by N-88F. Since CNAP primarily oversees the day-to-day execution of the FHP, CINCPACFLT budget personnel forward these documents to CNAP. When these documents are received by CNAP staff, they are validated and verified against the control limits and the OP-20 to ensure sufficient funds are available to execute the FHP. Using the Aviation Cost Evaluation System (ACES), CNAP compares the proposed OP-20 budget document from one year to the next to determine if the changes between the two years are executable. This analysis is done by matching the flight hours listed in the OP-20 to the control amounts provided in the OP-32, the OP-5 and other budget guidance notices. As noted earlier, if funding shortages are identified, CNAP can take two courses of action, 1) reprogram funds and flight hours within the overall allocation limit or 2) request additional FHP funding from CINCPACFLT.

To request additional funding, CNAP forwards both unfunded requirements documents and POM Papers to CINCPACFLT. Both the unfunded requirements document and POM Papers help to articulate and identify funding shortages at CNAP. Upon receipt, CINCPACFLT budget analysts and operations personnel review CNAP's inputs to determine if the requests are valid. If the inputs are considered valid, CINCPACFLT then will prioritize and incorporate CNAP's inputs among the other CINC major programs and forward the requests to FMB via the Resource Sponsor, N-88F, in early July. When FMB analysts receive CINCPACTFLT's inputs, they also review and prioritize the requests to determine which shortfalls should be incorporated into the Navy's budget and submitted to the DoD Comptroller. If approved by DoD, these shortfalls may ultimately be included in the President's Budget and receive congressional review for authorization and appropriation [Ref. 17].

b. Budget Allocation & Execution

CINCPACFLT responsibilities in the allocation and execution phase of the FHP are more limited. Nevertheless, these responsibilities, particularly in allocation, can result in significant decisions that directly impact the successful execution of the FHP.

The responsibility to allocate funds is the job of the CINCPACTFLT Execution Branch. The Branch distributes the quarterly FHP funding to CNAP as received from FMB. However, before these funds are allocated at the beginning of a new fiscal year, an analysis of the funding levels for each of the Navy CINC's programs is conducted. If this analysis determines any of the CINC's programs are inadequately funded, CINCPACFLT leadership may determine that reprogramming funds between programs is necessary. In recent history, many CINCPACFLT reprogramming decisions have resulted in the transfer of funds from the FHP account to other CINC programs. These reprogramming decisions can dramatically impact the daily operation of the FHP at CNAP and result in a number of added challenges in managing this already difficult program. The significance and impact of these advance-reprogramming decisions will be brought out in more detail during Chapters III and IV.

Since CNAP is the principle manager of the FHP, CINCPACFLT delegates the FHP execution responsibility to him. However, CINCPACFLT budget analysts and operations personnel monitor the program through daily telephone calls and program monitoring. These personnel monitor CNAP FHP obligation rates to see how funds are being spent, and conduct monthly reviews of the program by T/M/S to ensure fleet readiness goals are being achieved, and to discover potential mission trouble areas [Ref. 17].

This completes the discussion of the roles and budgeting actions undertaken by the squadrons, air stations, COMNAVAIRPAC, and CINCPACFLT. The next section of this chapter will continue the analysis of the remaining FHP budget players beginning with the Resource Sponsor, N-88F.

F. SPECIAL ASSISTANT FOR THE FLYING HOUR PROGRAM: N-88F

1. Introduction

The primary responsibility for budgeting and funding the Navy Flying Hour Program (FHP) resides with the Office of the Special Assistant for the FHP, N-88F. N-88F is the resource sponsor for the program, and falls under the cognizance of the Assistant Chief of Naval Operations for Air Warfare (N-88). It is at this level where the Air Type Commanders' flying hour requirements are translated into monetary amounts to execute their respective FHPs, and hence achieve fleet aviation readiness. The primary purpose of this section is to explain how the flying hour funding requirements are determined and to outline the roles and relationships of N-88F during the budget formulation process. This section begins with a brief overview of N-88Fs program responsibilities and relationships, followed by a more detailed description of FHP categories, cost components, and a comprehensive explanation of the way flying hour costs are forecasted and calculated to develop the Operation Plan 20 budget exhibit (OP-20). As explained earlier, FHP budget formulation is not an easy process to understand. Although the great budget scholar Wildavsky, was not familiar with the Flying Hour Program, he captured the essence of its difficulties in his analysis of how federal budget calculations are made: *"Budgeting is complex, both because there are so many interrelated items and because these often pose technical difficulties."* [Ref. 2:p. 44]

2. Overview of N-88F Program Responsibilities and Relationships

The responsibilities and functions performed by N-88F are demanding and difficult. Principle areas of oversight and responsibility include determining FHP funding requirements, budgeting, cost projection, coordinating with FHP fleet representatives, monitoring program execution, and presenting the Major Claimants' POM issues. The primary task of the N-88F staff as the resource sponsor is to ensure sufficient flying hour funds are programmed to achieve specific operational and material readiness objectives. [Ref. 15] Throughout the PPBS process, the staff participates in comprehensive meetings and conferences pertaining to FHP requirement assessments, pricing and execution. During the budgeting cycle, the staff constructs budget exhibits developed from Fleet inputs and from budget guidance published by the Assistant Chief of Naval Operations for Programming and Assessment (N-80 and N-81), and the Assistant Secretary of the Navy, Financial Management and Comptroller's Office (FMB). In terms of their coordination role, Figure 2.11 depicts some of the many fleet commands and agencies that N-88F communicates with on a daily basis.

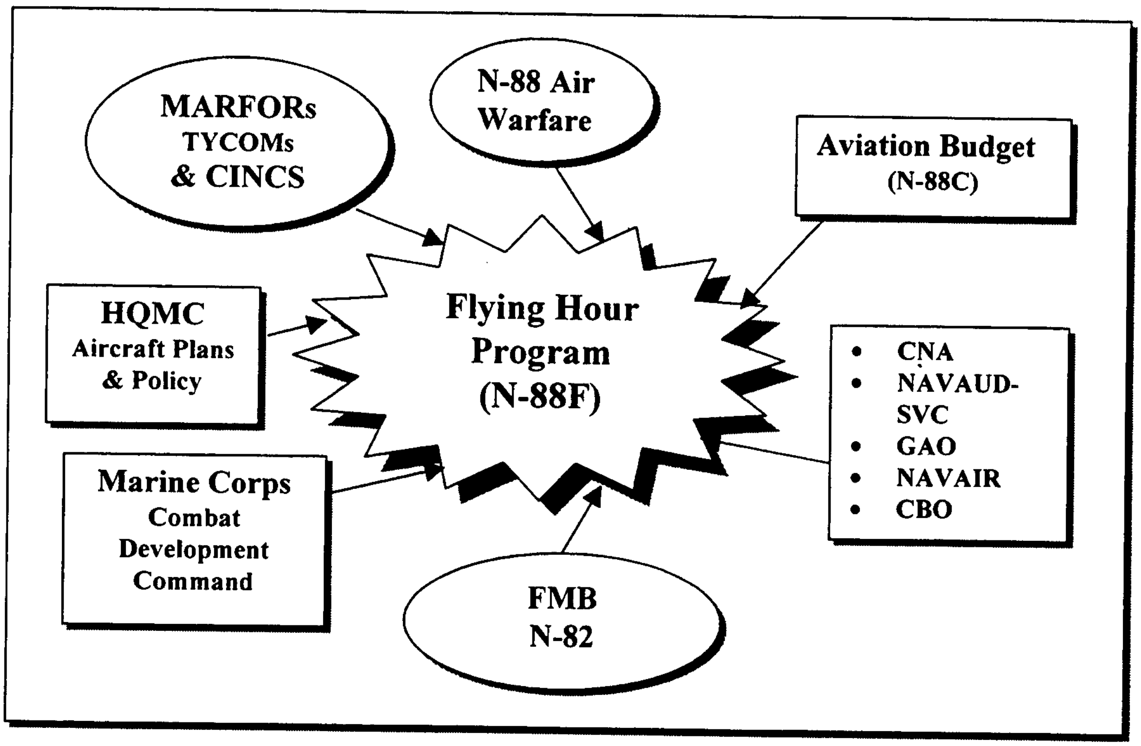

Figure 2.11. FHP Program Coordination [Ref. 18]

Since budgeting requires intense human interaction and negotiation, effective communication at all levels in the funding chain of command is essential. Communication with the Air Type Commanders usually pertains to budget issues, funding discrepancies, readiness implications, and policy changes. Other duties include hosting the annual Flying Hour Conference and managing the FHP database. The Flying

Hour Conference is a chance to have a "face to face" with all FHP analysts and budget players in order to communicate issues, concerns and potentially resolve program difficulties, such as projected funding shortfalls and potential budget reductions or "marks". The FHP database is called the Flying Hour Projection System (FHPS) and is used to store both historical and future FHP information. This information is used during each phase of the budget process to predict and validate future FHP requirements, conduct sensitivity analysis with different pricing options, and produce various budget exhibits such as the OP-20 (Estimate of Flying Hours and Related Costs). [Ref. 15:p. 2-1] What follows is a brief review of how the FHP is organized in terms of aircraft mission categories, funding and cost components.

3. FHP Categories, Funding and Cost Components

As noted in Chapter I, the FHP is the system used to predict, budget and justify the annual fiscal resources required for operating and maintaining all Navy and Marine Corps Type / Model / Series (T/M/S) aircraft, (including reserve squadrons). The overarching goal of the Navy FHP is to maintain and improve aircrew proficiency and aviation combat readiness. To achieve this readiness, the FHP is divided into four distinct categories or schedules which constitute the organizational basis for the OP-20 and the Flying Hour Cost Report, (both of which will be discussed in subsequent sections of this chapter.) Each schedule is unique and it is important to understand the distinction between them as each schedule uses specific source data elements in forecasting their respective costs. Some of these data elements are exclusively used for only one schedule, while other data elements are used by all four schedules. These four schedules are identified by letters, and delineate the various Navy / Marine Corps Aircraft squadrons by functional mission. A description of each schedule is presented below: [Ref. 15:p.1-2]

Schedule	Mission / Definition
A	*Tactical Air / Anti-Submarine Warfare (TACAIR/ASW)*: This category constitutes the bulk of the Navy / Marine Corps aviation

warfighting capability, which primarily consist of those squadrons capable of executing the "joint strike" and "crisis response" missions in support of the National Military Strategy. The ASW component pertains to the squadrons whose mission is to detect and attack subsurface threats and conducting maritime surveillance operations.

B *Fleet Air Training (FAT)*: This category (also referred to as Fleet Replacement Squadrons (FRS)), consists of squadrons that train pilots and navigators prior to joining TACAIR/ASW and Fleet Air Support units.

C *Fleet Air Support (FAS)*: The primary mission of these squadrons is to provide direct and indirect support (including logistics) to Navy and Marine Corps fleet operating units and shore installations. Although the FAS mission is separate and distinct from the TACAIR/ASW and Fleet Air Training missions, it serves as an integral component in achieving total Naval aviation readiness. Common mission examples include Carrier-on-Board Delivery, and Search and Recovery.

D *Reserves*: This category pertains to all Navy / Marine Corps reserve squadrons.

The FHP no longer includes the direct program costs associated with the Undergraduate (new student pilot) training category. Requirements determination for this training category falls within the purview of Chief of Naval Aviation Training (CNATRA).

The schedules that fall within the purview and control of the active duty Air TYCOMS are schedules A, B, and C. Before analyzing program cost components and how the schedules are calculated by N-88F, a brief review of the program's financial organization is presented.

a. Program Funding Breakdown

This section reviews the FHP funding composition relative to the percentage of funds the Air TYCOMS receive, the amount allocated to each FHP schedule, and the cost components that the funds are used for.

As explained in Section C, the DoN Flying Hour Program is funded from the Operations and Maintenance, Navy (O&M, N) appropriation. Funding for the FHP is contained in four of the eleven different Major Force Programs (MFP) known as: Strategic Forces, General Purpose Forces, Intelligence and Communications, and Reserves (See Figure 2.4 for the complete MFP / appropriation relationship.) Of the four MFP's, approximately 89% of the FHP O&M, N funding is contained in the General Purpose Forces program element (MFP 02). Reserve Forces, (MFP 05) constitute about 10% of total FHP funds and the remaining 1% is allocated across the other two MFPs. The resources that pay for the flight operations and maintenance costs for the two active duty Air TYCOMS come from the General Purpose Forces element. Forty eight percent is allocated to the Commander Naval Air Forces Pacific (CNAP), and forty one percent is allocated to Commander Naval Air Forces Atlantic (CNAL) as depicted in Figure 2.12.

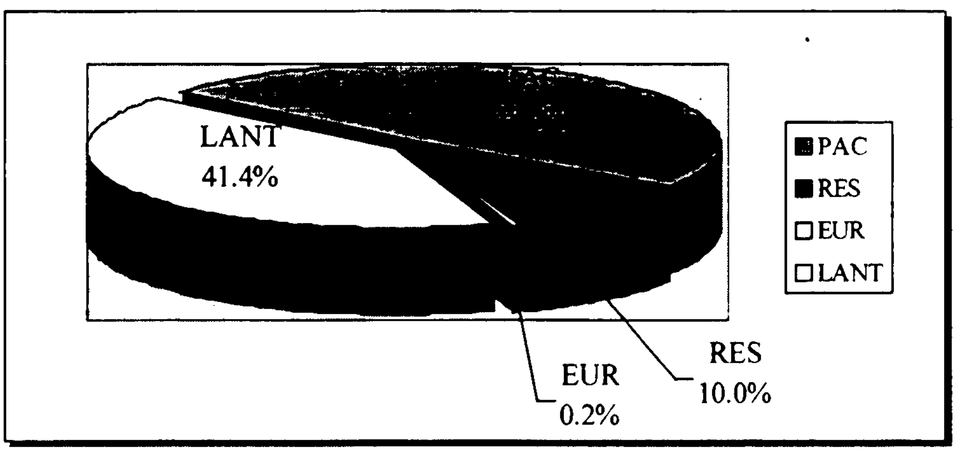

Figure 2.12. TYCOM Funding Allocation [Ref. 18]

The funding for the TACAIR/ASW (A), FAT (B) and FAS (C) schedules comes from the General Purpose Forces program element. On average, for the last three fiscal years, (96, 97, 98) these FHP schedules have been appropriated $3.2B (then year) dollars. Figure 2.13 illustrates the relative funding percentage of each schedule. The

TACAIR/ASW schedule is the most visible FHP category from both a budgeting and strategic perspective since it contains the majority of FHP funds and tactical Fleet aircraft.

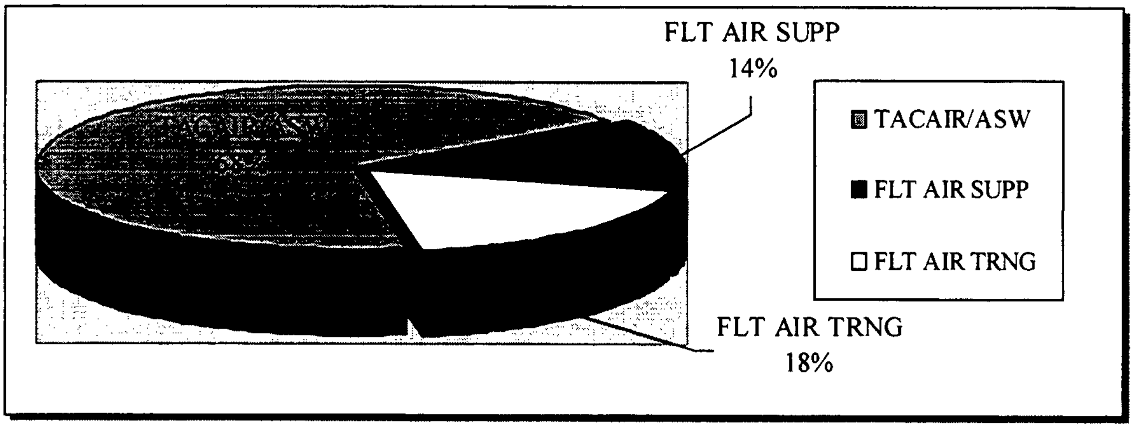

Figure 2.13. FHP Schedule Funding Percentages [Ref. 18]

As explicated earlier in the chapter and depicted in Figure 2.5, the appropriation funding is further subdivided into Budget Activities (BA), Activity Groups (AGs), and Sub-Activity Groups (SAGs). The primary FHP Budget Activity that CNAP is concerned with is BA-1 (Operating Forces), since it incorporates the funding for the TACAIR/ASW, FAT, and FAS schedules. The next discussion will outline the major FHP cost components, the Flying Hour Cost Report (FHCR), followed by a description of the Flying Hour Projection System (FHPS). An explanation of the cost components and their relationship to the FHCR and the FHPS is important in understanding how the TACAIR/ASW portion of OP-20 budget exhibit is developed.

b. Cost Components

FHP costs are delineated into four main categories or cost pools: Fuel, Maintenance, Aviation Depot Level Repairable (AVDLRs), and Special Interest Category "Funding Other" (F.O.). The first three are considered direct program costs which are reflected in the TYCOMs Flying Hour Cost Reports and the OP-20s developed by N-88F.

The F.O. category, contains the indirect FHP costs and does not appear in the FHCRs nor the OP-20. Figure 2.14 delineates these FHP costs by percentage of funds for the General Purpose Forces category. The cost categories are discussed below. Costs not covered by the FHP O&M, N appropriation, include procurement, overhaul and repair of engines and the aircraft themselves.

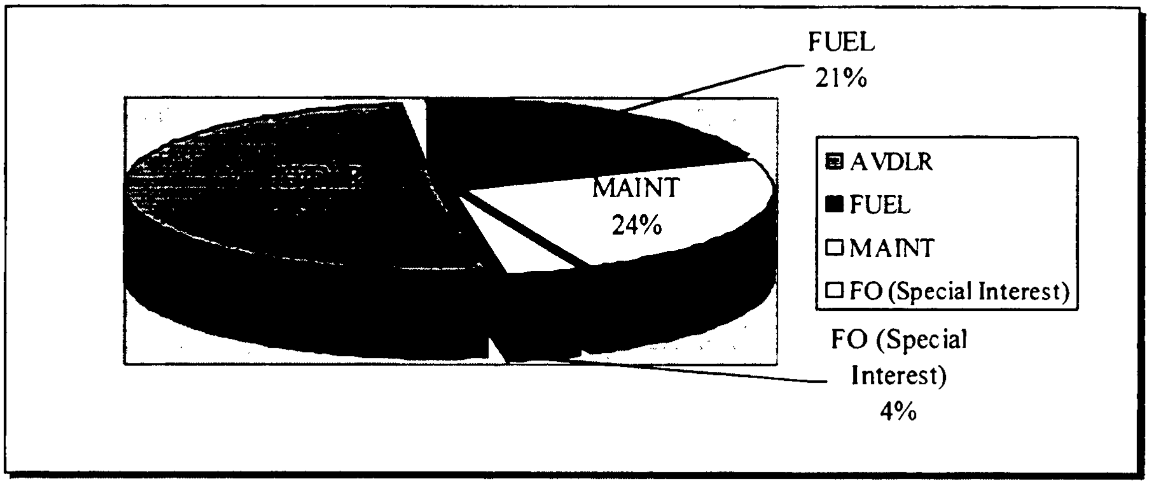

Figure 2.14. FHP Cost Components [Ref. 18]

Fuel. On average the fuel costs make up approximately 21% of the FHP budget and reflect all of the fuel and lubricants consumed in support of designated flying hour requirements. Two types of fuel costs are presently budgeted for in the FHP: JP-4 and JP-5. The Air Type Commanders determine the type fuel and mix required. The fuel pricing information (per barrel) is stored within the FHPS database. Fuel price assumptions and escalation rates are provided annually through DoD and are contained in NAVCOMPT notice 7111 [Ref. 15].

Aviation Depot Level Repairable (AVDLR). AVDLRs are repairable aircraft components or assemblies. These components are generally high cost and require long procurement lead times. Due to their high cost nature, significant savings can be achieved by repairing them as opposed to discarding these items when they fail or break [Ref. 19]. AVDLRs are typically repaired at the Depot Level when the item is determined to be Beyond the Capability of Maintenance (BCM) of the Intermediate maintenance facility. AVDLRs constitute approximately 51% of the FHP budget and are clearly the most problematic cost component, in that their costs have increased significantly since 1991 (increasing, on average, 7.5% per year). The AVDLR cost issue is a major cause of program underfunding and variability, as discussed in detail in Chapter IV.

Maintenance (MNT). This cost category includes the aggregate consumable maintenance costs incurred at both the Organizational (O-Level) and Intermediate maintenance levels (I-Level). At the O-level, these costs consist of purchases for preventive maintenance and corrosion control materials such as paint, rags and cleaning agents, as well as common hand tools and various consumable supplies used during aircraft maintenance. Maintenance costs associated with the removal of engines and other components are also included in this cost pool. The consumable maintenance costs incurred at the I-level consist of the outlays for the material used and activities performed in the repair of aircraft engines and components. Other outlays are made for a myriad of tools, flight equipment and contract maintenance [Ref. 15]. See Section E 3a. for a more detailed discussion about the Aviation Fleet Maintenance (AFM) category.

"Special Interest Category" Funding Other (F.O.). As previously indicated the FO costs are not included in the OP-20. These "other" costs represents outlays for flight simulator operations, civilian labor, administrative supplies, material, equipment, maintenance service contracts, and expense for travel and lodging associated with pilot and crew Temporary Additional Duty (TAD). Although most of these costs are considered an integral part of the cost for Naval Aviation, there are no FHP resources programmed by N-88F. Rather, the FO costs are incorporated in the Major Claimants' regular budget submission. The Air TYCOMs provide input for the development of this budget, based on their forecasted requirements for the FO category of funds. The FO category has become a perennial source of program underfunding, which will be further explained and analyzed in Chapter III.

c. *Flying Hour Cost Report (FHCR)*

During budget execution, the costs outlined above (less the FO category) are captured and reported in the Flying Hour Cost Reports (FHCR) by the Air TYCOMs. The source data for the FHCRs are the Budget OPTAR Reports (BORs), transmitted from the various squadrons and air stations that fall under the cognizance of the Air TYCOM. (BORs were explained in Section II-3c.2). In turn, the Flying Hour Cost Reports (FHCR), are transmitted electronically from the TYCOMs to N-88F and FMB on a monthly basis. Copies of the FHCRs are provided by the TYCOMS to their respective Major Claimants as well. The FHCR data is entered into the Flying Hour Projection System (FHPS) and serve as the primary budget input to develop the OP-20 budget exhibits [Ref. 15:p. 10-7]. The FHCR itself is delineated by Major Force Program, FHP Schedule, and program element for both Navy and Marine Corps Squadrons. For each schedule, the report depicts the cost per hour and total aggregate obligations to date for each of the three direct cost components (fuel, maintenance and AVDLR), by program element, and T/M/S aircraft. Flying Hour Projection System (FHPS).

As introduced earlier, the FHPS is the repository for all FHP historical and current year execution data. The system is used by N-88F to project FHP requirements and costs for the Planning, Programming, and Budgeting System (PPBS) and is physically located at the Naval Inventory Control Point in Mechanicsburg, PA. N-88F has a direct data link to the FHPS. The most important output of the FHPS is the OP-20. In addition to producing the OP-20 budget exhibits, the system helps N-88F produce a myriad of tailored reports to satisfy requests for information from higher headquarters or agencies including DoD and Congress. The system also allows N-88F to produce sample OP-20s to conduct simulation or "what if" drills regarding different pricing options and changes in force structure. The key data that the FHPS synthesizes in producing the OP-20 are the historical Flying Hour Cost Reports, the inventory and location of fleet aircraft (generated by the Aircraft Planning Data File (APDF)), and cost escalation factors. The FHPS uses a numbering system to identify the specific version OP-20 as it relates to the

PPBS cycle. The number and type of OP-20s produced in support of PPBS will be further discussed in Section G.

Before turning to specific budgeting events and activities performed by N-88F, the next section describes how the FHP flight hours and costs are determined.

4. FHP Requirements Determination

a. Cost Per Hour and FHP Forecasting Methodology

Two data elements are used to determine the flying hour requirements for the Air TYCOMs: 1) the number of flying hours required by the aircrews per month in each T/M/S aircraft, and 2) the cost to operate each T/M/S/ aircraft per flight hour (CPH). The number of flying hours required by the aircrews is obtained from the CNAP/CNAL Joint Instruction 3500.67D, Training Readiness Matrices. For example, the Training and Readiness Matrix indicates that the required number of flight hours for an F/A-18 crew is 25 hours per month. The cost per flight hour refers to the direct and indirect costs associated with operating an individual T/M/S aircraft on an hourly basis. CPH calculations for any T/M/S are essentially the sum of the aggregate cost pools delineated in the FHCRs (AVDLR + Maintenance + Fuel) divided by the number of hours flown: CPH = Sum of Total Costs / Total Hrs Flown.

The approved methodology for forecasting the FHP cost per flying hour for each T/M/S has varied over time. Historically, the primary means of projecting the budgeted cost per hour has been based on a three year moving average of actual FHP execution. The current methodology, used since FY98 is based on the costs from the most recently executed FHP budget, that is then adjusted for inflation and other escalation factors. Hence, in formulating the FY-98 budgeted cost per hour for Fuel, Maintenance and AVDLRs, FY 96 execution data (with some adjustments) were used. Variations to this current year execution methodology may occur, particularly when it is deemed that the specific execution year experienced high cost anomalies. Figure 2.15 provides an illustration of the required inputs needed to determine each T/M/S cost per hour used in the OP-20. It is important to note that the CPH for each T/M/S aircraft is different among the two TYCOMS, AIRLANT and AIRPAC. In fact, it can vary among different squadrons within the same TYCOM due to varying environmental operating conditions, missions, utilization rates and several other changing factors. Many FHP managers, and budget analysts have spent, and continue to spend an inordinate amount of time and effort in analyzing the variances in the cost per hour in attempt to control or explain some of the dynamics that drive increases in costs for each of the T/M/S aircraft. This issue and the adequacy of the current methodology used to forecast FHP cost data is examined in Chapter III.

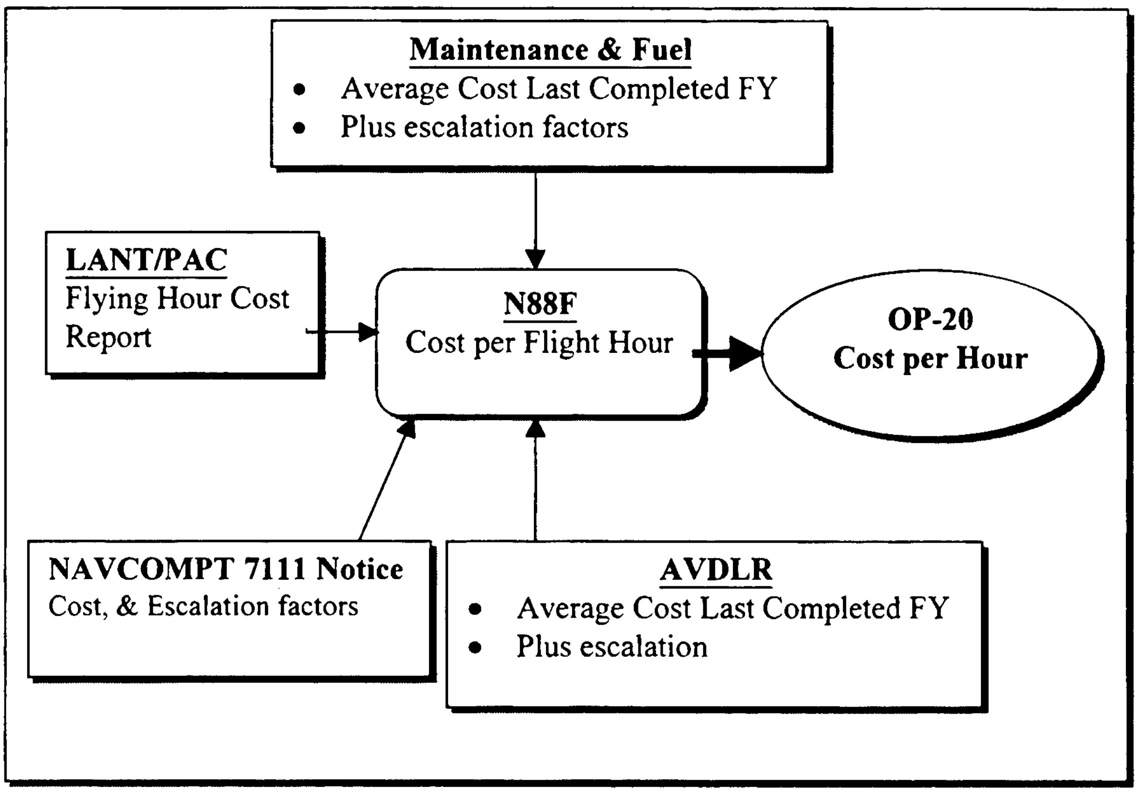

Figure 2.15. Cost Per Hour Inputs [Ref. 18]

b. Description of the Operations Plan 20 (OP-20) Exhibit

The OP-20 is the principle budget execution document produced from the N-88F Flying Hour Projection System (FHPS), that relates annual budgeted flying hours to forecasted flying hour costs. The OP-20 is broken down by FHP schedule, program element, and T/M/S which reflect the flying hours and budgeted CPH for each of the cost components (Fuel, AVDLRs and Maintenance). During budget formulation, the N-88F produced OP-20 serves as guidance for the Major Claimants and TYCOMs annual authorized flying hours that may be flown by each T/M/S aircraft, and the top-line funding allocation for the execution year. The Major Claimants and Air TYCOMs in turn, use the OP-20 as a guide in preparing their respective budgets and "check" if the funding and hours provided meet their requirements. Once approved via the budget process, the OP-20 becomes the primary resource allocation document for the TYCOMs to execute their respective Flying Hour Programs. The number and type of OP-20s produced in support of the PPBS cycle is confusing and will be detailed in Section G 2.b. The process by which N-88F calculates each of the FHP schedules for developing the complete OP-20 budget exhibit is reviewed next.

c. OP-20 Schedule Calculations for the Active Duty Forces

Now that a basic overview of the FHP cost components and costing methodology has been provided, this section completes the analysis of how N-88F calculates the predicted flying hours and funding requirements for each of the FHP schedules in developing the OP-20 budget exhibit. The goal of N-88F in this process is to fund the FHP requirement to the extent possible given funding availability. The term requirement refers to forecasting the required hours for each Air TYCOM and the costs associated with flying those hours (Fuel, Maintenance and AVDLR). The first calculation analyzed is the Schedule A: TACAIR /ASW.

(1) **Schedule A: TACAIR/ASW.** The formula elements used to determine the TACAIR/ASW schedule are described first, then the composite formula is

presented. These formula elements are as follows:

- Primary Authorized Aircraft (PAA) – This element refers to the requisite number of aircraft assigned to a squadron to be fully combat mission capable. The CNO determines this figure based on the Aircraft Program Data File (APDF). The APDF is a composite database that contains the inventory and location of all Navy / Marine Corps aircraft [Ref. 9 and 15].

- Crew Seat Ratio – Reflects the relationship of how many pilots are assigned to fly under combat conditions and integrates factors such as crew rest, illness, injury and leave time. This figure is established by the Naval Bureau of Personnel [Ref. 9, 20, and 22].

- Aircrew Manning Factor (AMF) - Reflects the number of aircrews budgeted per aircraft per squadron based on manning levels determined by CNO and adjusted by N-88F. The AMF has been subject to budget reduction marks from FMB and DoD particularly, when it is determined that different information systems reflect lower than 100% crew manning for various T/M/S's [Ref. 20].

- Hours per Crew per Month (H/C/M) – This component refers to the minimum number of hours that each crew must receive per month in order to be considered combat ready and technically proficient in the designated Primary Mission Areas (PMA) of the assigned aircraft. This figure is delineated in the Joint (CNAP/CNAL) TYCOM Training and Readiness Instruction [Ref. 20 and 21].

- PMR – PMR is defined in the CNAP/CNAL Joint Instruction 3500.67D, Training Readiness Matrices as "the hours required to maintain the average crew qualified to perform the Primary Mission Areas (PMA) of the assigned aircraft, to include all weather/day/night carrier operations". PMR is expressed as a percentage of total monthly flight hours authorized. Historically, PMR has been as high as 88% in the mid 1980s, but the current CNO PMR goal is 83% (plus 2% contributed via flight simulators). This goal is published annually by N-80, and is reflected in the DoN Consolidated Planning and Program Guidance (DNCPPG). The TYCOMs allocate PMR based on their Inter-deployment Training Cycle as explained earlier. PMR is only applicable in determining the flying hour requirements for the

TACAIR/ASW (Schedule A) portion of the FHP, and is not used in the other schedules (B, C and D). In summary, PMR is simply a markdown tool used in the OP-20 calculation to determine the annual budgeted flying hours and cost for each T/M/S resident in Schedule A. The topic of PMR is revisited in Chapter III.

The TACAIR/ASW Schedule is an integrated sequential formula, described below:

	FORMULA COMPONENTS	OUTPUT
1.	(Primary Authorized Aircraft) x (Crew Seat Ratio)	= Allowed Crews
2.	(Allowed Crews) x (Aircrew Manning Factor)	= Budgeted Crews
3.	(Budgeted Crews) x (Required hrs per crew, per month) x (12 months)	= Required annual flying hours per Squadron
4.	(Required annual flying hrs per Squadron) x (No. of Squadrons)	= Total annual Flying hrs required
5.	(Total annual Flying hrs required) x (83% PMR)	= Annual budgeted flying hours
6.	(Annual budgeted flying hrs) x (Cost per Hour)	= Annual budgeted cost

Table 2.1. TACAIR/ASW OP-20 Formula

(2) **Schedule B: Fleet Air Training (FAT).** Although Schedule B is calculated in a different manner than Schedule A, it uses the same historical cost per hour methodology. The level of funding for this schedule is driven by the projected student throughput (number of students), the students flying experience and the amount of training required to become proficient in operating the specific Type aircraft assigned. N-88F defines these student-training categories as follows: [Ref. 15:p. 4-2]

CAT I — First tour aviator who has completed primary training or first tour in a Type aircraft (Receives 100% of training syllabus).

CAT II — Second tour aviator with previous fleet experience in a Type aircraft (Receives 75% of training syllabus).

CAT III Either third tour with fleet experience in the Type aircraft (e.g. CO or XO) or Transitional aviator (Receives approximately 50% of CAT I syllabus).

CAT IV An experienced aviator with substantial Fleet experience in the Type aircraft and requires only a refresher NATOPS check (Receives 10-20% of the CAT I syllabus).

CAT V A specialized syllabus designed for aviation personnel such as foreign pilots or pilot's transitioning from fixed wing aircraft to helicopters (Receives 25-75% of syllabus, contingent on training needs).

The basic formula for calculating the estimated requirement for each of these categories is as follows:

	FORMULA ELEMENTS	RESULT
1.	(Number of Students) X (Syllabus hours per category)	= Number of Hrs
2.	(Number of Hrs from step 1.) X (CPH for the respective T/M/S aircraft)	= Budgeted Cost

Table 2.2 Fleet Air Training Calculation

These figures are adjusted if the number or type of aircraft changes or if the Pilot Training Rate (PTR) changes due to student throughput [Ref. 9:p. 17 and 15].

(3) **Schedule C: Fleet Air Support (FAS).** In the past, N-88F has used historical execution data exclusively to determine FAS funding requirements. The current approach uses the most recent year's execution data in conjunction with a methodology developed by the Center for Naval Analyses (CNA). The CNA methodology breaks down the FAS schedule into three mission related categories. These categories are Training, Operational and Other. The "Training" category pertains to the hours stipulated in the Training and Readiness Matrices that ensures pilot technical and

tactical proficiency. The "Operational" element refers to the flying hours required to conduct support missions such as Carrier On-board Delivery (COD) and Vertical Replenishment (VERTREPS). The "Other" category includes overhead hours such as ferry flights and maintenance check flights. [Ref. 15:p. 5-1]

The intent of this section was to provide a detailed description of the flying hour program organization, its components and how N-88F determines the FHP funding requirements via the OP-20. Understanding the basic mechanics, terminology and peculiarities of the FHP facilitates an understanding of the specific role of N-88F in the FHP budgeting cycle, discussed next.

G. THE N-88F ROLE IN THE FHP BUDGETING PROCESS

1. Introduction

A basic overview of the Resource Allocation Process and PPBS was presented at the beginning of this chapter to provide a clearer perspective of how the FHP fits within this greater budgeting framework. Section E 3c. described CNAPs role in formulating, submitting and executing the FHP budget. To complete the description of the FHP funding process, an analysis of the N-88F role in FHP budget formulation, submission and execution within the context of the PPBS cycle follows. This discussion also includes the roles and relationships with FMB and DoD/OSD, during budget submission and review.

2. Planning, Programming and Budgeting System (PPBS)

As noted earlier in this chapter, PPBS is a dynamic process that constitutes the framework in which the Department of Defense (DoD) plans, prepares, negotiates and makes decisions on policy, programs and resource allocation [Ref. 5]. Understanding the complexities of PPBS is a massive challenge due to the nature and size of DoD and the scope of the diverse mission and activities of the military. The DoN FHP is one of the many programs decided upon within this broader system. This section provides a brief overview of how some of the key PPBS events and processes relate to the FHP, and how N-88F and other tangential FHP budget players interact within this framework.

a. Planning

The key document developed in the planning phase, is the Defense Planning Guidance (DPG). Section B 1 details how it is contrived. The DPG consists of force structure and fiscal guidance for the Services to use in preparing their respective Program Objective Memoranda (POMs). This document also helps the Assistant Chief of Naval Operations for Programming (N-80) to develop the Navy's Consolidated Planning and Programming Guidance (DNCPPG). The DPG and the DNCPPG serve as the basis for developing the Navy's POM within the top-line funding totals for a six-year period. The DNCPPG also outlines the Naval Aviation Primary Mission Readiness (PMR) percentage.

b. Programming

The programming process serves as a means of integrating planning and budgeting in order to decide what programs to distribute available resources to. As the Resource Sponsor for the FHP, N-88F is continually engaged in the PPBS process to ensure there are sufficient resources programmed in the Future Years Defense Program (FYDP). The FYDP is the database that contains the DoDs approved programs. It displays the cost of programs like the FHP, by Major Force Program, Program Element and appropriation, for a six-year period. The programming process validates and makes changes to the FYDP. This process begins with the last four years of the program constructed in the previous PPBS cycle [Ref. 4:p. C-7]. Understanding the POM cycle is confusing, so an explanation is provided to better illustrate this process, and the years in question. As discussed earlier, the Program Objectives Memorandum (POM) essentially outlines the Services' spending plan for a six-year period. The first two years of the POM are the basis for the budget years (BY and BY+1). As an example, in FY 98, planning was conducted to submit the biennial budget for FY 00 and 01. FY 99 is referred to as the current year (CY) which is the upcoming fiscal year. The appropriation approved for FY 98 is the source of funds used for executing the current year, FY 99. FY 98 is referred to as the prior year (PY). The next four years FY 02-05 are known as the estimated budget outyears. Collectively, the fiscal years 1999-2005 are referred to as POM 00. The following display summarizes the POM 00 cycle: [Ref. 4: p. C-14]

98 99	00	01	02 03 04 05
PY CY	BY	BY+1	Budget Outyears

The previous POM cycle (referred to as POM 98) began in FY 96 and incorporated the following years:

96 97	98	99	00 01 02 03
PY CY	BY	BY+1	Budget Outyears

With a clearer perspective of this cycle, a description of some of the other programming events and review boards follows. The senior management group that drives the programming process for the Navy is called the Resource Requirements Review Board (R3B) [Ref. 4:p. C-7]. The R3B consists of representatives from the Navy Resources, Warfare Requirements and Assessments branch (N-8). The board's responsibility is to assess program needs and then prioritize these programs within given funding constraints. The R3B will eventually brief the CNO Executive Board and the Secretary of the Navy to obtain final POM approval. To facilitate POM development, the Resource Sponsors receive topline-funding limits from N-80 to construct their program budgets. N-88F will begin to develop a tentative POM OP-20, generated from the FHPS to fit within the given fiscal parameters.

As alluded to in section F 3d., there are many versions of the OP-20 produced during the PPBS cycle. These versions are identified by a specific version number generated by the FHPS. Although these OP-20s are commonly identified by their numbers, they sometimes are referred to as the phase or event they are supporting. For example, the Sponsor Program Proposal OP-20, POM OP-20, OSD budget OP-20, (meaning the OP-20 approved by FMB and submitted to OSD), and the President's Budget (PRESBUD) OP-20, i.e. the OP-20 approved by OSD/OMB and forwarded to Congress. In the programming phase, the first edition of these OP-20s are developed and used during the Sponsor Program Proposal (SPP) process. The SPP is the means in which the Resource Sponsors develop their initial proposals for inclusion in the Navy POM and FYDP. At the N-88F level, the SPP is essentially an in-house review by N-88 in which a few variations of the OP-20 are produced to assess different pricing options and funding plans for the respective budget years. [Ref. 23, 24, 25]

As noted earlier in this chapter, another feature that influences POM development are POM Issue Papers. Major Claimants like CINCPACFLT will submit prioritized POM Issue Papers, which mostly address mission concerns and funding shortfalls. Any issues that the Air Type Commanders wish to present will be incorporated into their Major Claimants issue papers. N-88F will then address the top five issues presented by the TYCOMs via their Major Claimants. For those FHP specific issues, N-88F convenes a working group to analyze and address the presented issues. The working group will assess the impact of all pricing and programmatic increases and decreases, and recommend appropriate actions to the N-88 (Director, Air Warfare) Flag Board [Ref. 15:p. 9-2]. The N-88 decision is difficult because as the Director of Air Warfare, he/she must make cost trade-off decisions to balance current FHP readiness against aviation modernization procurement needs, and other programs, within the confines of limited resources. This perennial phenomenon is the essence of budgeting. Jones and Bixler succinctly describe this budgeting dilemma, in their discussion of PPBS: "*Budgeting in PPBS is primarily an effort at rationing resources...a highly constrained exercise in pricing the executability of programs within the parameters of affordability and feasibility*" [Ref. 5:p. 25]. The N-88 Flag Board will then approve or disapprove the FHP adjustments based on planning and policy decisions, affordability and achieving readiness objectives. For those POM issues not approved and incorporated into the POM, N-88F provides written justification back to the Major Claimants. Once N-88 modifies and approves the SPP OP-20, the results are presented to the IR3B. During this review, negotiations are conducted and modifications made to the various SPPs. The final event of the programming phase is dubbed the "End Game" where the CNO Executive Board reviews the Sponsor Program Proposal to insure that "balance and coherence" is achieved for all programs in the POM. Once changes and adjustments are made, the Navy POM is presented for final review and approval to the DoN Program Strategy Board (DPSB), chaired by the SECNAV [Ref. 4:p. C-10]. The approved POM OP-20 version, as well as the other programs are integrated into the Navy's overall POM and forwarded to OSD for review. During the OSD POM review, N-88F works closely with FMB to properly defend the FHP against any marks that may be assessed by the OSD review team. The end of the programming phase occurs when the SECDEF issues a Program Decision Memorandum (PDM) which is the final decision on the POM OP-20 and the overall POM for the Navy. The PDM signals the completion of the programming phase and indicates the beginning of the budgeting phase.

*c. **Budgeting***

Once the POM is reviewed and accepted by OSD and OMB, the biennial budgeting phase begins [Ref. 15]. Budgeting is a more "precise process" in which monetary amounts are assigned to the approved programs determined in the previous phases. The formal Navy submission process is initiated when FMB issues the "budget call" to all budget-submitting offices to submit their budget estimates. This usually occurs in the Feb/March time frame. The mechanism that formally signals this process is the transmission of NAVCOMPT Notice 7111. As mentioned earlier, this notice contains top-line fiscal limits, instructions and guidance pertaining to the content and submission of budget estimates, the estimated inflation and escalation rates, the submission schedule and any deviations from existing financial management regulations. [Ref. 4:p. B-16] In turn, the Major Claimants issue budget calls to their subordinate agencies in the April/May time frame. Since the process of budgeting as Wildavsky calls it is "repetitive", the Navy financial chain of command has typically conducted prior budget planning and development before the budget call is issued [Ref. 2:p. 48].

3. Budget Submission and Review

The Major Claimants and TYCOMS use the POM OP-20 developed by N-88F during the programming phase as a baseline for formulating their respective budget exhibits. Once the budget exhibits are prepared and reviewed at the TYCOM and Claimant levels, their consolidated budget requests are submitted in accordance with the schedule provided in NAVCOMPT Notice 7111. This budget submission is the transition point in the budget review process, where the FHP budget is meticulously screened by each agency in the financial chain of command: N-88F, FMB, OSD/OMB, and finally Congress. The administrative goal of the review process is to ensure the Claimants have submitted a FHP budget that is justifiable and executable. The first level of review occurs at N-88F where the FHP submissions are reviewed to insure compliance with the DNCPPG and to insure the most current escalation factors are incorporated. Once N-88F completes reviewing and adjusting the FHP, it is forwarded to FMB where the review and adjustment process is repeated.

a. Assistant Secretary of the Navy, (Financial Management and Comptroller)

During the budget submission process, N-88F staff coordinates very closely with the Assistant Secretary of the Navy, (Financial Management and Comptroller) Office of Budget (FMB). This coordination entails responding to marks on the submitted FHP budget exhibit, as well as providing information to assist FMB in defending the FHP budget (OP-20) exhibits to the O&M, N budget analysts from the Office of the Secretary of Defense (OSD). The specific FMB section that manages and reviews the Navy FHP is Code FMB 121. This review process is officially referred to as the "NAVCOMPT Summer Review". During this review, FMB 121 may make modifications and changes, but the focus is to ensure that the OP-20 is updated with the most current pricing information. Additionally, FMB 121 screens the FHP budget estimates to ensure the following [Ref. 4:p. B-40 and 23]:

- That current escalation rates are applied to the budget estimates.
- Budget estimates are executable.
- Budget estimates are developed in accordance with POM, SECDEF guidance, and other policy decisions and documents.
- Budget estimates are accurate and defensible against the subsequent OSD and Congressional reviews.
- Budget estimates are financially feasible and balanced against other funding priorities.

Budget cuts or "marks" are levied on the FHP routinely when the FMB analyst disagrees with some portion of the Claimants' FHP schedule exhibits. There is a common perception that all marks are analogous with reductions, but the FMB analyst can add to or "plus up" portions of FHP funding requirements where shortfalls were assessed. For example, the FMB analysts wrote a mark during the POM 00 review that increased funds for portions of the Marines FHP outyear budget. [Ref. 23] If, in fact, marks are issued from FMB, N-88F responds with appropriate "Reclamas" to appeal and contest the reductions. These are then negotiated further to resolution; often reclamas are summarily denied by FMB. Once approved at the FMB level, the FHP budget is submitted to DoD as part of the budget proposal of the Secretary of the Navy.

b. OSD/OMB

The first time the FHP budget submission is reviewed outside of the DoN is when FMB forwards it to the DoD Comptroller Office, where the DoD O&M, N budget analysts conduct a joint review of the budget. The OSD budget analyst is charged with reviewing all Navy programs funded with the O&M, N appropriation. At this level the same repetitive procedures occur that took place at FMB: hearings, adjustments (marks or plus ups) and then appeals (reclamas) and responses/negotiation/discussion. Once the appeal process is complete, final decisions on budget submissions are reviewed with OMB budget staff and are provided in the SECDEF Program Budget Decisions (PBD). If the Secretary of the Navy (SECNAV), the CNO or CMC have difficulties with SECDEF level decisions, "Major Budget Issue" (MBI) meetings are conducted with SECDEF to resolve the problem areas [Ref. 4:p. B-42]. After MBIs are finished, final adjustments are decided, and the Navy budget submission (including the FHP exhibit) is incorporated in the SECDEF budget submission to OMB for subsequent presentation to Congress by the President. The congressional review and oversight process is decentralized into committees and subcommittees by each house of Congress and is complex in itself. One phenomenon that occurs in the review process is the concept of budget "role reversal". Once the recipient of the FHP budget is finished assessing and adjusting the funding totals, he/she then becomes the defender and protector of the budget. An analogy offered by one FHP analyst was one of wearing "different colored hats". When the analysts wear the "black hats" they aggressively seek out weak areas in the budget exhibits to "cut" at funding requests to minimize the amount taxpayers have to spend on the FHP and to protect against higher level reductions. When the budget is passed to the next level of review they don their "white hats" and become ardent supporters and defenders of the FHP budget requirement [Ref. 26]. Once OSD and OMB approve the FHP budget, it is integrated with the rest of the military department submissions, and incorporated into the Presidents budget request. The completion of the budget phase occurs when the President forwards the budget to Congress, scheduled annually for the first Monday in February.

4. FHP Budget Execution

Due to overall federal budget constraints, competing priorities and limited resources, the final version of the OP-20 approved by Congress contains less funding than the POM OP-20 initially developed in the Programming phase. Once the budget has been approved by Congress and signed by the President, the DoD Comptroller and then FMB allocates quarterly O&M, N funds in accordance with the approved OP-20 to the Major Claimants. The Claimants will then allocate OP-20 funds to the Air TYCOMS to begin execution of their respective FHP programs. Budget execution is ultimately where the FHP budget is validated to assess whether sufficient funds have been forecasted and allocated to achieve the flying hour requirements of the Air TYCOMS. The role of the higher-level budget analysts and officials (N-88F, FMB and OSD) during execution is primarily that of monitoring and control. As discussed earlier in this chapter the primary mechanism that N-88F and FMB use to conduct this monitoring role is through the Flying Hour Cost Reports transmitted from the TYCOMs. During execution, N-88F may publish additional OP-20s to reflect changes and reprogramming actions. The last type of OP-20 produced from the FHPS is the final execution OP-20, which summarizes the total program execution costs of the previous year. This OP-20 helps FHP program managers and budget analysts to review their predicted performance against their actual FHP execution for that specific year.

The hope and expectation during the execution year is that the actual FHP cost data are relatively consistent with the budget estimates. However, in recent years, execution costs have exceeded the budgeted estimates, which has been the case with CNAPs FHP. This may indicate that the FHP forecasting methodology is not accurate, prices are increasing or both. When this occurs, the onus is on the fleet FHP Managers and Comptrollers to embark upon "creative financing" to continue to try and achieve the aviation readiness goals without committing an Antideficiency Act violation. The Fleet will also address underfunding issues during the CNOs Mid-year Review. Regardless of the causes and contributing factors of underfunding, and this mismatch between actual and forecasted costs, there is never a concern that the forecasted FHP budget will result in unobligated funds. This is due to the "spend it or lose it" mentality that pervades all federal agencies. There is simply no incentive to underspend.

Other decisions and factors that compound budget execution fall within the realm of unfunded requirements and unplanned events. Examples include unplanned operational contingencies, lower than expected failure rates for repair components, and managerial decisions that reprogram FHP funds for other priorities. These and other execution problems and factors are discussed in Chapters III and IV.

5. Chapter Summary

This chapter presented a detailed overview of the FHP budgeting and funding process. The overarching intent was to create a document of sufficient detail that newly assigned FHP managers and budget personnel could use as it a single source reference to obtain insight into how the FHP requirement is determined, as well as an understanding of the roles and activities performed by the key FHP budget players. An overview of the DoD Resource Allocation Process and PPBS was presented to show how the FHP fits within this greater budgeting framework. The inherent difficulties and complexities of FHP budgeting are simply an extension of the larger DoD and Federal Budgeting Process. Although this chapter describes and analyzes certain FHP processes and components thoroughly, it has not addressed completely the tedious, day-to-day activities and negotiations that consume most of FHP budget player time and energy. Further, there are many other tangential budget players and agencies outside of the FHP budgeting chain that were not described because this is beyond the scope of this thesis.

Finally, the chapter also intended to provide the reader with sufficient understanding of the FHP components and mechanics in order to understand why problems may exist in the FHP and why underfunding may occur in the Air Type Commanders budgets. The next chapter examines FHP formulation problems, causes of FHP underfunding, and initiatives in progress to improve the overall DoN Flying Hour Program.

III. FHP UNDERFUNDING AND OTHER ISSUES IN BUDGET FORMULATION

A. INTRODUCTION

The first objective of this thesis is to describe the Flying Hour Program budgeting and funding process, detailed in Chapter II. Chapters III and IV provide FHP managers and budgeting personnel insight to some of the perennial FHP issues and causes of underfunding that occur during budget formulation and execution. The purpose of this chapter is to explain how FHP underfunding may result from budgeting dynamics, an environment of scarce resources and the FHP budget formulation methodology used to determine the flying hour requirement and associated costs. As stated earlier, CNAP's FHP underfunding is not attributable to one cause, but rather a combination of the effects of budget dynamics, unplanned events, managerial decisions and cost variance, all occurring in an environment of limited resources and competing priorities. This chapter begins by analyzing some of the factors of the budgeting process that contribute to FHP funding variability and uncertainty.

B. BUDGET PROCESS DYNAMICS

1. Introduction

As noted in Chapter II, the defense Resource Allocation Process is extremely complex. This complexity is largely due to the size of the DoD organization, its diversity of missions and the magnitude of its budget. The fact that the defense budget represents the largest source of remaining discretionary funding in the Federal Budget generates keen interest and makes it a lucrative target for oversight and reduction. The complexity of the resourcing process is also due to the many different organizations and agencies that are involved in formulating and producing the DoD budget and hence competing for their fair share of funds and/or benefits. The purpose of this section is to analyze some of the many dynamic factors that constitute this competitive budgeting process and how these dynamics contribute to budget instability, funding uncertainty and inefficiency for the DoD and DoN.

2. Defense Budgeting Dynamics

There are many dynamic factors that influence defense budgeting processes and funding levels. Since the DoN FHP is a comparatively small program within the DoD, constituting approximately 1% of the DoD budget, some of these dynamic factors are not readily correlated to specific causes of CNAP FHP underfunding. However, the effects of these budget dynamics are far reaching and cause variability and funding uncertainty at all levels of command within the military. This section first examines how changing public and political attitudes results in defense resource variability. The next section analyzes the effects of congressional control and micromanagement of the defense budget and its impact on efficiency, followed by an analysis of the inherent weaknesses in the PPBS process that contribute to budget formulation problems and funding variability.

a. Changing Attitudes, Preferences and Competition

The size and quality of the defense budget has historically been subject to resource variability, driven by changing public attitudes, political agendas and competition. This notion of changing attitudes is manifested in the traditional debate between investment in national defense or investment in domestic programs – "guns versus butter". Public attitude toward the level of U.S. defense spending has and will continue to be a powerful influence. This influence is particularly strong during peacetime and or/economic scarcity. During these times, the American public tends to view the defense budget as more discretionary and of little value, when faced with other pressing social issues and problems. Congress will in turn respond to constituent preference for more domestic spending and ultimately trim other discretionary programs such as defense, vice an unpopular alternative such as raising taxes. Changing attitudes and public preference clearly has contributed to a "boom and bust cycle" of defense funding, and during the times of scarcity, readiness programs like the Navy FHP feel the fiscal squeeze during budget formulation. Defense funding is also subject to variability associated with different political views and agendas. Korb states the budgetary process will always be inherently political and that the "Top-line" budget amount is often affected by the political situation of the President and how he intends to use it. Korb summarizes how past administrations have viewed and used the defense budget to accomplish different agenda / objectives:

> The final figure will be decided by whether the President desires to have a balanced budget like Truman and Eisenhower, whether he chooses to use the defense budget to stimulate the economy as did Presidents Kennedy and Nixon, or whether, like Presidents Johnson and Ford, he wishes to keep the entire federal budget below a certain amount. [Ref. 27:p. 345]

Extending Korb's observations to more recent administrations, we still see how the defense budget continues to vary in response to different political goals and objectives. During the Reagan era, the DoD budget thrived as this administration intended to stimulate the economy and use it as a mechanism to facilitate the end of the Cold War. During President Bush's term, defense funding began to decline sharply (with the exception of the Desert Storm period) to account for the new post cold war environment and deficit reduction measures. Under the current administration, the DoD budget has been reduced considerably to reinvest savings associated with downsizing and the "peace dividend" into domestic spending programs and other public areas. As demonstrated, the DoD and Services budgets and programs are subject to the preferences of society, changing attitudes and the varying goals of different political administrations.

Competition during budget formulation is another dynamic factor that can result in some programs losing funding and others gaining. Since the amount of resources and benefits contained in the defense budget is so high, many organizations, agencies and lobby groups battle intensely for their fair share of the budget. This competition is especially keen among and within the military departments and Services.

Not only do the Services compete for missions and funding, so do programs within the Services. For example, in the Navy, the different warfare communities such as Surface and Air compete regularly for funding priority and relevance. Wildavsky asserts that the "competition and stakes" in the DoD budget are higher than in any other federal department. Others like former Chairman of the JCS, General David Jones describes the defense budget as an, "intramural scramble for resources" [Ref. 2:p. 224]. Ultimately this degree of competition causes funding uncertainty for the FHP and/or other programs, depending on how persuasive arguments can be presented to gain "market share" from others. For example, if the Army can convince Congress helicopters are the weapon of choice vice fixed wing aircraft, or if the Navy Surface Warfare Resource Sponsor can convince Navy decision makers they have a greater need for funding over the Air Warfare community - reductions may occur in the FHP. The key issue is that in a constrained fiscal environment if money is competed away from one service to another, this causes adjustments and cuts to other programs.

Next, we analyze how Congress exercises control over the defense budget and assess the relative impact of this control on funding for programs such as the DoN FHP.

b. Congressional Control and Micromangement

Congressional control and micromanagement of the defense budget is a significant factor that influences budget formulation and efficient resource allocation decisions. The tendency for Congress to micromanage the DoD and DoN budget process is due to a myriad of reasons. This section examines these reasons and analyzes its relative impact on the budget process.

By law Congress has the right and duty to control the defense budget. This legislative power is mandated in the U.S. Constitution. Article I, Section 8 of the Constitution is clear in stipulating Congress' "power of the purse" as well as delineating its control over military policy and budgets. Congress has further increased its control through the enactment of several public laws requiring the authorization and appropriation for virtually all-military acquisitions and operational funding (See Jones and Thompson 1994, pp. 75-79.) In terms of controlling the defense budget some critics contend Congress goes well beyond the intended purpose of these laws. These criticisms seem to be well founded as evidenced by congressional action and behavior. What follows is an analysis of how and why Congress behaves the way it does toward the defense budget and why the tendency to micromanage exists.

The *proliferation of committees* involved with reviewing and negotiating the annual defense budget has contributed to increased micromanagement. Ten Senate committees and eleven House committees exercise formal jurisdiction over one aspect or another of defense policy. [Ref. 2:p. 243] The increase in Congressional committees results in lengthier negotiations, floor debate and budget total revisions. To illustrate the impact of this increase in the number of committees and their activity, Wildavsky points out:

> ...in 1969 Congress made 180 changes to the defense authorization bill and 650 revisions to the appropriations bill. These numbers increased to 222 and 1,032, respectively in 1975 and sky rocketed by 1985 to 1,145 authorization adjustments and 2,156 appropriations adjustments. Out of 2,600 line-items in procurement for weapons and munitions alone in 1986, for example, the Armed Services committees made 1,000 changes in authorizations [Ref. 2:p. 243].

In addition to defense committee expansion, *congressional staffs* have also increased in size and expertise due largely to committee competition and the quest for "good defense information". With the advent of this expansion, Congressional committees not only have the propensity to meddle in the details of the budget, but experienced staff members give them added capacity to do so. Cahn asserts that the increase in congressional staffs is "the single most important factor in enabling the Congress to engage in more detailed action on the defense budget" [Ref. 5:p. 113]. The increase in staffs also increases the time and effort that DoD and Service budget personnel have to devote to responding to a myriad of inquiries and requests for information regarding a program or mission area, during budget formulation. (For further analysis and data regarding the impact of increased congressional staffs and the trend in congressional micromanagement of the DoD budget, see Jones and Bixler, 1992, pp. 113-126.)

In addition to increased micromanagement of the defense budget, the overall impact of the increase in committees and congressional staff has been a loss of efficiency for both DoD budget personnel and Congress. For DoD budget personnel, the decisions and effort involved with budget formulation and attempting to meet all requirements in a constrained funding environment are difficult enough without having to spend inordinate amounts of time responding to staff inquiries and/or adjusting fiscal resource plans resulting from the annual line item scrutiny of the appropriations and authorizing committees. For Congress, this loss of efficiency is a product of repeating the same time consuming annual budget battle when they should be focusing more time and effort in formulating defense policy and taking action on other broad issues. Comments from various current and former Representatives and Senators corroborate the negative impact of the size and staffs and committees, as well as the failure to maintain a broader policy perspective:

> *Morris Udall (D-AZ):* More Staff creates more work, more projects to be done, more bills to be written...Congress ought to focus on the big issues. But I spend about half my time in fights that my staff or somebody else's staffs gets me into [Ref. 5:p. 119].

> *Barry Goldwater (R-AZ):* For DoD, this situation has become a nightmare. DoD witnesses have to testify as many as six different times before six different committees of primary jurisdiction. More and more other committees and members of Congress claim jurisdiction over DoD policy. More and more legislation is reported from subcommittees with only the smallest interest in national security [Ref. 5:p. 93].

> *Sam Nunn (D-GA):* We are focussing on the grains of sand on the beach while we should be looking over the broad ocean and beyond the horizon. We are not fulfilling our responsibilities to serve as the Board of Directors for the Department of Defense. Instead, Congress has become 535 individual program managers that are micromanaging the department at an alarming rate [Ref. 5:p. 42].

Other reasons for the growth and continuance of congressional micromanagement include past operational failures like Vietnam, Desert-One, Lebanon and various occurrences of waste, fraud and abuse in the procurement of military equipment. Public concern over military waste, fraud and abuse still exists today and is further heightened by media embellishment of such occurrences. These occurrences and allegations range from the infamous $600 dollar toilet seats and $100 dollar coffee machine purchases, to million dollar procurement frauds like the Army's "Sergeant York" Anti-air defense weapon (DIVAD). Hence, the congressional response to improve DoD purchasing efficiency has resulted in more micromanagement and oversight.

The desire for accountability of what the public is getting for the dollars spent on defense is another factor that causes Congressional control and oversight of the DoD budget. This accountability is manifested by constant inquiries into the procurement of various weapon systems and /or the procedures of various high cost programs like the DoN FHP. As noted in Chapter I, Congress directed the GAO to study the FHP on four different occasions to assess the validity of how the Navy determines the funding requirement and measures the program effectiveness. Determining the relative value of various DoD programs is not a new phenomenon as evidenced by a statement made by a Congressional member from a 1950 House Hearing: "The thing we want to do...is to be sure we get the maximum value for the money expended" [Ref. 28: p.108]. Today, Congress is still driven by this duty to ensure the taxpayer and the nation is spending defense funds properly and efficiently. However this duty tends to get obscured by other Congressional motives and conflicting commitments, and begs the question that Jones and Bixler pose: "who is watching the watchers"? [Ref. 5:p. 10-11].

Some critics contend the most influential reason for congressional micromanagement is due to the incentives and rewards associated with constituent special interest and pork-barrel politics. The impact of special interest politics on budget formulation and long term fiscal planning can be disastrous. This recurring phenomena and its impact is examined in the following section.

c. Special Interest and Pork-Barrel Politics

Special Interest politics is by far the worst form of congressional micromanagement. During each annual budget battle "Pork" emerges as a tremendous force that impedes defense budgeting efficiency and can lead to the Services purchasing capabilities and equipment which they do not need. The impact of such influence sub-optimizes DoD spending decisions and can in fact lead to budget cuts and funding uncertainty for specific programs like the DoN FHP. This section will first examine why constituent special interest occurs, followed by specific examples of how this interest impacts DoD and DoN budget formulation and funding decisions.

The reason why this phenomenon occurs is because the incentive for Senators and Representatives to "bring home the bacon" for local constituencies is very strong. Essentially this phenomenon is a perfect symbiotic relationship in that constituents want jobs and politicians want to be reelected. Hobkirk articulates this incentive issue and its effect on defense nicely:

> As has often been pointed out, the separation of powers attracts pressure groups activity for a number of reasons, and this pressure is exerted on the individual member of Congress, who is of course, particularly susceptible to regional or local pressures from the area he represents. Thus, congressional representatives of areas likely to benefit from a major weapon purchase might well feel that they owe it to their constituents to try and obtain the contract for their district or state, despite doubts about the overall benefit to national defense. [Ref. 29:p. 54]

Similarly, Jones and Bixler note that the search for "pork" leads to excessive micromanagement because it is in the details of the budget that "rewards" are found for both politicians and constituents. Wildavsky even asserts "pork" has been democratized and committee members and legislators view the defense budget as a chance to benefit their constituents and states, and that there have been "numerous instances of projects being forced on DoD in order to maintain local employment" [Ref. 2:p. 244].

At first glance, the phenomenon of congressional special interest may not appear to have a measurable impact on the DoN FHP, but its effects are direct and can easily result in budget reductions during the formulation process. Further, congressional special interest results in additional work for Service leaders and budget personnel. When the Service is required to fund special interest projects, further trade-off decisions, adjustments and re-calculations must be made in an already constrained budget and POM. To illustrate this problem, the Navy made a recent decision in a program review to cancel funding for the procurement of a 10 million dollar munitions program. The decision was made due to budget constraints and the fact that the program was a redundant capability. The next day a Representative from the district where the munitions contractors lived, made an inquiry questioning the Navy's decision, suggesting rather emphatically that the Navy "needed this program" and if funding was not restored the issue would be "elevated to higher authorities". Due to political pressure funding for the program was in fact restored, requiring Navy budget personnel to make additional funding trade-off decisions and adjustments in the POM to accommodate the "new" purchase [Ref. 30]. The inefficiency demonstrated by this example is consistent with comments made by Representative Lee Hamiliton (D-IN), emphasizing the terrible waste associated with special interest politics:

> Political interests in Congress are often the cause of military misspending. For purely political reasons, Congress will sometimes direct the armed forces to buy a weapon or keep a base open even when military planners strenuously object. It has been estimated that $5 billion dollars could be cut from the defense budget if legislators stopped seeking unjustifiable outlays for the benefit of their own constituents [Ref. 5:p. 95].

Special Interest politics is not just confined to creating pressure for the Services to purchase items they don't need, but can also impede their decisions to modernize and become efficient. For example the Navy was planning for and conducting R&D efforts to procure a new Common Support Aircraft (CSA) to gradually replace the existing multiple inventory of aircraft types (S-3, ES-3, E-2, and C-2) that perform the same support missions. The intent was to achieve savings associated with the economies of scale in procuring and maintaining one common aircraft type. However, this new design concept was met with fierce resistance from a Congressman whose district currently produced one of the older support aircraft (the Grumman E-2) that the new CSA was intended to eventually replace. The final action resulted in a "zeroing out" of the CSA R&D effort, meaning the funding programmed by the Navy was deleted from the budget. In this case the Navy was penalized for initiating smart procurement practices to achieve savings and operating efficiency. The future impact of not replacing these older support aircraft will result in higher maintenance and logistic support costs reflected in the Flying Hour Cost Reports and ultimately the OP-20 budget [Ref. 30].

Sometimes special interest procurements result in extended and unfunded support costs. For example, when political pressure results in the procurement of "extra" aircraft or other military equipment, the logistics tail (spares, test equipment, facilities, maintainers, etc.) must be procured as well. That tail carries with it a huge price tag. The end result is more funding adjustments, trade-off decisions and potential offsets in specific readiness programs like the FHP or Ships Steaming program.

Senator McCain recently addressed this problem as well, stating; "Congress is to blame for using readiness for parochial and other special interest projects", citing the perennial Air Force C-130 add-ons as a prime example, commenting there, "will soon be enough C-130s to distribute one to every schoolyard in America" [Ref. 31:p. 4].

Since the incentives to continue this behavior are strong for both politicians and constituents, congressional special interest and "good old pork" will persist as a dynamic budget factor that influences the DoD and DoN budgets.

d. Deficit Reduction and Budget Gaming

Pressure to reduce the National deficit is also a dynamic force that can lead to defense budget reduction and further Congressional control. Despite the fact that the DoD budget has been reduced significantly in recent years and suffers from a lack of real growth, the public still perceives the defense budget as a discretionary "cash cow", and therefore the target of choice for reduction. From the public's perspective, cutting defense is the logical choice since the other alternatives would entail tax increases and or less spending on other public programs and jobs. For this reason, deficit reduction legislation has increased congressional scrutiny of the budget. As the budget decreases in this Post-Cold War period, Congress reviews the defense budget with extra zeal to insure that defense dollars are spent properly and to protect against program cancellations and base closures when constituent jobs are at stake. The pursuit of deficit reduction also gives rise to another dynamic budget phenomenon referred to as "gaming" and/or "budget gimmicks".

When faced with discretionary budget constraints and difficult spending decisions Congress has the propensity to contrive gimmicks to comply with fiscal constraints while at the same time satisfying public demand. An example of these gimmicks is manifested in the way Congress manipulated budget figures to avoid the sequestration penalty associated with the Gramm-Rudman-Holings (GRH) deficit control Act. As Rosen explains:

> In its [GRH] first year of operation, one trick involved backdating hundreds of millions of dollars in Medicare checks, so that expenditures could be counted against the previous year's budget. [Additionally] to reduce the 1990 deficit, telephone companies were told to pay taxes a week early, adding 102 million in revenues that otherwise would have accrued in 1991. [Ref. 32:p. 147]

Similarly, Schick states that both the Congress and the Executive branch use bookkeeping tricks to show that spending or the deficit have been cut. He describes other cutting strategies as follows: "...disapprove requested increases, slowdown purchases and other expenses, and abolish vacant positions. Funds could be saved by giving agencies less than a full adjustment for inflation and in a particularly tight budget, resources could be taken away from them". Schick also asserts that budget gimmicks are not new and may even be more extensively used than previously in an era of fiscal constraint. [Ref. 33:p. 3-86]

What is the relevance of all this to the DoN FHP budget? In an environment of fiscal limits and budget decline, this notion of "gaming" and modifying the budget occurs at all levels in DoD, simply because the requirements have to fit within the top-line. Hence, "gaming" occurs to a degree in the FHP formulation process and that results in underfunding the program. This is examined further in section D. Next we briefly analyze the notion of efficiency in budgeting.

e. Loss of Efficiency

The preceding sections assert that excessive congressional control, micromanagement and other budget dynamics impede the efficiency of the budget process and DoD/DoN resource allocation decisions. To clarify this notion of efficiency and how congressional control and micromanagement degrades efficiency, we briefly examine the concept of a perfectly competitive market and how the conditions for efficiency are achieved.

In a market economy, efficiency is achieved when market prices, and the quantities supplied by the seller and quantities demanded by the buyer are allowed to fluctuate freely. When the market operates in this manner, supply and demand tend toward equilibrium and efficiency is achieved. However, when prices are artificially restricted from adjusting (e.g., through price controls such as ceilings or floors), this impedes buyer and seller behavior and hence efficient exchanges are not achieved and the market tends toward disequilibrium.

Similarly, congressional micromanagement can be viewed as a form of price control that restricts efficient resource allocation decisions in both formulation and execution. If budget planners and warfighting commanders could freely decide the efficient allocation of resources within budget constraints, efficiency could be naturally achieved similar to the functioning of a market environment. If decisions were not constrained by micromanagement, special interest and other budget process limitations, planners and warfighters would make the necessary trade-off decisions that maximize the output of different requirements, missions and functions, e.g. surface warfare, air warfare (FHP), procurement, and base operating support, etc.

Relative to budget process reform, Lerner argues if the DoD were allowed to operate more like a market economy, the necessary conditions for efficient allocation of resources would occur. Specifically, he asserts that if the resource allocation process could be decentralized to the degree that spending authority were allocated directly to the combatant commanders, their marginal rates of substitution or trade-off decisions between all of their output missions and responsibilities would tend toward equilibrium. In economic terms this condition is called allocative efficiency which refers to maximizing the output of two or more resources relative to a budget constraint and or a utility function. Lerner's decentralization argument is interesting and begs the question: why don't we decentralize the resource making process down to the warfighting commanders to allow them to make the decisions that will determine the best use of these resources in the production of their missions and responsibilities? The conditions for the DoD to mimic a perfectly competitive market are not likely, but decentralizing the funding process to the point of output (the combatant commanders) makes good sense.

However, to achieve a more decentralized funding process where there is a better link between the budget and mission, requires some degree of organizational change. The concepts of decentralizing the budget process to achieve greater efficiency and organizational change are further addressed in Chapter V, where the authors present alternative budgeting concepts that might minimize congressional micromanagement and improve the efficiency of the defense budget formulation and execution processes.

The next section examines some of the dynamics and issues associated with the Planning, Programming and Budgeting System.

3. Planning, Programming, and Budgeting System (PPBS) Issues

The Planning, Programming and Budgeting System (PPBS) has evolved since its inception under Secretary of Defense Robert McNamara in the 1960s. Although DoD budgeting process and forecasting methods were improved with the introduction of PPBS, the process under McNamara was too centralized and agencies outside the Pentagon were largely excluded from providing budget input [Ref. 29:p. 343]. Since this time, improvements have been made, but deficiencies still exist that impede budget formulation and execution efficiency. This section analyzes three weaknesses of the PPBS process that contribute to FHP variability and funding uncertainty. These are: 1) the length of the PPBS cycle, 2) excessive centralization and 3) the annualarity of the budget process.

The first issue has significant budgetary effects on the FHP in that the present process extends over too long a period of time, resulting in a budget that typically lags current year requirements. For example, from the time the Defense Planning Guidance (DPG) is developed until the time the budget is submitted to Congress, nearly two years have elapsed. During this lengthy period, many changes may occur in the economy or world situation, rendering planning and program decisions obsolete. Similarly this "lag" effect on the FHP invariably results in budget modification during the execution year to reflect changes, unplanned events and unfunded requirements. The impact of this time lag is best illustrated by Jones and Bixler with the following observation during one of the budget cycles: "The DPG issued to the Services for use in developing the 1992 fiscal year defense budget scheduled for a *February 1991* release was finalized in *October 1989* – just a month prior to the fall of the Berlin Wall" [Ref. 5:p.14]. Problems associated with the length and overlap of the process are also noted by Korb who indicates it, "tends to confuse many participants about where they are in the cycle" [Ref. 27:p. 343]. To further illustrate the confusion caused by the length and overlap of the process, we will briefly review the different activities occurring in the POM 00 cycle. In fiscal year 1998, military agencies and budget personnel were formulating and working on the basis of the biennial budget years (00-01) and the budget outyears. At the same time, Congress was negotiating and deciding upon the upcoming FY 99 budget, requiring Service testimony and short fused staff action by budget planners and Resource Sponsors. It is easy to loose sight of who is working what and when given the multiple year overlap in budgets. Since this perpetual process consumes a substantial amount of key FHP budget players and agencies time, it is difficult to communicate program changes and modifications that may occur during the upcoming budget year and the outyears. The significance of not capturing current changes as budgets are formulated has severe funding impacts. This and other FHP forecasting issues are addressed in section D.

Korb also suggests that the length of the cycle renders the planning aspect of PPBS irrelevant, in that it is difficult for political leaders to provide definitive guidance for military planners and warfighters about how they will operate in specific contingencies and deal with unplanned events [Ref. 27:p. 345]. Implicit in Korb's argument is that the process should be more decentralized to provide military commanders the flexibility to respond to contingencies and changing operational requirements.

The need for greater budget decentralization transitions into the second weakness of PPBS; the DoD resource decision and allocation system is still highly centralized and involves too many participants. Although the CINCs do participate in the Programming phase of PPBS through the submission of POM papers and Integrated Priority Lists

(IPL), the output of the process still results in an annual spending plan that doesn't provide them with much flexibility during the execution year. Thompson and Jones argue for a more decentralized DoD budget process that provides unified and specified commanders with greater flexibility and multiyear spending authority [Ref. 34]. This concept is referred to as "mission budgeting" and requires organizational change to better align DoD strategy with its organizational structure. Other defense budget experts including Michael Hobkirk agree that proper defense organization is critical for military commanders to respond to different mission requirements. He states, "defense organization must be able to react to the unexpected and mount operations for which no previous plans exist" [Ref. 29:p. 118]. The details of mission budgeting and how a better alignment between DoD's strategy and structure can improve the current budgeting process are analyzed in Chapter V.

Another flaw in the PPBS process that prevents efficient resource allocation decisions is the annual nature of budgeting and the recurring line item review that Congress imposes on the DoD budget. Because Congress continues to review and appropriate much of the defense budget on an annual basis, DoD is unable to achieve the intended flexibility and efficiencies associated with a biennial budget process. [Ref. 5:p. 29] As Jones and Bixler explain, this is frustrating for Service and Fleet Comptrollers because DoD initiated the biennial budget system at the request of congressional authorization committees. They further indicate that prospects of DoD budget reform are unlikely in view of the incentives to continue this annual review [Ref. 5:p. 32]. Wildavsky also comments on the inefficiencies of the annual nature of defense budgeting. He states:

> The United States is the only nation, so far as I know, that budgets for defense on an annual basis. This is said to be too short and frequent. The annual appropriations and authorization process has been blamed for what the [former] Senate leader on defense, Democratic Senator Sam Nunn of Georgia, often refers to as the "trivialization of Congress' responsibilities for oversight...and excessive micromanagement". [Further] Considering [resource allocation] one year at a time, it has been argued, leads to short-sightedness (only next year's expenditures are reviewed), overspending (because huge future disbursements are hidden), and parochialism (programs tend to be viewed in isolation rather than comparison to future costs in relation to expected revenue). [Ref. 2:p. 249, 268]

Implementing a multi-year budgeting approach would lead to greater efficiency in budget formulation and execution. Congress may resist the notion of multi-year defense budgets due to perceived loss of control. However, some critics contend that a multi-year defense budget would lead to greater control by enabling Congress to conduct a more comprehensive and thorough review of defense policy vice "line item" scrutiny over the budget. For the military, a multi-year budget could result in greater flexibility and less variability by having greater resources available to respond better to unplanned and unbudgeted events. Since unplanned and unbudgeted events often result in funding decrements for operational budgets such as the FHP (see Chapter IV), multi-year budgets would minimize funding uncertainty and problems generated by a rigid annual spending plan. Greater spending efficiency is also achieved by minimizing the incentive to spend every last penny before the end of the fiscal year. This alternative of multi-year budgeting for defense is examined in greater detail in Chapter V.

4. Summary

This section has attempted to explain how budget dynamics produce an environment of funding uncertainty, budget instability and inefficiency for the DoD and DoN. In turn, this environment causes funding difficulties for the CNAP Flying Hour Program. In fact, we have shown how the FHP and other DoN programs become "hostage" to larger political forces such as micromanagement and the "pork-barrel". Further, it is important for CNAP FHP managers and budget personnel to understand budget process dynamics because they influence how decisions are made and how FHP budget requests are subject to oversight and funding cuts during budget formulation and review processes. In addition to budget dynamics, the environment of limited resources and competing priorities further influences FHP funding problems. These two topics are analyzed next.

C. ENVIRONMENT OF LIMITED RESOUCES AND COMPETING PRIORITIES

1. Introduction

Perhaps the most influential factor that creates flying hour program funding problems is the fact that there are limited fiscal resources to fund any program among the other competing priorities within both the DoN and DoD. A constrained fiscal environment coupled with other resourcing priorities often drives unpopular funding decisions made within the parameters of affordability. To illustrate the magnitude of this resource problem, let us briefly examine the projection of funding shortfalls determined in the FYDP by a recent N-88 Program Review (PR-01). During this review, it was determined that the "raw" program shortfall could be as much as $30 billion to fund all aviation programs for the next five year period (2001-05) [Ref. 30]. This resourcing problem is not a new phenomenon. Similar funding shortfalls have been projected throughout the Post-Cold War period. The relative impact of this projection on the FHP is yet undetermined, but is likely that all programs will experience some budget degradation as affordability decisions are made to properly balance future Naval Aviation requirements. This section examines the impact of constrained resources on FHP decisions and how this environment provides additional incentives for budget reviewers to cut funding. Trade-off decisions between funding current FHP readiness versus aviation modernization requirements are also analyzed.

2. FHP Funding Decisions and Events

This section analyzes how different events and decisions occurring in an environment of constrained resources have influenced FHP funding levels during budget formulation.

Some critics contend that the single most influential factor contributing to FHP underfunding in fiscal years 97 and 98 was a decision made by FMB in July of FY 96 to not recognize FHP cost escalation during the POM 98 summer review. Due to funding constraints, FMB chose not to re-price the FHP and allocate additional funding to accommodate this cost growth. The overall impact of that affordability decision resulted in a flawed budget base that was perpetuated throughout the POM. The exact amount of underfunding experienced by CNAP resulting from this decision was difficult to determine. However the impact on CNAP was manifested by their need to conduct creative financing measures in FY 97 and 98 in order to continue flying operations and attainment of assigned readiness goals.

The specific "financing activity" that CNAP used to get through the execution year is called "bow-waving". Bow-waving refers to deferring the cost of Aviation Depot Level Repair parts (AVDLRs) from the current FY, to the next FY in order to keep the aircraft operating in the current year. Technically, when a Ready for Issue (RFI) repair part is taken from the "shelf" the bad or broken part is sent to the Depot facility for repair provided the item cannot be fixed at the Aviation Intermediate Maintenance activity (AIMD). To prevent the charge in the current fiscal year the AIMDs will retain the AVDLRs until the next FY. This necessary "cash flow" activity is a risky venture and can produce severe budgetary consequences. Although bow-waving enables the fleet units to continue flying when the budget is exhausted, it is financially risky because the subsequent year's cost could be considerably higher due to the effects of a higher surcharge rate. In addition to incurring a higher surcharge, the cost of the bow wave is not calculated and included in the OP-20 forecast for the next budget year. Hence, the FHP is underfunded and underpriced by at least the amount of the bow wave, perpetuating the shortfall in each subsequent budget cycle.

The reason why the cost of the bow wave is not included in the OP-20 calculation is because CNAP does not report the cost on the current year Flying Hour Cost Reports (FHCR) sent to N-88F and FMB. Since the OP-20 calculation is based on the most current year cost execution data (aggregated from the FHCR), the bow wave is never included, resulting in an actual Cost Per Hour (CPH) that is higher than the OP-20 CPH (budgeted CPH). Table 3.1 displays the disparity between budgeted and actual CPH for the total program from FY 1992-1998. Figure 3.1 shows the divergence in CNAPs budgeted and actual CPH for the TACAIR/ASW Schedule from FY 1991–1997. Because the actual CPH was higher than budgeted, CNAP flew less than the budgeted amount of hours for fiscal years 92-94, and 96-98. This disparity is shown in the bar graphs for those years. Figure 3.1 is further referenced and explicated in the next sections.

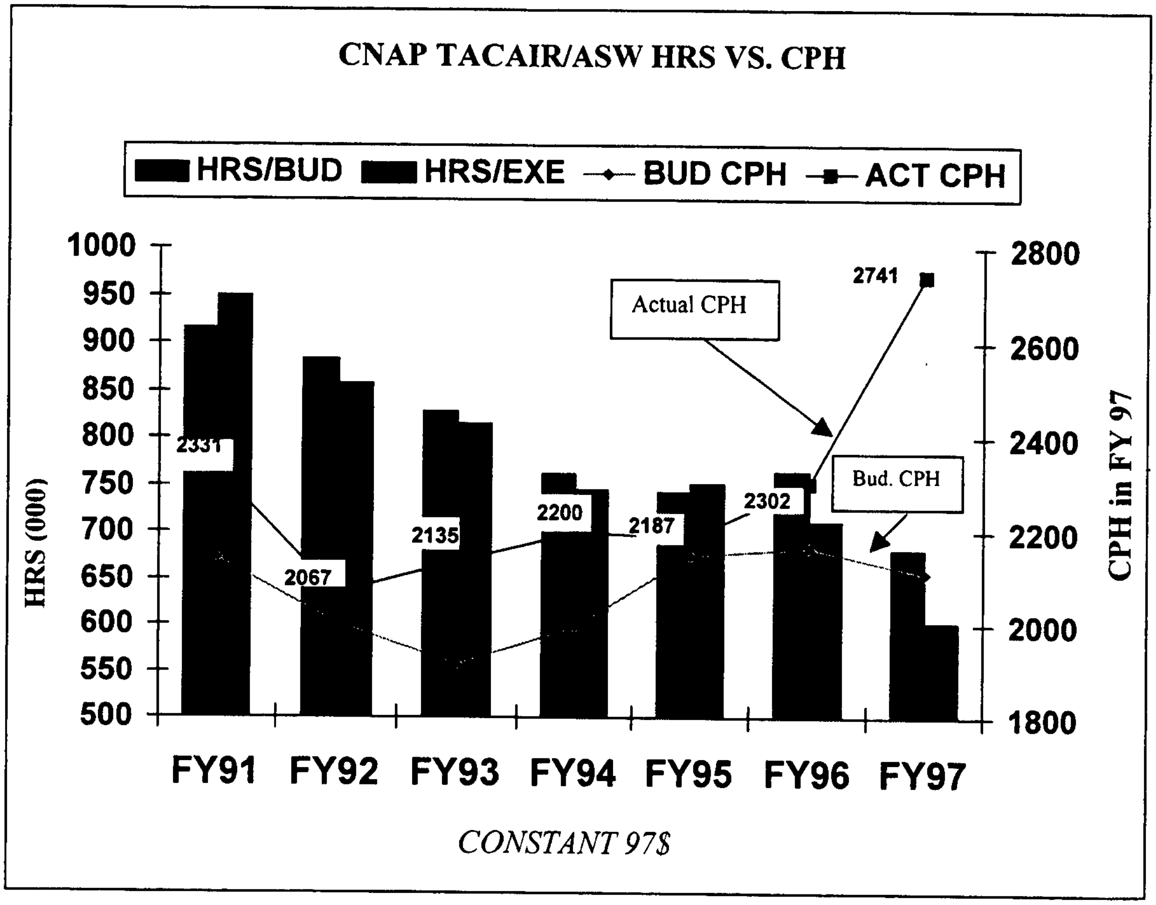

Figure 3.1. CNAP TACAIR/ASW Flying Hours vs. CPH [Ref. 35]

	1992	1993	1994	1995	1996	1997	1998
Budgeted CPH	$1621	$1766	$1856	$2316	$2079	$1962	$2686
Actual CPH	$1710	$1896	$2095	$2365	$2186	$2232	$3518

Table 3.1. CNAP Total FHP Budgeted vs. Actual CHP

The other reason for omitting the bow wave in future budget forecasts is due to affordability. The Resource Sponsor and the Navy Programmers simply don't have enough resource to fund the FHP requirement as well as buy back existing bow waves. Hence, from the Fleet perspective, the most significant cause of recent underfunding is the failure to recognize and include bow wave costs in subsequent budget predictions.

The consequence of this failure understates the true cost of the execution year and results in an underfunded program during the next year, and throughout the POM.

When executing a FHP budget that is not properly resourced, CINCPACFLT and CNAP have two basic choices. The first one is to bow wave and continue to fly and achieve the CNO directed PMR goal. The more cost conscious approach is to stop flying when the funds are exhausted and accept the degradation in readiness associated with flying less than the stipulated PMR goal. However, the second strategy (not flying the aircraft) can result in additional maintenance costs and safety problems associated with not "exercising" the aircraft. The cost of recent bow waves has been extremely high and, as noted earlier, is the result of an underfunded FHP budget determined during the formulation process. For example, the bow wave that was generated in FY 96 was $32 million and the AVDLR bow wave generated in FY 97 was $65 million. These bow wave bills are further compounded by other significant factors such as poor AVDLR reliability, unfunded requirements, and unplanned events. These other factors and the consequence of bow waving, is further examined in Chapter IV. Next we analyze an execution year event that resulted in favorable funding consequences for CNAPs FHP during one budget year.

Wildavsky terms the budgeting process *"repetitive"* because few problems have to be decided upon and solved "once and for all" since they can be re-addressed the following budget year. He calls this phenomena "problem succession", not "problem solving" which appears to be the perennial budgeting norm [Ref. 2:p. 48]. The military departments and Services also engage in problem succession, particularly since there isn't enough money to solve all problems and fund all requirements during any given year. However, when events or even calamities occur during the budget execution year problems tend to get fixed more quickly. This was the case during the FY 94 execution year, when the Commander in Chief of Pacific Fleet directed CNAP to fly only the amount of hours that the budgeted dollars provided. CNAP was forced to "park planes", which generated a lot of concern and attention regarding the FHP and the funding process from higher headquarters. Although CNAP did not specifically use the term "bow-waving" back in 1992 and 1993, they did "bow-wave" to a small degree to achieve the PMR goals. In these years relative underpricing occurred during budget formulation as result of deficiencies inherent in the three-year moving average approach used to determine the budget requirement. As a forecasting technique, a moving average uses a number of recent actual data values to generate a forecast. A moving average doesn't pick up trends very well but can be useful, provided that market demand stays fairly constant over time [Ref. 36:p. 165-167]. Assuming constant demand in the flying hour program from year to year is not always a reasonable assumption. Poor reliability of various spare parts and unpredictable events producing higher aircraft and spare part utilization rates, thus rendering this assumption inaccurate. Hence, the three-year rolling average underfunded the FHP at relatively 4-6% lower than actual requirements, which resulted in some bow-waving in those years. The bow wave carried over into 1993 caused a considerable disparity in the budgeted CPH and the actual CPH as depicted in Figure 3.1. Operating the CNAP aircraft at the higher CPH expended available funds in the OP-20 for FY-94 and in the 4th quarter caused the CINC to "park planes" as opposed to cash flowing his way to achieve higher readiness through bow-waving. As noted, this event caused considerable pressure to "fix" the funding process. As a result, the FHP in fiscal year 95 was priced properly. The unfortunate side effect is that the additional funding had to come from other sources, particularly the Navy modernization accounts. As indicated in Figure 3.1, sufficient funds were allocated, as evidenced by the relatively equal budgeted and actual cost per hours. Hence FY 95 was a well-funded and executed year from the Fleet perspective. However, rising AVDLR costs, poor spare part reliability, and more underpricing in the budget process resulted in additional funding difficulties in subsequent FYs.

In summary, this section demonstrated how the FHP is subject to funding variability due to affordability decisions, deficiencies in the old forecasting methodology and dramatic events enhanced by an environment of limited fiscal resources. Deficiencies in the current forecasting methodology and other FHP components are examined in section D.

3. Trade-off Decisions Between Funding Current FHP Readiness and Aviation Modernization

In a budget-balancing era, it has been impossible for Congress to satisfy all of the claims and requirements from society. Similarly, provided with limited fiscal resources, the DoD and Navy find it difficult, to satisfy the many claims for their unique services and capabilities. The shortfall projection by N-88 in PR-01, presented earlier, is a good example illustrating the magnitude of the problem of resourcing all Navy and Marine Corps aviation programs and requirements. The purpose of this section is to briefly examine some of the recent trade-off decisions between funding current FHP readiness and modernization to further highlight the severity of this uncertain funding environment.

The big loser in these trade-offs has not been the FHP. Rather, the loser is the Navy's re-capitalization and procurement accounts, as well as other programs that have been required in many ways to subsidize current readiness. Some pundits have criticized the DoD for not properly preparing for future battlefields and emergent threats, as Paul Braken implies in his article "*The Military After Next*" [Ref. 37]. Braken argues the military needs to develop new strategies and invest in the right technology to better prepare for new emerging competitors in the world. However, it remains a tremendous challenge for DoD/DoN planners, programmers and comptrollers to even look beyond the "Quarter after Next". With limited funding, the ability to allocate resources to all of the competing short-term and long-term requirements is virtually impossible. Further, as the competition for limited funds increases so does the difficulty in optimizing funding decisions. In his analysis of federal budgeting, Wildavsky explains, Congress is also faced with this annual dilemma of balancing limited funds against the endless claims and commitments to society. To solve this annual challenge, Congress often pursues a strategy called "satisficing" in that they try to allocate a "piece of the pie" to all players and programs, so they may "get by" and "come out all right" [Ref. 2:p. 48]. However, during Navy budget formulation, planners and programmers are often required to go beyond the strategy of "satisficing", to make vertical cuts and to eliminate some programs to maximize available funding for current programs. This is especially true with the DoN FHP, where many aviation modernization and improvement programs have been eliminated to fund current FHP readiness. As one budget analyst put it, "We are often faced with trading a hundred tomorrows for one today" [Ref. 30]. Recent decisions during budget formulation are consistent with this comment. For example, the following is a list of new equipment items and or missions that were canceled in the course of one year to free up additional funding for the FHP [Ref. 30]:

- Funding for Selected Aperture Radar (SAR) for the S-3B
- Funding for the AESA Radar for the F/A-18
- Funding for ejection seat upgrades
- Funding for the Decoupled Cockpit for the F/A-18F
- Survival Radio upgrades
- APN-6 spare parts funding
- Avionics test equipment
- Helicopter Crashworthy Seats
- Reduced CH-60 helicopter procurement quantities
- Sonar buoy purchases
- JSOW unitary
- ES-3A aircraft
- ASW mission from the S-3B

Although this list reflects Navy commitment to ensure Naval Aviation remains a viable warfighting capability, it indicates a bigger problem than funding the FHP. Rather, it reflects a substantial opportunity cost and a glaring need for an increase in Total Obligation Authority (TOA). Moreover, this list is not isolated to the Navy. Recently, former Assistant Commandant of the Marine Corps, General Neal stated before Congress:

"Without raising the top-line of the defense budget the price of maintaining this degree of readiness, given our aging equipment and increasing operational demands, has been paid for out of our modernization, base-infrastructure and quality of life accounts" [Ref. 31:p. 18].

During budget formulation, the DoN FHP has been subject to various "marks" from year to year, but available information indicates the FHP has not been recently required to forfeit much funding for other programs and priorities. However, during budget execution this is not the case. The CNAP FHP is often used to cross-subsidize other underfunded programs and funding priorities such as IT-21 and the Special Interest Category "Flying Other" accounts. These and other unfunded requirements during execution and their relative impact on CNAPs FHP are described in Chapter IV.

The relevance of this section to CNAPs FHP is to highlight the fact that the FHP is resourced in a very precarious and uncertain funding environment. Although some of the recent trade-off decisions involving the FHP in the budgeting process have resulted in fortuitous outcomes, without an increase in the top-line, it is only a matter of time before the program will be required to provide off-sets or reduced to pay for other Navy funding priorities.

The next section analyzes how the incentives to cut funding impacts programs like the FHP, and how this incentive is further heightened in a constrained funding environment.

4. The Incentive to Cut

In a scarce budgeting environment, the incentives to safeguard funds and look for ways to cut budget requests are intensified. Interviews with DoD and DoN budget personnel confirm this assessment and indicate the trend has increased in recent years along with the intensity to scrutinize and "trim" budget requests. There are two primary incentives for "budgeteers" to cut program funding. The first is to prevent the next level of review from reducing budget requests that are not well justified or supported. Thus, one of the goals during the DoN POM and budget review processes is to ensure that poorly justified requests are identified and cut. In this way, funds can be "kept in house" and shifted to other budget priorities, minimizing the chance of losing the funding when budget requests are passed on for DoD scrutiny. The other primary incentive is to safeguard taxpayer money and insure Navy funding is well spent. Other incentives exist including cultural pressure and competition to make marks. It is generally perceived as "unproductive" or ineffective behavior if a budget analyst doesn't make his or her share of marks. Budget analysts are paid to cut budgets. This is their role. The analogy presented in Chapter I regarding the "black hat" (the cutting role) may also incentivize cutting behavior to some degree. Although this assertion is difficult to prove, the reference to the behavioral incentives of the "black hat" was mentioned during interviews with budget analysts at different levels in the FHP budget chain. The term "black hat" may be construed as an organizational metaphor that can in fact influence behavior to cut budgets.

As noted in Chapter I, the incentive for Congress to cut readiness programs like the FHP is strong because cuts in these areas result in an immediate decrease in outlays that is used to "satisfice" other constituent demands. Wildavsky suggests, that when Congress cuts the defense budget they take the path of least resistance, which means cutting the one year spending accounts such as "Readiness and Manpower". Since the outlay rates for procurements are distributed over several years, an identical cut in a procurement program would result in a smaller annual decrease in outlays [Ref. 2:p. 247]. Another cutting strategy employed by Congress is to "cut less visible items" [Ref. 2:p. 63]. When Congressmen feel obligated to support a particular program or agency due to constituent pressure, cuts are often made in support areas that don't seem to have a direct impact on program activities [Ref. 2:p. 63]. Similarly, Wildavsky identifies "housekeeping" activities that don't appear to be connected with a program can be "put off for another year", but warns that deferring these activities may cost more in the end [Ref. 2:p. 63]. This budget reduction strategy and its negative consequence are also manifested within FHP budgeting, particularly in resourcing the Special Interest "Flying

Other" account, explained in Chapter IV.

One final observation from the interviews conducted with budgeting personnel is the need to articulate precisely why deviations have occurred between requested budgets and actual execution. It is often an "easy mark" to cut funding when analysts see the FHP was underexecuted, indicating to them that the Fleet couldn't fly all of the budgeted hours in the OP-20. As noted in Figure 3.1, this inability resulted from an underpriced program and other unplanned events/decisions that decremented current year funding. Nevertheless, it is important to articulate precisely why deviations and changes have occurred between the budgeted request and actual execution. Not fully executing a budget as requested is often construed by budget cutters that funding that was not needed in the first place.

In summary, the intent of this section was to identify powerful incentives to cut budgets and the importance of ensuring all funding requests and spending anomalies are justified and articulated clearly.

5. Summary

Operating in a limited resource environment is one of the biggest drivers of FHP problems and underfunding. This conclusion is not a great revelation. However, in the quest for quick answers to other systemic FHP problems, it is often overlooked and results in laborious staff studies that never logically conclude that the DoD/DoN needs more money to resource the unique requirements it is tasked to perform. If the need for an increase in TOA is overlooked, then perhaps a more pragmatic solution is to decentralize the resource allocation process as Lerner and other budgeting experts have suggested to achieve greater efficiency. This notion of decentralizing the resourcing process is fundamental to alternative budgeting concepts termed "Mission Budgeting" and "Responsibility Budgeting". These concepts as explicated by Jones, Thompson and Bixler could lead to more optimal budgeting for the DoD, and are presented and analyzed in Chapter V.

What follows is an analysis of specific deficiencies inherent in the FHP budget forecasting methodology and other formulation issues that often lead to underfunding in Air Type Command Budgets.

D. FHP BUDGET FORMULATION FACTORS AND ISSUES

1. Introduction

The OP-20 budget formulation methodology was detailed in Chapter II-F to explain the process and to provide sufficient understanding to analyze whether the methodology and model components are adequate for determining the resource requirements for the Air Type Commanders. The purpose of this section is to examine the FHP forecasting methodology and sources of variability that may affect budget forecasts. Weaknesses in some of the model components such as the Cost Per Hour (CPH) and Primary Mission Readiness (PMR) are examined. The last section describes some of the budget "gaming" strategies that have been used during the formulation process to produce a more affordable OP-20 budget to fit within assigned controls. This section concludes with an explanation of how planned contingency funding is factored into CNAPs FHP and a brief overview of some of the ongoing work conducted by N-88F to improve the FHP requirements determination and formulation process. As background information, this section begins with a review of some recent studies of the DoN FHP Cost Per Hour (CPH) and forecasting methods.

2. Background Information and the Cost Per Flight Hour (CPH)

The Flying Hour Program cost per flight hour basis and budget methodology have been subject to a great deal of study. Part of this effort was to determine the degree of correlation between flying hours and the three basic cost pools: fuel, maintenance consumables and AVDLR. For some time, it has been assumed these cost components vary directly with the number of flying hours flown. Logically then, if fewer hours are flown, there should be proportional savings in cost. However, this is not the case. It is now better understood that there are elements of fixed cost embedded in the cost per flight hour and the amount of these fixed costs vary among different T/M/S aircraft. Although flying less will result in some cost savings, the savings associated with flying less hours does not result in the same proportional decrease in the marginal cost per hour. For example some costs are still incurred regardless of the number of flight hours flown such as, costs for corrosion control, ejection seats, electronic radios and some hydraulic components. Costs for other items like engines and landing gear do vary with the frequency of flying. Studies regarding the variable and fixed cost relationships were heightened in the late 1980s and 1990s in an attempt to control increasing Naval aviation costs.

During this period Naval Postgraduate School theses analyzed this degree of correlation, but with mixed results. One thesis conducted in 1989 (Byrne) examined FHP cost data at the Pacific Missile Test Center. This author concluded that only fuel costs behaved as variable costs and that a relatively low correlation existed between the AVDLR and maintenance consumable costs. However, closer examination of the statistical results of the fuel costs revealed only one T/M/S aircraft (F-14) demonstrated somewhat of a significant coefficient of determination (r-squared) of 75%. [Ref. 38:p. 41] The R-squared values for the other T/M/S aircraft were too low to conclude the regression equation sufficiently explained the variation in fuel cost. Another thesis conducted in 1994 (Arkley) concluded different results. This study examined F/A-18 FHP cost data in Navy/Marine Corps Reserve units. The results demonstrated both fuel and maintenance consumables were significantly correlated to the cost per hour, but the degree of correlation between AVDLRs and flight hours was low, concluding that some AVDLRs behaved more like fixed cost [Ref. 39:p.72-78]. Recently another NPS student (Gardner, 1998) examined FHP cost data from Marine squadrons under Commanding General Marine Forces Atlantic (MARFORLANT). After extensive effort in adjusting the data, the results determined a low statistical correlation with any of the cost pools. The relatively low correlation among the cost pools in this study indicates a larger problem that affects all of Naval Aviation – no standard cost accounting system, which contributes to significant variability in how costs are reported and displayed.

Other studies. Due to FHP shortfalls and pricing problems experienced in FY 97, N-8 directed N-88 in April 1997, to initiate efforts to improve the FHP forecasting methodology so that the program is "properly resourced, executable, balanced and fully defensible to OSD and the Congress" [Ref. 40]. With this guidance, N-88F requested the Naval Center for Cost Analysis (NCCA) to analyze the FHP budgeting methodology to improve forecasting accuracy of the existing method and/or determine a better predictor of FHP costs. NCCA developed a simple regression model that proved to be accurate in predicting top-line aggregate FHP costs. Costs were consistent with past FHP cost data from 1988-1997 [Ref. 41:p. 1]. However, the model was unable to predict costs accurately at the Type Commander or T/M/S level. The data set used to develop the model consisted of FHP cost totals from fiscal years 1992-96 for only the active duty flying schedules: TACAIR/ASW, FAS and FAT [Ref. 41:p. 2]. The data were adjusted to FY 97 constant dollars. In the equation, total flight hours were used as the independent variable and total FHP costs were used as the dependent variable. In terms of statistically significant relationships, they found fuel and maintenance consumable costs highly correlated with flight hours flown as evidenced by an R-squared value of 92.7%. AVDLRs demonstrated no significant relationship with flying hours flown and behaved like a fixed cost. Some of NCCA's other findings were interesting. Up until 1991, the number of flight hours flown each year was relatively constant (about 1.4 million flight hours). However after 1992, the number of annual hours flown decreased significantly. Despite this decrease, the cost per flight hour has continued to go up each year, and the AVDLR costs remained constant. These findings seemed counterintuitive. The regression analysis determined that over half of the data behaved as fixed cost, which means that as these fixed costs are spread over fewer hours, the cost per hour increases. This finding was significant and as mentioned earlier contrasted the assumptions that the costs that constituted the cost per hour were relatively variable. This phenomenon partially affected the increase in FHP costs experienced by the Marines, when they flew considerably fewer hours in FY 97 under their new Aviation Campaign Plan (MACP). The effect of the MACP as a source of CNAP underfunding is explained in Chapter IV.

Further, NCCA confirmed the former 3-year moving average approach lagged actual costs, and the current approach of using current year execution costs as the basis for the future budget year tracked relatively closely with the NCCA model for the budget year, but understated the program costs in the outyears. [Ref. 41]

In summary, the NCCA statistical model proved to be an accurate predictor of aggregate FHP cost, but the simple regression formula is not adequate for justifying the hours and funding required for the DoN FHP during the budget process. The bottom line is that an algebraic equation would not hold up well under FMB, DoD and congressional budget scrutiny. Simply predicting incremental cost growth does not justify the requirement and expenditure of funds. Budgeting requires the Navy to justify cost growth, and accurately justify the requirement in terms of performance measures as per normal budget review procedures and enhanced by the guidance stipulated in the Government Performance and Results Act of 1993 (GPRA). Justifying the requirement and tying flying hours to readiness goals are becoming increasingly important, particularly when resources continue to be constrained. An effort by N-88F to improve this process is reviewed in section 6. Currently N-88F, does use the NCCA model as a benchmark to verify top-line OP-20 budget forecasts and to conduct "what-if" pricing drills.

• *Cost Per Hour Variance.* Another topic that has received considerable attention is why different flying squadrons using the same T/M/S aircraft have experienced different cost per hours. This attention has evolved from increased pressure for FHP cost control and the assumption that similar type aircraft should experience the same CPH. There are several reasons why a variance may occur. Perhaps the most significant factor is differences in operating environments. For example, 1st Marine Air Wing (1st MAW) squadrons operating in Hawaii and Okinawa experience significantly higher maintenance costs than the 3rd Marine Air Wing (3rd MAW) based in Southern California. [Ref. 42]

The weather conditions in Southern California are far more conducive to aircraft preservation than in Hawaii and Okinawa. The increased exposure to salt water corrosion for the Hawaii and Okinawa units has been particularly costly because the effects of this corrosion accelerate the cost for repairs on electrical equipment, hydraulic components, rubber seals, and other components. The disparity in costs between the two operating environments is manifested in the number of maintenance man-hours (MMH) required for corrosion control. In 3rd MAW, approximately 240 MMH per aircraft per year are expended for corrosion repair as opposed to approximately 1000 MMH per aircraft per year in the 1st MAW units [Ref. 42].

Other factors that can drive variances in the CPH are different aircraft utilization rates due to different mission requirements or changes in mission requirements, differences in aircraft age, difference in maintenance manning and experience, and timing of the installation of modification and reliability improvements. All of these variables can cause differences in the CPH among different operating squadrons using the same aircraft and result in increased variability in funding requirements.

3. FHP Forecasting Methodologies and Other Issues

As noted in section C of this chapter, the FHP budget methodology in the past was based on a three year moving average. This approach did not accurately predict flying hour costs due to the inability of moving averages to pick up data trends. The NCAA analysis confirmed this. Further inaccuracies in this averaging technique resulted from the fact that program costs were not varying up and down over time; rather they were consistently increasing. Coupled with rising FHP costs, inherent deficiencies in the moving average approach and adjustments made in the interest of affordability produced a budget for the Fleet that was underpriced and contained a lower than actual cost per hour to operate the aircraft. Figure 3.1 depicts this CPH disparity for fiscal years 1992-97 (less FY 95).

The current OP-20 forecasting methodology used since FY 98 applies the most current year execution data in determining the number of flying hours required and the new budgeted CPH for each T/M/S, based on the historical aggregate cost for each cost category: Fuel, Maintenance consumables and AVDLR. Escalation rates are then integrated in this projection to balance funding against the Navy Working Capital Fund surcharges and price increases. Hence, in formulating the FY98 budget cost per hour for Fuel, Maintenance and AVDLRs, FY 96 execution data (with some adjustments) were used plus the escalation factor provided through FMB. The OP-20 components and formula sequence used within the Flying Hour Projecting System to calculate the required hours and cost is outlined in Chapter II-F. Figure 3.2 summarizes this formula sequence and its components. An assessment of some of the weaknesses inherent in the current forecasting approach indicates that the OP-20 is a not a valid budgeting tool as discussed below.

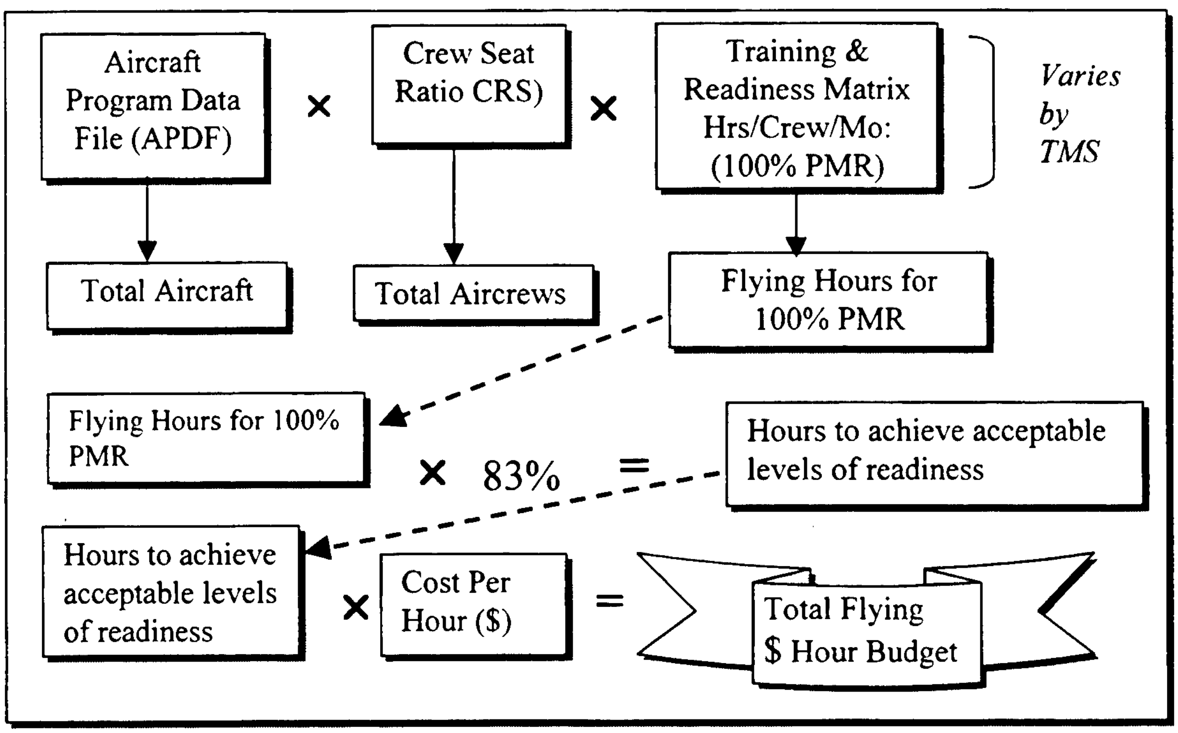

Figure 3.2. TACAIR/ASW Flying Hour Formulation [Ref. 18]

OP-20 Forecasting Weakness. The OP-20 is not valid for defining future requirements and predicting future cost. Such criticism is the result of funding difficulties experienced during execution and not attributable exclusively to the model itself as a forecasting tool. For example, not including bow wave costs and disregarding the effect of important external factors will undermine any budgeting technique. NCCA found the current N-88F methodology for predicting annual flying hours and associated costs for the current budget year to track fairly closely with the model they developed, provided that the flight hours are constant throughout the POM. There has also been an a study conducted by CNA (Sep 1998) to develop a new budgeting approach for determining the flying hour requirement. This CNA prototype approach was validated against the current methodology and the results indicated the current methodology has been accurate in predicting the proper number of annual flight hours. (An overview of this CNA study is presented in section 6.). However, the key weakness inherent in the methodology that contributes to underfunding is the fact that the FHP budget forecast "looks backwards", meaning the approach relies heavily on historical execution data to predict future costs. Historical data are inadequate due to unpredictable changes in many different variables. For example, the demand and usage of AVDLR and maintenance consumables always change from year to year. The variance in demand is further compounded by poor reliability in AVDLR components and unplanned events that result in higher OPTEMPO, aircraft utilization rates and cost. Aside from poor component part reliability and funding constraints, other significant factors that distort the forecasting accuracy of the OP-20 model are as follows:

- Changes in the "market basket of goods"
- Maintenance philosophy changes (O-D/OEM vs. O-I)
- Maintenance modifications and Engineering Change Proposals (ECP)
- Failure to include savings and cost of reliability improvement programs such as Logistic Engineering Change Proposals (LECP)
- Budget Gaming
- Escalation Rate Variability
- Unplanned events and requirements

All of these factors contribute to FHP budget underfunding and make the OP-20 useless as a forecasting tool.

From the Fleet perspective, if the model was left unchanged, it is believed that it would predict and provide the proper number of hours and funding to meet flying requirements. Although less than perfect as a budgeting tool, we conclude that the OP-20 model in itself is valid for determining the requirement for the budget year if conditions are static, other things being equal. It is a **useful** budgeting mechanism because it attempts to integrate many dynamic components that constitute the naval aviation flying hour requirement, (e.g. air crew personnel, crew seat ratios, number of training hours, fuel and maintenance cost etc.) Given its inherent weaknesses, it is the effect of other external factors that cause the OP-20 forecast to break down that results in underfunding. Ideally, what is required is a total cost model that integrates all aviation costs and externalities that have budgetary consequences. The Resource Sponsor is working diligently to improve the budgeting process and how the requirement is stated. These efforts are highlighted in section 6.

The flying hour program forecasting methodology is revisited in Chapter IV, with an analysis of AVDLR pricing and its effects on the CNAP FHP budget execution. What follows is a brief examination of some of the other variable factors occurring during budget formulation that contribute to weak budget prediction and FHP underfunding.

4. Other Variable Factors

a. Changing Escalation Rates

The way in which escalation rates are applied to the OP-20 forecast can also lead to underfunding. The term escalation rate refers to the change in surcharges from one year to the next (that is the change in rates for fuel, maintenace and AVDLR.) N-88 uses these escalation rate changes to change the pricing of the flying hour program. Escalation rates are issued to N-88 via N-82 in NAVCOMPT notice 7111. NAVSUP, in conjunction with NAVICP, contrives the escalation rates associated with the Navy

Working Capital Fund and the Defense Working Capital component [Ref. 43]. Due to time constraints in budget formulation, the way in which escalation rates are integrated into the OP-20 forecast is backwards. According to the Resource Sponsor, when they produce a budget they use a specific OSD escalation rate and apply it to each T/M/S for each of the cost pools: fuel, maintenance and AVDLR. Hence, the budget is essentially built from the micro-level to the macro-level. However, when the rate changes (due to changes in costs), they are issued a specific dollar amount calculated by N-82 to spread across the FHP, as opposed to being issued the rates and then telling N-82 what is required when the rate is applied to the current OP-20 forecast.

When the surcharge rate structure stabilizes the resource sponsor calculates what funding they should have received compared to what was received and there is typically a delta, hence another way the forecast is underfunded. This rate variability is illustrated by the following example. During the development of POM 98 prepared in FY 96, the rate that was applied to build the FY 98 budget was estimated to be *2.5 %* (the projected change in surcharge rates from FY97 to FY98). This 2.5% was applied to the T/M/S level as described earlier. The final rate applied to the FY98 budget was *24.7 %,* which accounted for the actual surcharge rate increase from FY 97 to FY 98. The actual surcharge in FY 97 was 27.4 % and the FY 98 surcharge was 57.5%. The change in the escalation rate of 24.7 % was received in the form of aggregate dollar totals to be applied across-the-board for the FY 98 OP-20 budget vice applying the rate down to each individual T/M/S aircraft to come up with a more accurate change in price. In this example, it was not possible to quantify the funding impact on the CNAP budget. This demonstrates how additional variability can result in underfunding or pricing errors for some T/M/S aircraft. The escalation rate, surcharge and pricing system relative to AVDLRs are examined further in Chapter IV.

The bottom line from the perspective of the Resource Sponsors is that if there was less variability in the escalation rates from year to year, they would be able to predict a more accurate budget in the future years and minimize the impact of FHP underfunding in the FYDP. However, escalation rates have varied considerably, making this view moot.

b. Primary Mission Readiness (PMR)

Primary Mission Readiness (PMR) was initially analyzed in Chapter II as one of the components used to calculate the budgeted cost per hour for each T/M/S in the TACAIR/ASW Schedule. This section analyzes some of the issues associated with the concept of PMR.

The relevance of PMR is rather obscure. The term is defined in the CNAP/CNAL Joint Instruction 3500.67D, *Training Readiness Matrices,* as "the hours required to maintain the average crew qualified to perform the Primary Mission Areas (PMA) of the assigned aircraft, to include all weather/day/night carrier operations." Over time, PMR has evolved into a surrogate readiness metric and is interpreted as an exclusive measure of operational readiness, particularly since the word readiness is reflected in the term. However, PMR has little to do with actual readiness because it is not integrated in any way with the Status of Training and Readiness System (SORTS). PMR is simply a tool used in estimating the annual budgeted flying hours and cost for each T/M/S. Historically, PMR has been as high as 87% in the early 1990s, but has been reduced, consistent with the trend in decreasing defense budgets and force structure. For funding purposes, the relevance of this concept is its application in the OP-20 budget calculation, where it is expressed as a percentage of total monthly flight hours authorized.

As of FY 98, the current CNO PMR goal is 83% (plus 2% contributed via flight simulators), and is published annually by N-80 in the DoN Consolidated Planning and Program Guidance (DNCPPG). The relevance of the 2% PMR simulation factor is another confusing aspect since it is not budgeted directly as a component of the OP-20. There is further confusion as to how this 2% simulation contribution is quantified and correlated with existing readiness measures. Nevertheless, 83% PMR guidance drives the

Air Type Commanders flying hour program and is subsequently misperceived as a valid measure of success in budget execution and as a Navy readiness indicator. Not achieving this percentage is perceived as under executing the program and is construed as justification for cuts in the subsequent execution years as in FY 92. CINCPACFLT directs CNAP to execute all of the hours to meet the CNO directed flying goal, but CNAP has experienced difficulties in doing so due to an underfunded budget and a lower budgeted than actual cost per hour, than funded costs per hour. Hence, to come close to the attainment of the published PMR goals, CNAP has pursued "creative financing" methods such as bow-waving and Unfilled Customer Orders (UCOs) to sustain flying through the end of the year. (UCOs are another cash flow management method used in FY 97 by CNAP and is explained in Chapter IV). These cost deferment methods have profound consequences for the subsequent budget year and across the FYDP as explained earlier. On the other hand, CINCLANTFLT guidance to CNAL is to fly to the budgeted dollars and as a result this has generated a smaller bow wave than CNAP had in FYs 96-97. However CNAL generated a larger bow wave in FY 98. N-88F is attempting to correct this disconnect between SORTS and the FHP to better link readiness to resources expended. These efforts are explicated in section 6.

In summary, PMR is an inaccurate metric that does not adequately relate flying hours to readiness. It has evolved into a surrogate measure of readiness and a relative measure of program funding, i.e. 83 % PMR is construed as a fully funded program in the budget arena. During budget formulation, PMR is often manipulated for some T/M/S aircraft to produce a FHP that fits the budget controls and achieves the aggregate 83% PMR goal. This budget strategy is a manifestation of budget gaming due primarily to limited resources.

c. Budget Gaming and Strategy

As analyzed earlier under the topic of Budget Process Dynamics, budget "gaming" and "gimmicks" emerge when fiscal controls constrain the level of spending that is needed or to make budget requirement fit within available funding caps. This phenomenon also occurs during FHP budget formulation and causes underfunding in Air Type Commander flying hour programs. Underfunding is not an intended consequence, but the product of the Resource Sponsor constructing a budget for which the requirements exceed the available top-line funding amounts. Due to the fiscal constraints levied on the Resource Sponsor, they do the best they can to properly price the FHP as well as balance funding for other aviation priorities including procurement, spare parts and depot maintenance. This annual resource balancing act is further constrained by rising AVDLR costs, poor spare part reliability, unplanned events that result in higher aircraft utilization, and Fleet reprogramming decisions, all of which drive up FHP costs. For reference purposes, this section will briefly describe some of the ways that the FHP budget is "forced" to fit within the top-line. First we examine how the forecasting methodology is at times modified to develop more affordable program and then analyze how PMR and other OP-20 model components are adjusted to produce lower cost outcomes.

(1) Adjustments to the Forecasting Methodology and PMR. The FHP forecast used for FY 97 is an example where the methodology was modified to produce a more affordable budget. The forecasting method used for this budget period was the 3-year moving average. The execution data for this prediction should have used fiscal years 93, 94 and 95. However, in the interest of "affordability", fiscal years 92, 93 and 94 were used instead. The reason for the adjustment was due to the fact that FY 95 was an expensive year that experienced some high cost anomalies. Therefore, the forecast was modified to produce a "less expensive" budget for FY 97. The result was an OP-20 that was underfunded by approximately 350 million dollars for the Fleet [Ref. 30]. It is not possible to delineate the exact amount that CNAP was underfunded from this aggregate 350 million total. As a result, FY 97 was a very difficult year for the FHP and CNAP. CNAP execution costs were considerably higher than budgeted for this year and resulted in the deferment of AVDLR costs via bow-waving. This disparity is shown in Table 3.2.

The manipulation of PMR is another way to produce a budget that fits within NAVCOMPT controls. Because some aircraft have a higher cost per hour than others, it is difficult to produce a fully-funded program that provides 83% PMR across-the-board for all T/M/S aircraft. Therefore, to produce an OP-20 that meets the CNO requirement of 83% PMR, the lower cost per hour aircraft such as the SH-60 helicopter are funded at a higher PMR percentage and some of the higher cost per hour aircraft such as the F-14 are funded to a lower level. The following table shows this PMR modification. This information was extracted from the OP-20 version 1057 (FY99) and displays the Type aircraft, budgeted cost per hour and the PMR percentage:

T/M/S	BUDGETED COST PER HOUR	PMR % (REQUIRE HOURS FUNDED)
F-14A	$5670.01	78%
F/A-18A	$5096.27	81%
E-2C (Prop)	$3344.47	89%
SH-60 F (Helo)	$1677.60	90%

Table 3.2. Disparity in T/M/S PMR Percentages

It is important to note that PMR is decreased for some T/M/Ss due to less than full manning. The impact of this PMR manipulation for CNAP results in a budget that cannot be executed as produced. This requires CNAP's FHP program manager to redistribute flying hours and associated funding among the different T/M/S to more accurately match flying hour mission requirements to their Inter-deployment Training Cycle (IDTR).

Another resourcing strategy is to attempt to fully price the TACAIR/ASW schedule, which contain most of the high cost "warfighting" aircraft, but at the expense of the other schedules, namely Fleet Air Support (FAS). However, this funding strategy causes the Fleet to reprogram funds back into the FAS schedule to restore the schedule to an adequate and sustainable level. Inadequate resources for the

FAS schedule prevents these aircraft from performing their critical logistics and support mission, (i.e. flying parts out to aircraft carriers). What's the solution? Some critics advocate more Fleet participation in the affordability decisions that result in overall fleet budget reductions. For example, if there is a requirement to cut $10 million from CNAPs FHP, then include the customer to optimize the decision as opposed to centrally deciding where to cut funding. If the Fleet is not included, the FHP program managers must reprogram funds and conduct "workarounds" to achieve a better fit between resources and mission. Higher level budget personnel indicate there are attempts to include the "customer" in these adjustment decisions, but at times this is not possible due to administrative and time constraints.

Ideally, the Resource Sponsor should look at how the Fleet is actually executing their requirements, then build a budget model to reflect execution. However, this gets back to the original dilemma in that historical budgeted costs do not match execution, and to build an OP-20 that reflects how the Fleet is actually executing the FHP would result in a budget that exceeds controls. In view of the top-line fiscal constraints, one alternative is to fully price hours but not buy as many hours. The danger with this approach is that the budget produced would be less than 83% PMR, and once you give up something in the budget process it may not be reinstated.

Although the OP-20 can be underpriced in the formulation process as described above, the Resource Sponsor and FMB frequently look to execution to fixing the underfunding through contingency dollars or other money that may become available as other programs under execute allocated funds.

(2) **Other Adjusting Methods.** *Aircrew Manning Factor (AMF).* The Aircrew Manning Factor is another OP-20 variable that can be adjusted to achieve a lower cost FHP. As explained in Chapter II, the AMF is one of the formula components used to calculate the forecasted flying hours and cost for the TACAIR/ASW Schedule. Ideally, the Resource Sponsor and Fleet would budget for 100% manning for all of the aircrews and maintenance personnel authorized by the Squadron Manning Document.

However, the actual personnel numbers fluctuate a bit due to training pipeline delays, attrition and other variables. As a result, some of the data bases that reflect personnel totals are inconsistent and don't show the same manning percentages that are shown in budget exhibits. For example, in FY 98, budget analysts discovered a discrepancy in the AV3M data base that reflected an 85% manning level, which was different from the personnel figures presented in the personnel budget exhibit [Ref. 43]. This discrepancy led to a budget mark that resulted in a reduction of 30 million dollars for the Fleet FHP. From the Fleet perspective they viewed this reduction as a budget gaming strategy to cut funding, particularly since some of their T/M/Ss are over-manned and have not received additional funds for an Aircrew Manning Factor that exceeds 100%. From the Resource Sponsors perspective, they need accurate data to properly resource and defend the FHP to FMB and DoD. Better personnel data obtained for the FY 99 budget helped to negate a similar mark.

Logistic Engineering Change Proposals (LECP) / Savings Initiatives. The Logistic Engineering Change Proposal (LECP) program is a Navy Inventory Control Point (NAVICP) initiative intended to achieve efficiencies for the Fleet and Supply system by improving the Mean Time Between Failure (MTBF) for certain aircraft components (AVDLRs), thus improving the reliability of these components. Improving the reliability results in fewer repairs so that the Fleet can save money by purchasing fewer repair components. The Fleet while very receptive to reaping the benefits of this program, objects to the current method of financing it. Improving the reliability of the various selected LECP candidates costs money. Therefore, in the budget process, the anticipated or projected savings associated with the improvement is taken out of the Air Type Commanders FHP budgets by applying the savings across all or some of the T/M/S. The problem with this approach is that that these savings are unrealized in the short-term and to decrement the Type Commander's current year budget for the projected savings results in underfunding. Further, there is no systematic way to verify the MTBF has actually been improved. The AMSR is examining this process to identify better ways to finance the program. LECPs are further analyzed as a source of CNAP FHP underfunding in Chapter IV.

Gaming strategies are also used by the Fleet to get the most out of limited budget dollars. For example, if it is known that the FHP is receiving adequate attention in the form of re-pricing and funding plus-ups during the POM or PR, the number one funding priority presented in Fleet POM papers or unfunded requirements may not be the FHP, but rather ship maintenance or some other base support priority.

5. Planned Contingency Funding

During annual budget formulation, CNAP predicts funding requirements for flying operations conducted in support of ongoing contingencies such as Bosnia and Southern Watch (Iraq). With each budget submission, this forecast is submitted by CNAP to FMB and N-88F. Once these organizations agree to the predicted requirement, N-88F will build two OP-20s for the execution year. One version contains the contingency funding and the other doesn't. As noted earlier, the OP-20 version with contingency funding contains the additional flying hours for the aircraft participating in those missions and is supposed to enable the Fleet to achieve 87% PMR. The OP-20 version that is built without contingency funding is priced for the Fleet to achieve the CNO PMR goal of 83%. However, since the OP-20 version without contingency funding has not incorporated previous bow waves in the budgeted forecast, the Fleet has not been properly resourced to achieve 83% PMR even with the contingency funding. The amount of funding that has been allocated and used by CNAP for contingency missions has been approximately 40-45 million dollars per year. Even with this additional funding CNAP has only been able to achieve about 81% PMR each year. For CNAP, each PMR percentage point represents approximately 11 million dollars [Ref. 44].

Appropriated funding was formerly held at the FMB level, but is currently retained at the DoD Comptrollers Office, OSD-(C). To receive this funding, the Navy submits justifications reflecting the amount and type of support provided for the contingency missions. In CNAP's case, they submit a monthly contingency report to

FMB via CINCPACFLT to request and obtain this funding. The interesting point here is that there is no guarantee CNAP or CNAL will receive this funding. CNAPs philosophy is that they will execute their FHP based on the expectation of receiving these funds. To date CNAP has received their "fair" share of contingency funds.

Aside from chronicling this significant annual budget formulation event, the additional relevance is that appropriated contingency funding is recognized by some budget personnel as an execution year "fix" to compensate the Fleet for underpricing during budget formulation. Currently, there exists some uncertainty regarding the continuance of the contingency funding plan. During POM 00 negotiations, there was a mark levied by N-80 to cancel this funding to the Fleet for FY 2000 and beyond. The justification to cut the funding was based upon the fact that the Fleet has under executed the 83% PMR during recent years and if properly funded to 83%, the Fleet should be able to execute the normal FHP *and* the contingency missions. This new mark is frustrating from the Fleet perspective because in their view they were never resourced to achieve the 83% goal due to underpricing, not including the cost of previous year's bow wave in the OP-20 forecasts. However, part of the problem is that the Fleet has not shown the fiscal "pain" via the readiness reporting system. Traditionally, the overall readiness picture presented by the Fleet has been inflated and construed by budget personnel as a program with no ostensible problems. The subject of readiness reporting and its impact is analyzed briefly in Chapter IV. The final outcome of the mark against the contingency funding is yet to be determined. In the interim, this issue presents more funding uncertainty for CNAP.

6. The New Training and Readiness Matrix (T & R Matrix) and Alternative TACAIR/ASW Budgeting Method

Another FHP variable that has budget formulation implications is the new Joint TYCOM T & R Matrix. This matrix was designed by the two Air Type Commanders (CNAP/CNAL) to improve aviation training and readiness reporting. The matrix is a more comprehensive system of tracking and reporting readiness. It is intended to better link training and resource requirements, to measures of effectiveness and measures of performance for all training events [Ref. 21:p. 3]. The interesting feature of the new training matrix is the automation of readiness reporting through a new program called "SHARP". The significant change relative to SORTS reporting is that the new approach minimizes the tendency to inflate readiness. The readiness rating generated by SHARP is expected to be a more accurate measure of training achieved based on the resources provided. In terms of the amount of flying hours, the new T&R matrix represents an increase in the number of hours per crew per month (H/C/M) for most T/M/S aircraft compared to the older T&R matrix. According to the Resource Sponsor, the net increase in hours equates to a requirement for a $200 million increase in the budget. The other concern with the new training matrix is the increase in utilization for some aircraft, that will accelerate the requirement for replacement aircraft for which there is no money programmed in the POM. From an affordability standpoint, N-88 cannot afford the new matrix and decided not to include the new hour requirements in the budget until the matrix can be validated.

During the interim, N-88F has commissioned the Center for Naval Analyses (CNA) to develop a better methodology for budgeting for the TACAIR/ASW schedule. The approach assumes that for a given number of flight and simulator hours, a certain level of readiness will be obtained (i.e. C-1, C-2, etc). This prototype approach is based on the new T&R matrix as well as historic levels of actual operations and historic levels of overhead flights. The categories of flying: training, operations and overhead are defined in accordance with the flight purpose codes used on the Naval Flight Record Subsystem (NAVFLIRS). The premise behind counting overhead flying is that it results in some degree of training benefit and attainment of PMA points. Using this approach, CNA attempted to determine the required number of hours per crew per month to achieve a C-1 / C-2 training readiness rating for three sample T/M/S aircraft: F-18s, E-2s, and S-3s [Ref. 43].

The initial results were interesting in that the number of hours determined for these aircraft were roughly the same hours required to achieve 83% PMR with the old T&R matrix. This result tends to indicate the OP-20 model has accurately predicted the proper number of required flying hours. This new approach may mean that the FHP can be budgeted for roughly the same number of hours and funding but the requirement will be justified more clearly. This CNA forecasting method eliminates the PMR factor to create a more defensible and logical way to justify flying hours and funding. The next step is to validate the approach with other T/M/S aircraft. The final step is to convince Navy Planners and Programmers to buy off on the new approach and ultimately include it as part of POM guidance. Instead of issuing 83% PMR as the annual funding and readiness guidance, the requirement would be stated in terms of hours per crew per month for each T/MS to meet a given readiness level. One remaining uncertainty with the CNA approach is to see how their readiness ratings compare with the readiness ratings generated by the SHARP program.

7. FHP and OP-20 Adequacy

This section has shown some inherent weaknesses in the FHP budget forecasting methodology. However, the OP-20 model is fairly adequate for projecting the required hours and costs in the budget year. At the aggregate level, NCCA found the current methodology for predicting costs tracked fairly closely with the model they developed, provided the flight hours are constant throughout the POM. Similarly, the initial CNA analysis to develop a new method for determining the flying hour requirement indicated that the current methodology is accurate in predicting the proper number of annual flight hours. However, the historical forecasting approach does not adequately predict the cost of the FHP in the outyears of the POM and results in understating the costs and the program. The key weakness in the forecast methodology is its "backwards looking" nature and inability to account for items that skew the cost of demand outside the norm. [Ref. 45] The data used to predict the FHP budget are based on 1 to 2 years old execution costs that are bound to change in the new execution year and the outyears of the POM.

Aside from relying too much on historical data, the most salient problem perpetuating FHP underfunding is not recognizing and incorporating the cost of bow waves in recent budget forecasts. As noted, this understates the true cost per hour and underfunds CNAPs FHP. When adequate resources are not provided in the budget, CNAP is unable to execute all of the budgeted hours provided. There are many other variables that can skew the FHP forecast and cause underfunding. Some of these variables were analyzed in sections B and C including budgeting dynamics, constrained resources and affordability decisions. Other factors not incorporated in the forecast that can have significant funding consequences include budget gaming, poor component reliability, changes in maintenance philosophies (O-D/OEM), changes in the market basket of AVDLRs, changes in prices, escalation rate variability and not properly integrating validated savings from reliability improvement programs. These and other execution issues are analyzed in detail in Chapter IV. If some of these aforementioned factors could be integrated into the budget forecast, the ability of the Resource Sponsor's ability to predict FHP cost and properly fund the program would improve. To do this, process improvements must be made and better communication is required among all of the key players: the Fleet, N-88, NAVAIR, NAVSUP, NAVICP and the Depots. The Aviation Maintenance and Supply and Readiness (AMSR) group is intended to facilitate this communication and achieve a better total cost picture for aviation requirements. An overview of the AMSR is presented next.

E. AVIATION MAINTENACE SUPPLY AND READINESS (AMSR) GROUP

To improve the overall operational and support posture of Naval Aviation in the 21st century, the AMSR group was formed in March 1998 as an ongoing, long-term effort to examine rising AVDLR costs, and recommend specific actions to, "reduce overall aviation maintenance and supply costs, and improve readiness" [Ref. 46:p. iv]. The group's membership consists of experienced Navy, Marine Corps and Civilian personnel from various aviation supply, maintenance and FHP agencies and organizations.

The AMSR is an excellent forum for analysis and modification of the many interrelated issues contributing to aviation cost growth, readiness degradation and associated FHP problems. The group has identified five primary aviation areas upon which to focus improvement efforts: 1) Metrics, 2) Integrated Logistics Support, 3) Maintenance and Supply, 4) Personnel and 5) Funding and Cost Management. Within these areas, 18 comprehensive issues were identified and targeted for specific short and long term action and improvement.

The following table lists the eighteen issues that are currently being studied and acted upon:

#	ISSUE/TOPIC	#	ISSUE/TOPIC	#	ISSUE/TOPIC
1	Readiness Metrics	7	NAVAIR/NADEP Core Depot Workload	13	Readiness Based Sparing Enhancement
2	Customer Focused Metrics	8	Aviation Configuration Management	14	Consumable Material Shortfalls
3	ILS Metric Reporting Improvements	9	Aircraft and Engine Shortfalls	15	Navy Aviation O & I Maintenance Manning
4	Data Integrity Improvement	10	Logistic Engineering Change Proposals (LECP)	16	AVDLR Cost & Reliability
5	ILS Moving From Plane-Side	11	Broad Arrow Management	17	Flying Hour Program Cost Management
6	ILS Health Maintenance	12	Cannibalization	18	Aviation Maintenance /Supply Funding

Table 3.3. AMSR Issue Items

The first time the AMSR convened, the group recognized the need for immediate attention to address shortfalls in the Flying Hour Program including the buying down of the existing bow waves, outfitting account and SDLM backlog. These efforts and the 18 issues listed above are continually being worked. The group meets on a regular basis, and the status and results are briefed to OPNAV. To date, some issues have been resolved and closed out. Between meetings, NAVAIR maintains an AMSR homepage that contains the status and progress of the work performed on the 18 issues. It is important to recognize that the AMSR is a long-term effort to resolve various aviation supply, maintenance and budgeting problems. The intrinsic value of this forum is the ability to communicate with all players that constitute the Naval Aviation system. This "systems" perspective is important because initiatives to resolve specific maintenance or supply related problems may have negative consequences in other areas such as budgeting or personnel.

As noted in Chapter I, the AMSR is used as a guide for the analysis in Chapter IV, since some of the issues directly or indirectly relate factors that contribute to FHP underfunding.

F. CHAPTER SUMMARY

This chapter has explained how the DoN Flying Hour Program and CNAP's FHP budget is subject to underfunding and variability during the budget formulation process. We examined budget process dynamics to develop greater insight into how political influences, process deficiencies and funding constraints affect the FHP budget for both the DoN and CNAP. The current budgeting environment of limited resources and competing priorities causes the FHP to be formulated in a process that is competitive and unstable. Specific FHP budget formulation factors and issues were analyzed to explain how the forecasting methodology and adjustments to the process result in FHP underfunding. Collectively, these influences degrade the efficiency of the FHP funding process and have negative budget consequences for the CNAP Flying Hour Program. Finally, the AMSR effort was summarized to demonstrate the ongoing initiative to improve Naval Aviation and associated FHP issues. As noted, some of the AMSR issues are used as a guide to analyze specific causes of CNAP FHP underfunding in the next chapter.

The next chapter analyzes some of the major historical and current causes of CNAP FHP underfunding experienced during budget *execution*. The chapter begins with a review of the trend in CNAP's program underfunding by examining budgeted and actual FHP costs from fiscal years 1992-1998.

IV. ANALYSIS OF CNAP'S FHP UNDERFUNDING

A. INTRODUCTION

Chapter III examined the sources and issues that contribute to underfunding during the FHP budget formulation process. Chapter IV, will now analyze some of the historical and current causes of CNAP FHP underfunding that occur during budget execution. As explained in Chapter III, FHP underfunding and resource variability during the budget formulation process result from a combination of budget dynamics, unplanned events and managerial decisions all occurring in an environment of limited resources and competing priorities. Similarly, in budget execution, these dynamics, managerial decisions and other variable factors contribute directly to CNAP historical and current FHP underfunding problems. This chapter explains the most significant problems and issues that cause FHP underfunding, creating constant and managerial challenges for CNAP.

B. CNAP FHP: BUDGETED VS. EXECUTION

Before examining the specific issues and causes of FHP underfunding, this section highlights historical CNAP FHP funding trends to demonstrate the disparity between how the CNAP FHP was budgeted verses how it was executed. This section begins with an explanation of these funding trends as illustrated in Figure 4.1. This historical perspective will help facilitate the subsequent analysis of other underfunding issues presented in this chapter that are not easily captured in graphic form. Figure 4.1 depicts CNAP flying hour program pricing history, beginning in FY 1992 through FY 1998. Each FY is graphically represented by an individual line that depicts cost per hour relative to a fully funded FHP (OP-20). A fully funded OP-20 is represented by the 0% variance goal. This means if the OP-20 provided all T/M/S aircraft with the resources to meet the planned PMR goal and flight operations for that year, then that respective FY line on the graph should approximately match the targeted 0% variance line.

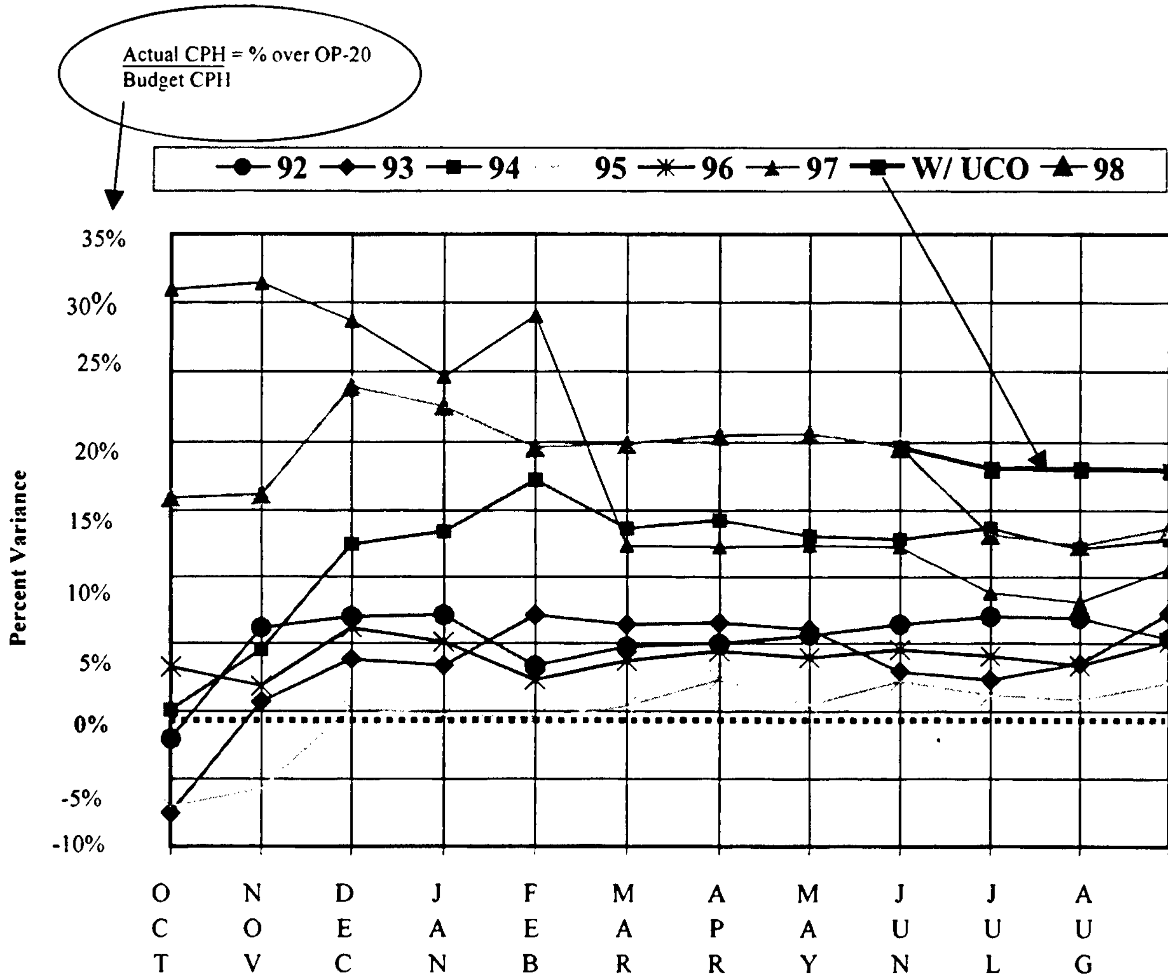

Figure 4.1. Actual Cost Per Hour vs. Budget Cost Per Hour [Ref. 16]

FHP COST PER HOUR (CPH) FY 92-98 (IN THEN YR. DOLLARS)								
Year	1992	1993	1994	1995	1996	1997	97 **UCO**	1998
OP-20	$1,621	1,766	1,856	2,316	2,079	1,962	------	2,686
Actual	$1,710	1,896	2,095	2,365	2,186	2,232	2,315	3,518

Table 4.1. CNAP FHP CPH [Ref. 16]

A quick view of this graph and corresponding Table 4.1, indicates that FY 95 was the only year of the seven displayed that remained close to the 0% CPH goal. To explain some factors that caused this disparity between budgeted and actual cost, as well as to document the CPH trend, an explanation of the critical factors and events for each year follows: [Ref. 44]

- FY 92. FY 92 was the first year after Desert Storm. The FHP budget was thought to be fully funded. Note that from October through February for this year and subsequent years, (with the exception of FY 98 – explained later) there is a steady increase in the CPH curve. This happens because many of CNAP's contracts are executed up-front in the beginning of the new fiscal year while at the same time, the Fleet flies fewer hours during the holiday months. Many of these contracts are high cost, and when they are distributed over a smaller flying hour base this results in an increased cost per flight hour curve displayed in October through February. As more hours are flown throughout the rest of the year, the CPH typically decreases and stabilizes by May or June. By this time the CNAP FHP Manager has a "better feel" for how the program's execution will end in September.

  Although FY 92 was considered to be fully funded, a point to note is the fact that the CPH line constantly stayed above the 0% variance goal. A primary reason for this was the deficiencies associated with the three-year moving average forecasting methodology as explained in Chapter III. As noted earlier, the FHP OP-20 budget exhibits were prepared using this method until FY 98. CNAP finished FY 92 at approximately 5% higher than the budgeted OP-20.

- FY 93. FY 93 followed a CPH pattern similar to FY92 and remained fairly stable until July when costs began to increase toward the end of the fiscal year. This rapid year-end cost growth was a caused by two factors: PMR and the resulting AVDLR "bow wave" explained in Chapter III. The PMR goal resulted in an increased cost per hour. As the Fleet flew more hours to achieve the PMR goal, more aircraft AVDLRs components failed, thereby driving increased AVDLR repair costs. This increased expenditure of AVDLR funds created a bow wave (a condition resulting from not having enough (AOM) funds available to repair AVDLRs), which deferred these expenditures until the next FY. As a result of these two factors, CNAP ended FY 93 at 7% over the budgeted OP-20.

- FY 94. This year signaled the beginning of serious problems for the FHP. The actual cost per hour in this fiscal year was significantly higher than what was budgeted in the OP-20. This disparity was the result of deficiencies in the three-year moving average and the fact that the budgeted forecast did ***not*** include the bow wave costs incurred in FY 93. As a result, the FHP forecast understated the true cost and produced a budget that was both underfunded and at much lower CPH than in FY 94. In this fiscal year, CINCPACFLT direction was to execute the program per the approved OP-20, meaning fly only the hours that were funded. Hence, in the fourth quarter after all allocated FHP funds were obligated, CINCPACFLT directed CNAP to, "park their planes" and to not incur another bow wave. This action resulted in a great deal of interest and attention focused on the FHP funding process. Even with this unprecedented action of parking aircraft, CNAP CPH still ended the year at 12.8% above the OP-20.

- FY 95. Parking Fleet aircraft in FY 94 brought tremendous interest and attention upon the FHP. As a result, action was taken to fully price the program for FY 95 - at the expense of other aviation programs and modernization accounts. By fully pricing the OP-20, CNAP was able to achieve the stated PMR goal, avoid a bow wave, and execute the FHP just slightly higher than budgeted (2% above the OP-20.) FY 95 became known as a "model" year for the FHP managers and helped to support the Fleet claim that the funding process in earlier years, was not working properly.

- FY 96. CNAP experienced significant funding problems in FY 96 due to the deficiencies noted in the three-year moving average forecasting methodology and because of an affordability decision made during budget formulation. Despite the fact that program cost's were increasing, CNO (N-82) failed to recognize this cost growth and did not re-price the program during the annual summer review session. As a result, the CPH experienced during execution was considerably higher than the OP-20 CPH as evidenced by Table 4.1. This in turn caused CNAP to exhaust the available OP-20 funds and bow wave AVDLR expenses as a means to continue flying throughout the rest of the year. The bow wave generated during this period was $32M and is not depicted in Figure 4.1. Figure 4.1 indicates a 5.1% over the OP-20. If this bow-wave was included in Figure 4.1, it would show that FY 96 ended the year at 12.8% over the OP-20.

- FY 97. This FY was also a difficult year for the CNAP FHP. This was due in part to limited resources and decisions made during budget formulation to build a cheaper OP-20. The methodology used to predict the budget for this year was still based on the flawed three-year moving average. However, a modification to the forecasting approach for FY 97 was made that further impacted the budget. Instead of using FYs 93-95, FY 97's budget was based upon FYs 92-94 because FY 95 was considered a high cost year and therefore too expensive to include in budget formulation. This modification caused a

$350M shortfall for the Fleet and resulted in the need for additional AVDLR bow waving to continue flying through the end of the year. Further underfunding occurred due to higher maintenance costs resulting from the Marine Aviation Campaign Plan (MACP) and unforeseen maintenance costs associated with reliability problems on the F/A-18 F404 engine, and CH-53 swash-plate. The MACP and reliability issues are further discussed in this chapter. One final cause of underfunding in FY 97 was due to CINCPACFLT and CNAP reprogramming decisions to reapply funding for other unbudgeted and underfunded programs. These reprogramming decisions and unbudgeted requirements are examined later in the chapter. All these problems contributed to another underpriced year at 13% and a record $65M bow-wave for CNAP. Figure 4.1 shows the impact of the bow-wave for FY 97 (see plot labeled "w/UCO".) The term Unfilled Customer Orders (UCO) is explained later in this chapter.

- FY 98. Due to the deficiencies of the three-year moving average, N-88 implemented a new forecasting methodology for FY 98's budget. The new approach was based upon using the most recent year's execution costs. Using the most current execution cost data helped minimize the problems inherent in the former technique. However, the most salient deficiency in the FHP budget formulation process still persisted. This deficiency was the failure to recognize and include the previous year bow wave cost in the following year forecast. The reason to not include the previous year's bow wave was due to limited resources and other competing funding priorities. As a result, the budget forecasts for FY 98 and out-years were still understated and consequently underfunded. Another problem contributing to further underfunding in FY 98 was due to the cost of the bow wave being subjected to a higher surcharge rate. The estimated bow wave cost that was rolled into FY 98 from FY97 was

$65M. This cost increased considerably due to a higher surcharge rate of 57.5% as compared to 27.4% in FY 97. As a result, CNAP's FHP was underfunded by 30% at the start of the FY 98. Fortunately, by March, several factors helped to lower the alarming CPH rate. These factors included, funding credits received from decommissioning the USS Independence and the home port change for the USS Nimitz, from San Diego to the East Coast, and expenditure reporting delays brought on by changing the CVs accounting system to STARS –FL. By July, the FY 98 CPH variance was below 10%, but by year's end, FY 98 still executed nearly 11% over the budgeted target.

This concludes the overview of the CNAP FHP budgeted versus actual funding disparities from FY 92-98. In summary, the primary cause of CNAP historical FHP underfunding was the deficiencies in the three-year moving average approach coupled with political decisions and the OP-20 budget methodology. These are the principle factors creating continued FHP underfunding as clearly supported by the CPH curves seen in Figure 4.1.

Next, this chapter will analyze seven major factors that have directly impacted the CNAP budget and remain as a significant source of continued FHP underfunding. These factors are 1) Aviation Readiness and Integrated Logistics Support (ILS) Reporting Metrics, 2) Logistics Engineering Change Proposals (LECPs) 3) Aviation Configuration Management 4) Aircraft Depot Level Repairables (AVDLR), ILS, Reliability and Pricing 5) the Marine Aviation Campaign Plan (MACP), 6) Effect of AVDLR Underfunding at CNAP, and 7) Unfunded Requirments.

C. AVIATION READINESS AND INTEGRATED LOGISTICS SUPPORT (ILS) REPORTING METRICS

One of the causes of FHP underfunding is the use of multiple ILS readiness reporting metrics. The metrics used in Naval Aviation do not provide an accurate measure of Fleet readiness or Fleet logistics support elements, making it difficult to support and justify increased FHP funding levels. In this section, an analysis of this problem is conducted, several supporting examples are shown, and an overview of current Fleet initiatives to correct this problem is presented.

1. Aviation Readiness Reporting

The ability of Fleet Commanders and Resource Sponsors to measure the effectiveness of force capabilities is crucial to meeting mission objectives and to ensure programs are properly funded. In budget formulation, the level of resources requested must be supported by tangible readiness goals if budget requests are to be approved. However, there are no common readiness goals used in aviation readiness reporting metrics. This leads to confusion between operational and supports units, and complicates the task of identifying and reporting the Fleet resource requirements. Additionally, the consolidation of fleet readiness reporting data in many cases masks significant problems experienced in specific Fleet units and aviation communities.

As discussed in Chapter II, the Status of Resources and Training System (SORTS) Report is the primary measure of an operational unit's combat readiness. The SORTS system reports readiness levels under a "C" rating metric. A rating of "C-1" means the unit is fully combat ready. Ratings of "C-2" through "C-4" indicate lesser degrees of readiness. A unique feature of SORTS is the ability of "C" ratings to be aggregated, or "rolled up" from the unit level to an air wing, battle group, or even Fleet level as a means to provide overall readiness assessments. The problem with this feature is that "rolled up" summaries can obscure readiness problems experienced by particular communities or T/M/S. Also, as noted by the AMSR working group, Resource Sponsors and supporting communities such as NAVSUP and NAVAIR, employ SORTS data to calculate overall "ratios of system capability" (i.e. aircraft Mission Capable (MC) statistics) to assess program health and formulate budget inputs. Currently, the SORTS reporting system records MC rates for assigned aircraft and permits aircraft MC rates as low as 60% to reflect a SORTS rating of "C-2". While a C-2 rating may be an acceptable posture at the

CINC level, certainly no squadron CO or Air Wing Commander would accept aircraft MC percentages that low. Consequently, there is significant pressure at the flight deck level to achieve much higher Full Mission Capable (FMC) and MC rates. [Ref. 46:p. 9] One example is shown in the figure below:

Readiness Goals for Navy F-14D Aircraft

- SORTS Readiness: 75% MC = C-1 (As reported by SCIR data)*
- CNO Readiness: 76% MC (As reported by AV3M data)*
- Battle Group CO: 84% MC (As reported by daily AMRR data)*

* SCIR: Subsystem Capability and Impact Reporting
* AV3M: Aviation Maintenance Data Reports
* AMRR: Aviation Maintenance Readiness Report

Figure 4.2. Readiness Goals for Navy F-14D Aircraft [Ref. 46:p. 9]

In addition to the multiple readiness reporting criteria, the support elements for Naval Aviation use the CNO Readiness Goals (OPNAVINST 5442.4M), (which are unique for each specific aircraft T/M/S) to make critical resource allocation decisions. These decisions can affect a host of ILS elements ranging from the level of spares stocked at the air stations (SHORCAL), or CVNs (AVCAL), to the decision if or when I-Level maintenance support is implemented for new aircraft components or systems.

Therefore, using multiple readiness reporting metrics results in inaccurate and inconsistent reported readiness and the inability to identify often whole aircraft type community problems. Yet, at the same time these communities are also pressured to achieve higher readiness levels. To achieve higher MC rates, the squadrons must constantly replace failed AVDLR components placing further demands on the already underfunded FHP budget. In summary, without a clear system of readiness goals and metrics, that links funding decisions to readiness and logistics support capability, the current aviation readiness reporting system will continue to drive uncoordinated support of aircraft and result in "surprises" regarding Fleet readiness. [Ref. 46:p. 10] Next, is an explanation of how the various reporting metrics directly affect the overall logistics support capability of CNAP aircraft.

2. Integrated Logistics Support (ILS) Reporting Metrics

The multitude of various aviation readiness reporting systems undermines the ability of supporting activities to achieve cost effective life-cycle ILS for Navy and Marine aircraft. The goal of the ILS system is to ensure all logistics support elements are developed and deployed in order to provide a completely integrated support structure for military equipment in an operational environment. To effectively evaluate aircraft ILS, there must be a means to objectively measure the ILS elements against established performance standards that can be, "linked through cause and effect relationships to affordable readiness goals" [Ref. 46:p. 14]. However, the current readiness/ILS reporting systems do not provide meaningful end-to-end ILS assessment information. This lack of assessment information is caused by current readiness/ILS reporting systems disjointedness, inconsistencies and "compartmentalization". Common problems with the current readiness/ILS reporting systems include [Ref. 46:p. 14]:

- SORTS: Has no capability to assess ILS health or predict ILS shortfalls. "It does not readily distinguish between a unit's material condition and its operational capability" [Ref. 46:p. 14].

- Aviation 3M Data (AV3M): Provides a large amount of data for system-wide ILS troubleshooting, but not rapidly enough to solve near term problems. Data are disconnected from reporting unit readiness reports and thereby insight into root causes or problems is reduced. Additionally, intermediate level maintenance support is not readily available in current reports and real-time NALCOMIS and SUDAPS reports (which provide daily ILS status at the user level) are not available to up-line activities.

- Aviation Maintenance Readiness Report (AMRR): Deployed aviation units send a daily AMRR. This report provides significant detail of deployed aircraft readiness and material support deficiencies for item managers and carrier readiness support staffs, but has no provision to aggregate the data to provide specific system ILS health evaluation and trends. Additionally, the data reported on the AMRR do not match any Subsystem Capability and Impact Reporting (SCIR) documentation reported by the SORTS. Furthermore, squadron and air wing organization/cultural pressures have led to the inflation of AMRR readiness figures by the reporting activity, thereby further obscuring problems within specific aircraft and communities.

- The last problem with ILS reporting metrics pertains to data integrity. For example, CNAP reported during FY 97 that between 30 and 40% of its submitted AV3M maintenance data were lost. Additionally, CNAP has noted significant inconsistencies in different databases designed to report similar and often matching information. One example illustrated in Figure 4.3 shows discrepancies between the number of aircraft assigned to CNAP as reported under the Aircraft Inventory Reporting System (AIRS), the TYCOM Readiness Management System (TRMS) and Naval Maintenance Support Office database (NAMSO).

Another data integrity issue cited is the number of flight hours reported. In FY 97 the AV3M system reported over 160,000 flight hours less than were reported by squadron Budget OPTAR Reports [Ref. 48].

To conclude, while the financial impact of these reporting discrepancies is not known, it can be said that any inconsistency revealed during budget review is likely to become a "target of opportunity" and result in a corresponding budget mark, further undermining efforts to properly fund the FHP.

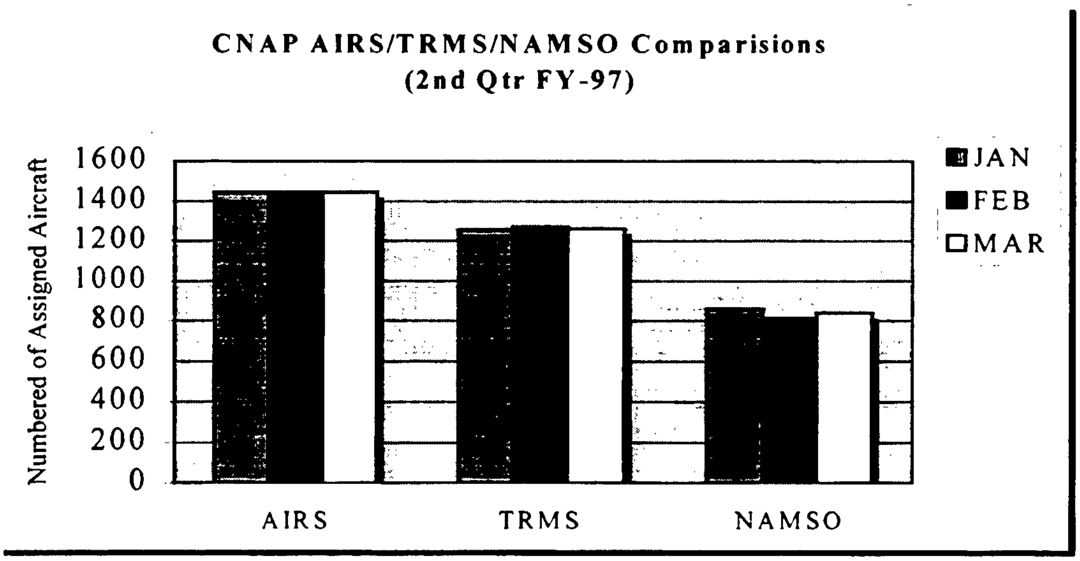

Figure 4.3. Aircraft Inventory Reporting Discrepancies [Ref. 47]

3. Solution

Accurate readiness and ILS reporting is critical to successful FHP budgeting and Fleet support. A clear and comprehensive reporting system and metrics must link readiness goals, while accurately documenting and evaluating overall logistics health. The solution currently in work is to development of a common reporting metrics system called "NALCOMIS Optimized". When fully developed and implemented, this system will integrate all current metrics into a single readiness/ILS reporting metric. This will provide leadership at all levels, real-time, all encompassing, end-to-end insight into both an operating unit combat readiness, as well as, overall ILS effectiveness. The next factor that has caused FHP underfunding is the Logistics Engineering Change Proposals (LECPs).

D. LOGISTICS ENGINEERING CHANGE PROPOSAL (LECP)

The purpose of the LECP program is to provide technologically superior Aviation Depot Level Repairables (AVDLRs) components to the Fleet and reduce total component life cycle support costs. The ultimate goal is to produce lower overall costs by increasing the reliability of AVDLRs and thereby reducing failure rates and parts consumption. The LECP program is managed by the Naval Inventory Control Point Philadelphia (NAVIC-P) under the "Buy Our Spares Smart" (BOSS III) concept and funded by the O&M, N appropriation through the Navy Working Capital Fund (NWCF). The program is successful and, to date, has resulted in over $230M invested and a savings to the FHP of $362M [Ref. 46:p. 37]. The way the program works is to systematically screen AVDLR components with poor reliability and that exhibit potential depot repair costs savings using the NAVICP Opportunity Index (OI) Ranking Concept for aviation platforms. The OI measures AVDLR reliability by; Mean Time Between Failure (MTBF), the number of failed components repaired at the depot level, and the costs per depot repair. A number of older AVDLRs have been replaced with newer and more reliable components resulting in higher Fleet readiness and lower support costs. The problem with the LECP program is that the initial cost of the new AVDLR is usually more than the AVDLR replaced. To realize the reliability and savings of new AVDLRs, the FHP must first buy and install the new higher priced AVDLR. However, the purchase of the new AVDLR is contingent upon the Fleet having the FHP resources to buy it. Under the current budget process, adequate resources are not provided to the FHP to finance the buy-out of the higher priced, improved AVDLRs from the NWCF. Moreover, the budget process takes these projected LECP dollar savings up-front as a reduction to the AVDLR portion of the FHP budget. Since the FHP does not have the resources to buy and install the LECP, there are two outcomes: 1) the AVDLR components are not installed and LECP costs savings and reliability improvements cannot be actualized and, 2) the Fleet buys the AVDLRs at the expense of other FHP costs and consequently is underfunded by that amount [Ref. 46:p. 37].

One example that illustrates this dilemma for CNAP is the Replacement Inertial Navigation Unit (RINU) for the P-3C and C-130 aircraft. (The RINU was developed under the LECP program and designed to replace the outdated and unreliable LTN-72, a top P-3 AVDLR readiness degrader.) The RINU has a projected Mean Time Between Failure (MTBF) of 4500 hours while the LTN-72 is currently less than 200 hours and costs the Fleet over $9M in annual repairs [Ref. 49]. This is an important aircraft upgrade, yet under the current RINU Memorandum of Agreement (MOA), the buy out (to receive this improved AVDLR) is projected to cost the CNAP FHP approximately $10.5M between FY00 and FY01, as displayed in Table 4.2:

COMPONENT	RINU	LTN-72
Technology	1990 Ring Laser	1960s Electro-Mechanical
MTBF	4,500 hrs. – 9,000 hrs.	200 hrs
Annual Repair Costs	Approx. $50K outside of warranty	$7.5M for FY97 (691 depot actions – Litton)
Warranty	15 yrs.	6 mos.

Pricing:

FLEET BUY OUT PRICE	CNAP P-3C	NO. RINU	TOTAL
$70,000 ea.	75 aircraft	2 units per aircraft	$10.5M

Table 4.2. RINU LECP [Ref. 50]

The LECP program provides significant reliability improvements to aircraft AVDLRs, reduces FHP costs and improves aircraft readiness. However, as explained in Chapter III, since there is no direct funding budgeted for the LECP program and it is difficult to confirm proposed cost savings from improved component reliability, underfunding may occur in the current year's FHP.

The AMSR working group has proposed several steps to correct the LECP problem. First, that Fleet SORTS reports include an evaluation of all pertinent ILS elements, such as equipment availability and current support deficiencies. Second, NAVAIR's Assistant Program Managers for Logistics (APMLs) establish "trigger mechanisms" to identify top readiness degraders as a means to both evaluate and correct ILS shortfalls. Lastly, the CNO (N-88) should submit budget inputs for LECPs under the procurement appropriation submission. The proposed budget would include the funds to pay the full price of the initial component installation, any required "plane-side" spares and wholesale system inventory requirements. [Ref. 46:p.37] The authors support the AMSR group's solution to this problem as a method to realize the improved efficiencies potentially gained under the LECP program and as a means to minimize CNAP FHP underfunding. The next topic presented is aircraft configuration management and its affect on the FHP.

E. AIRCRAFT CONFIGURATION MANAGEMENT

Aircraft configuration management has also contributed to significant FHP underfunding in a manner similar to the LECP program. This section, explains how the aircraft configuration management process works and provides two specific examples of how it can contribute to underfunding at CNAP.

The purpose of aircraft configuration management is to provide a systematic means of documenting and controlling the engineering design of weapons systems, so that readiness, safety, logistics support and life cycle costs are integrated. Configuration management for all systems including aircraft, is regulated by DoD Regulation 5000.2R. It is a management process that facilitates the upgrade of aircraft (and other systems) for improved performance, reliability, maintainability, service life extension, reduced support and operating costs, as well as, the means to correct system defects. The responsibility for aircraft configuration management resides with the respective aircraft Naval Aviation Program Managers (PMs) at Commander Naval Air Systems Command

(COMNAVAIRSYSCOM or NAVAIR). For Naval Aviation, configuration management has become increasingly important given the fact that the average life span for Navy aircraft is 30 years. Therefore, upgrades to aircraft systems are required to continue operations. These upgrades are controlled by configuration management and implemented through what is known as the Engineering Change Proposal (ECP) process.

The ECP process is the means by which system upgrades are proposed, contracted and finally installed within the aircraft. When ECPs are approved (depending on the scope of the upgrade), they are issued as a directive to the Fleet called a Technical Directive (TD). A TD is a document authorized and issued by NAVAIR which provides technical information to properly inspect or alter the configuration of aircraft, engines, systems, or equipment, subsequent to establishment of each respective aircraft baseline configuration. TDs provide detailed instructions on how to install the ECP and provide a record (in the aircraft and/or component logbook) of the upgrade. Incorporating ECPs into aircraft frequently calls for the installation of new parts. Under the current NAVAIR policy (NAVAIR Publication 00-25-300), TD parts kits that cost over $1000 per squadron and take more than eight manhours to install, are funded by NAVAIR. TD kits costing less than $1000 are ordered at the squadron level and paid for using FHP funds under the AOM/OFC-50 account. However, in recent years, this policy has not been closely followed because of limited resources and the PMs perception that ECPs are must have "safety of flight" improvements. Therefore, numerous TDs costing more than the $1000 threshold are issued to the Fleet. Since Fleet unit commanders are not responsible for the expense management of OFC-50 funds and because TDs often do provide measurable aircraft improvements, the squadrons order and install the TD kits. [Ref. 51]

One example that illustrates the financial impact on the CNAP FHP budget is demonstrated by a TD issued for the Navy SH-60 helicopter. This TD, AFB 0091: "Engine White Harness, Inspection & Replacement", is applicable to both the SH-60B and F series. As shown in Table 4.3, CNAP squadrons ordered 132 TD kits for a total cost of over $311K between FY 96-97:

SH-60 AFB 0091: "Engine White Harness, Inspection & Replacement"				
T/M/S	NIIN	QTY ORDER	UNIT PRICE	TOTAL COST
SH-60B	01-367-3066	46	$2,080	$ 95,640
SH-60B	01-367-3067	49	$2,129	$104,103
SH-60F	01-367-3066	37	$3,014	$111,518
				$311,261

Table 4.3. SH-60 AFB 0091 [Ref. 52]

The SH-60 TD illustrates one example of this problem. Given that CNAP operates over 1600 T/M/S aircraft, the cost to implement TDs for all CNAP aircraft could easily represent several million dollars in any given FHP execution year and countless squadron man hours. These are additional costs not provided in the FHP budget or squadron manning authorizations.

Another problem with aircraft configuration management is the increased logistics support costs brought on by having multiple groups or lots of aircraft within the same Air Wing. One example cited by the AMSR was an East Coast Air Wing that deployed with three different squadrons of F/A-18s; lot 10, lot 16 and lot 18 aircraft. Among these lots of F/A-18s, are significant avionics (APG-65 vs. APG-73 radar) and engine (F404-GE-400 vs. F404-GE-402) configuration differences and logistics support requirements. Consequently, multiple aircraft configurations result in increased AVDLR expenditures, increased spares requirements, dissimilar support equipment and increased training particularly at the intermediate maintenance level. While this example notes the problem for a CNAL activity, similar examples also exist in CNAP Air Wings.

There are two areas in aircraft configuration management that require solutions. The first, is the length of time it takes to approve ECPs and, the second, is the source of funding for ECPs. Historically, mixed aircraft configurations have been exacerbated by the length of time it takes ECPs to be approved by NAVAIR. One recent review revealed that the average time for complete incorporation of TDs was eight years, and some took 14 years. For many T/M/S aircraft, this results in duplicate and expensive Integrated

Logistics Support (ILS) elements remaining in place for years to support the variety of aircraft configurations. The AMSR group has concluded that to solve this problem, a "closed-loop" configuration control process be established at NAVAIR. Such a system would implement a comprehensive database to oversee the integration of engineering and logistics elements and provide program mangers with the ability to quickly assess the value of ECPs against the logistics support costs. [Ref. 46:p. 31]

The solution to fix aircraft configuration management is to provide a steady and reliable stream of financial resources. Similar to the solution for LECPs, ECPs should receive funding through the APN-6 procurement appropriation account. Furthermore, open communication between NAVAIR, the FHP Resource Sponsor and the Fleet is also needed to ensure consistent budgeting and sponsorship via the POM process for these logistics improvement programs. Without a concerted effort to fund aircraft improvements, lack of funding for ECPs will continue to cause underfunding of Air Type Commander FHP budgets. The next section covers the most dynamic cost component of the FHP, AVDLRs.

F. AVIATION DEPOT LEVEL REPAIRABLE (AVDLR): ILS, RELIABILITY AND PRICING

Of the three cost categories in the OP-20, AVDLRs are indisputably the most significant source of ongoing underfunding and budget variability for the FHP and CNAP. This section analyzes the AVDLR cost component and explains how it contributes to CNAP FHP underfunding, and highlights ongoing efforts to minimize the rising cost of AVDLRs. This comprehensive section is divided into seven parts. The first section begins with an explanation of AVDLRs. Section two highlights the trend of rising AVDLR costs and discusses the Aviation Maintenance Supply Readiness (AMSR) group and their efforts related to AVDLRs. Section three explains logistics concepts and Naval Aviation maintenance/logistics support. Discussions on diminishing "plane-side" support for AVDLRs, AVDLR ILS deficiencies, component reliability, and AVDLR pricing are covered in sections four through six. Finally, section seven examines some of the effects of AVDLR underfunding for CNAP.

1. Definition of AVDLRs

AVDLRs are aircraft or aviation related components that can be economically restored to a useable condition through regular repair procedures when they become unserviceable. AVDLRs are typically high cost items, which have long procurement lead-times. The overall management of AVDLRs is the responsibility of the Naval Inventory Control Point Philadelphia (NAVICP-P). This agency determines and manages inventory levels for all AVDLRs, coordinates the depot repair and procurement of AVDLRs, and forecasts the Fleet's demand for AVDLRs use.

Repair of AVDLRs is performed at all three levels of aircraft maintenance – organizational, intermediate or depot. However, most AVDLR repairs occur at the intermediate maintenance level (I-level) or at a DoD depot and/or commercial facilities. To meet operational commitments and maintain readiness levels, squadrons must be able to replace failed AVDLRs quickly. Failed AVDLRs are removed from the aircraft and swapped for identical AVDLR components issued from the supporting facilitie's AVDLR spare allowance pool. The failed AVDLRs are then sent directly to the I-level where they are repaired and returned to the local supply spare allowance pool. If an AVDLR cannot be repaired at the I-level, it is declared "Beyond Capability of Maintenance" (BCM) and shipped to a depot repair facility. A BCM action can occur when the I-level is not authorized to repair the component or when the I-level is not capable of accomplishing the repair because of lack of equipment, facilities, technical skills, parts, or when a backlog precludes repair within established time limits. Once at the depot, the AVDLR is repaired and returned to the supply system for issue to the Fleet or it is determined beyond economical repair and disposed.

a. Rising AVDLR Costs and the Aviation Maintenance & Supply Readiness (AMSR) Working Group

By early 1998, it became clear to Navy leadership that action had to be taken to curb the rapidly growing costs of the FHP program. As shown by Figure 4.4, in seven of the last eight years, AVDLR costs have exceeded the budgeted AVDLR cost per hour.

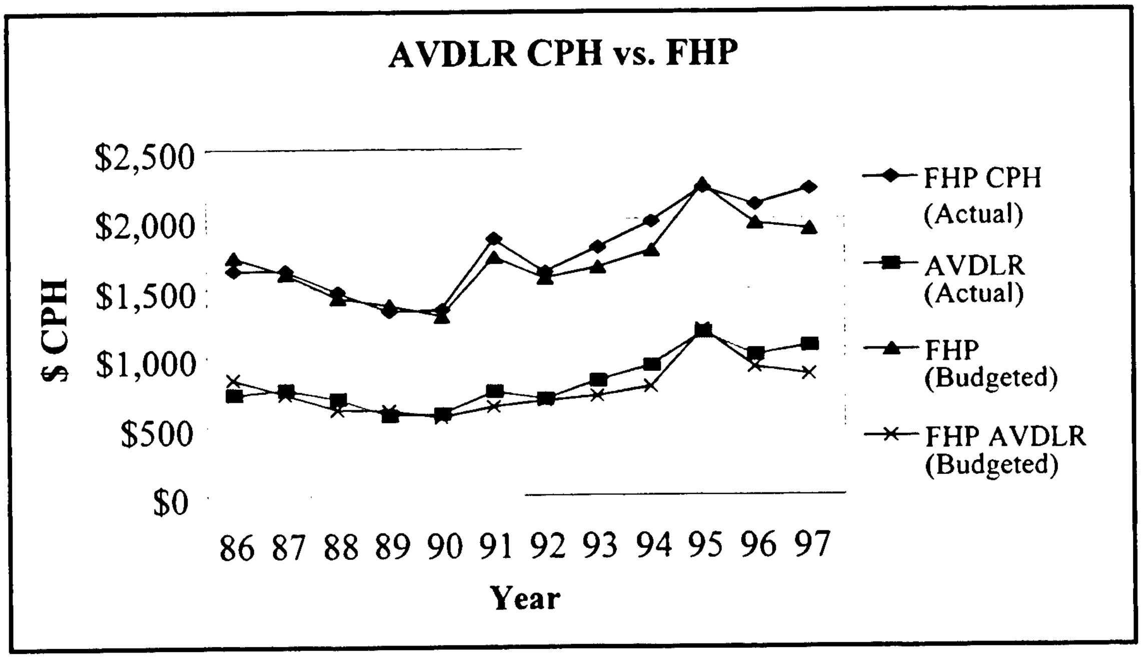

Figure 4.4. AVDLR CPH vs. FHP [Ref. 45]

In FY 98, the Navy spent nearly $3.5B to execute the FHP. Of that total, over $1.5B was directly attributable to AVDLRs and spare parts needed to support them. The cost of AVDLRs is growing at an average annual rate of 7.5%. Additionally, the top 50 most expensive AVDLRs (called "cost drivers"), represented less than 5% of the total demand but more than 20% of the cost for all AVDLRs. Yet, perhaps most alarming was the feedback from the Fleet regarding the impact of rising AVDLR costs. While the Fleet complained bitterly about AVDLRs and associated problems including Fleet cannibalization, extended aircraft down-time and extensive pre-deployment "robbing" of shore-based squadrons, none of the Naval Aviation readiness reporting indicators supported these claims. Therefore, at the direction of the CNO, a study of this "dichotomy" was ordered and a joint CINCPACTFLT, CINCLANTFLT and COMNAVAIRSYSCOM "Aviation Maintenance Supply Readiness (Study) Group" (AMSR) was formed. The group's charter is the following:

- Review squadron reporting Maintenance/Supply readiness shortfalls
- Examine FHP budget methodology
- Examine the migration of AVDLR support from O-level to D-level
- Assess I-level maintenance readiness to determine if resources are in place to support AVDLR maintenance
- Examine AVDLR issues and recommend specific actions to reduce aviation maintenance and supply costs, increase readiness and provide "systemic improvements" to the Naval Aviation support structure [Ref. 46:p. iv].

The AMSR work has been substantial during the past year. They have pinpointed a number of factors which contribute to the increasing costs of AVDLRs. In the latter half of this chapter, some of these factors are examined to determine the effects of FHP underfunding. The next section introduces logistics concepts and the Naval Aviation Maintenance and Supply logistics support methods.

2. Logistics Concepts and Naval Aviation Maintenance & Logistics Support

Many of the allegations and systemic problems that account for the rising costs of AVDLRs components are embedded in shortcomings of current logistics and support practices used by the Navy. Therefore, this section begins with an introduction to logistics concepts and an overview of how logistics support is integrated into the Navy maintenance and supply support system. This will help to provide an understanding of a number of AVDLR issues brought out by the AMSR.

a. Logistics Concepts

What is logistics? In the broadest sense, logistics provides support to operate and maintain a system. A system is comprised of elements that include a combination of materiels, equipment, software, facilities, data services, and personnel. When these elements are properly integrated, the system performs as a smooth operating self-sufficient entity in the environment for which it was designed throughout it's planned life-cycle. A system can range from a fleet of ships to an individual component such as a Trailing Edge Flap Actuator mounted on an F/A-18 aircraft. Inherent within the context of a system is the basic function of logistics, that is to provide material distribution and maintenance and support of the system throughout its entire life-cycle. Thus, logistics is the means by which a system is supported. The principal "logistics system support elements" include [Ref. 53:p. 1]:

1) Maintenance planning
2) Supply support (spare/repair parts)
3) Test and support equipment
4) Personnel training and training support
5) Manpower and personnel
6) Facilities
7) Transportation and materiel handling
8) Computer information systems
9) Data
10) Design interface

Failure to address these system support elements "up front" during design and development will guarantee disastrous results. As noted by one logistics expert:

> The logistics infrastructure must be initially planned and integrated into the overall system development process to assure an optimum balance between the prime equipment and its related support. This balance considers the performance characteristics of the system, the input resources required, the effectiveness of the system, and the ultimate life-cycle cost effectiveness. [Ref. 53:p.2]

The strategy to integrate and balance system effectiveness is best represented by the Systems Cost Effectiveness Diagram, (see Figure 4.5). Developing a cost-effective system within the constraints of operational and maintenance requirements is the objective. This figure represents the separate design and logistics factors and the manner in which their relationships are integrated and balanced in order to achieve a fully supported, cost-effective system.

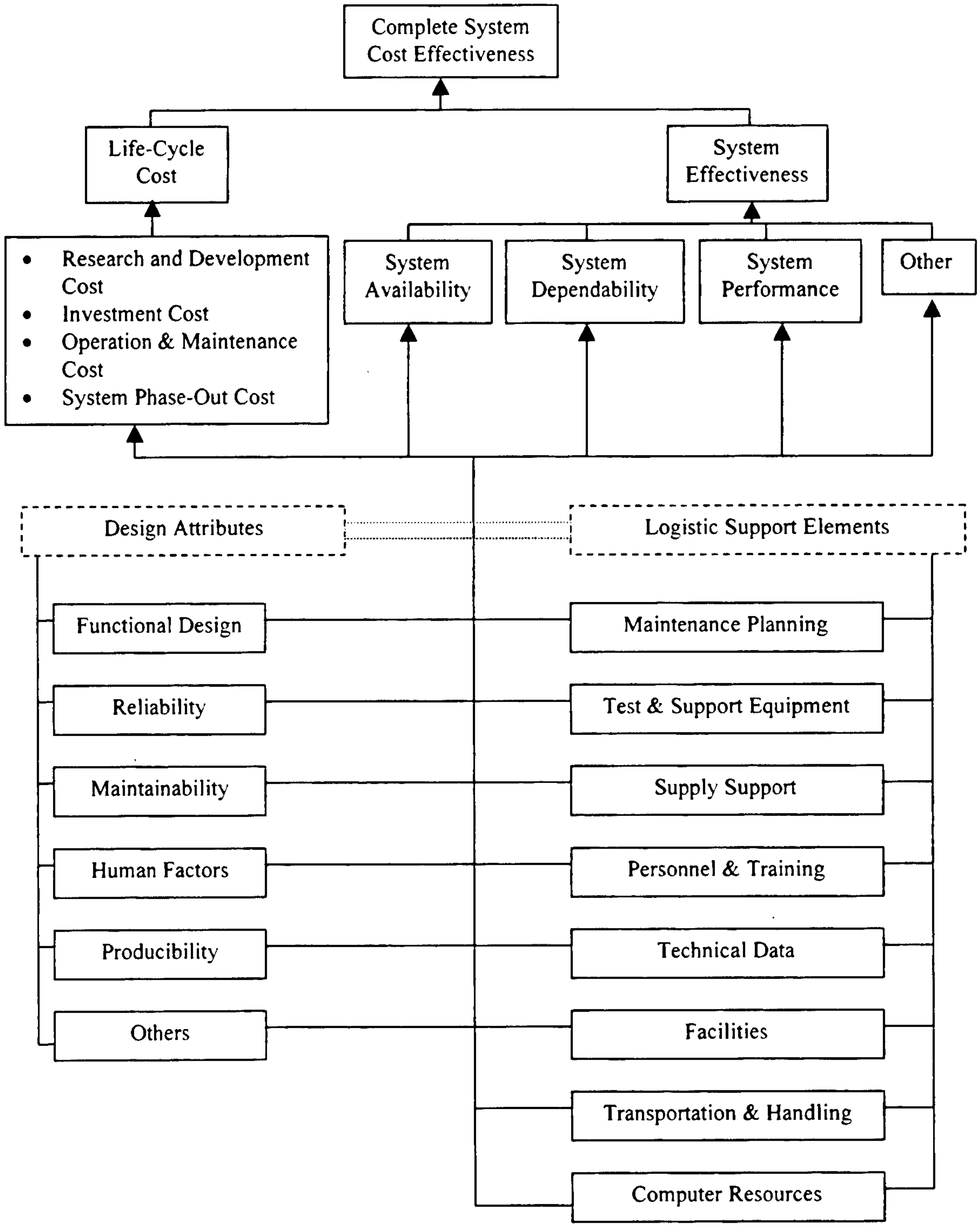

Figure 4.5. System Cost Effective Diagram [Ref. 53:p. 24]

These system cost effective logistics principles provide the foundation for the Naval Aviation maintenance and supply logistics support infrastructure. Therefore, the ability of the Navy logistics infrastructure to meet aviation systems support goals is critically dependent upon the following three points:

- Identification and documentation of the system's total life-cycle support requirements
- Preparation of a comprehensive plan to meet the identified life-cycle requirements
- Development, acquisition and up-front deployment of reliable and quality support resources.

In the Navy, the responsibility to achieve these logistics goals belongs to the Weapon Systems Program Manager (PM), whose job is to oversee the design, development and acquisition of the weapons system. PMs achieve these goals by a process of ensuring integration of the logistics system support elements balanced with the life-cycle cost (as depicted in Figure 4.5). This evaluation process is called "life-cycle trade-off" studies. The objective of trade-off studies is to produce a series of alternative support solutions for the system life-cycle support requirement. Trade-off studies are achieved by comparing the costs of on-site repair with a small spares inventory, versus the cost of off-site repair with a larger on-hand spares inventory. Once an alternative support solution is selected, a preferred support package is developed and deployed. This process of optimizing the total support package of all logistics system support elements is called "Integrated Logistics Support" (ILS). ILS is a management function that provides initial planning, funding, and controls to ensure a system will perform as designed and can be effectively supported throughout its life-cycle [Ref 46:p. 2]. To achieve the most cost and readiness effective ILS, the Navy employs a three level maintenance concept of; organizational (O-level), intermediate (I-level) and depot (D-level) maintenance.

The functions performed at each maintenance level are based upon support policies, logistics support requirements and effectiveness factors such as system reliability, maintainability and the cost of personnel. Perhaps the most significant effectiveness factors are reliability and maintainability. Therefore a brief explanation is provided:

1) *Reliability* is the probability that a system will operate in a given period of time when used under specified operating conditions. Reliability is commonly expressed as: - Mean Time Between Failure (MTBF).

2) *Maintainability* refers to the inherent system design characteristics and the ability of a system to be maintained. Its elements include ease of use, accuracy, safety, and economy in performance of maintenance actions. Maintainability is also defined as a characteristic in design it is expressed by frequency factors. The most common frequency factors are:

- MTBM: mean time between both corrective and preventative maintenance.
- MTBR: Mean time between replacement of an item.
- Mct: mean corrective (all unscheduled maintenance actions resulting from a system failure) maintenance time.
- Mpt: mean preventative (all scheduled maintenance actions performed to retain system performance) maintenance time.

During ILS planning stages, Navy logistics managers working with the PMs conduct trade-off studies to determine the proper level of maintenance and support designated by the weapon systems "Source, Maintenance and Recoverability" (SM&R) code. The purpose of constructing an SM&R code is to identify the repair location and establish an appropriate system of support logistics elements at the repair site (i.e., spare/repair part types, quantities, test and support equipment, manning levels and skill).

The primary method to determine the SM&R codes is through a "Logistics Support Analysis" (LSA). The LSA is an iterative analytical process to identify and evaluate the support requirements in the system design process. The LSA uses several economic statistical models. One common model is called a Level of Repair Analysis (LORA). The LORA identifies and evaluates a system's support requirements and recommends a least-costs maintenance and supply support structure for the specific system under study. [Ref. 46:p.4] This is achieved by evaluating the following inputs:

- Component reliability (MTBF)
- Component utilization
- Technical design complexity
- Component item unit costs
- Inventory holding and transportation costs
- Repair turn-around-time
- Repair costs
- Readiness impact

Studying logistics concepts, provides a clearer understanding of the complexities and decisions that must be made in selecting the appropriate level of logistics support elements for a system. To achieve these optimal levels of a weapon systems life-cycle support, a number of critical elements must be balanced to meet both mission readiness requirements while at the same time staying within limited resource funding. Clearly this is not an easy task. When this process is done properly, a robust support structure is created and readiness as well as logistics objectives are equally satisfied.

b. Naval Aviation Maintenance & Logistics Support

After a weapon system is deployed, the ILS resources are integrated in the field under the guidance of the Naval Aviation Maintenance Program (NAMP) OPNAVINST 4790.2G. The NAMP provides an integrated system for performing aeronautical equipment maintenance and related support functions. It was established by the Chief of Naval Operations (CNO) and implemented by the Chief, Bureau of Aeronautics, on 26 October 1959. The NAMP objective is, "to meet and exceed aviation readiness and safety standards established by the CNO" [Ref. 10]. This is accomplished by optimizing the use of manpower, materiel, facilities and financial resources. The methodology for meeting the objective is "continuous process improvement". The NAMP uses a three level maintenance concept, Organizational, Intermediate and Depot. This maintenance concept is discussed next.

The Organizational Level Maintenance (O-level) is usually performed by an operating unit (squadron) on a day-to-day basis in support of operations. The O-level maintenance mission is to maintain assigned aircraft and aeronautical equipment in a full mission capable status while continually improving the local maintenance process. While O-level maintenance may be done by I-level or D-level activities, O-level maintenance is usually accomplished by maintenance personnel assigned to aircraft reporting custodians (i.e. Squadron). O-level maintenance functions include:

- Aircraft handling, servicing, weapons loading, and materiel condition inspections
- On-aircraft preventative and corrective maintenance (This includes on-equipment repair, removal, and replacement of defective components)
- Installing aircraft Technical Directives
- Record keeping and reports preparation

Intermediate Level Maintenance facilities (I-level), called Aircraft Intermediate Maintenance Departments (AIMDs) or Marine Corp Aviation Logistics Squadrons (MALs), perform services in direct support of the local O-level activities. I-level activities are co-located with the squadrons at either an air station or air capable ship – CV or LPH/LHA. The I-level maintenance mission is to enhance and sustain the combat readiness and mission capability of supported activities by providing quality and timely materiel support at the nearest location with the lowest practical resource expenditure. I-level maintenance consists of both on-aircraft and off-aircraft support functions including:

- Repair defective AVDLR components and Support Equipment
- Calibrate designated equipment
- Process components from stricken aircraft
- Provide technical assistance to O-level units
- Install Technical Directives
- Manufacture selected aeronautical components, liquids, and gases
- Performance limited on-aircraft maintenance
- Annualize aircraft engine and gearbox oil contamination

Depot Level Maintenance (D-level) is performed at naval aviation industrial establishments to ensure continued flying integrity of airframes and flight systems. D-level maintenance is also performed on material requiring major overhaul or rebuilding of parts, assemblies, subassemblies, and end items, which do not require frequent repair. Much of the depot's repair efforts are batch processed. Since overhead costs are expensive due to "state-of-the-art" industrial equipment, batch processing helps the depot achieve greater component repair efficiency. D-level maintenance supports O-level and I-level maintenance by providing engineering assistance and performing maintenance beyond O & I Level capabilities. Finally, the D-level maintenance functions include: [Ref. 10]

- Rework of aircraft
- Rework and repair of engines, components, and Support Equipment
- Calibration of test equipment and aircraft components
- Installation of Technical Directives
- Modification of aircraft, engines, and SE

- Manufacture or modification of parts or kits
- Technical and engineering assistance by depot field teams

The remaining AVDLR sections will discuss three specific factors that have directly contributed to the rapid cost growth experienced in AVDLRs. These three factors are "Decreasing Plane-side Support of AVDLRs, "AVDLR ILS Deficiencies and Component Reliability" and "AVDLR Pricing".

3. Decreasing "Plane-side" Support of AVDLRs

One aviation readiness concern is the decreasing "plane-side" logistics support for AVLDRs. Decreasing plane-side support is the movement of repair capability from the air station to the depot, and the absence of readily available spare parts. The result has been lengthy aircraft "down-times", decreased readiness and a substantial impact on CNAP's FHP budget. This section will examine this problem and provide an example that illustrates its magnitude.

Historically, 75% of all AVDLRs have been supported by the I-level maintenance activity. However, increasingly more AVDLRs are not repaired by the AIMD or MALS as a new cost-savings maintenance philosophy is being pursued. This trend has been particularly evident for the F/A-18 C/D and F-14D aircraft. This philosophy is called "O to D" (Organizational to Depot) or "O to OEM" (Organizational to Original Equipment Manufacturer). The O to D concept is intended to reduce AVDLR logistics costs by removing the operating expenses associated with the I-level repair effort yet retain appropriate levels of "plane-side" support by procuring and stocking additional spare AVDLRs at the air station or CV. However, there are two critical elements that must occur for the O-D support philosophy to be successful: 1) additional spare AVDLRs must be procured, and 2) component reliability must be thoroughly evaluated in order to accurately forecast AVDLR spares allowance levels. These two critical elements have not been achieved in recently introduced AVDLR components.

AVDLR spares procurement element. Spare AVDLRs are procured through the

Aircraft Procurement Navy – 6 (APN-6) outfitting account. Over the past five years, the APN-6 account has been consistently underfunded. For example, in FY 98 the APN-6 outfitting account was underfunded by $183M. To cope with this shortfall, NAVICP has had to defer the initial AVDLR spares outfitting for F/A-18 and F-14D shore based support activities since November 97. [Ref. 46:p. 22]

The AVDLR reliability element. The AVDLR reliability element also impacts the O-D support concept. As discussed in the previous sections, logistics support requires thorough trade-off analyses be conducted to determine adequate life-cycle system support. To achieve this, PMs conduct LORAs to ensure that the appropriate logistics standards are established and met. During the LORA, effectiveness factors are evaluated to determine if the component under study is suitable for the O-D support concept. While it is beyond the scope of this thesis to determine the quality of these LORAs, current Fleet input anecdotally suggests that significant inadequacies in the LORA process exist and warrant additional research. One example that illustrates the burden of decreasing plane-side support for AVDLRs is the ARC-210 Radio.

Officially known as the AN/ARC-210(V) VHF/UHF/ECCM/SATCOM/ DATA LINK Airborne Communications System, the "ARC-210 radio" is a jam-resistant two-way voice and data communication link for the tactical aircraft environment. It features state-of-the-art design, surface-mounted technology, and modular construction. The ARC-210 system is the current Navy V/UHF standard for airborne communications systems and is being installed in all Navy, Marine, Air Force and Army tactical aircraft including, the F/A-18, V-22, AH-1W, MH-53, CH-46, B-1B, B-52, and UH-60.

The maintenance logistics plan for the ARC-210 was developed and initially fielded using the O, I and D maintenance support concept. O-level maintenance for the ARC-210 involves replacement of the entire radio, often called a Line Replaceable Unit (LRU) or more commonly referred to as Weapons Replaceable Assembly (WRA). Radio failures at the O-level are determined onboard the aircraft by using built-in test (BIT) software contained within the receiver transmitter. No external test equipment is used.

The BIT provides a "Go/No-Go" operational test of the ARC-210 and fault isolates to both the radio (WRA) and circuit card assembly, called a Shop Repairable Assembly (SRA). The I-level maintenance performs testing and diagnosis of failed radios using both the TS-4340 Radio Set Test Set, SG-1330 1553 Signal Generator Special Purpose Test Set and common general purpose test equipment. Finally, the Depot maintenance effort performs "piece-part" repair of WRAs and SRAs that are beyond the maintenance capabilities of the O-level and/or I-level activities. The Depot piece-part repair is done at the primary contractor's (Rockwell-Collins) facility. [Ref. 54]

The current depot repair cost for the ARC-210 is $640 per radio. This is the price paid under the current manufacture's warranty period for the radio. This warranty period expires in FY 2000. Post-warranty depot repair prices are being negotiated and, according to one source, it is estimated that the new depot repair price will be approximately $2000 per unit. [Ref. 55]

One of the first Navy aircraft to receive the ARC-210 was the F/A-18C (lot 16). To support these aircraft, ARC-210 radio I-level test equipment was procured and installed at a number of Navy and Marine I-level facilities. Shortly after procuring and installing this I-level test equipment, ARC-210 logistics managers decided to drop the I-level support. Instead, a direct O to D maintenance support policy for the radio was chosen. This policy was adopted as a cost-savings measure to reduce logistics support costs and because high reliability (MTBF) estimates for the radio suggested little need for I-level support. However, I-level activities that had received ARC-210 test equipment before the maintenance policy change were authorized to continue ARC-210 repair.

Failures for the ARC-210 have been higher than expected and a number of radios (where I-level was not available) have been sent to the depot (Rockwell-Collins) for repair. Feedback from the depot activities has indicated that many of the "failures" were a result of easily fixed aircrew operating errors and not actual radio component failures. Nevertheless, each time the radio is sent to the depot activity the funds to repair it are paid from the respective Air Type Commander's FHP budget. In an effort to curb expenses and minimize the readiness impact of the radios, CNAP logistics managers conducted a study of the radio ILS. In this study they discovered that many of the I-level activities, which had the test equipment, were able to correct these operator problems and return the ARC-210 to the squadrons thereby avoiding the $640 AVDLR depot level repair charge. To quantify the impact of this repair charge (as a result of not having sufficient I-level repair capability), the authors researched the number of repair actions for FY 97-98 performed by CNAP I-level (Navy and Marine) activities. The results of this research (see Table 4.4) show that of the 259 radios processed by CNAP I-level activities, 47% were either repaired or found to have "no defect". Therefore, by having I-level support for these radios, CNAP was able to save $78K in AVDLR repair costs.

	NO. RADIOS PROCESSED	NO. REPAIRED OR "NO DEFECT" DISCOVERED	NO. NOT REPAIRED
USN	115 ea.	78	37
USMC	144 ea.	44	100
Total	259 ea.	122 Cost savings to FHP $78,080	137 Cost $87,680

Table 4.4. ARC-210 Radio Repair Actions (CNAP) [Ref. 52]

While the AVDLR savings shown above are relatively small when compared to CNAP's overall FHP budget, the point worth noting is that the shifting AVDRL repair from the I-level to the depot in fact imposes an unplanned financial cost to the FHP budget and a decrease in Fleet readiness. Moreover, with increasingly more aircraft being supported by an O to D maintenance philosophy, these costs are becoming significantly more substantial and will continue to impact CNAP's FHP budget. In summary, when the appropriate plane-side maintenance and spares support are not provided, decreased readiness, aircraft cannibalization and increased AVDLR BCM costs will result. If this problem is to be solved, the APN-6 spares funding account must be sufficiently resourced and comprehensive LORAs must be conducted. Otherwise, affordable and optimal readiness repair and logistics support objectives will not be realized.

4. AVDLR ILS Deficiencies and Component Reliability

Another AVDLR factor that causes FHP underfunding for CNAP is inadequate AVDLR ILS support and AVDLR parts reliability. This section explains how ILS deficiencies occur and provides examples of how this impacts the FHP budget.

Much of the AMSR working group research has been focused on the decreasing logistics support for AVDLRs and the increasing rate in which AVDLRs are "BCM'd" from the Fleet to the depots. The AMSR group has noted that in many cases the ILS for AVDLRs is "lost" once the systems are fielded or that the ILS for some AVDLRs is missing or "imbalanced" when aircraft systems are initially deployed. This inadequate ILS results in materiel shortages, fewer mission capable aircraft and increased AVDLR expenditures. The AMSR found numerous examples of newly fielded systems that reached "Initial Operating Capability" (IOC) without adequate ILS. The consequences were, extended system down-time, and low operational availability that resulted in cannibalization and increased AVDLR repair costs to the Fleet. One continued source driving AVDLR ILS deficiencies has been the problem of not achieving initial engineering estimates for system reliability (MTBF). As explained earlier, the logistics support plan is based upon reliability estimates for each component. When these reliability estimates are not achieved, inadequate logistics support results. Furthermore, these lower reliability figures are not updated into the AVDLR ILS elements as a means to provide additional support in lieu of decreased reliability. To demonstrate the cost impact of poor AVDLR reliability, and MTBF rates; three top CNAP Fleet readiness degraders were researched: the AV-8B main landing gear (MLG), the F/A-18 MLG, and the P-3 propeller. As shown in Table 4.5, the actual MTBF for these components is far less than planned. As a result, CNAP I-level activities have had to BCM the number of failed components, incurring expensive depot repair costs that were not budgeted in the FHP.

AIRCRAFT COMPONENT	PLANNED MTBF	ACTUAL MTBF	PERCENT ACHIEVED	NO. OF BCM	TOTAL REPAIR COST
AV-8B MLG	640 hrs	265 hrs	41.4%	36 FY97-98	$954,030
F/A-18 MLG	1650 hrs	456 hrs	27.6%	110 FY96-98	$1,380,760
P-3 Propeller	1075 hrs	669 hrs	62.2%	122 FY96-98	$7,471,380
					$9,809,170

Table 4.5. Planned vs. Actual MTBF [Ref. 46, 52, 56]

To further illustrate the finacial impact of poor AVDLR component reliability, two additional examples are provided, the F/A-18 engine and the F/A-18 radar. Since the initial deployment of the F/A-18, many of aircraft's F-404 engine components have experienced a significantly shorter operating service life (MTBF) than was engineered and implemented into the ILS package. Four of the engine's six modules have experienced reliability reductions of 40% [Ref. 46:p.25]. As a result of low F-404 engine MTBF, F/A-18 aircraft readiness has decreased significantly, and at times, the F/A-18 engine bare-firewall count has totaled over 120 engines within CNAP's assigned F/A-18's. Furthermore, this decrease in reliability has imparted large financial costs to CNAP's FHP. One recent example that illustrates the magnitude of this cost to the FHP, has been the F404-GE-400 Power Plants Bulletin 90. PPB 90 is being implemented to repair premature engine failures caused by the High Pressure Turbine (HPT) Forward Cooling Plates (FCP). Initial NAVAIR estimates have projected 155 engines will require this repair at the I-level. Of these 155 engines, 54 belong to CNAP activities. The cost to repair each engine will be $163,000. Hence, the total impact of this repair cost to CNAP's FHP is $8,802,000 ($163,000 per engine * 54 engines). Moreover, the recovery period to repair the defective engines is estimated at 15 months [Ref. 57]. Clearly, unplanned failures of this magnitude result in decreased F/A-18 aircraft readiness and degradation to the FHP budget.

The last example to illustrate ILS deficiencies is the F/A-18 APG-73 radar. The APG-73 radar replaced the APG-65 radar beginning with delivery of F/A-18C lot 16 aircraft in 1996. Sufficient ILS for this radar was not put in place prior to the initial delivery and has continued to lag behind the repair requirements needed to support the radar system in the Fleet. The radar ILS has been particularly deficient at the I-level supporting activities. The primary I-level test bench designed to repair the radar is the Consolidated Automatic Support System (CASS). Upon initial delivery of new F/A-18s with the APG-73 radar, the CASS test bench and supporting Test Program Sets (TPS) to troubleshoot and repair the radar WRAs and circuit card SRAs was still under development and not available to the I-level. While spare APG-73 SRAs were purchased to support I-level repair of the WRAs, they were effectively useless since the CASS test bench and associated TPS needed to trouble-shoot the WRAs were still under development. As a result, stopgap repair measures were put in place. These measures consisted of contract repair efforts provided by the Aviation Repair Facility (ARF), a NAVAIR funded activity, at the two primary F/A-18 air stations, NAS Lemoore, and NAS Cecil Field. While the total cost of the ARF's operations to repair the APG-73 is unknown, this begs the question as to what other Naval Aviation Program(s) received funding offsets to pay for the ARF's operations and the principle ILS deficiencies of the radar. It also stands to reason that the lack of sufficient ILS for the APG-73 radar continues to drive extensive BCM actions and places further burdens upon CNAP's FHP.

ILS and component reliability shortcomings for both mature and new AVDLR systems have been a principal underlying cause of poor aircraft readiness and FHP underfunding. The ILS system must be "kept in balance" by conducting periodic reliability updates and assessments that include Fleet feedback of ILS effectiveness. One proposal by the AMSR is to implement an AVDLR component serial number tracking system. Under this concept all AVDLRs, not just life limited components, would be tracked for their MTBF to provide a quantitative measure of reliability and as a means to identify likely candidates for reliability improvements [Ref. 46:p. 54]. To conclude, component reliability improvement processes and a continued emphasis placed on quality ILS development and effectiveness once the system is fielded, will result in higher weapon system operational availability, provide for better use of maintenance resources and minimize FHP budget shortages.

5. AVDLR Pricing Factors

As noted earlier, AVDLRs make up over half the total FHP costs and they have been increasing since 1991. Furthermore, according to the AMSR's research, the Top 50 AVDLR cost drivers make up a disproportionate amount of the total AVDLR costs charged to the Fleet [ref. 46:p. 54]. Studies support this trend and show that AVDLR costs, as a percent of the FHP, have risen 44.29% in FY 92 to 51.38% in FY 97, despite a decreasing number of flight hours flown. Although part of the increase in cost is due to poor reliability and deficient AVDLR ILS, the complete explanation for this trend is not well understood. In an effort to understand the rising costs of AVDLRs, a number of extensive studies have been conducted by the AMSR, and the Naval Center for Cost Analysis (NCCA). There is an ongoing effort by the Navy Audit Service as well. Despite these research efforts, the most fundamental unanswered question remains: Why are the prices of AVDLRs going up?

Therefore, the purpose of this section is twofold. First, to provide an explanation of how AVDLR prices are formulated and second, to focus on some of the principle factors that cause AVDLR price variability and price increases. This section begins with AVDLR pricing methodology.

a. AVDLR Price Formulation

The manner in which AVDLR prices are calculated is perhaps one of most complex processes in Navy logistics and supply management. Pricing AVDLRs involves the work of dozens of DoD and DoN activities, countless inputs and variables, and is subjected to many of the same budget complexities and perturbations described in Chapter III. With this in mind, it is not surprising that AVDLR pricing methodology is neither well understood nor clearly articulated by any one person within "the business". Furthermore, there is no single element or function resident in the AVDLR pricing process that can readily account for the increasing trend in AVDLR prices. The fact remains that there is no simple answer. In reality, the increasing prices for AVDLRs are the result of combining many interrelated processes and elements that stem from policy decisions used throughout DoD. Before explaining some of these processes and how they affect AVDLR pricing, we first begin with a simple explanation of how AVDLR prices are formulated.

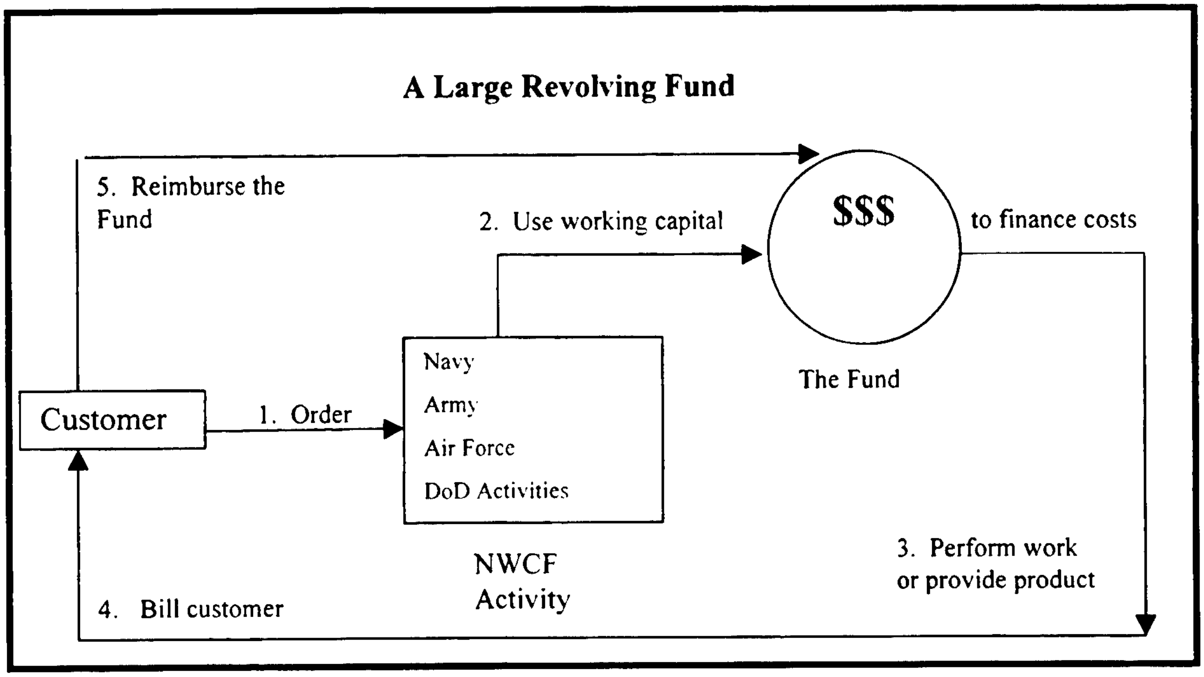

Figure 4.6. Navy Working Capital Fund [Ref. 4:p. N-23]

AVDLRs are financed under the Navy Working Capital Fund (NWCF), (see Figure 4.6). The NWCF is a revolving fund with two primary assets – cash and material. The goal of the fund is to operate very much like a commercial business. That is, to procure materials which customers need, stock these materials until required and use the cash received from the sales to pay for all operating costs and the replacement of materials. The primary difference between a commercial business and the NWCF is that the NWCF is not intended to make a profit, but rather to operate with the long-term objective of "breaking-even". Under the NWCF concept, the fund is reimbursed by the prices the users are charged to obtain services and materials. Users pay for these services and materials from their operating budget – the O&M, N account. There are two prices charged to the users, Net and Standard. The price the customer (Fleet) pays for each AVDLR it uses is contingent on whether or not the using activity returns an unserviceable AVDLR component, called a "carcass", in exchange for each AVDLR issued. Net price is the charge for an AVDLR when a carcass "turn-in" is made. Standard price is the cost if no carcass turn-in is made. Standard prices are typically higher than net prices because they include the cost of procuring a new AVDLR vice repairing the defective "turn-in".

Since the NWCF operates on a break-even concept, prices set for AVDLRs are subject to adjustments from year to year in order to recover the cost of operating gains and losses the NWCF may incur. This break-even concept is called "full cost recovery". Full cost recovery is obtained through the use of a "surcharge". The purpose of the surcharge is to simply recover the costs of operations that are experienced by the NWCF. All costs related to the delivery of the material or repair of AVDLRs performed by the NWCF are recovered in the surcharge pricing for that material or service. Hence, the surcharge is applied to every good or service the customer purchases from the NWCF. The surcharge is calculated by dividing the costs of operations over the cost of goods sold as depicted in Figure 4.7.

$$\frac{\text{Cost of Operations}}{\text{Costs of Goods Sold}} = \text{Surcharge \%}$$

$$\text{For FY 98: } \frac{\$1{,}299.8\text{M}}{\$\,2{,}258.8\text{M}} = 57.5\%$$

Figure 4.7. FY 98 Surcharge Rate [Ref. 58]

As the NWCF cost of operations or cost of goods sold varies from year to year, the surcharge rate will also vary to reflect these losses or gains in order to achieve a

Net Operating Result (NOR) of zero. A point to note is that there is a surcharge rate calculated for each Budget Project. The 57.5% rate shown above is actually the "composite" surcharge rate. In other words, it is the average surcharge rate for all Budget Projects. AVLDRs fall under two budget projects, BP-85P (procurement) and BP-85R (repairable).

One common question that comes up while studying the surcharge component of AVDLRs is: What is included in the surcharge? Since the NWCF is comprised of a number of DoD activities, there are an equal number of surcharge elements to represent those activities' operations and Cost of Goods Sold (COGS). While a complete list of all elements is beyond the scope of this thesis, the primary components that make up the NWCF surcharge are as follows [Ref. 58]:

- **Material Maintenance** covers inventory and carcass losses, obsolescence and depot washout.
- **Supply Operating Cost** pays for operating costs at the NAVICP and Fleet and Industrial Supply Center (FISCs).
- **Payments to Others** goes to Defense Logistics Agency (DLA), Defense Activity Addressing System Office (DAASO), Defense Finance and Accounting Service (DFAS), JLFSC and Defense Reutilization and Marketing Service (DRMS) for services.
- **Defense Management Review Decision (DMRD) Savings** are surcharge offsets that allow the customer to benefit from savings through reduced material costs; i.e. purchases from one year to the next.
- **Navy Cash Requirement** recoups cash to maintain financial solvency for the fund.

In addition to the NWCF break-even objective, the NWCF also has an objective to maintain stabilized surcharge rates. The surcharge rates the customers pay are established at the beginning of the year and remain "fixed". The rates charged for the services are based upon the NWCF portion of the President's Budget. The primary objective of stabilizing rates is to "shelter DoD customers from wide price variances due to cost escalation (inflation) as compared to budgeted prices" [Ref 4:p. N-17]. In other words, this is done to help formulate budgets and compensate for the differences between pricing assumptions made in the previous year's budget and the actual costs incurred during the year. This stabilization element is referred to as the Value of Annual Demand ("VAD") but also commonly known as the "Annual Price Change" (APC) or "Rate Change".

The purpose of the VAD/APC is in essence an escalation rate to adjust the OP-20 budget for net changes in anticipated individual AVDLR component demand and prices. In simplest terms, the VAD/APC is the difference of surcharge for AVDLRs from one year to the next and represents total forecasted customer cost change for the coming year. The use of VAD/APC is to "balance" or "adjust" the OP-20 in response to the VAD/APC rate (total cost impact), in the customers account. The VAD/APC is calculated as follows:

$$VAD\ /\ APC = \sum_{x=k_1}^{k_n} P_x D_x$$

Where
k = Individual Supply System Items
n = Total Number of Supply System Items
P = Price of Item to Fleet Customer
D = Demand *Forecasted* by NAVICP for That Item

$$\text{VAD/APC Escaltion Rate} = \frac{\text{VAD Comming Year}}{\text{VAD Current Year}}$$

Figure 4.8. VAD/APC Calculations [Ref. 59]

The way in which the VAD/APC "balances" the OP-20 budget account is best explained by the procedures used to develop it. During budget formation, the

NWCF entities, such as NAVICP, construct their budget submissions during early spring and submit these budgets to their Management Commands (similar to a Major Claimant). These budget submissions contain NAVICP's projected sales requirements for the wholesale/retail level of materials and services that they plan to buy in support of Fleet operations for the upcoming year. These budgets also contain the proposed surcharge rates. During May/June these budgets are reviewed and adjusted, and finally submitted to FMB and OSD in September. OSD reviews the NWCF budgets and makes adjustments to the surcharge up until December, at which point they are incorporated into the President's Budget for submission to Congress. At the same time the NWCF budgets are submitted, so too are the Navy "customer" budgets, i.e. OP-20. For example, the OP-20, developed during budget formulation is adjusted by the standard OSD(C) published inflation guidance. However, the OP-20 budget does not factor in the NWCF surcharge rate into their budget, because the rates are not yet approved or available. Since the NWCF surcharge rates are not available to the customer, a procedure to "balance" the customer budget is made. This is the purpose of the VAD/APC. When the final surcharge rates are approved, the VAD/APC escalation rate is calculated. After the VAD/APC escalation rate is calculated it is compared to the customer's submitted budget and FMB makes an adjustment or "balance" to the customer account to reflect the new NWCF surcharge rate that the customer will be charged. In recent years, this has meant that additional funding was added to customer accounts. To provide a historical perspective of the surcharge and VAD rates, and demonstrate the variability from year to year, a display of AVDLR rates for procurement (standard price) and repair (net price) are shown in Table 4.6.

FY	RATE	85P AVIATION PROCURMENT	85R AVIATION REPAIR
FY 95	Surcharge	56.6%	36.2%
	VAD/APC	5.7%	28.3%
FY 96	Surcharge	23.8%	14.5%
	VAD/APC	-21.6%	-21.6%
FY 97	Surcharge	27.6%	27.9%
	VAD/APC	5.7%	5.7%
FY 98	Surcharge	55.7%	56.2%
	VAD/APC	24.7%	24.7%
FY 99	Surcharge	47.8%	-3.6%
	VAD/APC	42.8%	-3.6%

Table 4.6. AVDLR Surcharge & VAD/APC Rates [Ref. 60]

One point to note, is that for FY 99 the AVDLR VAD rate was –3.6%. This means that prices for the FY 99 market basket of AVDLRs were slightly less (96.4% [or 3.6% less]) than the prices represented in the FY 98 market basket.

The last step of the AVDLR pricing process is called "The Annual Price Update" that occurs in late spring when NAVICP updates the prices for AVDLRs. The details of the process are complex, though essentially, the goal of this process is to set the prices for the entire market basket of AVDLRs, which was projected during the earlier budget process. This is achieved by making minor surcharge increases or decreases within the market basket of AVDLRs in such a way that the overall price is inline with the approved VAD/APC that is "locked" into the customer and President's Budget. Using the locked VAD/APC ensures the prices of AVDLRs match the funds budgeted in the customer account.

b. Factors That Cause AVDLR Price Fluctuation (Variability)

Many of the problems that account for AVDLR cost increases are a direct result of the "backwards looking" process in which Navy budgets are formulated. As explained in Chapter III, one major limitation during the formulation process is the use of historical data to build and project future budget requirements. In a dynamic and unstable environment such as Naval Aviation, this type of process will not accurately capture the changes (in customer requirements) that take place from year to year. The purpose, therefore, in this section is to show some of the specific factors and variables that bring about an unstable environment and the resulting AVDLR price fluctuation and FHP underfunding. These factors are "AVDLR Demand Forecasting" and the "NWCF Surcharge".

(1) **AVDLR Demand Forecasting.** Determining customer annual demand for AVDLRs is extremely complex and problematic in that the forecasts for "projected sales" are made as much as two years in advance of execution. NAVICP uses a number of inputs to determine the projected sales for the represented market basket of AVDLRs. Inputs include quarterly historical usage of AVDLRs based upon both filled and unfilled supply requisitions, NADEP forecast inputs, which include expected repair prices, called the Component Unit Price (CUP), commercial depot repair costs, and AV3M AVDLR utilization data. These inputs are combined in a computer-modeling program to annually forecast the prices for all 70,000 AVDLR line items. Since demand-forecasting for AVDLRs is a "scientific guess" based upon historical data and programmatic changes, the quality and accuracy in which these inputs to capture Fleet demand is paramount. As noted in the VAD/APC analysis, when demand is forecasted for the next year, the expected money value of the anticipated demand is compared with the previous year resulting in a delta to the existing funding stream which will produce either a bill or savings. Since the prices for AVDLRs are "fixed" for the execution year the only variable is demand. This presents three possible demand-forecasting outcomes:

- *Perfect Forecasted Demand.* When the demand forecast is perfect, the Fleet's account is adjusted perfectly and they purchase exactly what was predicted and the system is in equilibrium.
- *Forecasted Demand is Less Than Actual.* If the demand forecast is less than actual demand, the Fleet's account is underfunded and they seek mid-year relief. Additionally, the NWCF's sales base is decreased resulting in a higher surcharge and higher AVDLR prices the following year.

- *Forecasted Demand is Greater Than Actual.* When the demand forecast is greater than actual demand, the Fleet's account is overfunded and capital investment opportunities such as, fleet modernization, are lost. OPTAR holders spend the excess funding (perhaps wastefully) and the NWCF is left with surplus materials or services. For the NWCF, this results in a lower surcharge (spread over the larger sales base) and lower AVDLR costs, but also an increased debt due to insufficient sales. Therefore, the impact in the following year, is a higher surcharge rate and an increase in AVDLR prices. [Ref. 61]

Perhaps the biggest problem with current AVDLR forecasting stems from the fact that demand requirements for AVDLRs are understated in budget formulation. Critics would perhaps argue that the demand is "perfect" since it matches the funds budgeted. Yet, the fallacy with this argument is that the Fleet spends every penny provided. So the real question in measuring demand-forecast accuracy is, "Did the Fleet get enough money to buy what was needed?" The answer is "No", since every year from FY 95 there has been a multi-million dollar AVDLR bow-wave. [Ref. 62] Thus the Fleet buys the budgeted forecast but the demand is understated. Furthermore, the problem is compounded and perpetuated every year because the forecast methodology is backwards-looking in that the requirement is stated based upon what was spent in the previous year rather than what will be executed in the new year.

Another fallacy in the AVDLR forecasting method is the notion that the AVDLR market basket accurately captures (represents) Fleet demand. Proponents of this theory suggest that the small changes in the VAD/APC (as seen in FY 97 and FY 99 AVDLR Repair account) support their assumption that the AVDLR forecasting method currently used is effective. However, enormous AVDLR price variability seen in individual NSNs from one year to the next shows otherwise. This variability is not readily apparent to the casual observer. The reason being is that the variability of individual components becomes lost during the AVDLR pricing process. In the pricing process, nearly all 70,000 AVDLR line items are averaged together in order to apply an aggregate surcharge rate to the entire AVDLR market basket. This process however, obscures individual AVDLR line item price increases and/or decreases. In statistics, this phenomena is known as the law of large numbers. This theorem states that within a given population, individual outcomes may have a wide range of values from extremely large to small. "Statistics for Business Managers" explains this theorem as follows:

> If an extreme value falls into the sample, although it will have an effect on the mean, the effect will be reduced since it is averaged in with the other values in the sample. As the sample size increases, the effect of a single extreme value gets even smaller, since it is being arranged with more observations. [Ref. 63:p. 263]

Hence, while on the surface AVDLR prices may seem reasonable, within any given sample there may be large price swings from one year to the next. See Appendix B for an illustration of individual AVLDR price variations.

Additional factors that can affect the accuracy of demand-forecasting and price variance include budget lag-time, Fleet modernization, data and information quality, AVDLR reliability, an unstable operating environment, and insufficient accounting systems.

Budget lag-time is perhaps the most significant problem in accurately forecasting AVDLR demand and pricing. In the case of AVDLRs, NAVICP has to develop the Fleet's demand as early as two years ahead of the execution year. Furthermore, AVDLR budget inputs are based upon 1-2 year old AVDLR execution data. Given that there is no method in budget formulation to account for dramatic yearly changes due to variances in AVDLR reliability, shifting maintenance philosophies, Fleet modernization efforts, bow-waving and changing mission requirements, it is not surprising that AVDLR prices fluctuate greatly from year to year.

Efforts to modernize the Fleet are another source of AVDLR demand-forecasting instability. Throughout the year, the procurement and logistics support chain seeks to introduce new T/M/S aircraft, ECPs, LECPs, and other modifications which affect the market basket of AVDLRs. The problem, is that there is no method to systematically incorporate and synchronize these changes and associated costs (to the Fleet) into the OP-20. For example, an Operational Safety Improvement Program (OSIP) often puts a more expensive part into the logistics system and takes a less expensive part out. By looking backwards, the FHP is based upon the cheaper part, which incorrectly reflects the requirement and Fleet demand.

One possible solution to account for modernization would be to add a mechanism in the FHP OP-20 development to incorporate all known modernization issues such as OSIPs and LECPs. Such a mechanism would require a consistent and accurate centralized database that will consolidate all investment costs and provide a process to integrate them. Such a database must link together all ongoing and future modernization initiatives between NAVICP, NAVAIR Program Offices, NAVSUP, NADEPs, and Fleet, and construct a more accurate AVDLR market basket. Unfortunately, there is currently no such database system.

Critics might suggest that the AV3M system is capable of linking together all modernization initiatives, but as noted earlier, there are far too many inconsistencies within the AV3M system to accomplish this. Specific AV3M problems relative to forecasting AVDLRs include; a 90 day-lag period to receive reported data, limited reporting of Fleet cannibalization actions, lost or incomplete data, no capability to track AVDLR failure rates (MTBF) by serial numbers and a general inability to assess deficient AVDLR ILS. One solution to overcome these AV3M problems is implementation of the new "Optimized NALCOMIS" database. This system is currently under development and is specifically tailored to address these problems. When online, it will successfully integrate and link together all key AVDLR pricing, ILS, and modernization programs and their respective management activities.

The next factor that causes poor AVDLR demand forecasting is AVDLR reliability and failure rates (MTBF). AVDLR reliability was discussed earlier as a primary cause of ILS deficiencies. Equally important is the significant affect that AVDLR reliability has on demand-forecasting. The current AVDLR demand-forecasting approach utilizes algorithms, allowance models, and maintenance philosophies based upon failure mode analysis data an advertised MTBF of "X hrs". However, empirical data indicate a much lower MTBFs for certain components. Table 4.7 demonstrates this disparity between advertized and actual MTBFs for two AVDLR items. Lower MTBFs subsequently drive higher than anticipated number of failures, which in turn drives a higher than projected number of BCM actions, which contrinbute to increased FHP costs.

Component	Provisioning MTBF	Current MTBF	Data Source
P-3 propeller	1,110 hrs	669 hrs	P-3C Readiness Analysis Team
F/A-18 Trailing Edge Flap Actuator	6,000 hrs	500-550 hrs	NAVICP

Table 4.7. Component MTBF [Ref. 46:p. 56]

Another factor that causes variability in AVDLR pricing and FHP budgeting is the unstable aviation operating environment. As much as NAVICP tries to accurately determine Fleet AVDLR needs for the upcoming year, their demand-forecasting process is done two years before execution. This is far too much in advance to capture all the ongoing changes in the DoD's operating environment. On one hand, if the Fleet operating environment were in fact stable, the current demand forecasting process would provide consistent results. However, consistent demand-forecasting for AVDLRs is extremely difficult to obtain given the magnitude of changes that occur from year to year in the Navy Flying Program. As a result, of these changes and the inability to forecast them, the Fleet may need more parts or different parts than predicted. Some of the changes in the operating environment that produce instability and variability in demand-forecasting include:

- Depot closures and work force consolidation – loss of expertise
- Increased commercial repair endeavors

- Repair part obsolescence
- Diminishing vendor sources
- New equipment and new items not reflected into FHP price methodology (lag effect)
- Changes in maintenance philosophy not readily incorporated into budget process
- Budget reprogramming decisions made before and during execution
- Higher airecraft utilization due to mission changes
- Decreased O to I repair – shifting "plane-side" ILS
- Not incorporating the AVDLR bow-wave costs in the budget forecast
- A limited number of AVDLR repair observations at the depot in which to base the repair prices on

One final factor that contributes to the inaccuracy of demand-forecasting and price variability is the ineffective accounting system used in DoN. Although it is beyond the scope of this thesis, current DoD accounting systems do not accurately measure and/or link funds spent to the level of readiness achieved. Under the present system it is very difficult to determine what the actual costs of components are, and what is included in those costs. Moreover, it is nearly impossible to assess those cost to any measure of achieved readiness for a T/M/S aircraft. Ideally, the repair costs of AVDLRs should be passed on to the user, though this is not the current practice. Instead, much of costs associated in repair, are lumped together (by use of a surcharge) making it extremely difficult to determine who used the component, what it cost, and how did it impact mission capability.

In conclusion, accurate AVDLR demand-forecasting is contingent on an accurate market basket of AVDLRs, as well as procedures that will identify all inputs that affect current and future AVDLR demand. If not, AVDLR forecasting will continue to fall short of the Fleet's needs and cause further FHP underfunding.

(2) **NWCF and Surcharge Rate.** The fact that the surcharge rate changes are "balanced" for the customer's account suggests that the surcharge itself is not problematic. However, increases in the surcharge rate (Figure 4.9) represent inefficiencies in the operations of the NWCF and contribute to the overall cost increases experienced for AVDLRs. The three principle problems with the surcharge and the NWCF that create AVDLR price variability are; 1) Decreasing Customer Base, 2) Conflicting Priorities, and 3) Surcharge Offsets.

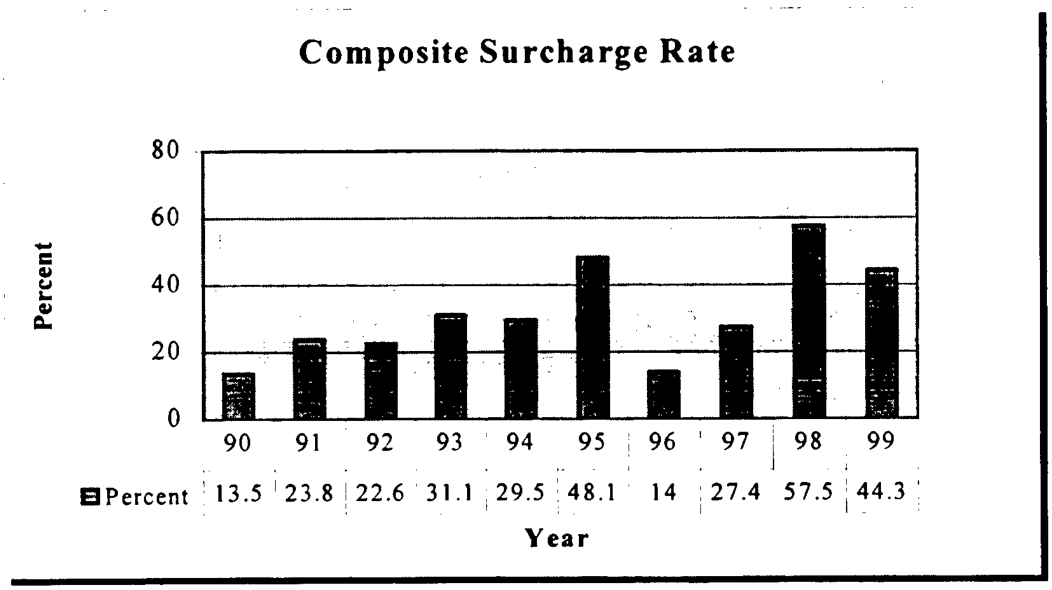

Figure 4.9. Composite Surcharge Trends [Ref. 58]

Decreasing Customer Base. Under the NWCF unit cost system, budgets and costs projections are based upon the estimated outputs or work units. If the projection is not realized, then NWCF expenses could exceed its revenue and result in an operating loss. As the surcharge rate increases to recover these operating losses, the customers seek cheaper alternative sources for services and thereby, cause the prices to climb higher, because the WCF has to spread their fixed costs and overhead over a smaller revenue base. This process continues until the activity eventually goes out of business. This effect is called the "Death Spiral" of Demand. [Ref. 4:p. N-4] The "Death

Spiral" concept is becoming a big iussue, particularly as the Navy re-engineers it's logistics supply chain to become more efficient. As the Navy increases the use of programs such as LECPs, Direct Vendor Deliveries (DVDs), and Contractor Logistics Support (CLS), the impact on the NWCF is lost revenue, which may result in a higher surcharge for AVDLRs. Figure 4.10 depicts this revenue reduction effect.

	FY 98	**Surcharge**	**Total Costs**	**Change in Cost**
Cost of Operations / Cost of Goods Sold =	$1,299.8M / $2,258.8M =	57.5%	$3,558.6M	
Cut Ops Costs 20%	$1,039.8M / $2,258.8M =	46.0%	$3,298.6M	-7.3%
Reduce Cost of Material 20%	$1,299.8M / $1,807.0M =	71.9%	$3,106.8M	-12.6%

Figure 4.10. NWCF Revenue Base Reduction [Ref. 58]

Conflicting Priorities. Another problem with the NWCF that has an impact on the price of AVDLRs is the effect of conflicting priorities imposed upon the NWCF. Conflicting priorities often result in an increase in the surcharge rate to the customers. These conflicting priorities include:

- Generating enough cash to maintain the required 7-10 day "cash balance" in the NWCF corpus.
- Improving NWCF operation efficiency as ILS moves toward CLS, DVD support concepts (7% decline in Sales base experienced FY 97).
- Implementing DoD policy decisions *not* associated with Navy Supply Management costs ($300M in unrelated Supply Management costs affected the rate in FY 98).

- Supporting LECP buy-in decisions despite eroding customer APN-6 buy-out account funding and increasing surcharge. The NWCF is "left holding the bag" because the customer can't pay for the LECPs. Therefore, the NWCF has to recover these disbursements through a higher surcharge, because they didn't "make the sale". Fewer sales result in an increased surcharge the following year.

Surcharge Offsets. Perhaps the most significant factor in why the surcharge causes AVDLR price variability and underfunding, is that the funds used to "balance" the customer's budget for any surcharge rate increases must be offset at the expense of other programs in the budget. In the case of AVDLRs, offsets can result in hundreds of millions of dollars shifted from other programs that effect FHP underfunding especially when offsets are taken from AVDLR cost-saving programs such as LECPs or ECPs. [Ref. 64]

Finally, the effect of the surcharge and the policies of the NWCF, result in unintended consequences which contribute to the "Death Spiral". Specifically, the Fleet will continue to explore all possible avenues to maximize their budgets and minimize the high costs associated with doing business with the NWCF. The key to minimizing this effect, is to stabilize the surcharge rates from year to year, which then allows the Resource Sponsor to budget with a higher confidence without sub-optimizing the Navy supply system. This can be achieved through better accounting of expenditures, accurate overhead pricing and allocation to the customer, and the removal of conflicting priorities that currently burden the NWCF system.

In summary, a great deal of confusion in AVDLR pricing stems from the complexities of AVDLR demand-forecasting, the NWCF surcharge, and the process of pricing and balancing the Fleet's AVDLR FHP account. Moreover, when these complex factors come together, they create a synergy, which tends to contribute to a less than precise method of properly matching costs to requirements and ultimately compromises Fleet readiness. With further study, a clearer understanding of terms, processes, and the use of a common strategy among all key players, may help avoid the confusion and minimize the conflicting interest and thereby enhance the ability to understand and manage the process with more precision and effectiveness.

6. Effects of AVDLR Underfunding at CNAP

Throughout this chapter a number of topics such as LECPs, aircraft configuration management, ILS changes and AVDLR component reliability were analyzed to assess their impact upon CNAP FHP underfunding. This section highlights some additional impacts on CNAP and the Fleet caused by AVDLR underfunding and insufficient ILS. The most visible effect of FHP underfunding during execution at the TYCOM level is manifested by AVDLR bow-waving, aircraft cannibalizations and Unfilled Customer Orders (UCOs).

a. AVDLR Bow waves

The AVDLR bow wave is the most apparent symptom of recent FHP underfunding. As discussed earlier, the practice of bow-waving AVDLRs has been used since FY 93 as an all-to-frequent strategy for the Fleet to execute the FHP due to insufficient funding. Bow-waving has a tremendous effect on Fleet readiness and creates several serious problems. The first problem is that bow-waving represents an inefficient use of funds. Once the new fiscal year begins, all AVDLR requisitions that were deferred pending new TOA, are often subjected to an increased surcharge rate. The effect of an increased surcharge rate results in millions of dollars wasted that should have been used to execute the current year's FHP. Additionally, bow-waving puts the war fighting capability decisions into the hands of the logistics support chain instead of the operational commanders. This happens because bow-waving decisions are driven by the funds available to the individual supply departments and CNAP logisticians. Hence, the logistics support chain is forced to make critical funding and prioritization decisions as to which AVDLR components will be repaired and thereby, drive and ultimately determine the war-fighting capabilities of a unit, ship or air wing. Lastly, bow-waving creates excessive management oversight and, although difficult to measure, has a direct effect on unit moral, pilot/aircrew training, aircraft maintenance expertise, and a potential affect on aircraft operational safety.

b. Aircraft cannibalization.

Another effect of underfunding AVDLRs is aircraft cannibalization. In the face of underfunding and lack of readily available AVDLRs, squadrons and I-level activities have little choice but to cannibalize engines, avionics and airframe components as the only means to repair aircraft and achieve unit and air wing operational training goals. Cannibalization creates several problems including; increased maintenance workload, increased risk of damage to aircraft components, and the potential increase of aircraft mishaps. Moreover, cannibalization actions are viewed as culturally unacceptable practices within the maintenance ranks despite the frequency of occurrence.

Throughout the AMSR study, the Fleet has maintained that they have to increasingly cannibalize aircraft components to meet operational goals. Table 4.9 in fact shows an upward trend in cannibalizations and supports the Fleet's assertion that cannibalization has increased. This table shows that the 2nd Marine Air Wing (MAW) experienced an increased cannibalization rate (per hundred flight hours) for all operated T/M/S aircraft from FY 93 through FY 97.

USMC – SECOND MARINE AIRCRAFT WING FY 93 – FY 97 CANN/100 FLIGHT HOURS						
Aircraft	EA-6B	F/A-18C	AV-8B	CH-53E	AH-1W	CH-46E
FY 93	10.9	3.8	3.8	5.3	2.8	
FY 94	3.5	6.4	8.7	3.5	8.6	3.1
FY 95	7.3	4.5	6.9	3.3	8.4	4.3
FY 96	13.1	7.6	8.4	3.6	10.4	6.3
FY 97	13.8	10.1	11.8	6.6	9.9	6.1

Table 4.8. 2nd MAW Cannibalization (Data Source: AV3M) [Ref. 46:p. 41]

Though Table 4.9 shows increased cannibalization rates for the 2nd MAW, the author's research indicated that CNAP's Fleet-wide "documented" cannibalization rates do not show as dramatic an increase. One-reason that cannibalization rates for CNAP have not increased as significantly as the Fleet suggests is due to the aforementioned cultural pressures to not cannibalize aircraft components. Therefore, when cannibalizations take place, there is often a conscience decision made not to document them. In addition to the cultural problems, the cumbersome and time consuming paperwork to document cannibalizations combined with input limitations of the legacy NALCOMIS database system, further skew the actual number of cannibalizations the Fleet performs. Although it is difficult to measure the actual number of cannibalizations performed in the Fleet, all cannibalizations result in added work, man-hours and increased use of consumable materials, "wasted" in the component removal and installation process. One example that illustrates man-hours associated with cannibalizations was shown in MAG-16. AMSR research showed that MAG-16 reported 1,544 cannibalization actions, which used 7,508 man-hours in FY-97. This equates to 750 unfunded man-days to perform this additional maintenance [Ref. 46:p. 41]. While total dollar costs of cannibalizations are impossible to quantify, clearly, in an environment of limited funds and personnel shortages, cannibalization actions will have a large impact on a unit's mission readiness, and war fighting capability. The last impact on CNAP and the Fleet caused by AVDLR underfunding are Unfilled Customer Orders (UCOs).

c. *Unfilled Customer Orders (UCOs)*

Due to budget shortfalls, CNAP has frequently engaged in "cash flow" transactions to sustain flying operations through the fiscal year. Bow-waving was one of these activities, the other is Unfilled Customer Orders (UCOs).

As noted above, the UCOs are a cash flow generating strategy in which the Fleet administratively cancels (de-obligates) outstanding requisitions for AVDLRs to recover the cash as a means to pay for more urgent requirements. This strategy is a mechanism used by CNAP to achieve the 83% PMR goal and prevent over-obligation of budgeted FHP funds. The catch is that under the agreement between CNAP and NAVICP, all requisitions cancelled must be re-ordered within 45 days after the new fiscal year. This caused additional underfunding for CNAP when they used the strategy in FY 97. During FY 97, select CNAP activities were directed to administratively cancel all outstanding requisitions and provide the recouped funds to CNAP, so that these funds could be reprogrammed to meet higher FHP execution priorities. Table 4.10 shows the total amount of these UCO cancellations by activity for FY 97:

ACTIVITY	AMOUNT
USS KITTY HAWK	$4.1M
USS VINSON	$12.2M
USS LINCOLN	$2.8M
3RD MAW	$17.7M
TOTAL	**$36.8M**

Table 4.9. CNAP UCO FY 98 [Ref. 65]

The risk associated with this strategy is the potential impact of incurring higher costs in the next FY because of an increase in the surcharge. This happened to CNAP in FY 98 when they were required to purchase the cancelled requisitions at a significantly higher surcharge rate of 57.5% vs. 27.4% from FY 97. As a result of this higher surcharge, the CNAP FHP budget for FY 98 incurred a net loss (and additional underfunding) of $8M. In summary, the UCO strategy is another example where CNAP was forced to conduct creative financing to execute the underfunded FHP budget in FY 97.

This completes the discussion of the FHP AVDLR cost component. The purpose of analyzing AVDLRs and their associated problems was to chronicle and illustrate the impact of this highly variable and poorly understood cost component upon the rising FHP costs and CNAP FHP underfunding. Furthermore, it was pointed out there are many visible symptoms and causes of increasing AVDLR prices that directly effect FHP underfunding. The principle factors that cause increasing AVDLR cost growth and prices increase are principally, poor component reliability, ILS deficiencies, insufficient readiness reporting metrics, the NWCF surcharge and demand-forecasting shortcomings. The next section of this chapter analyzes the affect of the Marine Aviation Campaign Plan on the CNAP FHP and the affects of reprogramming decisions and unfunded requirments.

G. MARINE AVIATION CAMPAIGN PLAN

1. Background

Another unplanned event in budget execution that resulted in CNAP FHP underfunding was the result of the *Marine Aviation Campaign Plan* (MACP), implemented in FY 97. In FY 97, the Marine Corps adopted a new approach for managing their allocation of FHP funds. Due to increased OPTEMPO, manning issues and aviation safety concerns a balance between maintaining operational and material readiness had become increasingly difficult to achieve. Further, the pursuit and attainment of Primary Mission Readiness (PMR) goals was causing increased costs associated with higher aircraft utilization rates. Hence, the Marine Corps Aviation Campaign Plan (MACP) was developed to achieve a better balance between resources and requirements. What follows is a brief overview of the MACP elements, which is necessary to understand how the plan contributed to CNAP FHP underfunding in FY 97.

The MACP was designed to "maximize" combat readiness, and improve the "health and strength" of Marine aviation [Ref. 66:p. A-1]. Since its inception, the MACP has been refined to focus on six core areas to achieve a better fit between resources and requirements. These six areas are 1) Aviation Manning, 2) Naval Aviation Time-To-Train, 3) Flying Hour Program (FHP), 4) Simulation, 5) Operations, Training and Readiness, and 6) Aircraft Material Condition. The most important element of the

MACP is the Flying Hour Program, which initiated a new sortie-based training approach for executing the FHP. The Marines believe that the sortie-based approach provides a better correlation to flying hour costs and is a better predictor of aviation readiness. The sortie-based philosophy focuses on the premise that the interval of flying is more important than the frequency of flying, with the overarching goals of ensuring that pilots and crews receive between 12-15 sorties per month, and that the FHP is executed within 2% of the sortie based projections.

Another key difference with the sortie-based approach is the emphasis on unit combat capabilities vice individual training goals. The previous focus of the USMC individual pilot capabilities that drove higher aircraft utilization, training OPTEMPO and flying hour support costs. In terms of readiness, the philosophy of focusing on unit combat capabilities is consistent with the argument presented by Stockfisch (1973) and Bassford (1988) that in, "peacetime, evaluation of unit performance should focus entirely on the unit's readiness to perform its wartime mission" [Ref. 34:p. 236]. Additionally, the focus on unit core competencies is intended to achieve cost efficiencies associated with flying fewer hours while still producing combat ready squadrons capable of achieving the "units" mission. The savings achieved by flying less (resulting from decreased fuel and maintenance consumption) is intended to facilitate investment in safety enhancements, maintenance improvements and simulation suites to augment pilot/crew training proficiency as a result of flying less hours. There is considerable debate within aviation communities whether flight simulation is an adequate substitute for actual flying time. This debate is beyond the scope of this thesis.

2. Source of CNAP FHP Underfunding

The Marine aviation organizations that fall under CNAP purview for budgeting and funding purposes are the 1st and 3rd Marine Air Wings (MAWS). Operationally these two MAWS report to the Commanding General, Fleet Marine Forces Pacific (FMFPAC). As noted above, the MACP resulted in unintended budgetary consequences for CNAP's FHP budget in FY 97. During this FY the Marines flew 29,089 hours less than what was budgeted for in the OP-20 (version 925). Flying fewer hours was consistent with the MACP strategy to achieve savings associated with flying less and to minimize the effects of excessive aircraft utilization. However, even with fewer hours being flown there was an increased cost to CNAP of approximately $13,296,973. This cost figure is derived by comparing the FY 97 budgeted funding level versus what the Marines executed for the year. The average aircraft cost per hour (CPH) also increased for the Marines by $391.65. The increased total cost and the increased CPH was attributed to two factors. The first component that contributed to the cost increase was increased maintenance spending to improve the safety and material readiness of the 1st and 3rd MAW aircraft. The second factor that contributed to the higher total cost was the fact that not all costs that constitute the aircraft CPH are variable. As explained in the NCCA analysis in Chapter III, the presence of fixed cost components within the CPH means that significant maintenance costs are incurred regardless of the number of hours flown. In other words, the savings associated with a decrease in flight hours do not occur at the same marginal rate. Recent FMFPAC statistical studies have confirmed this fixed cost phenomena. The FMFPAC analysis further concluded that the variable and fixed cost components are different for different T/M/S aircraft. One study of the AV-8B Harrier concluded that the fixed cost components were approximately 40% of the total CPH [Ref. 67]. The interesting result from the FMFPAC study indicated the fixed cost component was less than what the NCCA study concluded which was approximately 50% at the aggregate level. Other T/M/S aircraft analyzed such as the F/A-18 and CH-53, demonstrated a fixed cost component of approximately 20% [Ref. 67]. Both the NCCA and FMFPAC analyses will show the impact on the CPH when fewer hours are flown. When fixed costs are embedded into total costs, the resulting CPH is higher because there are fewer hours to spread the total cost over, (*CPH= Total Costs ÷ Total Hours Flown*).

The relevant data extracted from the CNAP FY 97 OP-20 and FHCR to show the cost impact are summarized below:

DATA SOURCE	FLYING HOURS	AVG. T/M/S COST PER HR.	TOTAL $
OP20(Ver925) (Budgeted)	200,938	$1860.00	$373,660,000
FHCR Sept 97 (Actual)	171,849	$2251.65	$386,944,000
Difference	29,089 ↓	$ 391.65 ↑	$13,284,000

Table 4.10. Effect of MACP Budgeted vs. Actual FHP Figures

In summary, the MACP contributed to the overall underfunding that CNAP experienced in FY 97 that was reflected in the $65 million bow wave generated in this year. While there is some debate over the full cost impact of the MACP, the relevant point for this analysis is that the MACP serves as an example of an unplanned or variable event that contributed to funding uncertainty for CNAP. The effect of the MACP is also manifested in subsequent year FHP underfunding. This effect was a product of the OP-20 forecasting methodology for the FY 98 and 99 budgets, in that the FY 96 execution data used as the basis, did not contain the increased cost per hour of $391.65. However, to correct this funding deficiency, the FYDP has been re-priced with FY 97 actual cost data, which captures the MACP cost increases [Ref. 44].

Some additional comments are needed to understand the future status of the MCAP. In the POM process the USMC has been able to reprogram money into the Aviation Procurement (APN-7) account to purchase additional simulators in accordance with MACP objectives and the "Simulation Master Plan". Additionally, the Marines FHP in the outyears has been plussed up to account for the higher CPH and flying hour requirements. Further analysis on the MACP sortie-based methodology and aviation simulation training is recommended in Chapter V. The next section analyzes some of the causes of CNAP underfunding related to reprogramming decisions and unfunded requirements.

H. REPROGRAMMING DECISIONS AND UNFUNDED REQUIREMENTS

1. Introduction

Frequently during budget execution there are investment opportunities and unbudgeted requirements that emerge from changing environmental conditions, such as modifications to missions and changes in technology. To respond to and take advantage of these changes and opportunities, Fleet Commanders may reprogram money between accounts. Reprogramming refers to moving money within an appropriation for purposes other than those for which it was originally appropriated by Congress. However, due to limited resource availability and a centralized DoD resource allocation process, it is often difficult for the military departments and Services to maximize emergent investment opportunities without contravening previous resource commitments. In the case of CNAP, resources budgeted for the FHP have been used to fund other emerging requirements and priorities. CNAP fiscal managers have reprogrammed FHP funds to properly resource other underfunded programs. The purpose of this section is to chronicle how recent reprogramming decisions and unfunded requirements have contributed to CNAP FHP underfunding. The section will conclude with an assessment of the impact of reprogramming on the budget and budget process.

2. Information Technology for the 21st Century (IT-21)

The Information Technology for the 21st Century initiative (IT-21) is a good example of how unfunded requirements and changing priorities can impact FHP funding for CNAP, in any execution year. First a brief overview of IT-21 is presented followed by a description of how the CNAP FHP was affected.

To expedite the implementation of IT-21 in fiscal year 1997, the Commander in Chief, U.S. Pacific Fleet (CINCPACFLT) decided to reprogram money from existing funding accounts into IT-21. IT-21 is an initiative originally developed by CINCPACFLT to leverage information technology to maximize Fleet warfighting capabilities. The IT-21 initiative is embraced by all Fleet Commanders and Navy Leadership. The concept essentially is a force multiplier intended to provide commanders with greater situational awareness, increased agility of command and improved information support. The following description of IT-21 is from the Navy Information Technology Home page:

> IT-21 is a customer-driven demand to modernize the Navy's C4I infrastructure...[and] is one of the Fleet's responses to adapt and develop new operational concepts in an ever-changing environment. The goal of IT-21 is to link all U.S. forces and eventually even our allies together in a network that enables voice, video and data transmissions from a single desktop PC, allowing war-fighters to exchange information that is classified or unclassified, and tactical or non-tactical. To do this we must build a system to industry standards, using commercial-off-the-shelf technology (or COTS), devoid of stovepipes, in a client-server environment that allows the pull of just what information is needed in a way that is seamless to the user in the field...The principle elements of IT-21 are Asynchronous Transfer Mode (ATM) local area networks (LANs) afloat and LANs/ wide area networks (WANs) ashore populated by state-of-the-art personal computers (PC). These networks integrate tactical and tactical support applications with connections to enhanced satellite systems and ashore networks. It will be supported by regional network operating centers and all elements will be Defense Information Infrastructure (DII) Common Operating Environment (COE) compliant [Ref. 68].

The IT-21 concept is clearly a superior warfighting initiative and wholly consistent with the information technology tenets articulated in the Joint Chiefs of Staff, *Joint Vision 2010*. However, as noted in Chapter III, the current programming and budgeting process is not capable of resourcing new and / or emerging requirements in the execution year. Therefore, an executive decision was made to reprogram $41 million from various CINPACFLT accounts to accelerate the implementation of IT-21. The amount reprogrammed from the CNAP Flying Hour Program was $27 million [Ref. 25]. The impact on the CNAP FHP was severe, since the FY 97 program was already underfunded due to not incorporating the bow-wave from FY 96 into the FY 97 budget forecasts, as noted earlier. The additional $27 million deficit contributed to further underfunding and a portion of the $65 million "bow-wave" generated in the same FY to achieve the targeted FHP readiness goals.

3. Naval Strike and Air Warfare Center (NSAWC)

Resourcing aviation training associated with the Naval Strike Warfare Center (NSAWC) in FY 96 and 97 is another example where flying hour program funds were used to pay for unfunded requirements that emerged during the execution year. Background information is provided on reprogramming decisions and the fiscal impact on CNAP is explained.

The decision to fund the NSAWC requirement was the product of a CNO Air Board decision in FY96 and 97. The Air Board consists of senior Naval aviation leaders from N-88, NAVAIR, the Safety Center and the TYCOMs. The Air Board generally meets quarterly to make decisions regarding Naval Aviation issues and priorities [Ref. 30]. Sometimes the resulting decisions have budgetary consequences that affect current execution year budgets, as in the case of NSAWC.

Prior to FY 96 there were two organizations located at Miramar Naval Air Station that conducted integrated air warfare training: 1) "Top Gun" squadron, and 2) an adversary squadron. Due to stipulations of the Base Realignment and Closure Act (BRAC) and DoD downsizing, the adversary squadron was deactivated and Top Gun (with its supporting budget) migrated to the new Naval Strike and Air Warfare Center located at Naval Air Station Fallon, Nevada. The mission of the adversary squadron was intended to be absorbed by reserve squadrons and NSAWC units and integrated under the existing "STRIKE U" command at Fallon. The mission of NSAWC is to train pilots to become tactics instructors at the Fleet Air Training squadrons.

When NSAWC initiated operations during FY 96, some of the adversary training support costs were not previously factored into the budget process. As a result, there was a $10 million maintenance contract and some Temporary Additional Duty (TAD) requirements that had to be funded in order to sustain the training [Ref. 44]. A decision was made by the Air Board to reprogram funding from existing CNAP FHP funds that contributed directly to additional FHP underfunding by approximately $13 million.

In FY 97 there also were shortfalls in the NSAWC budget that CNAP was required to resource directly from their FHP budget. Table 4.11 below summarizes the relevant data extracted from the OP-20s and FHCRs for Fiscal Years 96 and 97. This table reflects the budgeted versus executed amounts for the combined Top Gun and Strike squadron requirement. The last row shows the total cost difference that CNAP was required to reprogram from the FHP:

	FY96 (TOP GUN & STRIKE SQD)	FY97 (TOP GUN & STRIKE SQD)
Budgeted	$24,112,000	$23,834,600
Executed	$37,235,000	$31,843,000
Difference	$13,123,000	$8,008,400

Table 4.11. Budgeted vs. Actual Cost Difference for NSAWC (FY 96 & FY 97)

In Fiscal Year 1998, the budget process caught up with Fleet needs, and sufficient funds were programmed for NSAWC to execute its training requirements. In fact, NSAWC under executed budgeted dollars in FY 98 due to lower than expected student through-put. Sufficient resources are currently programmed for NSAWC in the budget outyears and it appears CNAP will no longer have to subsidize the requirement from the FHP.

In summary, this analysis illustrated the impact of selected unplanned / variable requirements on the flying hour program. The requirement to reprogram FHP funds further compounded an underfunded FHP budget and contributed to the overall "bow waves" created in both FY 96 and 97. The following section analyzes reprogramming decisions initiated as a means to properly resource other CNAP underfunded accounts.

4. Special Interest Category "Funding Other" (FO)

An area that is a constant fiscal burden on the CNAP FHP is the Special Interest

Category, "Funding Other" (FO) program. This budget area has been chronically underfunded in the budget process and subsequently FHP funds have been reprogrammed to bring this account up to a minimum executable level for the past several years. As described in Chapter II (II-F 3 b.), the FO account consists of several different non-flying hour program areas such as TAD, simulator maintenance support, and aircraft training ranges to name a few. Appendix C contains a detailed description of the programs within the FO account. Although the FO programs are not direct FHP costs, they are an integral part of the overall support cost for naval aviation each year. For example, the simulation support category helps to fund the overall attainment of PMR. As a component of the CNO PMR goal, simulator training contributes to 2% of the 85% annual goal. Additionally, the FO program funds the use of training ranges which are essential in honing aircrew warfighting skills associated with dropping ordnance and attacking targets. These are only two of the FO categories but they illustrate the importance of properly resourcing the account since it contributes to the attainment of aviation readiness.

The FO budget suffers from a lack of resource sponsorship in the POM process. As explained in Chapter II, the FO costs are not captured in the Flying Hour Costs Reports nor are they factored into the OP-20 budget produced by N-88F. Hence, when there is no sponsor advocating and justifying this requirement, it becomes the asset of choice for budget cuts. As a result, the funding levels for these non-flying hour programs have been on a downward slope for the past few years. In the CNAP case, the lack of proper resources budgeted for the FO became so severe in FY 98 that they received permission from CINCPACFLT to fund the FO programs directly from the FHP TACAIR/ASW schedule. Table 4.12 illustrates the FO resourcing and reprogramming trend from FY 95 through FY 98. The "Requirement" row refers to the amount CNAP requested. The "Reprogrammed" row reflects the total amount of funding re-applied from the FHP to the FO budget:

	FY-95	FY-96	FY-97	FY-98
Requirement	$125,714,000	$101,181,000	$128,914,000	$128,785,000
Received	$77,501,000	$87,633,000	$83,600,000	$81,065,000
Executed	$80,441,000	$98,380,000	$97,458,000	$118,044,000
Reprogrammed from FHP	$2,940	$10,747	$13,858,000	$36,979,000

Table 4.12. F.O. Reprogramming Totals from Flying Hour Program

In fiscal years 95-96, the CNAP Base Operating Support (BOS) budget shared the reprogramming burden with the FHP. The BOS was consolidated at CINCPACFLT in FY 96, so the amounts reprogrammed for FY 97-98 were exclusively taken from the FHP. The total amount reprogrammed from the FHP in FY 98 was considerable, but necessary for CNAP to successfully operate. Ten million dollars of the total amount reprogrammed in FY 98 was for an unfunded requirement that resulted from CNO direction to provide funding for a higher meal rate for sailors executing Squadron and Air Wing group travel orders. Additionally, funding was provided for the FMFPAC Marines Individual Material Readiness List (IMRL) (See Appendix C). The Marine IMRL has been an unfunded requirement in the POM/PR for several years, and CNAP finally decided to "fix it out of hide".

Figure 4.11 provides a perspective of the FO budget for FY 98 through 01. Although this figure only depicts the FO amounts programmed to support the TACAIR/ASW and FAS schedules, it shows the continuing trend of deficient resources to support the program. This figure depicts the budgeted funding amounts versus the CNAP stated requirement. The horizontal line reflects the minimum sustainment level for FO funding (1997 dollars). This minimum sustainment level has been thoroughly validated and "scrubbed" by CNAP to insure that only the most important funding requirements were included. What this figure portends for the FHP is more reprogramming and continued underfunding.

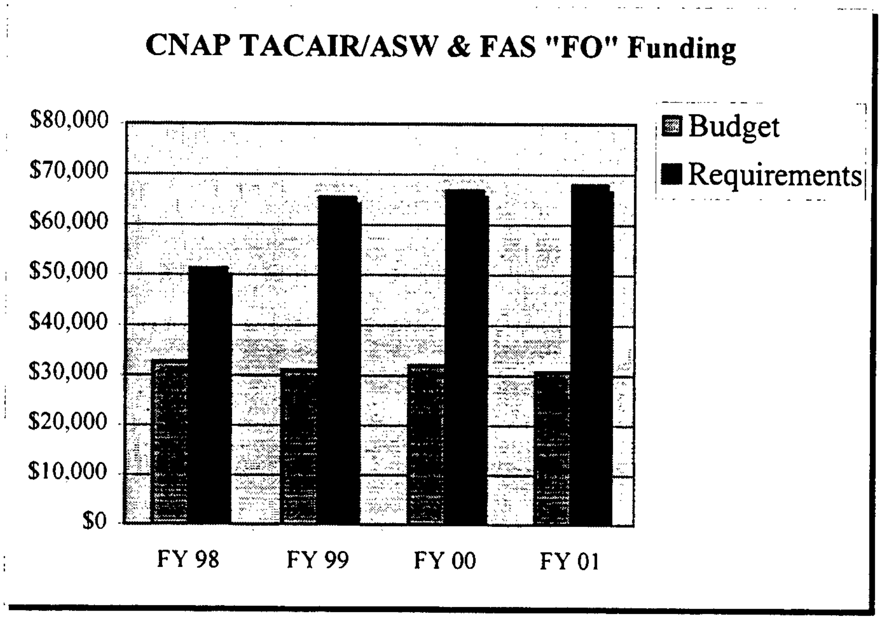

Figure 4.11. CNAP "FO" Funding Levels for TACARI/ASW & FAS "FO" Schedules [Ref. 69]

To seek funding relief, CNAP routinely addresses these shortfalls via the POM process, OM-6 exhibit (unfunded requirements), the FHP conference and the FMB Mid-Year OPTEMPO meeting held at CINPACFLT. FMB and the CNO have recognized the FO budget shortfalls and the drain on the FHP. In the 1st quarter of FY 99, a meeting was held by FMB, N-88 and Fleet representatives to discuss the problem and attempt to analyze possible solutions. The meeting concluded with an agreement by N-88 budget personnel to identify requirement officers that will in fact represent the FO program for the Fleet in the POM process. From the Fleet's perspective, this appears to be a positive outcome and may alleviate future budget cuts. However, during the interim they must contend with current year underfunding.

Aside from receiving increased budget authority for the FO accounts, one way to improve efficiency in stating the FO requirement is to develop a systematic forecasting method or to better predict Fleet FO needs. The current method for forecasting the requirements is based on historical data and professional judgement. Creating some type of formula or method to determine requirements may also help the new FO Requirements Officers to better defend the resources needed by the Fleet during the POM and budget reviews. Improving the FO forecasting methodology is recommended for follow-on research.

5. Unplanned Contingencies

Another variable factor that has caused flying hour program underfunding for CNAP has been unplanned contingencies, which is analyzed next. Unplanned operational contingencies are variable events that continue to result in CNAP FHP underfunding. These unpredictable missions cannot be forecasted and therefore are not resourced in the annual budget process. During the interim, the Fleet is expected to reprogram and finance the cost of these variable events with current year funds. Although most of the associated cost for supporting contingencies is remunerated through congressional emergency supplemental appropriations, the fiscal and operational impact on the Fleet is significant. In the case of CNAP, when a contingency does occur, existing FHP funds are decremented and reprogrammed to fund the new requirements. This entails quite a bit of work to modify training and support schedules for all squadrons, alter overall flying hours, cancel TAD, and reduce or delay maintenance. Contingency requirements in FY 98 provide a good example to demonstrate the fiscal impact on CNAP. During the 3d quarter of FY 98, CINCPACFLT was required to deploy a second aircraft carrier to the Persian Gulf to assist in resolving the U.N. Weapons Inspection crisis with Iraq. The cost associated with accelerating the pre-deployment training, TAD and actual deployment of this second aircraft carrier required CNAP to reprogram $43.7 million dollars from the FHP. In the 4th quarter of FY 98, CNAP received supplemental appropriation funds to recoup the cost of deploying the second carrier. The supplemental funding covered the contingency deployment costs and also helped to buy down the existing AVDLR bow wave that was generated from current year underfunding and the portion carried over from FY 97.

6. Section Summary

This section demonstrated how reprogramming decisions have contributed to CNAP FHP underfunding and have further compounded an already constrained and underpriced budget. The decision to reprogram funds in the cases of IT-21 and NSAWC are examples where Fleet Commanders chose to modify their annual spending plans to take advantage of investment opportunities that emerged during the execution period. As noted, these decisions adversely impacted the CNAP FHP in FY 97 and 98, particularly since the FHP already suffered from underpricing and underfunding. In the case of the FO accounts, reprogramming has been a necessity and a means for the CNAP comptroller and FHP manager to balance their programs to sustainable and executable levels.

Unfortunately, higher-level budget reviewers tend to view "discretionary" decisions as sources of self-generated FHP underfunding. Such decisions can impact future year funding levels in that these same budget critics perceive the reprogrammed amounts as surplus FHP funds. Further restrictions on reprogramming are increasing and represent another way that Congress uses nonstatutory control measures to micromanage the DoD budget [Jones and Bixler, pp.55-60]. From the Fleet perspective, tighter congressional control on reprogramming makes it even more difficult to execute constrained budgets. For CNAP, tighter congressional control would not necessarily be a problem, provided the FHP budget appropriated is executable. However, as explained in Chapter III and throughout this chapter, this is not the case. In fact, the CNAP Comptroller and FHP manager must consistently reprogram OP-20 funds between the different flying categories and accounts to balance overall program goals and CNAP training requirements. The annual effort expended in reprogramming is a manifestation of another problem from the Fleet perspective, in that the CINC really has no control or leverage over the construction of the OP-20.

What is the solution to this dilemma? One answer is for CNAP and the Fleet to receive increased spending authority to properly execute mission requirements without having to use creative accounting and financing to make it through the budget execution year. However, in an era of limited fiscal resources, additional spending authority is not likely to be provided by Congress. A more practical solution is to include the Fleet in the decisions that result in budget cuts and underfunding. For example, if it is determined in the programming process that the Navy FHP is required to absorb a $30 million cut, the Air Type Commanders should be consulted to recommend where *they* can best absorb funding cuts, vice having to go through the labor intensive and bureaucratic effort of reprogramming after the budget is received. If including the Air TYCOMS is not feasible due to administrative budget process constraints or time limitations, the Fleet and CNAP need to retain the flexibility to reprogram their budgets to create balanced and executable spending plans.

Alternative budget reform concepts that might lead to greater DoD budget efficiency and flexibility for Fleet commanders to respond to changing environmental conditions and mission needs during budget execution are presented in Chapter V.

I. CHAPTER SUMMARY

This chapter has chronicled and analyzed some of the major causes of CNAP FHP underfunding and variability experienced during budget execution. The purpose of this chapter is to create a reference document for CNAP FHP personnel that provides insight to the historical and current causes of FHP underfunding. Most of the problems stem from: 1) unplanned/unfunded requirements, 2) poor AVDLR component reliability, 3) deficiencies with Integrated Logistic Support, 4) variability in the AVDLR pricing methodology and NWCF surcharges and 5) deficiencies in the FHP and AVDLR forecasting methodology and not incorporating the cost of previous year bow-waves in the budget forecast.

The optimistic solution to these problems is to increase budget appropriations to adequately fund all current requirements for aviation readiness and Fleet modernization. However, this solution is unlikely. In fact, defense spending restrictions and downsizing will likely continue in the Post-Cold War environment. If this is the case, DoD may need to make fundamental changes in its organizational structure and its budgeting methods to increase efficiency and minimize funding uncertainty. These alternatives would tend to minimize congressional line item review of the DoD and DoN annual budget, and to better align DoD strategy with its structure through "mission-driven, results-oriented budgeting" [Ref. 34]]. The final chapter of this thesis will discuss budget reforms, summarize the thesis questions and suggest areas for further research.

V. CONCLUSIONS

A. INTRODUCTION

The purpose of this thesis was to examine the FHP budget process and analyze the issues causing underfunding in the Commander Naval Air Forces Pacific (CNAP) Flying Hour Program. The objectives of the thesis were as follows:

- Create a reference document that new CNAP FHP personnel may use to obtain an overview of the FHP and understand how the FHP budgeting and funding process works.
- Provide insight to some of the perennial factors contributing to program underfunding and variability that occur during both budget formulation and execution.
- Present alternative budget reform concepts that may attenuate defense resource variability and increase budgeting efficiency.

This chapter summarizes the answers to the primary and secondary research questions, presents final conclusions and describes alternative budget reform concepts that may minimize defense resource variability and improve budget process deficiencies. This chapter concludes with recommendations for follow-on thesis research.

B. PRIMARY RESEARCH QUESTION

What variable factors and decisions occur during FHP budget formulation and execution that explain the historical and current underfunding of the Commander Naval Air Forces Pacific Flying Hour Program (FHP)?

As demonstrated in Chapters III and IV, there are many factors that contribute to FHP underfunding and resource variability for CNAP. During FHP *budget formulation*, budget process dynamics contribute significantly to FHP resource variability. Although these dynamics are difficult to trace to FHP underfunding, the influence of congressional micromanagement, special interest politics, changing public attitudes and budget process deficiencies can cause considerable budget instability for all Navy programs and often result in sub-optimal resource allocation decisions.

The annualarity of the budget process and deficiencies in PPBS also contribute to resource instability and the production of budgets that typically "lag" behind execution year requirements. As much as PPBS attempts to be "forward-looking" in coordinating funding for future requirements, the budgets developed in this framework amount to an annual spending plan that offers little flexibility for military commanders to respond to unplanned events and changing requirements. When unplanned events do emerge and requirements change, current funding is reprogrammed and or obligated sooner than anticipated, often leading to underfunding in the FHP.

The environment of limited resources and competing priorities are other variables that cause funding instability for the FHP. There simply are not enough resources to adequately fund all DoD/DoN programs and priorities. In this constrained environment, the incentives to cut budgets and make funding adjustments in the interest of affordability increase, which further compounds funding instability.

Finally, the most significant factor that contributes to FHP underfunding during budget formulation is the FHP forecasting methodology. As noted in Chapters III and IV, the former three-year rolling average technique was deficient and continually lagged behind current year execution cost. Hence, the budgeted OP-20 understated the true cost per hour experienced by CNAP during execution. The higher actual CPH would obligate available funds sooner than expected, forcing CNAP to "bow-wave" to continue flying and to attain annual PMR goals. Since the deferred cost of the bow-wave was not included in subsequent year forecasts, the FHP underfunding would perpetuate into the next execution year and across the FYDP. Coupled with deficiencies in the forecasting methodology, **not recognizing and incorporating the cost of the bow-wave in the FHP forecast has been the biggest driver of recent budget underfunding.**

During FHP *budget execution*, the primary causes of CNAP FHP underfunding are as follows:

- **Unplanned / Unfunded requirements**. Unplanned and unfunded requirements result in the obligation of FHP funds sooner than anticipated or require the reapplication of FHP funds through reprogramming. Specific examples include:

  -Changes in mission and aircraft utilization rates, resulting in a higher CPH

  -Contingency missions requirements

  -Deficient forecasting methodology, which produced a cost per hour that, was lower than actual execution

  -MACP, IT-21 and NSAWC

  -The need to cross-subsidize underfunded programs such as the Special Interest Flying Other (F.O.) program

  -Using FHP funds to finance modifications (ECPs) and reliability improvements (LECPs)

- **Deficient repair part (AVDLR) reliability**. Poor reliability and increased component failures result in an increase in demand and hence increase execution year costs. Poor reliability and underfunding also increases the trend in aircraft cannibalization.

- **Deficient Integrated Logistics Support (ILS) planning and practices.** Inadequate spare parts determination and improper O and I level support can result in an increase in execution years costs. Changes in maintenance philosophies (i.e. increased focus on O to OEM/Depot Level vice O to I Level) has budgetary consequences that are currently not integrated into budget forecasts. Deficient maintenance manning and training can also cause underfunding through increased execution costs.

- **Excessive variability in AVDLR pricing and NWCF surcharge rates.**

- **Deficiencies with the AVDLR demand-forecasting methodology**:

  -Too much reliance on historical data

  -Inability to integrate changes in the "market basket" of AVDLRs

  -Inability to integrate actual component failure rates due to absence of MTBF tracking system

To an extent, CNAP has compounded its own FHP underfunding by not demonstrating funding shortfalls and the associated "pain" via readiness reporting. When the FHP Resource Sponsor and higher-level budget analysts see no degradation in Fleet readiness, there is no justification to provide an increase in funds. Rather, they are inclined to make further budget cuts and adjustments.

In summary, the key causes of CNAP FHP underfunding and related problems stem from the following comprehensive factors: 1) Budget dynamics, limited resources and competing priorities, 2) Unplanned / Unfunded requirements, 3) Deficiencies in the FHP forecasting methodology and not incorporating the cost of previous year bow-waves, 4) Poor AVDLR component reliability, 5) Insufficient AVDLR Integrated Logistics Support (ILS), and 6) Variability in the AVDLR pricing methodology and NWCF surcharges.

C. SECONDARY RESEARCH QUESTIONS

1. What is the purpose of the DoN Flying Hour Program (FHP) and how does the FHP budgeting and funding process work? Is the methodology for determining FHP requirements adequate and valid?

A comprehensive explanation of the purpose and current FHP budgeting and funding process is explained in Chapter II. As noted, the process itself is extremely complex. Understanding all of the FHP budgeting intricacies and functional responsibilities of the many organizations involved with the process, is a massive undertaking. For newly assigned CNAP FHP managers and tangential budget personnel, this complexity is compounded by the fact no formal training is provided. Recognizing this, the authors explained the FHP budgeting and execution process in detail to facilitate clearer understanding and insight to the mechanics of the process.

Chapter II began with an explanation of the purpose of the FHP which is to provide the necessary resources to operate and maintain all Navy and Marine Corps aircraft, to achieve and sustain Naval Aviation readiness. The FHP is also a systematic approach for Fleet Commanders and Resource Sponsors to construct defensible budget exhibits that justify the resources required to attain aviation readiness goals for combat, support, and training aircraft. An examination of the DoD Resource Allocation Process was provided to facilitate understanding of how the DoN FHP fits within this larger budgeting framework.

The focus of Chapter II was to describe the roles and responsibilities of the FHP budget players relative to the CNAP FHP financial reporting chain. Budget formulation, execution and relationships were explained from the CNAP squadron level through CNAP, CINCPACFLT, the Resource Sponsor (N-88F), FMB and finally to DoD/OSD. The details of budget formulation and review were highlighted at all levels, demonstrating the fact that budgeting is a highly social process, requiring intense communication, negotiation and compromise.

The FHP budget formulation methodology that was explained in Chapter II, was then further examined in Chapter III to determine the validity of this methodology in determining the flying hour requirement and associated cost. In that chapter, we concluded that the former three-year rolling average approach did not adequately forecast the requirement due to inherent statistical deficiencies in this approach. This averaging technique consistently lagged behind actual execution costs and did not account for cost anomalies.

Chapter III also demonstrated that the current FHP forecasting methodology has some inherent deficiencies, but as a budget tool, the OP-20 is useful in predicting the FHP requirement for the budget year. The primary deficiency with this methodology is its exclusive reliance on historical data. Changes in prices and demand for AVDLRs during the execution year results in a FHP budget that understates the true FHP costs.

Ultimately, it is the effect of many different external factors and dynamics that cause FHP forecasting inaccuracies and program underfunding. In fact, in view of all the many different variables discussed in this thesis such as budget dynamics, limited resources, poor ILS and reliability, LECPs, ECPs, changes in maintenance philosophies, cost deferment, inconsistent readiness reporting, varying utilization rates, Operational contingencies, AVDLR demand and price variance, inadequate application of escalation rate changes during budget formulation, affordability decisions, budget gaming, and unplanned events, is there any real reason why the FHP forecast should match execution year costs? The answer is "no".

Ideally, the solution to capture all of these variable factors is the development of a "total cost" model that is capable of integrating direct FHP costs and all of the other external variables that have budget consequences. The AMSR represents the first step towards this solution, and is attempting to integrate all of the different organizations, activities and components that constitute and affect the Naval Aviation system.

2. What factors cause Cost Per Hour (CPH) increases and variance in CNAPs FHP, and is the CPH an adequate metric for assigning program costs?

The reason why CNAP cost per flight hour has increased and varied from the budgeted CPH is primarily due to receiving inadequate resources in the FHP budget. As explained in Chapter III, (see Figure 3.1 and Table 3.1) this disparity between the higher actual CPH versus the lower budgeted CPH occurred due to the deficient three-year rolling average forecast technique that always lagged behind actual cost experience. Budget decisions and modifications to FHP forecast, made in the interest of affordability, also produced an OP-20 that contained a "hollowed-out" CPH. Finally, failure to recognize and include the previous years' bow-wave in the FHP forecast further understated the budgeted CPH.

Chapter III also examined other factors that can cause variance in the CPH even among similar T/M/S aircraft. They are summarized as follows:

- **Different Operational Environments**. Different operational environments and conditions can drive cost per hour variance as demonstrated with the different Marine squadrons based in Southern California versus Hawaii and Okinawa.
- **Utilization rates**. Different mission requirements or unplanned Fleet

operational contingencies can contribute to significant differences in the budgeted versus actual CPH.

- **Unplanned AVDLR reliability failures**. Unexpected AVDLR failures for certain T/M/S aircraft can cause an increase in demand for repair parts that were not budgeted for and thus cause an increase in the CPH for the respective T/M/S. The F-404 engine for the F/A-18 is a good example where increases in demand for engine repair drove-up the F/A-18 CPH considerably.
- **Shortages in maintenance manning levels and experience, particularly at the O and I levels of maintenance.**
- **Timing of installation of aircraft component modifications and reliability improvements.**

Next, we will summarize the answer regarding the adequacy of the CPH approach as a metric for assigning and reporting program costs.

The basis for measuring costs in the FHP is flying hours. Several studies and statistical analyses have been conducted to determine the degree of relationship between flying hours and the direct program costs: fuel, maintenance consumables and AVDLRs. Generally, these studies indicated the number of flying hours flown correlates fairly well with fuel and maintenance consumable costs, but little to no correlation exists with AVDLRs (concluded by NCCA and some NPS Theses). As of this writing, another analysis was conducted by CNA (October, 1998), that refuted the NCCA analysis, indicating that there is a correlation between flight hours and AVDLR costs, which further obscures the issue. Hence, in response to the question, the CPH approach ostensibly is a useful metric for reporting and forecasting fuel and maintenance consumable costs, but recent analyses concluded different results as to the degree of relationship between the cost per flight hour and AVDLR costs. In view of this discrepancy, more analysis is required and the question remains: Is the AVDLRs cost per flight hour really meaningful? This is a challenging question because as noted, there are some AVDLR costs that are incurred regardless of the number of flight hours flown, such as hydraulic and electrical components and corrosion repair; and there are some AVDLR components such as engine components, that do vary with the number of hours flown.

operational contingencies can contribute to significant differences in the budgeted versus actual CPH.

- **Unplanned AVDLR reliability failures**. Unexpected AVDLR failures for certain T/M/S aircraft can cause an increase in demand for repair parts that were not budgeted for and thus cause an increase in the CPH for the respective T/M/S. The F-404 engine for the F/A-18 is a good example where increases in demand for engine repair drove-up the F/A-18 CPH considerably.
- **Shortages in maintenance manning levels and experience, particularly at the O and I levels of maintenance**.
- **Timing of installation of aircraft component modifications and reliability improvements**.

Next, we will summarize the answer regarding the adequacy of the CPH approach as a metric for assigning and reporting program costs.

The basis for measuring costs in the FHP is flying hours. Several studies and statistical analyses have been conducted to determine the degree of relationship between flying hours and the direct program costs: fuel, maintenance consumables and AVDLRs. Generally, these studies indicated the number of flying hours flown correlates fairly well with fuel and maintenance consumable costs, but little to no correlation exists with AVDLRs (concluded by NCCA and some NPS Theses). As of this writing, another analysis was conducted by CNA (October, 1998), that refuted the NCCA analysis, indicating that there is a correlation between flight hours and AVDLR costs, which further obscures the issue. Hence, in response to the question, the CPH approach ostensibly is a useful metric for reporting and forecasting fuel and maintenance consumable costs, but recent analyses concluded different results as to the degree of relationship between the cost per flight hour and AVDLR costs. In view of this discrepancy, more analysis is required and the question remains: Is the AVDLRs cost per flight hour really meaningful? This is a challenging question because as noted, there are some AVDLR costs that are incurred regardless of the number of flight hours flown, such as hydraulic and electrical components and corrosion repair; and there are some AVDLR components such as engine components, that do vary with the number of hours flown.

The integrity and accuracy of the data is also extremely important to ensure any further statistical analysis produces valid results. It is important to note that the AVDLR cost component was an adjunct to the original FHP cost pools (fuel and maintenance consumables), because, AVDLRs were not sponsored and resourced by N-88F. In view of this, perhaps a different metric could be used for AVDLR costs such as sorties. A recent study conducted by the Logistics Management Institute, indicated that demand for aircraft spares is more closely related to sorties versus flying hours [Ref. 70]. Further analysis regarding the merits of using sorties versus flying hours as a cost basis is recommended for follow-on research at the end of this chapter.

3. What are some of the reasons causing AVDLR cost increases?

There are many factors contributing to AVDLR cost growth. The most significant causes are summarized as follows:

- **Deficient AVDLR ILS**. Many newly fielded and older AVDLR components do not have adequate logistics support in place to provide timely repair at the O-level and I-level maintenance facilities.
- **Actual AVDLR component reliability has been far less than the planned reliability for many components, thus increasing Fleet demand and FHP costs.**
- **Deficiencies with the AVDLR forecasting methodology**. This approach relies too much on historical data and does not account for items that skew the cost of demand outside the norm [Ref. 45]. Further, the FHP budget does not capture all of the changes in the "market basket" of AVDLRs from year to year, which understates the true cost of AVDLRs during execution.
- **Budget formulation adjustments designed to make the FHP budget fit within budget controls.**
- **Not including the cost of previous years AVDLR bow-wave costs into the new FHP budget forecast.**
- **FHP funds reprogrammed to fund other requirements and/or programs.**
- **Variability in the NWCF surcharge rate changes** (See question number four).

4. To what extent is the Navy Working Capital Fund Surcharge and escalation rates impacting current year execution funds?

After completing extensive research for this question and over 40 interviews with budget personnel, comptrollers, supply and maintenance officers and other personnel from DoD, FMB, NAVAIR, NAVSUP, NAVICP, N-88, CINCPACFLT, and CNAP; the authors were unable to conclude with certainty whether the Navy Working Capital Fund Surcharge and escalation rates contribute to Fleet budget underfunding. There are many varying opinions as to whether it does or doesn't degrade the "customers" execution year budget. In theory, the process is designed to balance sufficient funding in the customer accounts for the anticipated wholesale surcharge. As explained in Chapter IV, the purpose of the surcharge is to recover the cost of operations of the supply system by balancing total revenues against the total costs of the NWCF organizations. It is commonly referred to as the "cost of doing business" represented by the formula: *Surcharge = Cost of Operations ÷ Cost of Goods Sold.* The bottom line is that whatever the surcharge rate is for the year, appropriate funding is balanced in the customer accounts. However, many dynamic factors can alter this "balance" and may contribute to some degree of underfunding. Based on our research the following key issues and observations regarding the surcharge and escalation rates are provided:

- *Surcharge Rate Variability.* There is considerable variability in the surcharge rate formulation process. Part of this variability stems from the fact that there are pricing components and taxes that constitute the Cost of Goods Sold and the Surcharge that have nothing to do with Naval Aviation and the FHP. Additionally, there are other taxes levied on the NWCF and outside policy decisions made that are not associated with Supply Management, but do contribute to variability and surcharge increases [Ref. 71]. Further, the NWCF rates are forecasted and negotiated in a budget environment that is similar to, and done concurrently with the DoD ("customer") budget process.

As the rates are estimated and forecasted by the NWCF entities, they are subject to similar budget review processes and adjustments, to include marks and reclamas, until the rates are finalized and approved by OSD. Hence, there are similar budget dynamics that transpire and may in fact contribute to some degree of funding variability once these rates are applied to the customer's budget.

- *AVDLR Pricing Methodology.* The AVDLR pricing methodology is interrelated with the surcharge and is another source of variability. The primary source of this variability stems from changes in the "market basket" of AVDLRs. This "market basket" is supposed to be a statistically valid sample of the "universe" of existing AVDLRs that the Fleet is expected to use in the execution year. Part of the surcharge rate components are based upon the expected Fleet demand of this representative "market basket". However, both the market basket and customer demand are subject to change. Each year there are new AVDLRs that are introduced and used by the Fleet for certain T/M/S that are not yet part of this market basket sample and hence the current surcharge does not capture the actual real world costs of these new components at the T/M/S level. Further, the forecasted customer demand often changes due to the nature of variable consumption. This customer demand can change due to increased aircraft utilization rates, changes in AVDLR component reliability and deficient AVDLR ILS. This demand can also change as a result of customer decisions to maximize their spending by purchasing material or services outside of the NWCF.

Some critics in the Fleet are suspect as to the adequacy of the surcharge and the "market basket". This suspicion is not arbitrary. They assume if in fact the process works correctly (i.e. customer accounts are properly balanced), then the funding provided in the OP-20 should match the real world costs experienced during the execution year. However, in recent years this has part, the answer is better communication and mutual understanding between all affected agencies and customers. The AMSR and other study efforts continue to analyze the NWCF process to minimize skepticism and confusion. These study efforts are focused on the pricing methodology and effects of the surcharge. Additionally, the NAVSUP "Surcharge Reduction Group" is working diligently to contrive cost cutting strategies and methods to increase revenue.

- *Value of Annual Demand (VAD) / Annual Price Change (APC).* The authors concluded that the VAD/APC does not directly lead to an increase in AVDLR prices. As pointed out in Chapter IV, the VAD/APC, is simply a method to calculate the difference between the surcharge from one year to the next and provide the appropriate funding amounts necessary to "balance" the customer's budget against the predicted demand for AVDLRs. The problem with the VAD/APC occurs when the customer's account has to be "plussed-up" if the VAD/APC does not adequately "balance" the customers account. The funds used to offset these plus-ups come at the expense of other aviation programs. Moreover, these offsets often undermine cost saving initiatives such as LECPs, and ECPs.

- *Repair part cost escalation rate changes.* The method by which changes in escalation rates are applied to the OP-20 is backwards and results in program underfunding. As discussed in Chapter III-D, when the rates do change, the Resource Sponsor (N-88F) should provide the complete OP-20 budget adjustment to N-82 and not simply receive an aggregate adjustment to be spread across the FHP.

- *Death Spiral of Demand.* The effect of the "death spiral" is certainly one of the biggest challenges facing the Navy Working Capital Fund and its cash management position. As discussed in Chapter IV, the "death spiral" refers to the loss of sales due to changes in buyer behavior. When the customer doesn't purchase the estimated demand quantity that was projected, a higher surcharge may occur as a result of spreading the same level of fixed overhead costs over a smaller revenue base. As explained earlier, this change in buying behavior is due primarily to the perception of excessively high cost material, which forces customers to search for alternate and cheaper providers. Another conflicting problem contributing to the "death spiral" is Navy re-engineering efforts to improve its supply and logistics management/practices. Initiatives such as Direct Vendor Delivery (DVD), Contractor Logistics Support (CLS), and LECPs are intended to make the Navy more efficient, but they work to the detriment of the NWCF in the form of fewer sales and potentially higher surcharge rates. To the authors knowledge, there doesn't appear to be a long-term strategy to account for the loss of sales and revenue. Without commensurate decreases in the cost of operations, the surcharge will continue to increase and remain a source of variability affecting long-term budget planning. Hence, it is particularly critical for the NWCF to stabilize the rates and devise new ways of cutting costs and generating revenue as the Navy becomes more efficient through improved logistic support practices and supply chain relationships.

D. CONCLUSIONS

Based on our research and findings, the following section provides final conclusions for addressing flying hour program funding problems, logistics support and cost management issues. Since the flying hour program is formulated and negotiated in the greater defense budgeting framework, the last section presents an overview of two budget reform concepts that may increase defense budgeting efficiency and attenuate DoD resource variability.

1. Continue with the Aviation Maintenance Supply and Readiness Group and Other FHP Process Improvement Efforts

Our research shows that no FHP problem or funding issue can be analyzed in isolation. The FHP budget processes and execution support costs are affected by a myriad of interrelated organizations, activities and decisions. Often, well intended decisions and improvements made by one organization can have negative budgetary consequences on the FHP. The Logistics Engineering Change Proposal (LECP) program changes in maintenance philosophies, and contractor logistics support arrangements are good examples that demonstrate the unintended fiscal impact on the FHP.

Therefore, since Naval Aviation is a comprehensive integrated system, the authors believe the AMSR effort is an excellent forum to systematically and collectively analyze root causes of problems and allocate the right resources to achieve proper solutions to improve overall Naval Aviation readiness. Ultimately, the success and outcome of this effort is contingent on the continued commitment of senior Navy and Marine Corps leadership and the continued work by the talented experts that comprise the group.

To our knowledge, there are two issues that do not appear to be adequately addressed by the AMSR, the Navy Working Capital Fund Surcharge, and AVDLR pricing. Although the group is analyzing AVDLR pricing under issue # 16: "*AVDLR Cost and Reliability*", the magnitude and complexity of these two issues may exceed the current scope and capacity of the group to isolate root causes of problems and develop specific solutions to minimize AVDLR price and surcharge variability. Many different organizations are conducting or have conducted analysis regarding the impact of the surcharge and AVDLR pricing, but more study is needed to **ensure the "customer" is receiving adequate funding in the FHP budget process and paying the "right price" for AVDLRs during the execution year**. If feasible, the AMSR should specifically address these issues as a separate long-term action item and to do so, the group requires greater representation from the specific organizations and personnel involved with estimating and determining the escalation rates and AVDLR price structure.

a. Improving the FHP Budgeting and Requirements Determination Process

The Resource Sponsor is extremely committed to improve the FHP requirement determination process. Stating the FHP requirement accurately and linking this requirement to a level of readiness is critically important. As budgets get tighter, so does congressional oversight, and Congress wants to see that the Navy has sound criteria for justifying the requirement and that it is linked to a discrete measure of performance. Although one of the last GAO reports conducted on the DoN FHP was over nine years ago, one passage still has relevance:

> The scarcity of resources has increasingly led to the request that flying hours budgets be justified in terms of improved operational capability. In other words, those responsible for the budget-in the services, in OSD, and in Congress--want better evidence about what we are getting for the money we spend on the flying hour program. In the absence of such evidence, it is likely to become increasingly difficult to justify funding for the flying hour program [Ref. 72: p. 88].

As explained in Chapter III, N-88F commissioned CNA to develop a new method of budgeting that better links readiness levels with both the number of flying hours flown and simulation training conducted. The initial prototype methodology proved successful with three different T/M/Ss. N-88F plans to continue the study and validate the approach with the other Navy T/M/Ss as soon as funds are allocated.

b. Increase Spending Authority

Operating in a limited resource environment is a significant challenge for the Navy and clearly one of the biggest drivers of FHP underfunding and budget instability. As explained in Chapter III, a constrained funding environment often causes gaming and adjustments to create a FHP budget that fits within the "Top-line". Lack of proper resources results in trade-off decisions that sub-optimizes and degrades funding for other Navy programs. Lack of adequate resources also results in the phenomena of "cutting less visible" support areas, which ultimately result in underfunding for the FHP. This problem is seen in the lack of resources programmed for the "Special Interest" category FO account, where the FHP has been required to cross-subsidize this underfunded aviation support program. So what is the ideal solution to minimize the effect of a limited resource environment? The simplest answer is not a revelation – an increase in spending authority! Budget critics may view this conclusion as naïve or not practical, but it is consistent with the recent Joint Chief's testimony (September 98) before Congress; indicating that current funding levels cannot sustain readiness and that, "readiness and morale has been suffering from years of tight budgets" [Navy Times, 28 Sep. 98]. In fact, an increase in spending authority has been the solution all along and precisely why the Commandant of the Marine Corps has requested Congress for a budget increase for the past three years. Providing more money for the DoN FHP will not solve all of its problems, but at least the extra resources will minimize causes of underfunding and execution year "work arounds" resulting from the current constrained resourcing process. Additionally, some of the solutions recommended by the AMSR require funding to improve processes and acquire new data gathering systems such as the "MTBF tracking system" and "NALCOMIS Optimized". Finally, an increase in funding does not abrogate Fleet requirements for cost management and the need to execute funds efficiently. The issue of cost management is briefly analyzed next.

c. Continue FHP Cost Management Practices

Some of the interviews we conducted suggested Fleet FHP cost management practices are "deficient" and/or "suspect". Although cost management and efficiency can always be improved in any organization, there is no Fleet squadron or command that operates with the goal of executing scarce FHP funds inefficiently. In fact, CNAP has improved its cost management and raised the level of FHP cost consciousness with the implementation of practices and programs like the AIRPAC Financial Analysis Tool (AFAST). The AFAST program is a "data base" intended to raise the level of cost awareness among CNAP units. It allows unit Commanders to view the amount of AOM funding spent in direct support of their flight operations as well as the ability to compare spending status/rates relative to other CNAP units.

Another FHP cost management practice at CNAP is closely monitoring BCM actions to ensure all possible I-level repair efforts have been attempted before AVDLRs are sent to the depot. This program is known as "Mother May I" and it has saved millions of FHP dollars. These savings have been achieved by increasing the repair capability at selected CNAP AIMD's and by forwarding AVDLR repairs from smaller, less capable AIMD's to more robust AIMD's, thereby avoiding the higher costs associated with a depot-level repair.

Although these cost management improvements help CNAP monitor and manage FHP costs, there is a critical need for standardizing cost accounting and reporting for the entire FHP. In fact, the lack of a standardized cost accounting system is a major problem throughout the Navy and DoD. In the DoN, FHP many dynamic factors affect the accuracy of budget forecasts and FHP management. These dynamics are compounded when there are different practices and procedures for assigning and reporting program costs. Perhaps the biggest reporting deficiency with the FHP is the phenomenon of "cost migration". When other sources of money dry up, there is a tendency to charge items that are not necessarily associated with the operation and support of a T/M/S aircraft. The authors do not know the extent of this problem, but it is obviously an important issue relative to FHP cost reporting and forecasting. The issue relates to the old axiom "Garbage in – Garbage out", and if the right costs are not being accurately captured, then funding variances will occur. The issue of FHP cost accounting and cost management was beyond the scope of the thesis and therefore recommended as a follow-on topic in the last section of this chapter.

d. ILS Issues and Cultural Change for Better Logistics

Chapter IV emphasized the importance of establishing and maintaining sufficient AVDLR ILS for aircraft and aircraft components. Key problems with current deficiencies in ILS stem from: limited resources resulting in inadequate trade-off analysis, inflated MTBF projections, compromises in aircraft configuration, initial ILS fielding and overall insufficient consideration and evaluation of total life-cycle support needs. To minimize the impact of inadequate ILS on the Fleet, proper logistics support analysis must be conducted throughout a systems life-cycle to achieve the right aviation logistics support. During the acquisition process, the best approach is to design reliability into the aircraft system and AVDLR components, and placing the onus on contractors to prove their reliability claims. Continuing with reliability improvement programs for already fielded AVDLRs will clearly benefit Naval Aviation readiness in the long run, but adequate funding must be provided in the POM process, to prevent the FHP from being used as the source of financing in the short-term.

The final step to improve ILS, is to change the way logistics is currently viewed in the acquisition arena. In an acquisition environment that is incentivized by producing military equipment within cost, on time and achieving the right operational performance, logistics is often subordinated. When funding constraints force trade-off decisions in the acquisition process, logistics is typically cut from the procurement budget. The effect of not adequately planning for and resourcing logistics ultimately results in higher Operation and Support (O&S) costs once the equipment is fielded to the "customer". To change this view of logistics support, a cultural change is required in the defense acquisition world that prevents poor life-cycle support. As one Naval logistics expert indicated:

> We need to move to a culture where logistics is inextricably linked to acquisition and everyone's efforts optimize the whole and not just a part. Our culture must be one where all the players in the game are rewarded for the same thing: a program that is in equilibrium throughout its life-cycle and provides optimum logistics results" [Ref. 73: pp. 1-4].

The next section presents an overview of some budget reform concepts that may improve the defense resource allocation and execution process, and minimize overall budget instability.

2. Budget Reform Concepts

As noted in Chapter III, defense budget dynamics and budget process deficiencies contribute to DoD/DoN resource variability and inefficiency. Although some of the effects of these dynamics are difficult to quantify for programs like the FHP, their influences cause budget instability and funding uncertainty. To minimize their effect and in the current spirit of "process reinvention", perhaps it is time to change the organization of the budget process and the way defense resource allocation decisions are made. What follows is a brief discussion of two alternative budget reform concepts that may improve the defense resourcing process and budgeting efficiency.

a. Multiyear Budgeting

The annual defense budget process is criticized as being shortsighted and inefficient. As noted in Chapter III, the annual nature of defense budgeting drives much of this inefficiency. Each year, Congress repeats its line item review of the defense budget, which consumes a great deal of time and effort. Unfortunately, the time and effort that Congress devotes to the administrative oversight of the defense budget comes at the expense of conducting analysis of defense policy issues and strategy. Former Senator Sam Nunn criticized the annual budget cycle in that it results in the, "trivialization of Congress' responsibilities for oversight". [Ref. 5: p. 42]. Nunn argues that Congress needs to maintain a broader defense policy perspective, vice line-item scrutiny and micromanagement of the defense budget. The late Senator Barry Goldwater also noted the problem associated with the annual budget cycle:

> In essence Congress is completely consumed by an excessive detailed scrubbing of the defense budget, conducted line item by line item. Lost in this maze of financial plusses and minuses is any opportunity for real oversight...preoccupied by the yearlong budget process and submersed in budget trivia, the Congress has no time for pivotal issues. [Ref. 5: p. 43].

Similarly for the Services and military departments, defense budgeting is repetitive, time consuming and inefficient. Despite all of their constant budgeting efforts, the final output of this process still only amounts to an annual rigid spending plan that offers little flexibility for military commanders to respond to changing events or emergent opportunities during execution. Although reprogramming funds occurs during execution, congressional restrictions and oversight make it difficult to do so.

According to our interviews with FHP budget personnel and Fleet comptrollers, multi-year appropriations for the operating and support accounts would be a welcome reform measure that could increase the efficiency in which the budget is formulated, executed and managed.

For military commanders, a multiyear defense budget would facilitate an increase in efficiency by providing greater latitude in spending decisions and by promoting a long-term focus toward resource allocation decisions; similar to most commercial businesses. Multi-year appropriations would also provide greater flexibility to respond to emerging opportunities and/or contingency missions without the requirement to initiate the laborious process of reprogramming funds from other accounts. Finally, a multi-year defense budget would enable better resource planning and spending decisions by minimizing the, "spend it or lose it" mentality that tends to dominate end of year spending activity. The current annual defense appropriation process incentivizes the military to make inefficient spending decisions toward the end of the year. The "reward" for being efficient and saving money is the potential loss of budget authority in future years. Other benefits of a multiyear budget would include less budget instability, and potentially, less congressional micromanagement of DoD program and spending decisions.

For Congress, a multiyear defense budget could lead to greater efficiency by liberating appropriation committees from their time consuming annual duty of "scrubbing line items". A "liberated" Congress could then focus more on formulating and negotiating defense policy, and achieve the broader perspective to which Senator Nunn alluded. Multiyear budgets would minimize the current congestion and delays in passing annual appropriations. This congestion is primarily due to excessive committee debate and protracted hearings that occur each year. Additionally, the time and effort devoted in passing Continuing Resolutions to permit the DoD (and other agencies) to obligate funds at the start of each fiscal year, would no longer be needed.

However, Congress has resisted a multiyear approach for defense appropriations due to perceived loss of control and influence over the defense budget and defense spending decisions. Further, there is no incentive or reward for Congress for developing sound defense policies. Rather, as asserted by Jones and Bixler, the "rewards sought by politicians and constituents alike" are found in the details of the budget, not deliberating over defense policy. [Ref. 5: p. xxvi]. Ultimately, since the annual defense authorization and appropriation processes serve as the primary means for controlling the DoD budget, there is little chance of Congress approving multiyear funding for the operations and support accounts. Additionally, the incentives fueled by constituent special interest and committee competition also make the prospect of adopting a multiyear budget unlikely (Jones and Bixler 1992, pp. 12-46).

Nevertheless, implementing a multiyear budget could result in increased budget efficiency and minimize defense funding uncertainty. Finally, a multiyear budget could minimize the tedious and repetitive nature of budgeting for all defense budget players. Next, we will discuss the concept of mission budgeting for defense that further extends the argument for a multiyear defense budget.

b. Mission Budgeting for Defense

Mission Budgeting refers to decentralizing the defense resource allocation process and realigning Department of Defense strategy with its structure. This realignment will facilitate the production of, "mission-driven, results oriented budgets" that will help improve budget formulation and execution efficiency [Ref. 34: p. xvi]. What follows is a brief outline of the Mission Budget concept and an analysis of how this approach could increase defense budgeting efficiency.

One inherent deficiency with the defense Resource Allocation Process is that it is not linked very well to DoDs mission or its organizational structure. Although defense resources are programmed across the broad Major Force Program categories, it is difficult to link these programmed resources with mission outcomes or results. Additionally, the current resourcing process is very centralized and involves too many bureaucratic layers and participants that duplicate efforts and have nothing to do with achieving National Military objectives.

Mission budgeting for defense attempts to improve these deficiencies, by better aligning responsibility, control and financial structures [Ref. 5: pp. 7-8]. Mission budgeting provides a more efficient means of allocating and executing defense resources by decentralizing spending authority and financial management decision making to the major Warfighting Commanders where defense strategy is carried out. Jones and Bixler assess the defense strategy and structure misalignment as follows:

> In theory, the control and financial structures of an organization serve the mission or responsibility structure. However, this is not what we find when we examine the DoD. Rather, the control structure dominates the responsibility structure, and the financial structure appears either to dominate or operate independently from the responsibility and control structures. This is evident in examining the causes of budget-formulation disconnects between planning, programming, and budgeting in PPBS, and the difficulty of executing budgets in the Pentagon, in the subsidiary organizational units around the Pentagon, and at the command and field levels. [Ref. 5: pp. 210-211]

The responsibility structure that Jones and Bixler refer to is composed of the specified and unified military commands and the service commands that are responsible for executing the National Military Strategy. The control structure refers to the military operational chain of command that executes the policies and objectives outlined by the Executive and Legislative branches. The financial structure is comprised of all of the comptrollers and budget personnel in the military departments extending out to the Major Claimant and Subclaimant levels and down to the Fund Administrating Activities. [Ref. 5: pp. 209-210]

Providing a multiyear mission budget that contains both operating and capital investment funds to the major command level would better link DoD strategy with its responsibility structure. Allocating these funds directly to the major military commands would enable commanders to execute their budgets with an efficiency similar to which the private sector enjoys. Having access to a mission budget could result in better long term investment decisions and provide greater spending flexibility as opposed to receiving a rigid annual spending plan. This decentralized approach to allocating defense funds would negate the need for multiple DoD budgeting organizations and personnel involved in the current budgeting process. Once this budgeting bureaucracy is streamlined, the financial structure will then better serve the responsibility structure, that is the warfighting commands.

Similar to the advantages of a multiyear budget, a multiyear mission-oriented budget would liberate Congress from the annual line item review of the defense budget. Congress could then devote more time to developing defense policy and assessing the performance of military commanders in executing their budgets. Further, Congress could concentrate more on implementing incentives for the military commanders to make efficient spending decisions in line with established policy and previously agreed-upon performance requirements. This means performance reporting would be more directly linked to the level of expenditure and mission accomplishment. Congress would maintain control by rewarding those commands that achieve performance goals and objectives by providing additional funding. Likewise, those that fail to achieve performance goals would be penalized by having funds rescinded or transferred. This control system would facilitate healthy competition among the different military commands and provide adequate oversight by Congress.

In terms of the duration of this mission budget authority provided to major military commanders, Jones suggests the following guidelines. The operating portion of the budget should be appropriated for a minimum of two-years without any restrictive rules or requirements for spending on individual programs or items in the budget; and that the capital portion of the budget be appropriated on a five years basis and would be fully funded. [Ref. 5: pp. 212-13] Often, DoD purchasing practices are fragmented and result in inefficiency because its budgets are less than fully funded. Hence, fully funding the capital / investment budget is important to eliminating funding uncertainty and allowing the budget to support procurement plans, vice the other way around.

The assumption behind the success of decentralizing resource allocation to military commands is that military commanders would know best what types of operations, training, hardware, facilities and equipment are required to best support war plans and operational requirements. [Ref. 5: p. 214]

Within the mission budgeting framework, the PPBS process would continue, but in a more streamlined manner. Since military commanders would have greater responsibility and discretion in executing their own capital investment budgets, programming would be a command function as would budget formulation and execution. The military departments would retain some comptroller and budget personnel to integrate the command budgets and present them to OSD and the Congress. [Ref. 5: p. 217] Because much of the budgeting and financial management process would be decentralized to the command level, the size of current budget organizations and military/civilian staffs could be reduced considerably, and hence result in considerable financial savings.

In summary, the concept of mission budgeting requires careful assesment because it is so different from the current system. However, better aligning DoD strategy with its structure through "mission-driven results oriented budgeting" could increase efficiency by directly linking scarce resources with mission output. Other benefits include: a reduction in congressional micromanagement of the defense budget, more time for Congress to decide upon a long term defense policy, better accountability and spending performance metrics, competition, optimizing spending decisions through a decentralized operating and capital investment budget, and empowering military commanders to maximize their defense budgets, and providing them with greater flexibility to respond to a dynamic environment.

Although the Congress and DoD may resist more decentralized budgeting due to loss of discretionary budget control, they should consider the potential efficiencies gained by such an approach. In fact, in the Post Cold War era it is likely that defense spending will continue to decline. If this is the case, the DoD must continue to achieve greater efficiency in all operating capacities and functions including budgeting and financial management. Implementing Mission Budgeting at least on a test basis is worthy of trying. The final section will present recommendations for follow-on thesis research.

E. AREAS FOR FURTHER RESEARCH

This thesis examined the DoN FHP budgeting and funding process and factors that have contributed to program variability and underfunding in the CNAP FHP. Because the FHP is so complex and involves many different interrelated logistics, financial management and budgeting areas, there are several related topics worthy of further research. The following topic areas and questions are intended to facilitate this effort:

1. *NWCF Charges Assigned to AVDLRs.* The charges that are assigned to the cost of repairing a BCM'd AVDLR component sent to the depot are questionable. Certainly the charges for labor, purchase of material and specific overhead costs charged to the repair of the component are legitimate. However, there is an indication that "other extraneous" costs are tacked on to the AVDLR repair. Therefore, an interesting study would be to track the migration of selected AVDLR components from a squadron to the depot and

account for all cost charges to the BCM'd component to assess whether these charges are legitimate. If there are extraneous costs assigned, are these costs accounted for in the surcharge and are the customers budgets "balanced" to absorb such charges? Further, in the spirit of "value added", this analysis may be able to confirm what agencies truly add value to the shipping, handling and storage of the AVDLR component, and whether processes and procedures can be improved, consolidated or eliminated to minimize costs to the "customer".

2. *NWCF Rate Formulation Process and AVDLR Pricing.* As noted, the process of forecasting and determining the NWCF surcharges, escalation rates and AVDLR pricing, relative to the FHP is extremely complex and ripe for improvement. Comprehensive research in this area is required to mitigate the complexity and to quantify the funding impact on the FHP (or any program for that matter). Other questions include: Is the "market basket" of AVDLRs a statistically valid sample for forecasting AVDLR demand? Is the NAVICP pricing algorithm adequate determining AVDLR prices? Is there a way to accurately predict the escalation rate changes for the FHP Resource Sponsor? Can the use of a Variable Surcharge rate reduce the cost of AVDLRs and more accurately identify true component cost to the customer?

3. *Marine Aviation Campaign Plan (MACP).* Further study of the MACP would prove to be an interesting and useful analysis. Specifically analyzing the pros and cons of the "sortie–based approach" for executing the FHP. The key question to answer is this: Is the sortie methodology a better cost basis for executing the FHP than the CPH approach, and are FHP costs more correlated to sorties or the number of flying hours? Other questions relative to the MACP include: Is the Marine Aviation Campaign Plan helping the Marines control FHP costs and are there any lessons learned that may be applied to the Commander Naval Air Forces Pacific FHP management? Additionally, one of the tenets of the MACP is to increase usage of simulators to sustain pilot proficiency and readiness. Hence, another area to examine is how the readiness achieved from simulation training can be measured and integrated into current aviation readiness reporting.

4. *FHP Cost Accounting Procedures.* There is concern that extraneous costs are being charged to the FHP at the Air Type Commander level. This "cost migration" may be contributing to FHP cost increases and if so, will contribute to errors in future FHP forecasts. Therefore, is this cost migration phenomenon occurring in the Air Type Commanders FHPs, and if so, what are the driving factors. The bigger issue relates to the fact that the Navy lacks

a standardized cost accounting system. A useful thesis would analyze the number of disparate accounting systems and procedures used throughout the Navy and the feasibility of designing and implementing a standard Activity-Based Costing system. Perhaps benchmarking or analyzing private sector successes in improving their accounting systems would be relevant to this analysis.

5. *Improving AVDLR Reliability.* Can AVDLR component reliability and other effectiveness factors be improved through better incentives, performance measurement and meaningful contracting? What are some alternatives for placing the onus on the contractor vice the government for proving reliability thresholds? Are thorough and sufficient LORA's properly evaluating all life-cycle costs for AVDLR's, and what has been the impact on component reliability, pricing and Fleet readiness?

6. *Special Interest Category Funding Other (FO).* The underfunding of the FO account and its impact on the CNAP FHP was explained in Chapter IV. A lack of resource sponsorship during the POM process has resulted in underfunding of the FO account, and has routinely required CNAP to reprogram FHP funds to sustain critical FO support programs. A recent FMB meeting (Oct 98) was held to discuss the best method to budget and resource the FO program. It was decided that N-88 would provide "requirements officers" to represent the various FO programs in the POM process. The current method for forecasting the requirement is based on historical data and professional judgement. An interesting follow-on study would be to assess the effectiveness of the new requirements officers in defending the FO program from cuts, and whether a more systematic formula or model could be developed to help the requirements officers defend the FO requirement. Since the FO program contributes directly to aviation readiness and the FHP, another interesting question to pursue is can the FO requirement and costs be integrated into the OP-20 model?

7. *Maintenance Philosophy Changes.* What has been the effect of the increased O-D maintenance philosophy on FHP costs? What have been the effects of outsourcing initiatives such as DVDs, CLS, and LECP upon AVDLR prices and the quality of ILS and aircraft readiness?

8. *Reliability Centered Maintenance.* What impact has Reliability Centered Maintenance (RMC) had on the cost, the demand-forecasting and adequacy of

AVDLRs and ILS? Does it hinder or improve mission readiness?

9. *FHP Cost Management Practices.* Can more efficient use of FHP funds be accomplished by assigning unit (squadron) commanders financial responsibility for AOM (AVDLR) funds? What would be the implications of doing so, on readiness, aircraft material condition and aviation safety? What type of incentives are required to make commanders more cost conscious, and would these incentives influence behavior that would result in "cutting corners" and aviation safety problems?

APPENDIX A. AFO & AFM LISTING

(OFC-01) Aircraft Flight Operations (AFO). This account is the primary fuel and petroleum, oil and lubricants (POL) account used during flight operations and any required flight equipment used in the operation of the aircraft. Authorized expenditures include:

- Aviation fuels consumed in flight operations
- Initial and replacement issues of authorized items of flight clothing and flight operational equipment for pilots and flight crews.
- Consumable office supplies for aviation squadrons
- Aerial film, recording tape, and chart paper consumed in flight
- Flight deck boots and safety boots used by squadron personnel directly involved in the readiness, launch, and recovery of aircraft.
- Liquid and gaseous oxygen consumed during flight by the aircrews.
- Aircraft maintenance costs and repair parts when obtained from any other military source.
- COG 2 forms when not directly used in support of maintenance.
- Consumable ASW operations center supplies when consumed in flight.
- Publications (other than those of a recreation nature) used to impart technical and professional knowledge of officers and enlisted personnel in the command
- Plaques for the CO and XO offices only.
- Special identification clothing, for example, flight deck jerseys, and helmets, used by squadron personnel in the readiness, launch and recovery of aircraft.

(OFC-50) Aircraft Operations Maintenance AOM. The AOM account is broken down into Aviation Depot Level Repairable (AVDLR) and Aviation Fleet Maintenance (AFM):

- AVDLR: AVDLRs represent the largest portion of funding within the FHP. Depot level repairable are financed by the Navy Working Capital Fund (NWCF). Under this process, the squadron finances the depot level repair and procurement of 7R COG repairable components through the local

[Ref. Appendix A: "*The Naval Aviation Maintenance Program (NAMP)*", OPNAVINST 4790.2g February 01, 1998].

replenishment of these repariables to replace Beyond Capability of Maintenance (BCMd), lost, or missing components. Although the squadron initiates the repair requirements, the supporting Intermediate Maintenance Activity (IMA)/station holds theses funds on behalf of the squadron. The IMA acts as the broker in deciding whether an AVDLR charge is made if repair is not possible. Thus the IMA and air station retains control of the AVDLR replenishment OPTAR via the local comptroller.

- AFM: Aviation Fleet Maintenance expenses include:

  - Paints, wiping rags, towel service, cleaning agent, and cutting compounds used in preventive maintenance and corrosion control of aircraft.
  - Consumable repair parts, miscellaneous material, and Navy stock account parts used in direct maintenance of aircraft, including repair and replacement of FLRs, AVDLRs, and related SE.
  - Pre-expended, consumable maintenance material meeting requirements of NAVSUP Publication 485 and NAVSUP Publication 567 used in maintenance of aircraft, aviation components, or SE.
  - Aviation fuel used at I-level in test and check of aircraft engines during engine buildup, change, or during maintenance. Oils, lubricants, and fuel additives used at both O-level and I-level.
  - Allowance list items (NAVAIR 00-35QH-2) used strictly for maintenance, such as impermeable aprons, explosive handlers coveralls, industrial face shields, gas welders gloves, industrial goggles, and nonprescription safety glasses.
  - Fuels used in related SE (shipboard only).
  - Replacement of components used in test bench repair Maintenance or equipment replacement of aircraft loose equipment listed in the AIR.
  - Consumable hand tools used in the readiness and maintenance of aircraft, maintenance and repair of components, and related equipment.
  - Safety and flight deck shoes used in maintenance shops.
  - Repair and maintenance of flight clothing and pilots and crew equipment.
  - Authorized decals used on aircraft.

- Replacement of consumable tools and IMRL allowance list items.
- Items consumed in interim packaging and preservation of aviation fleet maintenance repairables.
- Items, such as MAFs, MAF bags, equipment condition tags, and COG 1I forms, and publications, used in support of direct maintenance of aviation components or aircraft.
- Authorized special purpose clothing for unusually dirty work while performing maintenance of aircraft.
- Civilian labor only when used in direct support of AFM (requires ACC/TYCOM approval prior to use).
- Costs incurred for IMRL repair.
- Replacement of general purpose electronic test equipment allowance items which are missing or unserviceable (COG Z).
- Oils, lubricants, and fuel additives consumed during flight operations.
- Navy stock account repairable material (non-AVDLR) used in direct maintenance of aircraft component repair, or related SE.
- The requisitioning of material incidental to TD installation, for example, fluids, epoxies, and shelf life items, not to exceed one thousand dollars per TD per squadron.
- IMRL/TBA replenishment/replacement.

AFM funds shall ***NOT*** finance:

- Housekeeping, office supplies, or habitability items.
- Services, such as printing and office equipment maintenance.
- General station collateral equipment, including labor-saving devices (Section C allowance list items).
- Packing, crating, and preservation for storage or shipment.
- Data processing equipment and supplies.
- Operating costs of vehicular and mobile equipment other than shipboard SE.

APPENDIX A CONTINUED

- Non-aviation miscellaneous equipment, even though repair may be performed in the ship's AIMD, for example, MG-5, automotive vehicles, crash cranes, deck scrubbers, and fork lifts.
- Maintenance of SE by Public Works Departments or Centers.
- TDs requiring the local requisitioning of significant chargeable materials for the purpose of modifying or improving assigned airframes or equipment. These will be funded by COMNAVAIRSYSCOM, upon submission of a request citing TD number, aircraft type, or other system application, and total funds required. Significant chargeable materials are considered to be materials valued at one thousand dollars or more per TD per unit.
- Initial outfitting of IMRL and TBA allowance list items. NOTE: OFC-01/09 funds with Fund Code 8X will be used to fund IMRL and TBA initial outfitting.
- Labor, unless specifically authorized.

APPENDIX B AVDLR TOP 95 HIGH COST DRIVERS

*OI RANK	OI HEAD RANK	RANK	NIIN	FGC	SMIC	APPLICABILITY	NOMENCLATURE	97 BCM'S	97 AVDLR PR	97 AVDLR COST	98 BCM'S
		1	12,881,767	D0KA	TN	F-404 (FA-18)	COMPRESSOR ROTOR,	207	$ 276,760	$ 19,027,440	152
NR		2	12,011,357	AQFA	TN	F-404 (FA-18)	ROTOR,HIGH PRESSUR	200	$ 57,340	$ 11,468,000	179
3		3	12,643,928	HJUA	LU	CH-53E	HUB ASSEMBLY,ROTAR	24	$ 1,069,140	$ 12,829,680	6
3		4	8,871,944		BP	P-3	PROPELLER	172	$ 42,700	$ 7,344,400	99
26		5	14,194,805	A1TA	SN	TF34-GE-2	MODULE,PRESSURE,TU	57	$ 68,530	$ 3,906,210	61
1		6	13,703,011	F2KA	XQ	T-700	ROTOR,COMPRESSOR,	90	$ 74,540	$ 6,708,600	64
22		7	13,163,474	CQMA	LU	CH-53E	BLADE,ROTARY WING	231	$ 63,380	$ 7,320,390	115
	122	8	13,389,696	MBJA	WK	H-46	HEAD,ROTARY WING	30	$ 133,940	$ 4,018,200	28
5		9	11,520,863	HCHA	GF	FA-18	GEARBOX,ACCESSORY	129	$ 89,300	$ 5,759,850	83
		10	10,110,855		SZ	CAINS (ASN92)	GIMBAL ASSEMBLY	267	$ 28,790	$ 7,686,930	31
25		11	13,174,521	FBCA	SF	FA-18	POD,AIRCRAFT	44	$ 76,980	$ 3,387,120	43
	85	12	13,399,259	MA6A	WK	H-46	HEAD,ROTARY WING	26	$ 132,750	$ 3,451,500	24
20		13	1,101,616	XKJA	FP	P-3C	AMPLIFIER,RADIO FRE	77	$ 57,730	$ 4,445,210	41
NR		14	12,918,009	HKTA	TN	F-404 (FA-18)	COMPRESSOR ROTOR,	69	$ 37,910	$ 2,615,790	79
2		15	12,684,420	NGTA	LU	CH-53E	GEARBOX ASSEMBLY	18	$ 204,140	$ 3,674,520	9
	113	16	12,919,506	EBWA	TN	F-404 (FA-18)	CASE AND VANE ASSEM	66	$ 59,600	$ 3,933,600	51
NR		17	995,138,664	EGLA	UN	F402 (AV-8B)	TURBINE ROTOR,TURB	9	$ 345,480	$ 3,109,320	14
NR		18	5,872,530		EE	E-2C	AMPLIFIER,RADIO FRE	23	$ 227,020	$ 5,221,460	6
22		19	11,589,679		VH	SH-60B	BLADE,ROTARY WING	127	$ 26,890	$ 3,415,030	86
37		20	13,949,231		TN	F-404 (FA-18)	ROTOR,HPT	43	$ 47,530	$ 2,043,790	38
8		21	13,437,026	GRMA	GF	FA-18	SERVOCYLINDER	302	$ 11,570	$ 3,494,140	195
		22	14,134,476	EYNA	GF	FA-18	PROCESSOR,RADAR D	20	$ 237,550	$ 4,751,000	16
NR		23	14,002,184		GF	FA-18	RECEIVER,RADAR	8	$ 290,640	$ 2,325,120	12
NR		24	13,870,348	B4MA	BV	LTN-72	NAVIGATIONAL UNIT I	210	$ 14,180	$ 2,977,800	122
	122	25	12,019,639	MBJA	WK	H-46	ROTARY WING,HEAD	25	$ 133,940	$ 3,348,500	9
194		26	4,849,246	4SGA	FQ	T-64	COMPRESSOR ROTOR,	27	$ 59,900	$ 1,617,300	30
NR		27	14,399,549	CWLA	WK	H-46	BLADE,ROTARY WING	52	$ 37,944	$ 1,973,088	51
2		28	13,000,940		SF	FA-18	OPTICS,STABILIZER	91	$ 23,420	$ 2,131,220	67
NR		29	14,132,203		GF	FA-18	CONTROLLER PROCES	43	$ 90,660	$ 3,898,380	30
		30	11,589,678		VH	SH-60B	BLADE,ROTARY RUDDE	102	$ 24,050	$ 2,453,100	70
1		31	1,216,932	16BA	CY	AWG-9	ANTENNA ASSEMBLY	92	$ 24,430	$ 2,247,560	67
4		32	12,235,107	A6NA	TN	F-404 (FA-18)	TURBINE ROTOR,TURB	92	$ 18,630	$ 1,713,960	95
	85	33	12,019,601	MA6A	WK	H-46	ROTARY WING HEAD,FO	13	$ 132,750	$ 1,725,750	12
NR		34	11,969,857	GWRB	WK	H-46	TRANSMISSION ASSEM	27	$ 72,120	$ 1,947,240	16
14/3		35	2,019,809		BE	E-2/C-2	PROPELLER,AIRCRAFT	42	$ 57,430	$ 2,412,060	12
6		36	13,513,373	HF2A	GF	FA-18	SERVOCYLINDER	168	$ 15,780	$ 2,651,040	89
7		37	11,932,159	4JQA	CS	S-3	SERVOCYLINDER	50	$ 46,240	$ 2,312,000	25
		38	12,623,221	JR4A	SF	FA-18	POD,AIRCRAFT	20	$ 76,980	$ 1,539,600	18
NR		39	7,574,905	GE1A	EQ	T-58	COMPRESSOR ROTOR,	56	$ 58,120	$ 3,254,720	2
3		40	5,967,186	2LRA	SN	TF34-GE-2	ROTOR,LOW PRESSUR	16	$ 67,580	$ 1,081,280	21
		41	12,124,194		SM	ALQ-165	TRANSMITTER,COUNTE	14	$ 102,750	$ 1,438,500	15
/30/121		42	10,577,834	QNBA	DQ	T-56	ROTOR,TURBINE,AIRCR	53	$ 57,190	$ 3,031,070	1
11		43	12,326,815	AE3A	GF	FA-18	HOOK SUBASSEMBLY,A	314	$ 5,070	$ 1,591,980	205
13		44	8,688,836	CC3A	BP	P-3	CONTROL,PROPELLE	113	$ 16,020	$ 1,810,260	49
NR		45	12,204,832	JQVA	EN	J-52	ROTOR AND STATOR A	42	$ 45,680	$ 1,918,560	27
NR	1,6	46	9,280,072	Y0GB	FZ		GYROSCOPE,DISPLACE	402	$ 4,820	$ 1,937,640	131
NR		47	11,444,269	JSLA	QH	H-53	BLADE,ROTARY WING	49	$ 28,980	$ 1,420,020	44
		48	12,118,103		SM	ALQ-165	TRANSMITTER,COUNTE	21	$ 102,750	$ 2,157,750	12
11		49	12,894,810	FR0A	VH	SH-60B	GEARBOX,MODULE,MA	14	$ 83,060	$ 1,162,840	12
33		50	11,506,731	BS6A	GF	FA-18	CYLINDER AND PISTON	31	$ 47,160	$ 1,461,960	33

Sorted by 97 & 98 ADLR Costs
*Opportunity Index=NAVICP List That Takes Into Account MTBF, Readiness, and AVDLR Costs
[Ref. Appendix B: Naval Supply Systems Command, staff member database., October 1998]

NR=Not Ranked On NAVICP OI List
NI=Not Identified On NAVICP OI List

APPENDIX B CONTINUED

13		51	13,660,337	B5JA	XQ	T-700	COMPRESSOR,AXIAL,G	21	$	37,150	$	780,150	40
		52	12,594,293	P1KA	DH	H-3	HEAD,ROTARY WING	7	$	205,600	$	1,439,200	3
5		53	11,626,087		UN	F402 (AV-8B)	TURBINE,HIGH PRESSU	7	$	92,430	$	647,010	15
86		54	11,589,606		VH	SH-60B	BEARING,BLADE RETEN	171	$	3,010	$	514,710	156
6		55	12,226,122	DNLB	WK	H-46	TRANSMISSION ASSEM	46	$	29,620	$	1,362,520	24
25		56	12,429,588	EXFA	VH	SH-60B	ACTUATOR,FOLD,MAIN	128	$	8,540	$	1,093,120	81
9		57	12,960,634	HRTA	BP	P-3	COMPRESSOR,ROTARY	66	$	15,830	$	1,044,780	51
NR		58	13,972,401		EP	EP-3E	TUNER,RADIO FREQUE	45	$	44,060	$	1,982,700	10
10		59	11,452,669	LYYA	GF	FA-18	HEAT EXCHANGER,AIR	82	$	17,620	$	1,444,840	40
2		60	13,660,565		CS	S-3	CONVERTER,SIGNAL D	8	$	198,960	$	1,591,680	5
		61	10,402,181	X3FA	CY	AWG-9	WAVEGUIDE,SPECIAL	83	$	15,960	$	1,324,680	49
6		62	11,133,259	FRSA	CS	S-3	DRIVE,CONSTANT SPEE	138	$	16,310	$	2,250,780	1
		63	13,432,609	PQQA	GF	FA-18	INDICATOR,ATTITUDE	217	$	6,890	$	1,496,130	131
7		64	12,707,137	G2EA	SF	FA-18	PLATFORM ASSEMBLY,	142	$	13,330	$	1,892,860	23
26		65	995,134,730	C87A	GF	FA-18	ELECTRON TUBE	92	$	18,720	$	1,722,240	23
2		66	11,542,794		SF	FA-18	MODULE,FILM TRACTIO	142	$	15,250	$	2,165,500	3
NR		67	11,969,820	DLQB	WK	H-46	TRANSMISSION ASSEM	27	$	63,490	$	1,714,230	6
		68	309,552		LC	C-130	PROPELLER,AIRCRAFT	33	$	34,950	$	1,153,350	25
9		69	13,399,308	LAMA	VH	SH-60B	TIP,AIRCRAFT	413	$	5,270	$	2,176,510	1
		70	13,988,561	EHXA	F8	ASN-139	INERTIAL SYSTEM NAV	123	$	17,620	$	2,167,260	1
		71	10,734,475	0DXA	CY	AWG-9	TRANSMITTER,RADAR	10	$	35,780	$	357,800	17
58		72	11,861,619		SF	FA-18	DRIVE ASSEMBLY,DERO	66	$	11,000	$	726,000	93
NR		73	11,758,690	F8VA	EQ	T-58	COMPRESSOR ROTOR,	27	$	36,170	$	976,590	22
200		74	13,910,501	KBGA	CS	S-3	BRAKE,MULTIPLE DISK	84	$	24,400	$	2,049,600	6
2		75	4,091,557		FE	EA-6B	GOVERNOR,RAM AIR T	53	$	9,550	$	506,150	77
NR		76	11,861,418		SF	FA-18	OPTICS,STABILIZER	48	$	23,420	$	1,124,160	27
		77	11,358,372	2M4A	PQ	TF-30	NOZZLE SEGMENT,AFT	633	$	1,800	$	1,139,400	402
175		78	1,592,298		MH	H-46	GYROSCOPE,DISPLACE	556	$	3,540	$	1,968,240	6
NR		79	993,009,946	AQ9A	AT	F402 (AV-8B)	TURBINE ROTOR,TURB	7	$	252,170	$	1,765,190	8
	285	80	13,004,530	BAVA	TN	F-404 (FA-18)	FRAME ASSEMBLY,EXH	65	$	13,670	$	888,550	74
NR		81	993,960,847		UN	F402 (AV-8B)	ROTOR,FAN,AIRCRAFT	7	$	74,400	$	520,800	15
30		82	13,207,011	E9DA	FE	EA-6B	RADOME	41	$	30,480	$	1,249,680	18
1		83	13,181,228	C4HA	GF	FA-18	WINDSHIELD PANEL,AI	17	$	32,500	$	552,500	31
7		84	995,550,105	ACXA	AT	F402 (AV-8B)	HUB,ROTOR,GAS TURB	9	$	185,730	$	1,671,570	18
9		85	1,538,347		CY	AWG-9	AMPLIFIER,PARAMETRI	81	$	11,400	$	923,400	102
NR		86	14,227,332		AH	H-1	FORWARD LOOKING IN	9	$	50,060	$	450,540	21
		87	1,306,794	47EA	CY	AWG-9	ELECTRON TUBE	164	$	11,430	$	1,874,520	3
12		88	12,503,633	M0LA	XH	SH-60B	RECEIVER-TRANSMITT	20	$	35,280	$	705,600	25
		89	13,315,451	FR9A	DH	H-3	GEARBOX,ACCESSORY	6	$	155,220	$	931,320	4
2		90	11,723,653		SR	AV-8B	SERVOCYLINDER	78	$	18,150	$	1,415,700	61
	54	91	11,424,358	DQNA	LU	CH-53E	SERVOCYLINDER	72	$	17,580	$	1,265,760	48
20		92	11,567,310		SF	FA-18	DISPLAY UNIT,HEAD-U	40	$	17,450	$	698,000	36
		93	14,137,480	BSYA	HT	SH-60F	REELING MACHINE,CAB	17	$	101,210	$	1,720,570	5
12		94	13,336,641		GF	FA-18	MIXER STAGE,FREQUE	24	$	36,460	$	875,040	20
19		95	11,310,577	L10A	SN	TF34-GE-2	CASE AND VANE ASSEM	15	$	29,380	$	440,700	15

Sorted by 97 & 98 ADLR Costs
*Opportunity Index=NAVICP List That Takes Into Account MTBF, Readiness, and AVDLR Costs

NR=Not Ranked On NAVICP OI List
NI=Not Identified On NAVICP OI List

APPENDIX B CONTINUED

AVDLR NET PRICE AND SOURCE OF REPAIR

Surcharge (BP85R)	FY93	FY94	FY95	FY96	FY97	FY98	FY99
	30.18%	20.20%	36.18%	14.50%	27.95%	53.46%	42.80%

	NIIN	FGC	FY93		FY94		FY95		FY96		FY97		FY98		FY99	
1	000309552		$34,280	O	$25,500	Z	$23,340	Z	$26,080	Z	$34,950	D	$41,320	D	$37,310	C
2	001101616	XKJA	$10,370	O	$3,730	O	$17,240	P	$44,920	P	$57,730	*	$71,170	*	$62,320	C
3	001216932	16BA	$39,070	O	$105,870	O	$69,230	P	$36,630	P	$24,430	W	$30,260	P	$36,860	O
4	001306794	47EA	$18,920	I	$9,970	I	$23,120	I	$14,220	I	$11,430	*	$14,490	*	$11,670	*
5	001538347		$9,230	C	$8,340	C	$13,080	C	$7,950	C	$11,400	C	$9,850	C	$9,130	C
6	001592298		$7,380	O	$7,770	P	$7,570	P	$6,110	P	$3,540	*	$7,450	*	$4,310	*
7	002019809		$42,710	O	$36,220	O	$64,340	P	$55,520	P	$57,430	P	$121,960	*	$106,700	*
8	004091557		$6,910	O	$6,770	O	$6,300	P	$5,810	P	$9,550	*	$20,760	D	$19,400	D
9	004849246	4SGA	$16,620	O	$55,790	O	$72,920	P	$48,420	P	$59,900	P	$111,330	P	$116,550	O
10	005872530		$213,520	C	$137,490	C	$135,260	C	$169,370	C	$227,020	W	$271,060	W	$237,500	C
11	005967186	2LRA	$11,080	O	$13,950	O	$59,650	P	$46,310	P	$67,580	P	$108,710	P	$54,400	O
12	007574905	GE1A	$9,570	O	$17,460	O	$68,190	O	$49,480	O	$58,120	P	$55,700	P	$49,930	P
13	008688836	CC3A	$17,580	O	$17,090	O	$23,580	P	$19,470	P	$16,020	*	$23,710	*	$24,340	*
14	008871944		$37,800	O	$58,100	O	$61,770	P	$52,750	P	$42,700	*	$85,350	*	$89,040	*
15	009280072	Y0GB	$5,250	O	$4,240	O	$5,440	O	$5,140	O	$4,820	*	$7,700	*	$7,960	*
16	010110855		$26,880	C	$30,280	C	$49,010	C	$31,850	C	$28,790	C	$43,090	C	$34,980	C
17	010402181	X3FA	$5,980	O	$14,050	O	$18,580	P	$13,610	P	$15,960	P	$23,360	P	$33,060	O
18	010577834	QNBA	$8,050	O	$10,350	O	$12,800	P	$57,440	O	$57,190	*	$70,460	*	$68,820	C
19	010734475	0DXA	$22,700	O	$54,900	O	$38,530	P	$30,900	P	$35,780	P	$105,750	P	$89,960	O
20	011133259	FRSA	$8,680	O	$10,720	O	$22,560	P	$16,390	P	$16,310	P	$23,060	P	$29,560	O
21	011310577	L10A	$43,530	O	$34,650	O	$57,270	O	$37,000	O	$29,380	P	$91,490	P	$57,140	P
22	011358372	2M4A	$1,700	O	$1,550	Z	$1,760	Z	$1,750	Z	$1,800	D	$2,280	D	$2,030	D
23	011424358	DQNA	$6,670	O	$6,960	O	$12,720	P	$9,500	P	$17,580	*	$13,280	*	$12,940	O
24	011444269	JSLA	$39,600	O	$33,090	O	$31,290	P	$25,990	P	$28,980	P	$34,650	P	$31,700	O
25	011452669	LYYA	$2,220	C	$1,200	C	$4,130	P	$2,990	P	$17,620	*	$27,280	C	$21,570	C
26	011506731	BS6A	$19,380	O	$29,340	O	$48,590	P	$27,770	P	$47,160	P	$43,320	P	$40,130	O
27	011520853	HCHA	$35,920	O	$26,010	O	$29,680	P	$22,270	P	$89,300	*	$90,320	*	$34,040	*
28	011542794		$12,120	C	$10,380	C	$10,110	A	$17,530	A	$15,250	W	$21,210	W	$18,500	A
29	011567310		$15,260	C	$11,880	C	$13,290	A	$45,520	A	$17,450	W	$33,440	P	$29,730	*
30	011589606		$2,170	C	$11,210	C	$2,220	C	$2,590	C	$3,010	C	$14,650	C	$13,280	C
31	011589678		$23,500	C	$12,350	O	$18,140	P	$10,070	P	$24,050	C	$26,060	C	$22,660	*
32	011589679		$17,290	O	$11,760	O	$15,680	P	$35,320	P	$26,890	C	$39,160	C	$31,740	*
33	011626087		$128,700	O	$129,660	O	$128,150	P	$92,400	P	$92,430	P	$146,330	P	$136,100	O
34	011723653		$25,940	C	$9,740	C	$16,870	P	$11,510	P	$18,150	*	$8,030	W	$7,850	O
35	011758690	F8VA	$9,440	O	$22,260	O	$40,580	P	$42,990	P	$36,170	P	$51,670	P	$43,970	O
36	011861418		$18,600	C	$48,880	C	$41,670	A	$67,340	A	$23,420	A	$35,500	A	$32,390	A
37	011861619		$9,570	C	$7,490	C	$8,720	A	$10,120	A	$11,000	W	$15,300	W	$4,770	A
38	011932159	4JQA	$44,300	C	$50,880	C	$46,920	C	$41,430	C	$46,240	C	$51,390	C	$29,010	C
39	011969820	DLQB	$52,290	O	$37,250	O	$78,340	O	$60,780	O	$63,490	P	$85,440	P	$175,050	P
40	011969857	GWRB	$38,530	O	$42,120	O	$93,180	O	$75,410	O	$72,120	P	$122,370	P	$176,610	P
41	012011357	AQFA	$53,920	O	$73,330	O	$97,400	P	$54,480	O	$57,340	*	$58,200	*	$74,930	P
42	012019601	MA6A	$81,990	O	$98,730	O	$139,600	O	$190,300	O	$132,750	P	$189,940	P	$173,790	P
43	012019639	MBJA	$64,350	O	$45,620	O	$128,340	O	$139,010	O	$133,940	P	$203,830	P	$172,370	P
44	012118103		$107,470	C	$105,310	C	$136,590	C	$91,950	C	$102,750	W	$64,380	W	$57,710	O
45	012124194		$104,540	C	$105,310	C	$136,590	C	$91,950	C	$102,750	W	$118,430	W	$115,780	O
46	012204632	JQVA	$35,380	O	$130,350	O	$57,310	O	$42,110	O	$45,680	P	$38,740	P	$56,940	O
47	012225122	DNLB	$18,750	O	$25,840	O	$41,760	P	$33,460	P	$29,620	P	$57,980	P	$90,930	O

APPENDIX B CONTINUED

48	012235107	A6NA	$4,450	O	$55,190	O	$21,080	O	$18,260	O	$18,630	P	$25,120	*	$24,560	O
49	012328815	AE3A	$7,860	O	$4,020	O	$4,930	P	$4,280	P	$5,070	P	$7,140	P	$5,850	O
50	012429588	EXFA	$4,380	C	$4,240	C	$11,720	C	$13,450	C	$8,540	C	$19,630	C	$13,500	*
51	012503633	M0LA	$26,480	C	$29,080	C	$78,920	P	$39,850	P	$35,280	*	$48,350	*	$29,290	*
52	012594293	P1KA	$141,360	O	$166,760	O	$235,970	O	$205,810	O	$205,600	O	$469,570	C	$416,250	C
53	012623221	JR4A	$10,070	C	$47,020	C	$127,140	A	$47,460	A	$76,980	A	$109,570	A	$32,140	A
54	012643928	HJUA	$188,090	O	$219,070	O	$337,750	P	$279,320	P	$534,570	*	$584,640	*	$503,640	*
55	012684420	NGTA	$109,630	C	$132,460	C	$314,580	P	$246,510	P	$204,140	*	$385,090	*	$409,680	P
56	012707137	G2EA	$17,750	C	$14,100	C	$16,980	A	$10,750	A	$13,330	A	$16,290	A	$14,910	A
57	012881767	D0KA	$11,100	O	$97,800	O	$132,400	P	$79,680	P	$275,760	*	$317,820	O	$102,240	P
58	012894810	FR0A	$38,990	O	$64,110	O	$86,670	P	$74,690	P	$83,060	*	$146,350	C	$194,200	*
59	012918009	HKTA	$11,940	O	$98,760	O	$46,480	P	$32,560	O	$37,910	P	$57,380	P	$30,960	P
60	012919506	EBWA	$19,280	O	$15,560	O	$65,630	P	$54,410	O	$59,600	P	$61,790	P	$45,420	P
61	012960634	HRTA	$19,660	O	$24,740	O	$22,700	P	$16,140	P	$15,830	*	$30,230	*	$28,470	*
62	013000940		$19,290	C	$34,850	C	$38,320	A	$63,580	A	$23,420	A	$35,500	A	$32,390	A
63	013004530	BAVA	$7,010	O	$3,870	O	$8,770	P	$8,050	O	$13,670	W	$14,900	*	$13,000	P
64	013163474	CQMA	$19,150	O	$15,540	O	$26,060	P	$21,570	P	$63,380	C	$77,920	*	$24,760	*
65	013174521	FBCA	$10,070	C	$47,020	C	$103,210	A	$30,790	A	$76,980	A	$109,570	A	$32,140	A
66	013181228	C4HA	$5,230	O	$5,130	O	$6,650	O	$4,300	O	$32,500	C	$45,020	C	$72,540	P
67	013207011	E9DA	$7,670	O	$5,550	O	$44,290	P	$26,600	P	$30,480	*	$39,120	D	$32,330	P
68	013315451	FR9A	$101,930	O	$115,990	O	$178,260	O	$95,900	O	$155,220	P	$244,390	C	$231,130	P
69	013336641		$6,670	O	$30,020	C	$80,320	C	$41,570	C	$36,460	C	$49,140	*	$2,800	*
70	013389696	MBJA	$64,350	O	$45,620	O	$128,340	O	$139,010	O	$133,940	P	$203,830	P	$172,370	P
71	013399259	MA6A	$81,990	O	$98,730	O	$139,600	O	$190,300	O	$132,750	P	$189,940	P	$173,790	P
72	013399308	LAMA	$2,770	C	$2,080	O	$3,120	P	$2,950	P	$5,270	*	$3,660	*	$3,200	*
73	013432609	PQQA	$6,360	O	$8,550	C	$5,410	P	$5,160	P	$6,890	*	$5,920	*	$3,700	*
74	013437026	GRMA	$16,490	O	$9,080	O	$11,290	P	$6,180	P	$11,570	P	$13,100	P	$11,860	O
75	013513373	HF2A	$50,420	O	$20,750	O	$28,320	P	$15,350	P	$15,780	*	$12,830	*	$6,370	*
76	013660337	B5JA			$28,370	Z	$32,140	Z	$44,470	Z	$37,150	*	$52,080	*	$46,040	*
77	013660565				$192,790	C	$224,030	C	$178,260	C	$198,960	C	$180,570	C	$157,770	*
78	013703011	F2KA			$71,200	Z	$57,610	Z	$57,350	Z	$74,540	*	$91,560	*	$80,950	C
79	013870348	B4MA					$14,810	C	$13,910	C	$14,180	C	$19,020	C	$16,570	C
80	013910501	KBGA							$12,820	P	$24,400	P	$9,280	O	$4,330	O
81	013949231								$45,670	O	$47,530	O	$119,300	O	$74,960	O
82	013972401								$41,680	C	$44,060	O	$56,560	C	$50,660	C
83	013988561	EHXA							$14,510	O	$17,620	C	$12,270	C	$13,550	C
84	014002184								$328,370	O	$290,640	W	$255,340	A	$4,510	A
85	014132203										$90,660	C	$17,520	A	$13,020	A
86	014134476	EYNA									$237,550	C	$61,280	W	$12,720	A
87	014137480	BSYA									$101,210	O	$33,220	X	$41,700	C
88	014194805	A1TA									$68,530	O	$142,920	*	$84,360	O
89	014227332										$50,060	C	$70,230	C	$58,210	C
90	014399549	CWLA									$37,944		$56,060	O	$6,720	O
91	993009946	AQ9A							$211,060	O	$252,170	O	$30,350	O	$853,890	P
92	993960847										$74,400	O	$95,920	O	$93,760	O
93	995134730	C87A									$18,720	W	$23,160	W	$32,520	*
94	995138664	EGLA									$345,480	O	$283,690	P	$257,390	O
95	995550105	ACXA									$185,730	O	$15,360	O	$13,890	O

APPENDIX C. DESCRIPTION OF FO PROGRAMS

1A1A-FO

TAD

Funding in this program finances TAD requirements associated with operations and operational training for deployment of both Navy and Marine Tactical Aviation (TAC AIR) squadrons. TAD funding is used to finance Navy and Marine travel of aircraft squadron detachments from combat training sites; training of Functional Wings (FUNCWINGS), TYPEWINGS, squadron personnel at designated training sites; travel for maintenance and operations related technical support conferences, travel to "A" school training sites; six-month P-3 deployments; shore basing of deployed CV and CVN units.

Individual Material Readiness List (IMRL)

Funding in this program supports IMRL requirements for both Navy and Marines active aviation squadrons. IMRL specifies quantities of aviation support equipment that is needed by a command to perform its maintenance functions. This list is kept current by a monthly report called Support Equipment Resource Management Information System (SERMIS). IMRL equipment tools are essential in order to ensure our aircraft are in good condition and meet the required mission.

Operational Staffs

The operational staffs in this program are the two Functional Wings (FUNCWINGS) and nine TYPEWINGS that provide all administrative support to Pacific Fleet (PACFLT) aviation squadrons. Labor/materials, training, etc. However, ADP is funded out of 1A2A-FO.

1A2A-FO

TAD

This program finances travel for Fleet Readiness Squadrons (FRS) aircraft squadron detachments to and from combat training sites; both Navy and Marine training of FUNCWINGS/TYPEWINGS squadron personnel at designated training sites; travel to maintenance and operations related technical support conferences; travel to "A" schools, emergency leave, and travel of designated maintenance personnel to effect repairs on aircraft away from home base.

[Ref. Appendix C: "Description of Programs Including The "FO" Special Interest Item" CINCPACTFLT FHP Staff Memorandum, October 14, 1998.]

APPENDIX C. CONTINUED

Fleet Imaging Command Pacific

FLTIMAGCOMPAC provides audiovisual and Fleet Combat Camera Group Support. The Fleet Combat Camera Group provides documentation of both combat and non-combat areas as directed by CINCPACFLT. They have played a vital part in the Persian Gulf, SOMALIA and Joint Exercises.

Transportation of Things

This program provides support to squadrons deployments away from their base which permit the squadrons to use ranges/ordinance not routinely available to them. Funds are used to finance transportation of aviation supplies and equipment to and from exercises, purchases of aviation supplies and equipment/tools, and other material requirements in support of PACFLT aviation program.

Tactical Support Centers (TSC)

This program finances COMPATWINOSPAC and NAS North Island Technical Support Centers (TSC). Funds are provided for maintenance, operational and administrative requirements for Anti-Submarine Warfare (ASW) squadrons. The TSC provide the ASW squadrons with flight data utilized in ASW operations. HQ at Barber's Pt, and Dets at North Island, Whidbey Island, Diego Garcia, Misawa, Kadena, and Kami Seya.

FMFPAC Other Aircraft Support

This program supports the Marines Flight Hour Program (FHP). It provides Automated Data Processing (ADP), meteorological, INMARSAT, van maintenance and other aircraft support.

Marines Air Traffic Control Squadrons (MATCALS)

Provides air traffic control to Marine squadrons. Funding is used to operate and repair/replace end items related to MATCS and Landing Systems radar and AN/TPN-22 Precision Approach equipment.

Marines FAST Contact

This contract provides Marines Aviation logistics Squadrons with supply management analysis, on-site assistance visits, development of system procedures and documentation, designing/development and presentation of training, and general supply/management problems analysis.

APENDIX C. CONTINUED

Staff Fleet Automated Data Processing (ADP) Support

This program provides ADP support to COMNAVAIRPAC staff and Fleet squadrons. Finances computer purchases, software, maintenance, and training in microcomputers.

Fleet Area Control and Surveillance Facility (FACSFAC)

FACSFAC provides scheduling, coordination, and control of operational areas for subsurface, surface, and airborne military platform operations within and transiting to and from these areas. Funds are also used to support the maintenance of FACSFAC electronic radar equipment. We have FACSFAC HQs at San Diego and a Det a Barber's Pt.

Commercial Air Services

This program provides contractual services for Air Intercept Control (AIC), tracking (IRACK), Anti-Submarines Air Control (ASAC), Over-The Horizon (OTH), and Aerial Target Towing for both WESTPAC, Mid-PAC and West Coast training units.

Navy/Marines Drones/Target/Range Services Support (transferred to 1C4C/1A7A)

This program provides for the maintenance of PACFLT targets and drone usage at non-PACFLT ranges and launch consumables (missile shoots).

FUNCWINGS/TYPEWINGS

Provides civil service personnel support and materials in support of PACFLT simulators. The personnel required for this support are a Contact Officer Technical Representative and Education Specialist.

Fleet Aviation Specialized Operational Training Group Pacific (FASOTRAGRUPAC)

FASOTRAGRUPAC provides training in aviation maintenance, administration, acoustic analysis, NALCOMIS, microcomputers, Survival-Evasion-Resistance-Escape (SERE) training, Anti-Submarine Warfare (ASW)/Electronic Warfare~w) training on systems equipment and tactics. FASOTRAGRUPAC also provide approved audiovisual aviation training support and other related media services, and specialized ship's and mobile training team support as directed. We have five FASOTRAGRUPAC Dets and a HQ at NAS North Island. UIC:57094 HQ at NAS North Island; UIC:45002 Det at Whidbey; UIC:44997 Det Guam; UIC:42343 Det North Island; UIC:44995 Det Atsugi; UIC:44998 Det Barber's Pt. (OPTAR allocates sub-OPTAR).

APENDIX C. CONTINUED

Fleet Simulators Support

The funds used in this program are to finance Advance Acoustic Analysis Training (AAAT), Aviation Training Support System (ATSS), Command Aircraft Crew Training (CACT), Contractor Operation and Maintenance of Simulators (COMS) and Instructional Systems Development (ISD). These programs provide the operations and maintenance, software development, and air-crew training needed to support PACFLT aviation simulators training.

TYPEWINGS/Simulator School Training

Funding for administrative, personnel, training and maintenance support for TYPEWINGS and three training school: a) Sea-Based Weapons and Advance Tactics School, Pacific at NAS North Island; b) Electronic Combat Weapons School at NAS Whidbey; c) Carrier Airborne Early Warning Weapons School at NAS Fallon (CAWS was transferred to CNO 09BF Jul 96 DON Budget); d) STRIKE Fighter Weapon School, Pacific at NAS Lemoore.

Miscellaneous Support

Any other funding support that does not fall under the above categories and is in support of aircraft operations and training.

LIST OF REFERENCES

1. Assistant CNO for Air Warfare Home Page, (1998), Naval Aviation Vision Document: *Naval Aviation...Forward Air Power... From the Sea*, [http://www.hq.navy.mil/airwarfare.htm]., October 1998.

2. Wildavsky, Aaron, *The New Politics of the Budgetary Process*. Addison-Wesley Educational Publishers Inc, 3rd ed., 1997.

3. Naval Center for Cost Analyses, "CNO Flying Hour Program: CCA Model Update Brief", 29 September 1998.

4. "Practical Comptrollership Manual", Naval Postgraduate School, Monterey, CA., August 1998.

5. Jones, L.R., and Bixler, Glenn C., *Mission Financing To Realign National Defense*, JAI Press Inc., 1992.

6. Schick, Allen., "CRS Report for Congress, Manual on the Federal Budget Process", Congressional Research Service, The Library of Congress Press, 1997.

7. Schmoll, Joseph H., "Introduction to Defense Acquisition Management", Defense System Management College, 1996.

8. "Highlights of the Department of the Navy FY 1999 Budget", [http://navweb.secnav.navy.mil/pubbud/99pres/highbook/99high_u.pdf].

9. Smith, George S., *Management of the Navy Flying Hour Program: Responsibilities and Challenges for the Type Commander*, Master's Thesis Naval Postgraduate School, Monterey, California, September 1990.

10. "The Naval Aviation Maintenance Program (NAMP)". OPNAVINST 4790.2G, 01 February 1998.

11. Personal interview with Commander Air Wing Nine staff member, Naval Air Station Lemoore, Lemoore, CA, 16 October1998.

12. Personal interview with Comptroller staff member, Naval Air Station Lemoore, Lemoore, CA, 30 September 1998.

13. Personal interview with Flying Hour Program staff member, Commander Naval Air Force Pacific, San Diego, CA, 10 September and 16 October 1998.

14. Personal interview with Flying Hour Program Air Operations staff member, Commander Naval Air Force Pacific, San Diego, CA, 1 July 1998.

15. Assistant Chief of Naval Operations for Air Warfare (1996 Draft) N-88 "Flying Hour Program (FHP) Desktop Procedures Guide". 1996.

16. Commander Naval Air Forces Pacific Flying Hour Program Brief for RADM McCarthy, San Diego CA., January 1998.

17. Personal interview with Flying Hour Budget Analyst Staff Member, Commander In Chief Pacific Fleet, Pearl Harbor, HI, 27 August 1998.

18. Assistant Chief of Naval Operations for Air Warfare Naval Aviation "Flying Hour Program Brief", Washington, D.C., 1998.

19. Department of the Navy, Naval Supply Systems Command Publication 545, Depot Level Repairable (DLR) Requisitioning, Turn-in and Carcass Tracking Guide, February 1989.

20. Personal Interview with Flying Hour Program Manager, Special Assistant for the Flying Hour Program (N-88F), Washington D.C., 4 September1998.

21. Commander Naval Air Force U.S. Pacific Fleet/Commander Naval Air Force U.S. Atlantic Fleet, COMNAVAPACINST 3500.67D/COMNAVAIRLANTINST 3500.63C, "Squadron Training and Readiness", (Draft). August 1998.

22. Murray, Michael N. III., *The Marine Corps Flying Hour Program: Responsibilities and Challenges for the Type Commander.* Masters Thesis. Naval Postgraduate School, Monterey, California, December 1989.

23. Personal Interview with Navy (Financial Management and Comptroller). Budget Analyst, Washington D.C., 2 and 8 September1998.

24. Personal Interview with Assistant Chief of Naval Operations for Air Warfare, Budget Analyst, (N-88), 6, 7 and 14 October 1998.

25. Personal Interview with Flying Hour Program Analyst, Special Assistant for the Flying Hour Program (N-88F), Washington D.C., 8 October 1998.

26. Personal Interview with Office Sectretary of Defense (Comptroller), Budget Analyst, Washington D.C., 5 August 1998.

27. Korb, Lawrence J., *The Budget Process in the Department of Defense, 1947-77, The Strengths and Weaknesses of the Three Systems*, Public Administration Review, American Society for Public Administration (ASPA), 1997.

28. Huzar, Elias., *The Purse and the Sword, Control of the Army by Congress through Military Appropriations*, Cornell University Press, 1950.

29. Hobkirk, Michael D., *The Politics of Defense Budgeting: A Study of Organization and Resource Allocation in the United Kingdom and the United States*, National Defense University Press, 1983.

30. Personal Interview with Assistant Chief of Naval Operations for Air Warfare, Budget staff analyst, (N-88), 26 and 39, and 31 October, 1998.

31. Maze, Rick., "Retired Leaders: Readiness Problems Didn't Happen Overnight", Navy Times, Army Times Publishing Co., October, 1998.

32. Rosen, Harvey S., *Public Finance*, McGraw-Hill. 1995.

33. Schick, Allen., *The Capacity to Budget*, The Urban Institute Press, 1990.

34. Thompson, Fred, and Jones, L.R., Reinventing The Pentagon, *How the New Public Management Can Bring Institutional Renewal*, Jossey-Bass Publishers, 1994.

35. Heizer, Jay and Render, Barry., *Productions and Operations Management*, Prentice Hall. 1996.

36. Commander Naval Air Forces Pacific "Flying Hour Program Brief" "FY 97, FY 98 and Beyond", October, 1998.

37. Braken, Paul., "The Military After Next", The Washington Quarterly, MIT Press, Autumn, 1993.

38. Byrne, Vanessa J., *Analysis of the Aircraft Flying Hour Program at the Pacific Missile Test Center, Master's Thesis*, Naval Postgraduate School, Monterey, California, June 1987.

39. Arkley, Larry E., *Modeling F/A-18 Flight Hour Program Costs Using Regression Analysis*, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1994.

40. Department of the Navy, Office of the Chief of Naval Operations "Flying Hour Program Pricing, Memorandum" for Director, Air Warfare Division (N88) Ser. N8/7U638139, Washington D.C., 14 April 1997.

41. Naval Center for Cost Analyses, "CNO Flying Hour Program Model Synopsis", June 1998.

42. Commanding General 1st Marine Air Wing, Information Paper: "Cost Per Hour Differences (1st MAW vs. 3rd MAW)", January 1997.

43. Personal Interview with Flying Hour Program Analyst, Special Assistant for the Flying Hour Program (N-88F), Washington D.C., 9 and 24 October 1998.

44. Personal interview with Flying Hour Program staff member, Commander Naval Air Force Pacific, San Diego, CA, 21-23 and 29 October 1998.

45. Naval Inventory Control Point – Philadelphia (NAVICP-P), "Aviation Depot Level Repairable (AVDLR) Cost Working Group Findings" Brief, Philadelphia, PA., 1998.

46. Aviation Maintenance Supply Readiness (AMSR) (23 Apr 98), Changes Needed to Support the Navy and Marine Corps of the 21st Century. San Diego, CA.

47. Commander Naval Air Forces Pacific, "AV-3M Documentation Brief", October 1997.

48. Assistant Chief of Naval Operations for Air Warfare staff member, "Budget OPTAR vs. AV3M Reported Data" E-mail, Washington, D.C., September 25, 1998.

49. Defense Acquisition Deskbook, Version 2.5, September 30, 1998.

50. Commander Naval Air Forces Pacific "Memorandum of Agreement – Fleet Buy Out of the Replacement Interial Navigation Unit (RINU) for P-3 Platform", San Diego, CA., October 1998.

51. Personal Interview with Commander Naval Air Forces Pacific Maintenance Department staff member, San Diego, CA., 21 October 1998.

52. Commander Naval Air Forces Pacific Aviation Financial Analysis Tool (AFAST) data inquiry, October 21, 1998.

53. Blanchard, Benjamin S., *Logistics Engineering and Management*, IV Edition, Prentice Hall, 1992.

54. Rockwell-Collins Company., [http://www.collins.rockwell.com/government-systems/products/pgarc210.shtml], November 1998.

55. Personal Interview with Commander Naval Air Forces Pacific Avionics Maintenance staff member, San Diego, CA., 21 October 1998.

56. Personal Interview with Naval Aviation Depot – Jacksonville P-3C Readiness Analysis Team staff member, Jacksonville, FL., November 3, 1998.

57. Personal Interview with Commander Naval Air Forces Pacific Engine Manager staff member, San Diego, CA., October 21, 1998.

58. Naval Supply Systems Command "Navy Working Capital" Brief, Mechanicsburg, PA., June 1998.

59. Assistant Chief of Naval Operations for Air Warfare (N-88) Flying Hour Program "Pricing the OP-20" Brief, Washington, D.C., October 1998.

60. Personal Interview with Naval Supply Systems Command Surcharge staff member, November 2, 1998.

61. Personal Interview with Assistant Chief of Naval Operations for Air Warfare Flying Hour Program Analyst, staff member, (N-88C), Washington D.C., September 4, 1998.

62. Personal Interview with Naval Supply Systems Command (NVSPHQ) staff member, Philadelphia, PA, August 21, October 27 1998.

63. Levin, D. M., Berenson, M. L., Stephan, D., *Statistics for Managers*, Prentice Hall, 1997.

64. Personal Interview with Analyst, Special Assistant for the Flying Hour Program (N-88C), Washington D.C., November 5 1998.

65. Personal Interview with Commander Naval Air Forces Pacific Supply Department staff member, San Diego, CA., October 21, 1998.

66. "Marine Aviation Campaign Plan Update – 1998", Marine Corps Gazette, Marine Corps Association, May 1998.

67. North, James, H., (MARFORPAC CNA Representative Memorandum), "Predicting Flight Hour Costs – The Case of AV-8B's", Camp Smith, HI., April 21, 1998.

68. Navy Information Technology-21 (IT-21) Home Page, [http://www.inpo.navy.mil/it-21.html].

69. Commander Naval Air Forces Pacific, "FY99 Apportionment/FT00-01 Budget" briefing, San Diego CA., 22 July 1998.

70. Sherbrooke, Craig, C., "Using Sorties vs. Flying Hours to Predict Aircraft Spares Demand", Logistics Management Institute, April 1997.

71. Naval Supply Systems Command (NAVSUP), "Cash and Surcharge in the Navy Working Capital Fund (NWCF)" Video Briefing, Mechanicsburg, PA., July 1998.

72. Edwards, Michael, V., *Flight Hour Costing at the Type Commander and Navy Staff Levels: An Analytical Assessment*, Master's Thesis, Naval Postgraduate School, Monterey, California., December 1992.

73. RADM Eaton, Donald R. USN (ret.), "A New Stratgey: Cultural Change for Better Logistics by the 21st Century", Naval Postgraduate School, Monterey CA, 1998.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center 2
   8725 John J. Kingman Road, STE 0944
   Fort Belvoir, VA 22060-6218

2. Dudley Knox Library 2
   Naval Postgraduate School
   411 Dyer Road
   Monterey, CA 93943-5101

3. Marine Corp Representative 1
   Naval Postgraduate School
   Code 037, Bldg. 234, HA-220
   699 Dyer Road
   Monterey, CA 93940

4. Prof. Larry R. Jones, (CodeSM/Jn)... 1
   Naval Postgraduate School
   Department of Systems Management
   Monterey, CA 93943-5103

5. John E. Mutty, (Code SM/Mu) 1
   Naval Postgraduate School
   Department of Systems Management
   Monterey, CA 93943-5103

6. Commander Naval Air Forces Pacific (CNAP).. 2
   Attn: Code N01F3, CDR R. Pottberg
   PO Box 357051
   NAS North Island, CA 92135-7051

7. Peter J. Keating 1
   2208 North Trinidad St.
   Falls Church, VA 22043

8. David A. Paulk.. 1
   6519 Jermar LN NW
   Seabeck, WA 98380