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NAVAL AVIATION

The Flying Hour Program's Budget and Execution

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The Honorable John P. Murtha
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

The Honorable Daniel K. Inouye
Chairman, Subcommittee on Defense
Committee on Appropriations
United States Senate

This report presents the results of our examination of the Navy's flying hour program. The Navy's fiscal year 1987 flying hour budget was $3 billion and funded 2.2 million flying hours for training, support, operations, and administration. Nearly all the program's hours were budgeted for training. The average monthly flight time required for each aircrew was derived using formulas that consider forecasts of aircraft inventory and number of aircrews and military judgment.

We found that the Navy's management controls ensure that hours flown and dollars spent do not exceed those allocated. But, neither the Navy's budget nor its management information system link requirements determination and resource expenditures to any measure of program achievement. The Navy has recently initiated several efforts to develop measures that will demonstrate the benefits derived from various levels of flying.

We are sending copies of this report to the Director, Office of Management and Budget, and the Secretaries of Defense and the Navy, as well as other interested parties.

GAO staff members who made major contributions to this report are listed in appendix IV.

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Associate Director, Navy Issues

Executive Summary

Purpose

The ability of the Navy to perform its missions effectively is critical to the defense of the nation and its success in wartime. To that end, it is essential that the Navy's tactical air forces, which strike naval and land targets, be flown by crews proficient in their military flying tasks. These tasks, and related ship-based take-offs and landings, are difficult and dangerous, requiring highly developed skills. The Navy's primary means of developing and maintaining these skills is hands-on training through its flying hour program, which funds the number of hours naval aircraft can be flown.

Because of the importance of maintaining aircrew proficiency, the former Chairmen, Subcommittees on Defense, House and Senate Committees on Appropriations, asked GAO to review how flying hour requirements are determined and the validity of the determinations. GAO was also asked to report budget execution trends and determine whether the Navy's flying matched its justification in the budget request.

Background

The Navy's flying hour program for fiscal year 1987 cost $3 billion and funded 2.2 million flying hours for training, support, operations, and administration. Nearly all the program's hours (85 percent) were budgeted for training, using different formulas based on forecasts of aircraft inventory and aircrews and military judgment as to the average monthly flight time needed for each aircrew.

To obtain a detailed understanding of the program, GAO reviewed the budgeting and execution of the Navy's tactical air and antisubmarine warfare flying hours budget. This is about 62 percent of the Navy's flying budget. GAO also examined, in detail, the Navy's flying hour budgeting and execution for the F-14A, a tactical fighter plane.

Results in Brief

Formulas used to estimate flying hour requirements for the Navy's aircraft operation budget are based on standards supported by expert judgment that have not yet been validated in any other way. The Navy currently has two extensive studies underway that are examining the relationship between various flying skills and the hours of training a pilot receives. At this point, the program has not established specific mission-related performance goals that can be linked to how requirements are determined or resources used. Overall, the hours flown and costs incurred generally correlate with the total amounts estimated in the Navy's budget justification; however, there are variations between

the flying hours budgeted and those actually flown by the aircraft types. Even when these variances appear significant, Navy reports do not identify the reasons for the variances.

Principal Findings

Program Lacks Objective Budget Estimates and Performance Goals

The Navy's budget estimates for aircraft operations are based on flying hour requirements computed from formulas that quantify hours and funds to satisfy the operating tempo the Navy expects to achieve. The formulas employ standards that have not yet been objectively tested or demonstrated as valid by the Navy. For example, the 25-hour monthly standard to maintain F-14A aircrew proficiency, which the Navy has used to compute F-14A flying hour requirements since the aircraft became operational, is the same standard the Navy used for its F-4, an earlier fighter.

Current management controls insure that hours flown and dollars spent do not exceed those allocated by the Navy Comptroller. However, neither the Navy's budget nor its management information system link requirements determination and resource expenditures to any measure of program achievement. In fact, the Navy has not adopted mission-related performance objectives describing what the program is expected to achieve (e.g., number of combat ready aircrews trained) and therefore cannot measure whether estimated requirements and requested resources are valid.

Variances in Program Not Analyzed

The flying hour program is a part of the Navy's operations and maintenance appropriation, and the Navy has flexibility to reallocate resources among various aircraft to meet unforeseen emergencies. For fiscal years 1983 to 1987, the Navy's actual flying hours under the program ranged from 2 million to 2.2 million, representing at least 94 percent of the hours requested in the Navy's budget. Over the period, the Navy spent at least 90 percent of the $1.8 to $3.0 billion requested each year. Although the overall data show that program execution parallels the request, individual aircraft statistics show wide variances in flying hours and funds allocated and used. For example, for fiscal years 1984 through 1987, actual F-14A flying hours used varied from 4.6 percent less to 17.2 percent more than requested.

Although variances in program budget and execution appear significant, Navy reports do not identify the reasons for the variances, and management does not evaluate the effect on program operations or the Navy's ability to carry out its missions. For example, during fiscal years 1984 to 1987, the Navy database showed that deployed Atlantic Fleet and Naval Reserve F-14A aircrews flew 23,296 hours more than estimated, costing $56.2 million more than was justified by flying hour formulas. However, the Navy does not have a way of knowing how the increased flying hours affected F-14A pilot proficiency or its ability to conduct tactical air missions.

Department of Defense and Navy Actions

Acting on the results of GAO's work, the House Committee on Armed Services, on April 5, 1988, in House Report 100-563, directed the Navy to provide budget justifications in the future that include measurable mission-related goals and the resources needed to meet each goal, a method for measuring the degree to which the goals are met, and an explanation of the variances between goals and actual results.

While the Navy cannot, at this point, relate the resources it expends to the operational capabilities attained, the Navy and the Department of Defense (DOD) are undertaking a number of studies that are designed to identify this relationship. GAO recognizes that it is frequently not an easy task to identify and determine which measures portray the results of a program accurately and clearly. Devising the best way to demonstrate the application of resources and resulting operational effectiveness is difficult and is likely to be an evolutionary process.

Recommendations

Because of the efforts that DOD and the Navy have underway, GAO is making no recommendations.

Agency Comments and GAO's Evaluation

DOD generally concurred with GAO's report.

DOD disagreed that Navy management did not routinely identify and evaluate variances in budgeted and actual flying hours and costs. DOD stated that variances were reviewed at the carrier air wing level but not evaluated by specific type of aircraft. DOD said it was essential that the carrier air wing commander be able to use the various types of aircraft in a wing in a flexible way and to modify training plans in response to specific threats as scenarios change during deployed operations.

GAO agrees that flexibility is required. However, the Navy bases its flying hour budget on the operations of individual aircraft types. If the planned flying hours are based on the Navy's expert judgment of what is needed for pilots to become proficient and maintain their proficiency and if that judgment is accurate, then it is possible that variances between the planned and actual flying by aircraft type could adversely affect the proficiency and mission readiness of pilots. These variances need to be closely monitored. In recognition of the value of analyzing variances by aircraft type, DOD stated that ongoing Navy studies will include a review of the best method to address program variances whether by carrier air wing or aircraft community.

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Abbreviations

DOD	Department of Defense
FHCRS	Flying Hour Cost Reporting System
GAO	General Accounting Office
TACAIR/ ASW	tactical air/antisubmarine warfare
TMS	type, model, and series

Introduction

The Navy's ability to perform its missions effectively is critical to the defense of the nation and its success in wartime. To that end, it is essential that aircrews who perform tasks related to the Navy's tactical air mission—striking naval targets and protecting ships from air threats—be proficient. These tasks, and related shipboard take-offs and landings, are difficult and dangerous. They demand highly developed skills that aircrews must apply on missions that arise with little notice, such as those flown near Libya in 1986. The Navy's primary means of providing proficient aircrews is through hands-on training in its flying hour program. This program funds the number of hours Navy and Marine Corps aircraft can be flown and provides each aircrew with a certain amount of flight time.

Overview of Flying Hour Program

The Navy's flying hour program accounts for part of the operating costs for most Navy and Marine Corps aircraft—specifically, the costs for fuel, other petroleum products, and repairs to aircraft components, as well as those associated with administrative supplies and services.[1] On the basis of various objectives, the Navy estimates the number of hours aircraft must be flown and the costs associated with those hours. Flying hour requirements in the Navy's justification to the President's budget request for fiscal year 1987 were projected at 2.2 million flying hours, costing $2.9 billion, or 13 percent of the amount requested for Navy operations and maintenance.

Funds provided for the program are used for

- training (aircrew training; unit or squadron training; and battle group, fleet, and joint service exercises),
- operations (reconnaissance and communications),
- support (logistics and airlift, services to others, as when transporting material or people), and
- administration (delivering aircraft, maintenance-check flights, gunnery, or bombing competitions, etc.).

The Special Assistant to the Deputy Chief of Naval Operations for Air Warfare is designated the program manager and is responsible for program budgeting, coordination, and monitoring. The Navy Comptroller allocates funds to the Commanders of the Atlantic and Pacific Fleets and the Naval Reserve and monitors program spending. These

[1] Procurement, overhaul, and repair of aircraft and engines are paid for by other programs, as are the aircrew and the maintenance payroll, maintenance training, and the costs of aviation facilities.

commanders are responsible for providing combat ready aircrews and for ensuring that hours flown and funds spent do not exceed those allocated.

Previous Reviews and Congressional Concerns Regarding the Program

Our prior reports questioned the adequacy of the processes the Navy uses to budget and execute this program.

- In 1976, citing examples of nonessential flights and an inability to know if readiness standards were being met by aircrews, we reported[2] that the Navy needed to manage its flying hour program more effectively. We recommended that the Navy improve the accuracy of reports on aircrew readiness, eliminate unnecessary flying, and increase the benefits derived from hours flown.
- In 1979 we reexamined the program and concluded that the process for programming training requirements for tactical and patrol aircraft employed faulty practices.[3] We concluded that the Navy's standards for P-3 patrol aircraft flying could have been reduced and that its central programming of flying hours did not adequately consider the operating environment, such as material readiness and maintenance problems. Also, flying by many supervisory and staff pilots may not have been necessary. We recommended that the Department of Defense (DOD) improve its guidance for managing the services' flying hour programs by more closely linking budget requests to actual needs.
- In 1983 we reported[4] that the Navy's budget estimates were based on formulas that did not represent the missions being funded; i.e., the budget was based on training needs but much of the Navy's flying was for nontraining activities. Further, the Navy lacked program goals and performance indicators to measure program effectiveness and to develop future budget requests.

The Congress has taken steps to obtain reliable information on the costs and benefits of DOD programs, including the Navy's flying hour program. On April 5, 1988, citing our continuing concerns regarding the flying hour program, the House Committee on Armed Services, in House

[2]Flying Hour Programs of the Military Services: Opportunities for Improved Management (LCD-75-451, June 18, 1975).

[3]The Services Can Further Refine Management of Flying Hour Programs (LCD-79-401, Mar. 27, 1979).

[4]The Defense Budget: A Look at Budgetary Resources, Accomplishments, and Problems (GAO/PLRD-83-62, Apr. 27, 1983).

Report 100-563, directed the Navy to provide budget justifications that include

- measurable mission-related goals and the resources needed to meet each goal,
- a method for measuring the degree to which the goals are met, and
- an explanation of the variances between goals and actual results.

Objectives, Scope, and Methodology

At the request of the former Chairmen, Subcommittees on Defense, House and Senate Committees on Appropriations, we reviewed certain aspects of the management of the Navy's flying hour program. We were asked to review how flying hour requirements were determined and the validity of the determinations, report program trends, and determine if program execution matched the justifications in the budget requests.

We concentrated on three major segments—tactical air forces, fleet air training, and tactical air and antisubmarine reserve forces[5] —that represented about 1.4 million hours and 62 percent of the program for fiscal year 1987. Our review covered the program for fiscal years 1983 through 1987.

To determine how the Navy budgets, manages, and executes the program and to obtain an understanding of the program's management controls, we interviewed officials and reviewed pertinent documents at Navy headquarters, fleet, and operating commands. (See app. I for a list of the activities visited.) To gain further insight into the program, we did a case study of the F-14A aircraft to illustrate these processes for one type of aircraft. To determine how closely program execution matched the hours and funds requested in the President's budget, we gathered and analyzed the Navy's information on funds spent, hours flown, and number of aircrews. We could not compare program expenditures to the amounts appropriated because flying hour funds were not separately appropriated nor were the amounts identified in the Navy's operations and maintenance appropriation.

Many of our analyses were based on computer data obtained from three Navy systems. Data included estimated and actual flying hours and dollars, maintenance activity, and aircraft inventory. However, we were

[5]Other program segments include operations, intelligence and communication, undergraduate aircrew training, and airlift support. These segments represented 836,411 hours and 38 percent of the amounts requested in the President's fiscal year 1987 budget.

unable to verify the accuracy of much of the data drawn from computer systems because the Navy did not retain the original records.

We performed our review in accordance with generally accepted government auditing standards.

Budget and Execution Processes of the Flying Hour Program

As part of the operations and maintenance appropriation, the Navy's flying hour program is budgeted and executed under DOD's Planning, Programming, and Budgeting System. The Department of the Navy has assigned key managerial responsibilities for this program to the Office of the Deputy Chief of Naval Operations for Air Warfare and the Navy Comptroller. Fleet and Reserve commanders implement the program.

Programming and Budgeting Flying Hours and Costs

The general programming and budgeting of the flying hour program are directed by DOD guidance in the areas of policy, strategy, force and resource planning, and fiscal decision-making. Programming determines the number of hours that must be flown to meet the various needs of the Navy's active and Reserve forces. Budgeting provides estimates for funding requirements and, given likely appropriation limits, the reductions in the program's hours and funding.

Programming Hours and Costs

During the programming process, the Special Assistant to the Deputy Chief of Naval Operations for Air Warfare, as the program manager, computes flying hour requirements—the number of hours needed for each aircraft type, model, and series (TMS). The method of calculating hours varies by program segment. For example, support and administrative flying use historical aircraft utilization rates, and each of the four other segments—tactical air/antisubmarine warfare (TACAIR/ASW), carrier deployable reserves, fleet replacement squadrons, and undergraduate training—has its own formula.

These formulas are undocumented, communicated by the outgoing to the incoming program manager, and represent the historical practice of past managers. The formulas use certain values, of which some—like the monthly flying hours per aircrew—vary by aircraft, and others—such as the reduction for flight simulator use—are applied to all aircraft. The need for accurate, objective standards is evidenced by their importance in computing flying hour requirements and therefore Navy budget requests.

Budgeting Hours and Costs

After determining the number of hours needed per aircraft type, the program manager estimates the cost per flying hour for each and adjusts it for inflation. Next, the program manager multiplies the cost per hour by the number of hours for each aircraft. The product of the hours and costs constitutes the program's resource requirements.

According to Navy officials, program funding has historically been less than programmed requirements. Therefore, the Navy Comptroller has made adjustments to reduce the hours for selected aircraft. The adjusted results appear in justification documents that support the Navy's funding request for aircraft operations in the President's budget.

Funding for aircraft operations is provided primarily through the general purpose forces budget activity of the Navy's operations and maintenance appropriation. The Navy's congressional budget submission identifies the funds requested for general purpose forces and for each general purpose forces account, such as aircraft operations. For aircraft operations, it identifies total amounts requested for TACAIR/ASW, fleet air training, and fleet air support operations. Other supporting budget exhibits, which are not usually submitted with the budget, identify hours and costs budgeted for each specific type of aircraft.

The Congress appropriates one amount for all Navy operations and maintenance accounts. The Navy then allocates the appropriated funds among operations and maintenance budget activities. The Navy may move funds among the various accounts within the general purpose forces budget activity throughout the execution year without informing the Congress. The reprogramming of $5 million or more between operations and maintenance and other budgets, such as between the aircraft procurement budget and the operations and maintenance budget, requires congressional approval.

In commenting on a draft of this report, DOD concurred with our basic description of the programming and budgeting of the flying hour program. However, it took exception to our statement that the formulas used to determine flying hour requirements are passed informally from the outgoing program manager to the incoming program manager. While DOD agreed that there is no Navy-wide directive that encompasses all aspects of this program, it stated that the program is managed under defined and accepted programming guidance applicable to all Navy programs and that historical records are maintained to provide the program manager with insight into past management. It added that the program manager must have a broad knowledge of program guidance and historical documents, as well as a thorough understanding of the planning, programming, and budgeting processes. DOD also provided a more detailed description of certain aspects of the programming and budgeting processes of the flying hour program. (See app. III.)

We did not question the qualifications of Navy personnel managing the flying hour program nor the programming guidance. Our point was that the process for computing flying hour requirements was not documented and that the values used in its requirements formula were not validated. The Navy agreed.

Executing the Program

Once funds are appropriated by the Congress, the Navy Comptroller allocates operations and maintenance funds (i.e., confers obligational authority) to major claimants.[1] Within their obligational authority, commanders and squadron subordinates fund flying hour program requirements to train combat ready aircrews. They also ensure that hours flown and obligations incurred do not exceed resources allocated. The hours and obligations are also reported to the program manager, who uses the data to monitor program execution.

Flow of Funds to Users

The Navy Comptroller distributes quarterly obligational authority to fleet commanders in chief based on their spending plans and prior quarterly obligation rates. If any quarterly obligation exceeds plans, obligational authority for the remaining quarters may be decreased.

Quarterly obligational authority is passed from fleet commanders in chief through command channels to squadron commanders. Squadron commanders must ensure that hours flown and obligations incurred do not exceed the resources allocated without prior written approval. Major claimants, however, may reallocate obligational authority and flying hours among their squadrons and aircraft as needed.

Reporting Program Data

Until recently, the Navy operated four systems to collect data on the program. Three of these maintained data on specialized aspects of the program—aircraft maintenance, aircraft inventory, and naval officers' flying. The fourth, the Flying Hour Cost Reporting System (FHCRS), maintained data on hours flown and obligations incurred.

The FHCRS was designed to enable the program manager to monitor the program and develop estimates for program projections. Under it, squadrons prepare and submit to their major claimants monthly reports

[1] In the flying hour program, major claimants include the Commander, Naval Air Forces, U.S. Atlantic Fleet; the Commander, Naval Air Forces, U.S. Pacific Fleet; the Chief of Naval Education and Training; the Commander, Naval Forces, Europe; and the Commander, Air Reserve.

that identify number of operating aircraft, number of hours flown, and amount of fuel consumed. These reports are summarized in a monthly flying hour cost report that the major claimants submit to the program manager, who uses the information to estimate future flying hour costs. This cost report lists the financial obligations directly associated with operating and maintaining aircraft, as well as the number of hours flown and the number of operational aircraft.

According to the program manager, on January 1, 1987, the Navy consolidated all but the FHCRS into one new system, the Naval Flight Record Subsystem. This subsystem uses the same data source—the flight record that each aircrew fills out after each flight—and produces the same reports formerly created by the three separate systems. The difference is that the source data are entered into one system rather than piecemeal into three separate systems.

Monitoring Program Execution

In monitoring the program, the program manager uses the FHCRS to ensure that obligations match funding, coordinate with the Navy Comptroller on selected program data, and review major exceptions to planned flying hours and obligations. The program manager prepares and submits a quarterly summary report to the major claimants who inform the program manager of significant deviations in funding and flying hours found during their reviews.

The Navy Comptroller also monitors execution of the TACAIR/ASW segment to check the status of obligations. The Comptroller uses quarterly reports that have been specially prepared by the fleet commanders in chief and that contain data on the number of onboard aircrews and the hours flown for four mission areas (training, exercises, contingency operations, and services).

Although controls have been established to monitor hours flown and obligations incurred to ensure they do not exceed resources allocated, the Navy has flexibility in deciding where to place its resources. Managers may move operations and maintenance funds between the various types of aircraft and among other categories of the general purpose forces budget activity to respond to operating conditions, e.g., the unavailability of aircraft due to the failure of or the lack of spare parts. Flying hour program execution depends on many factors. For example, world conditions, such as the Persian Gulf situation, dictate Navy decisions on how and where to use flying hour resources.

The Flying Hour Program Needs Measures of Effectiveness

Funding to maintain the readiness of the Navy's airplanes plus the proficiency of its crews is provided through the Navy's operations and maintenance budget. But, the Navy's budget submission does not directly relate costs or funding requests for flying hours to measures of proficiency or effectiveness. Consequently, the Congress cannot determine how more or less resources would affect mission effectiveness or aircrew proficiency. In prior reviews of the Navy's flying hour program, we questioned whether program operations were linked in any demonstrable way to proficiency or effectiveness. Our current review raised many of those same concerns. However, responding to congressional concerns raised during this review, the Navy has initiated several efforts to quantify relationships between hours flown and the attainment of skill proficiency and mission effectiveness. These studies have identified links between the application of resources and the attainment of skill proficiency. However, identifying the best measures is likely to be an evolutionary process.

Program Lacks Effective Budget Estimates and Performance Measures

The Navy's budget estimates for aircraft operations are based on flying hour requirements that are computed from formulas that quantify hours and funds to satisfy the operating tempo the Navy expects to achieve. According to Navy officials, key values incorporated in the formulas, such as standard monthly flying hours for aircrew training needed to maintain combat proficiency and authorized crew-to-seat ratios,[1] are based on historical or expert military judgments. These formulas are passed informally from program manager to program manager as rotations of assignments occur.

Although we discussed the process and the formulas with Navy officials, they did not provide, and we could not locate, documented validations of the values or documentation of how the values came to be accepted as justifications for flying hour requirements. For example, the 25-hour monthly standard used for F-14A flying hours was carried over from the F-4 aircraft. There is no study that computed the standard and it has not been changed or reviewed since the aircraft was introduced into the fleet.

Fleet and Reserve commanders are responsible for providing combat ready aircrews and for insuring that hours flown and funds spent do not exceed those allocated by the Navy Comptroller. Current managerial

[1]The crew-to-seat ratio is the ratio between the number of authorized aircrews and the number of authorized aircraft. The ratio also takes into account sickness, injuries, and leave.

controls insure that commanders do not exceed dollar allocations in total for the general purpose forces budget activity. But neither the Navy's budget nor its management information system link requirements determination or resource expenditures to any measure of program achievement. In fact, the Navy has not adopted mission-related performance objectives describing what the program is expected to achieve and therefore cannot tell whether requirements estimated or resources requested are valid. In our opinion, such measures or performance objectives might be based on (1) the number of combat ready aircrews trained, (2) the number of mission hours flown developing skills and building proficiency in performing missions like the antisubmarine warfare missions, or (3) the number of hours flown for special operations, such as the Persian Gulf mission.

During April 1988, citing our continuing concerns regarding the flying hour program, the House Committee on Armed Services, in its report on the National Defense Authorization Act for fiscal year 1989, directed the Navy to incorporate specific flying hour goals and related costs in its fiscal year 1990 budget submission and to report fiscal year 1988 actual expenditures and 1989 estimated expenditures for each goal.

Variances Are Not Evaluated for Program Effects

Navy managers do not have procedures or information that would routinely identify and evaluate variances in budgeted and actual flying hours and costs. If more hours are flown by F-14A aircrews, then aircrews that fly A-6s or F/A-18s must fly less or funds may possibly be taken from other program categories, such as real property maintenance or ship modernization. In any event, the Navy cannot explain the impact of variances as the Congress requested. Consequently, the Navy does not have a way of measuring the impact that flying more or less hours has on its ability to carry out its missions, such as TACAIR and ASW.

From fiscal years 1983 to 1987, the annual number of flying hours ranged from 2 million to 2.2 million and the cost ranged from $1.8 billion to $3 billion. A comparison of funds and flying hours estimated with those used for this period shows that the Navy, in total, used 94 percent of the flying hours estimated and spent 90 percent of its funds. The hours flown and the costs incurred were generally less than estimated until fiscal year 1987, when both hours and costs exceeded amounts estimated by about 2.6 percent. (See table 3.1.)

Table 3.1: Overall Program Variances From the Navy's Budgets in Hours and Dollars

	Hour variance		Dollar variance	
Fiscal year	Thousands	Percent	Millions	Percent
1983	−111.3	−5.2	$−41.1	−2.2
1984	−30.9	−1.5	3.3	0.2
1985	−26.2	−1.2	−172.4	−6.3
1986	−71.5	−3.2	−328.9	−9.9
1987	55.5	2.6	79.7	2.7

Source: U. S. Navy data

Although hours flown and costs incurred generally correlate with the total amounts estimated in the Navy's budget justification, our review of flying hour statistics for specific types of aircraft showed much greater variances in the flying hours and the funds allocated and used. (See tables 3.2 and 3.3.)

Table 3.2: Flying Hour Variances From the Navy's Budgets for Selected Aircraft by Fiscal Year

	1984		1985		1986		1987	
TMS aircraft	Hours	Percent	Hours	Percent	Hours	Percent	Hours	Percent
A-6E	4,293	7.7	−935	−1.6	3,184	5.6	−1,911	−3.0
A-7E	6,526	5.8	−1,489	−1.2	−10,817	−9.0	2,826	3.3
E-2C	8,408	29.9	−4,573	−10.7	−3,322	−8.2	1,693	5.0
F-14A	15,999	17.2	−1,341	−1.2	−1,422	−1.2	−5,676	−4.6
F/A-18	−3,341	−14.2	−3,359	−9.1	−1,143	−1.7	−427	−.5
SH-2F	3,629	8.3	1,739	3.6	−1,514	−2.8	2,536	5.0
SH-3H	−1,504	−3.2	1,006	2.0	−5,010	−9.3	−1,400	−2.8
P-3C	2,449	1.8	9,672	6.6	−6,555	−4.2	−1,029	−.7
S-3A	−1,554	−2.6	5,677	10.3	3,208	5.4	5,033	9.3

Source: Navy Flying Hour Projection System and GAO computations

Table 3.3: Flying Hour Cost Variances From the Navy's Budgets for Selected Aircraft

Dollars in millions

	1984		1985		1986		1987	
TMS aircraft	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
A-6E	$12.072	13.97	$-.612	-.46	$36.113	25.31	$10.074	6.02
A-7E	14.023	12.87	-2.129	-1.29	8.498	4.70	.031	.02
E-2C	3.725	17.00	-11.641	-20.94	-6.127	-9.07	13.309	24.38
F-14A	13.191	6.93	4.899	1.61	-51.283	-13.82	-7.035	-2.15
F/A-18	-5.069	-14.22	-22.826	-22.46	-53.708	-12.53	-17.334	-17.11
SH-2F	1.414	8.01	.566	1.61	21.626	43.41	-2.538	-3.82
SH-3H	-2.393	-11.24	-8.018	-17.26	-16.154	-23.97	-5.838	-11.30
P-3C	1.152	.81	4.269	2.06	-9.804	-4.00	-7.323	-3.28
S-3A	-8.730	-15.32	-.951	-.97	-21.581	-15.56	29.882	30.04

Source: Navy Flying Hour Projection System and GAO computations

Discussions with Navy officials provided the following opinions as to why some variations occurred between budgeted and actual costs and hours.

- The requirement for aviation depot level repairables (a category of repair parts) was made a part of the flying hour program in fiscal year 1986. However, the cost was not included in the fiscal year 1986 flying hour budget estimate. Consequently, flying hour costs exceeded the budget estimate by $34 million. In the following year, the Navy over compensated and increased its estimate. These actions caused variations in flying hour costs without a corresponding increase in the number of hours flown.
- The cost of flying varies from one squadron to another, even if both fly the same type of plane. For example, A-6E costs for training squadrons differ from A-6E tactical squadrons. Atlantic Fleet costs differ from Pacific Fleet costs. The type of flying also influences costs. Air combat requires more fuel and puts more strain on the aircraft than general instrument flying. This could increase both costs for fuel and for maintenance. (A report on variances, such as those reflected in the tables, could provide explanations similar to those cited.)

F-14A Flying Hour Program

To obtain a thorough understanding of the flying hour program, we examined the Navy's program operations for F-14A tactical fighter for fiscal years 1983 through 1987. We selected the F-14A because it represents a significant part of the Navy's allocation for TACAIR/ASW flying

hours. In fiscal year 1986, the F-14A had the largest dollar allocation among the Navy's TACAIR/ASW aircraft. The methods for calculating flying hour requirements for each of the three types of squadrons — deployable, fleet training, and Reserve F-14A — are discussed in more detail in appendix II.

For fiscal year 1987, the Navy estimated that 120,730 hours and $319.7 million were needed to fly the F-14A aircraft. These amounts represented 5.5 percent of the hours and 10.6 percent of the dollars requested for all Navy flying. The percentage of F-14A flying hours to total flying hours has been essentially constant since 1983. However, our analysis showed that during fiscal years 1984 through 1987 deployed Atlantic Fleet F-14A squadrons flew 18,700 more hours than requirements formulas justified, at an additional cost of $46.5 million. During the same period, Reserve F-14A aircrews flew 4,500 more hours than estimated, at an additional cost of $9.8 million.

The Navy can move funds between the various types of aircraft and among other categories within the general purpose forces budget activity. The additional funds used for F-14A flying may be taken from other Navy aircraft programs or other budget categories. However, the Navy, as a matter of routine, does not identify these variances or their effects on the individual aircraft program. Therefore, questions of whether the proficiency of F-14A aircrews improved as a result of increased flying or whether other programs were adversely affected by the corresponding reductions are not addressed.

In commenting on a draft of this report, DOD disagreed that Navy management did not routinely identify and evaluate variances in budgeted and actual flying hours and costs. DOD stated that variances were reviewed at the carrier air wing level but not evaluated by specific type of aircraft. Carrier air wings are composed of a mixture of aircraft types and, as a unit, are responsible for multiple missions. Training to meet these multiple missions requires use of different carrier air wing assets at different times. DOD expressed the view that it is essential that the carrier air wing commander have the flexibility to modify training plans in response to specific threats as scenarios change in deployed operations. We agree that flexibility is needed, but the Navy bases its flying hour budget on the operations of individual aircraft types. Also, its training and skill qualification are by aircraft type. If the planned flying hours are based on the Navy's expert judgment of what is needed for the pilots to become proficient and maintain their proficiency and if that judgment is accurate, then it is possible that variances between the

planned and actual flying by aircraft type could adversely affect pilot proficiency and mission readiness. These variances need to be closely monitored on a Navy-wide basis as well as by the carrier wing commander. DOD stated that ongoing Navy studies are expected to produce a methodology to track the determination of requirements through the budget process to program execution, and will include a review to determine the best method to address program variances whether by carrier air wing or aircraft community.

DOD and Navy Actions

Acting on the results of our work, the House Committee on Armed Services, on April 5, 1988, in House Report 100-563, directed the Navy to provide budget justifications that include measurable mission-related goals and resources needed to meet each goal and develop a method for measuring the degree to which the goals and objectives are met. The Committee also directed the Navy to examine the variances between its objectives and actual results, explain the differences, and submit this analysis along with its annual budget justification.

DOD and the Navy have begun a number of efforts that are designed to measure the relationship between the kinds and amounts of resources expended and the operational capabilities attained. Stated another way, the Navy and DOD are working on developing output measures of readiness. When available, these measures could be used to track variations in readiness that are associated with variations in resource levels and should be useful to those who plan and program the resources needed for operations.

DOD agrees that better performance indicators can be developed to measure readiness. In commenting on this report, it discussed an ongoing research project aimed at developing linkages between flying hours and indicators of operational performance. The major research performed under this project during 1988 has been an analysis of Navy carrier landing grades and Marine Corps bombing scores as a function of pilots' recent and career flying experience. As expected, the results indicate that there is a positive relationship between both short-term and long-term flying experience and performance. An extensive program of future research is planned to follow up on these results.

The Navy has also begun two projects to gain a better understanding of the effects of variation in hours flown on pilot performance during the

various phases of the deployment cycle.[2] Another study is planned to develop a methodology to determine aircrew readiness for each type of aircraft. According to the Navy, this process should also result in the development of indicators for justifying budget resources and measuring execution. However, transition from the current process to a system that more precisely links readiness to resources will be a major evolution that is likely to require several years.

DOD also recognized the need to develop and maintain a system for aggregating data on the benefits of additional flying hours. For example, in June 1987 DOD directed the Institute for Defense Analysis to provide a study on improved methodologies for relating flying hour activities to operational readiness and safety measures. This study is to be conducted in three phases; phase one has been completed. A conclusion of phase one is that data exist to develop links between flying hours and measures of operational performance and safety for a wide range of aircraft. Candidate performance measures include carrier boarding rates, bombing scores, mishap rates, carrier landing scores, flight check grades, and air effectiveness measurements. The second phase, now underway, is to identify as many illustrative relationships between flying hours and performance as possible. Plans for the third phase include a broad research effort covering all of the services and a wide range of aircraft types.

Conclusions

The Navy's budget requests are based on the resources the Navy expects to use, such as the fuel needed by its aircraft and the flying hours to be used by each aircrew. However, formulas used to estimate flying hour requirements are not based on validated standards or on identified mission needs. Also, neither the Navy's budget nor its management information system link requirements determinations or resources used to any measure of program achievement, such as the number of combat ready aircrews trained, the number of mission hours flown to maintain qualifications for combat missions, or the number of hours flown for special operations, such as the Persian Gulf mission. Furthermore, Navy management does not have procedures or information systems that routinely identify variances in flying hours and funds allocated and used or that analyze their effects on aircrew proficiency and effectiveness. Finally, the Navy has not adopted performance objectives describing what the

[2]A deployment cycle consists of about 6 months deployment aboard an aircraft carrier; 1 month in a personnel turnover and leave status upon return from deployment; 8 months of less intensive turnaround training; and 3 months of more intense training for the next deployment.

program is expected to achieve, which further compounds the program manager's task. As a result, the Navy cannot determine the effectiveness or efficiency of the program's application of resources (flying hours and funds).

In response to the House Committee on Armed Services' direction and this effort, DOD and the Navy have several studies underway to accumulate and analyze cost and performance data and to relate the data to flying hour requirements. Military judgment is likely to play a role in determining combat readiness and pilot proficiency, but the high cost of flying dictates that emphasis be placed on developing better measures of pilot proficiency and mission effectiveness. We recognize that it is frequently not an easy task to identify and determine which measures portray the results of a program accurately and clearly. Devising the best way to demonstrate the application of resources and the resulting operational effectiveness is likely to be difficult and an evolutionary process.

Activities Visited

Washington, D.C.	• Office of the Secretary of Defense, Training Policy Directorate • Office of the Deputy Chief of Naval Operations for Air Warfare • Office of the Navy Comptroller
New Orleans, Louisiana	• Commander of Naval Reserve Force • Commander of Naval Air Reserve Force
Norfolk, Virginia	• Commander of Naval Air Force, Atlantic Fleet • U.S.S. Dwight D. Eisenhower (CVN-69)
Virginia Beach, Virginia	• Commander, Fighter, Medium Attack, Early Warning Wing, Atlantic • Fighter Wing One, Naval Air Station, Oceana • Fighter Squadron 101, Naval Air Station, Oceana
San Diego, California	• Commander Naval Air Force, U.S. Pacific Fleet • Fighter, Airborne Early Warning Wing, U.S. Pacific Fleet • Fighter Squadrons 124, 191, and 194, Naval Air Station, Miramar
Dallas, Texas	• Fighter Squadrons 201 and 202, Naval Air Station, Dallas

Case Study of the F-14A Aircraft

The F-14A aircraft (see fig. II.1) is the Navy's premier fighter and is designed and built specifically to fight enemy planes. Known as the "Tomcat," the F-14A is a two-seat, twin-engine aircraft with variable sweep wings that can land and take-off from aircraft carriers or land bases. It can detect aircraft and missiles in the sky at extended ranges and track and attack several of them simultaneously. As of April 1987, the Navy had received 557 F-14A aircraft.

Who Flys the F-14A?

The F-14A is flown by Navy deployable, fleet training, and Reserve squadrons. The Navy has 22 F-14A deployable squadrons, each authorized 14 aircrews[1] and 12 aircraft. These squadrons are an integral part of 11 of the 13 carrier air wings and rotate through an 18-month operational cycle. (See fig. II.2.) The cycle consists of about 6 months deployment aboard an aircraft carrier; 1 month in a personnel turnover and leave status upon return from deployment; 8 months of less intense, turnaround training; and 3 months of more intense training for the next deployment.

Deployable squadrons fly F-14As to maintain aircrew readiness and conduct air operations for the carrier task force. In addition, squadron augmentation aircrews in the Naval Reserve use the deployable squadrons' aircraft and flying hours on a limited basis to maintain aircraft carrier landing qualifications.

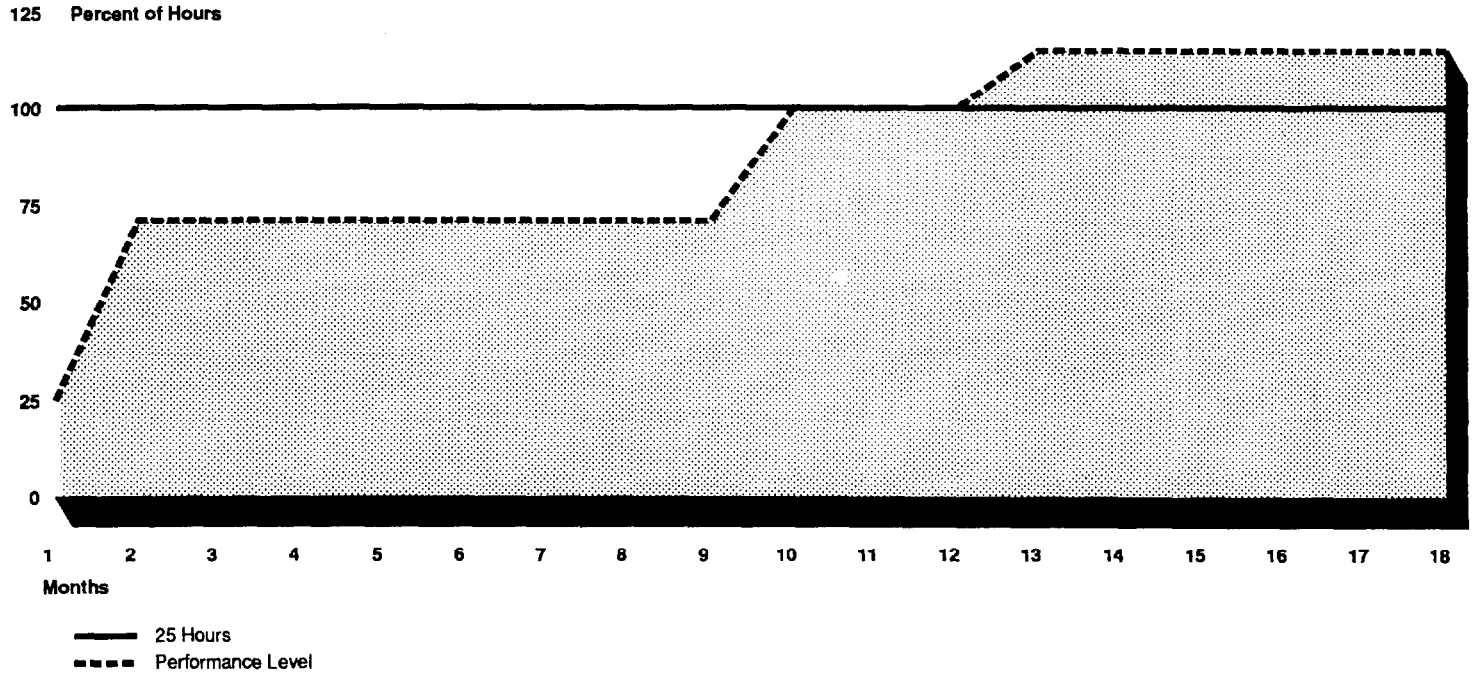
Fleet training squadrons in the Atlantic and Pacific Fleets train graduate pilots and radar intercept officers selected from basic flight school to form F-14A aircrews. The training squadrons also retrain aircrews who formerly flew F-14As. The Atlantic Fleet training squadron was authorized 18 instructor pilots and 24 instructor radar intercept officers in 1985. In 1986 it had 36 F-14A aircraft.

The Naval Reserve has equipped and crewed F-14A squadrons to deploy upon mobilization to the two Reserve carrier airwings and squadron augmentation units—aircrews designated to augment specific deployable squadrons during mobilization. Reserve squadrons conduct aircrew readiness training to prepare for mobilization as a unit and are authorized 12 F-14A aircraft and 17 aircrews each. Augmentation aircrews use F-14A aircraft belonging to the Reserve, fleet training, and deployable squadrons to obtain their flight training.

[1]One pilot and one radar intercept officer constitute an F-14A aircrew.

Figure II.1: U.S. Navy F-14A "Tomcat" Aircraft

Figure II.2: Percent of Programed Hours Flown Over the Operational Cycle



Month 1: Personnel turnover and leave

Months 2-9: Turnaround training

Months 10-12: Pre-deployment training

Months 13-18: Deployment period

Source: Navy briefing documents.

Trends in F-14A Flying Hours

In its justification for the President's fiscal year 1987 operations and maintenance budget, the Navy estimated flying hour requirements for the F-14A aircraft at 120,730 hours and $319.7 million. These amounts represented 5.6 percent of the hours and 10.9 percent of the funds the Navy estimated for the flying hour program. The percentage of F-14A flying hours to total Navy flying hours has been essentially constant since 1983.

However, the F-14A flying hours estimated increased each year from fiscal years 1983 through 1987 and the flying hours used increased in 4

of the 5 years. (See table II.1.) The Navy flew F-14As about 9,900 and 15,615 more hours than estimated in fiscal years 1983 and 1984, respectively. Conversely, it flew F-14As from 1,412 to 5,872 less hours than estimated during fiscal years 1985 through 1987.

Table II.1: F-14A Flying Hours Requested and Used

	Flying hours			
			Variance	
Fiscal year	Estimated	Actual	Hours	Percent
1983	86,737	96,637	9,900	11.4
1984	91,633	107,248	15,615	17.0
1985	107,144	105,732	−1,412	−1.3
1986	115,055	113,303	−1,752	−1.5
1987	120,730	114,858	−5,872	−4.9

Note: Estimated amounts are those requested in the President's budgets submitted to the Congress.

Source: Navy Flying Hour Projection System and GAO computations

The Navy spent more for F14-A flying than estimated in fiscal years 1983 through 1985 and less than that estimated for fiscal years 1986 and 1987 (see table II.2.)

Table II.2: Funds Requested and Used for F-14A Flying by the Atlantic and Pacific Fleets and the Naval Reserve

Dollars in millions

	Atlantic		Pacific		Reserve		Total	
Fiscal year	Requested	Actual	Requested	Actual	Requested	Actual	Requested	Actual
1983	$111.9	$108.7	$80.7	$84.0	$0	$0	$192.6	$192.7
1984	104.0	108.8	83.2	91.4	0	0	187.2	200.1
1985	163.4	158.0	133.5	140.1	3.3	6.7	300.2	304.8
1986	199.6	170.5	150.7	128.7	15.1	13.4	365.4	312.5
1987	169.0	159.7	131.9	135.9	18.8	17.9	319.7	313.6

Note: Amounts requested in the President's budgets submitted to the Congress.

Source: Navy Flying Hour Projection System and GAO computations

The Atlantic Fleet estimated and used more F-14A flying hours and funds than the Pacific Fleet during fiscal years 1983 through 1987. The Reserve had little F-14A flying during this period since it did not begin forming F-14A squadrons until fiscal year 1985. (See table II.3.)

Table II.3: F-14A Flying Hours Requested and Flown by the Atlantic and Pacific Fleets and the Naval Reserve

	Atlantic		Pacific		Reserve		Total	
Fiscal year	Requested	Actual	Requested	Actual	Requested	Actual	Requested	Actual
1983	50,247	54,942	36,490	41,695	0	0	86,737	96,637
1984	51,448	59,134	40,185	48,114	0	0	91,633	107,248
1985	59,351	56,449	46,625	46,588	1,168	2,695	107,144	105,732
1986	63,238	56,329	47,227	51,143	4,590	5,831	115,055	113,303
1987	57,740	55,688	54,409	50,411	8,581	8,759	120,730	114,858

Note: Amounts requested in the President's budgets submitted to the Congress.

Source: Navy Flying Hour Projection System and GAO computations

Budget Development Methodology

The Navy uses various methodologies in developing its F-14A flying hour budget estimate. Navy officials said that the methodologies are based on tradition, not on written guidance and instructions. Regardless of the methodology used, aircrew training is the justification for the estimated flying hour requirements for the F-14A aircraft.

The program manager, using mathematical formulas, develops the number of hours needed for deployable F-14A, fleet training, and Reserve squadrons. According to the program manager, he prices the F-14A flying hours and consolidates this amount with that for other types of aircraft to determine the dollar amount to be included in the President's operations and maintenance budget request for aircraft operations. As the request is considered, any changes that affect the Navy's total planned flying also will affect the flying hours of particular aircraft types and will eventually have to be compensated for in the program's execution.

Deployable Squadrons

Navy headquarters officials said they determined the flying hours needed for F-14A deployable squadrons by using a standard formula that is applied to all aircraft employed in tactical air and antisubmarine warfare. The formula[2] for determining F-14A flying hour requirements is:

[2]The formula for fiscal year 1987 and out years includes an aircrew manning factor that adjusts the request per the available aircrew. The adjustment for fiscal year 1987 was 95.5 percent of request and for fiscal years 1988 to 1989, it was 96.5 percent. The simulator reduction was eliminated from the fiscal year 1987 budget.

Projected average F-14A inventory X budgeted F-14A aircrew-to-seat ratio = F-14A aircrews requested

F-14A aircrews requested X 25 hours a month = total hours a month for F-14A aircrews

Total hours a month X 12 months - 2 percent F-14A flight simulator time = F-14A annual flying hours

F-14A annual flying hours X primary mission readiness rate[3] = F-14A annual flying hours needed

Total F-14A flying hours needed X F-14A cost per hour = dollar amount included in the Navy's flying hour program request

According to the deputy program manager, the projected average inventory is the Navy's estimate of the average number of F-14A aircraft expected to be held in inventory by all squadrons for the budget year. The budgeted aircrew-to-seat ratio is based on the Navy's goals for staffing each F-14A squadron. The 25 hours is the Navy's judgment of the average monthly flying hours each aircrew needs to be proficient at its job. The primary mission readiness rate is a factor used to compute the flying hours needed to maintain the minimum acceptable readiness posture over the long term. Navy officials explained that this rate is adjusted for those times in the operational cycle when little flying is done.

According to Navy officials, when applying the formula each year, the Navy varies the projected average F-14A inventory to reflect the expected aircraft inventory and the primary mission readiness rate to reflect the one provided in the program objective memorandum. According to the program manager, the aircrew-to-seat ratio, the 25-hour monthly standard, and the 2-percent reduction for flight simulator time remain the same each year.

The flying hours and funds estimated for F-14A deployable squadrons increased from 66,600 hours and $148.6 million for fiscal year 1983 to 88,300 hours and $235.9 million for fiscal year 1987. In each year, the Pacific Fleet's estimate was less than the Atlantic Fleet's estimate.

[3]The primary mission readiness factor is adjusted to account for simulator time. For example, the fiscal year 1987 primary mission readiness rate was reduced from 87 percent to 85 percent for simulators.

Naval Reserve

The Navy uses a formula different than that used for deployable squadrons when it estimates flying hour requirements for its F-14A Reserve squadrons. A Navy official explained that it yields about one-half the number of hours required for aircrews in deployable squadrons. Reserve aircrews have experience in F-14s, having served in deployable squadrons while in the active Navy and do not need as many hours. The formula is:

Number of Reserve pilot billets X 150 hours[4] a year X primary mission readiness rate - 2.5 percent F-14A flight simulator time = annual Reserve flying hours

According to the flying hour program manager, he multiplies the total hours determined in the above process by the hourly cost for F-14A Reserve aircraft to compute funds required.

For fiscal years 1985 to 1987, the Reserve F-14A flying hour estimate in the Navy's justification to the President's budget was relatively small (see tables II.2 and II.3) because squadrons did not begin flying the aircraft until fiscal year 1985. In that year, the Navy estimated 1,168 hours and $3.3 million for the Reserve. These estimates increased to 8,581 hours and $18.8 million in fiscal year 1987.

Fleet Training Squadrons

Estimating the flying hours needed for fleet training squadrons is a multi-step process. The Deputy Chief of Naval Operations, Air Warfare, first estimates the number of student pilots and radar intercept officers that will be trained during the budget year. This estimate includes an adjustment to compensate for expected aircrew attrition from the training squadrons and the Fleets' deployable squadrons. The Deputy Chief then multiplies the adjusted number of students by the number of flying hours required for F-14A training, which varies depending on the flying experience of the students. For example, pilots who have flown 250 hours in F-14As have an annual training requirement of 130 hours. More experienced pilots with 1,000 to 1,500 hours experience have an annual training requirement of 80 hours.

The Deputy Chief determines the program funds required by multiplying the number of flying hours by the F-14A hourly flying cost for the fleet training squadrons. The amounts estimated for fleet training

[4]When computing the flying hours needed by squadron augmentation aircrews, the Navy uses 135, rather than 150, hours.

squadrons increased from 20,099 hours and $44 million for fiscal year 1983 to 23,835 hours and $65 million for fiscal year 1987 (see table II.6 for this trend). The Pacific Fleet's training squadron estimate was generally smaller than the Atlantic Fleet's estimate.

Program Execution

Although flying to train aircrews and to maintain proficiency is the Navy's justification for its F-14A flying hour estimate, deployable squadrons also obligate hours and funds to fly nontraining missions, such as operations and support. The Navy traditionally allocates more training hours to its F-14A Reserve aircrews than the formula yields. The fleet training squadron generally flew less and spent less than the amounts requested.

Deployable Squadrons

Flying for training constitutes most of the F-14A flying hours expended. However, F-14A deployable squadrons also fly operational missions, from aircraft carrier decks, to investigate and intercept foreign aircraft that intrude into U.S. airspace and approach U.S. vessels at sea. When deployed aboard aircraft carriers in high threat areas, these squadrons fly combat air patrols to protect carriers and other ships in the force against threatening aircraft. Other reasons for flying include functional checks flights and developmental or evaluation flights.

Some F-14A aircrews fly more hours monthly than those produced by the formula. For example, the requirements development formula computed a 21.25 hour monthly flying rate for each pilot in fiscal year 1986. During the year, 25 percent of the F-14A aircrews flew 23.5 hours or more a month; some flew as much as 63 hours a month. This can be attributed in part to variations in the number of hours flown during the different stages of the operational cycle. On the high side, aircrews fly about 28.8 hours a month (115 percent of requested hours) during the squadrons' approximately 6-month deployment period. On the low side, aircrews fly about 6.3 hours a month (25 percent of requested hours) during the stand-down period, which occurs at the end of a 6-month deployment.

Notwithstanding operational cycle flying requirements, F-14A deployable squadrons generally fly more hours than programmed. For example, Atlantic Fleet aircrews in these squadrons flew 18,743 hours more

than estimated requirements[5] for fiscal years 1984 through 1987, costing $46.4 million (see table II.4.)

Table II.4: Variances in Atlantic Fleet F-14A Aircrew Flying

Dollars in millions

	Flying hours			
Fiscal year	**Formula**	**Flown**	**Difference**	**Amount**
1984	40,188	46,747	6,559	$11.9
1985	41,208	44,856	3,648	9.8
1986	40,494	45,426	4,932	14.3
1987	40,341	43,945	3,604	10.4
Total	**162,231**	**180,974**	**18,743**	**$46.4**

Source: Navy Flying Hour Projection System, Atlantic Fleet monthly squadron training and readiness reports data, and GAO computations

We computed Atlantic Fleet flying hours using the Navy's formula and compared it with the actual hours flown by the squadrons. The result was hours flown in excess of formula generated requirements. The hours were priced out using average hourly costs from the Navy's flying hour projection system. While the Navy can adjust formula generated requirements, we found that aircrews flew more hours than projected by our computations using the formula and actual data. The same situation existed for the Reserve (see table II.5).

According to Navy officials, the 25-hour standard has been used from the first year the F-14A became operational. However, it was reevaluated and found to be less than what aircrews actually needed to maintain their proficiency. While the data suggest that too many hours are flown, Navy officials said too few are flown. However, it appears that no one really knows.

In commenting on a draft of this report, DOD stated that it was inappropriate to compare the results generated by the requirements formula with the hours actually flown. According to DOD, it is more appropriate to compare the larger amount contained in the President's budget request with the actual flying. We believe our comparison is appropriate since our focus was on the validity of the requirements formula, which, according to the Navy, provides sufficient hours to maintain the proficiency of pilots.

[5]Computed by multiplying the programmed monthly flying hours per aircrew times the average assigned aircrews in Atlantic Fleet F-14A squadrons.

Naval Reserve

Flying hours requested for F-14A Naval Reserve squadrons and squadron augmentation units are used solely for training. During fiscal year 1985, when Reserve squadrons received F-14A aircraft, they flew a total of 2,695 hours, costing $6.7 million. By fiscal year 1987, after additional F-14A aircraft were added to Reserve squadrons, flying hours and dollars spent increased to 8,759 and $17.9 million, respectively.

According to Reserve officials, in fiscal year 1987 the Navy allocated 135 flying hours to each F-14A Reserve aircrew, even though the computed annual requirements yielded an actual aircrew average of 130 hours. A Navy official explained that this was done to insure that 100 percent of the funds were used since, traditionally, Naval Reserve squadrons manage their flight operations conservatively and tend to underobligate their allocations. However, like the deployable squadrons, we found that F-14A Reserve aircrews generally flew more hours than the projected requirements.[6] Since fiscal year 1985, actual Reserve aircrew flying hours have exceeded formula requirements by 4,553 hours, costing $9.8 million (see table II.5).

Table II.5: Variances in F-14A Naval Reserve Aircrew Flying

Dollars in millions

	Flying hours			
Fiscal year	**Formula**	**Flown**	**Difference**	**Amount**
1985	2,544	2,695	151	$.4
1986	4,198	5,831	1,633	3.7
1987	5,990	8,759	2,769	5.7
Total	**12,732**	**17,285**	**4,553**	**$9.8**

Source: Navy Flying Hour Projection System, Reserve squadron monthly training and readiness reports, and GAO computations

Fleet Training Squadrons

F-14A training squadron hours flown and funds used fluctuated during fiscal years 1983 through 1987. (See table II.6.)

[6]Computed by multiplying the programmed monthly flying hours per aircrew times the average assigned aircrews in Atlantic Fleet F-14A squadrons.

Table II.6: Flying Hours and Funds Requested and Used by F-14A Fleet Training Squadrons

Dollars in millions

Fiscal year	Fleet	Flying hours			Dollars[a]		
		Requested	Used	Variance	Requested	Used	Variance
1983	Atlantic	11,193	11,353	160	$24.3	$23.2	$−1.2
	Pacific	8,906	8,807	−99	19.7	17.5	−2.2
	Total	20,099	20,160	61	44.1	40.7	−3.4
1984	Atlantic	9,597	12,387	2,790	19.0	23.6	4.6
	Pacific	9,772	10,586	814	20.2	21.1	.8
	Total	19,369	22,973	3,604	39.3	44.6	5.4
1985	Atlantic	12,075	11,593	−482	33.9	37.1	3.2
	Pacific	10,058	9,263	−795	28.8	30.3	1.5
	Total	22,133	20,856	−1,277	62.7	67.4	4.7
1986	Atlantic	12,102	10,903	−1,199	42.2	38.7	−3.5
	Pacific	11,890	11,831	−59	41.0	24.0	−17.0
	Total	23,992	22,734	−1,258	83.1	62.7	−20.4
1987	Atlantic	12,001	11,743	−258	41.1	33.3	7.9
	Pacific	11,834	10,952	−882	23.9	28.4	4.5
	Total	23,835	22,695	−1,140	65.1	61.7	3.4

[a]Totals do not add due to rounding.

Source: Navy Flying Hour Projection System and GAO computations

Both fleet training squadrons averaged eight classes a year in fiscal year 1988. A class is 30 to 33 weeks duration, depending on the extent of preliminary training that students receive before the class, such as survival training. Also, some students require more flying time than others to complete the training program.

Comments From the Department of Defense

ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301-4000

FORCE MANAGEMENT
AND PERSONNEL

26 JAN 1989

Mr. Frank C. Conahan
Director, National Security and
International Affairs Division
U.S. General Accounting Office
Washington, DC 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "NAVY FLYING HOUR PROGRAM: Costs Should Be Linked to Operational Effectiveness," dated October 14, 1988 (GAO Code 394199/OSD Case 7803). The Department generally concurs in most of the report findings, but certain clarifications and corrections are necessary to make the report fully accurate.

The Department agrees that the standards used in determining flying hour requirements need to be validated and that better performance objectives, linking requirements determination and requested resources, should be developed. As an initial step, the Navy is in the process of revalidating the standards used to determine program requirements. The DoD and the Navy are also working toward developing better linkages between flying hours and mission performance. For balance, the GAO report should acknowledge these initiatives, which are intended to improve the effectiveness and efficiency of the Navy flying hour program. Developing new methods of budgeting and justifying flying hour programs is a difficult and complex process. It is projected that the new methodology will first be reflected in the FY 1992-FY 1993 President's Budget.

The Department does not agree with the statement in the draft report that variances between the budget for the flying hour program and its execution are not analyzed for program effect. Variances are reviewed at the carrier air wing level for effect on mission readiness. Review of variances at the Navy-wide type model series level, as suggested by the GAO, does not adequately consider the dynamics of the training environment. However, the Navy is reviewing alternative methods for evaluating variances.

Detailed Department of Defense comments on the GAO findings are provided in the enclosure.

Sincerely,

Grant S. Green, Jr.

Enclosure:
As Stated

GAO DRAFT REPORT, DATED OCTOBER 14, 1988
GAO CODE 394199, OSD CASE 7803

"NAVY FLYING HOUR PROGRAM: COSTS SHOULD BE LINKED TO OPERATIONAL EFFECTIVENESS"

DEPARTMENT OF DEFENSE COMMENTS

* * * * *

FINDINGS

FINDING A: Overview of Flying Hour Program. The GAO reported that the Navy's primary means of providing proficient aircrews is through hands-on training in the flying hour program, which funds the number of hours Navy and Marine Corps aircraft can be flown and provides each aircrew with flight time. The GAO explained that the Navy flying hour program accounts for part of the costs for fuel, other petroleum products, and repairs to aircraft components, as well as those costs associated with administrative supplies and services. The GAO further explained that procurement, overhaul, and repair of aircraft and engines are paid for by other programs, as are the aircrew and the maintenance payroll, maintenance training, and the costs of aviation facilities. The GAO reports that flying hour requirements in the Navy's justification of the President's budget request for FY 1987 were projected at 2.2 million flying hours, costing $3.1 billion. (In order to obtain an understanding of the flying hour program, the GAO conducted an in-depth case study of the Navy F-14A.) (p. 1, pp. 7-9, pp. 35-54/GAO Draft Report)

Now on pp. 8-9 and pp. 25-35

DoD Response: Concur. It should be noted, however, that the flying hours and costs cited in this finding represent the FY 1987 President's Budget Request for both active and reserve forces for the total Department of the Navy Flying Hour Program. The GAO report, on the other hand, focuses on the Tactical Air/Antisubmarine Warfare (TACAIR/ASW) portion of the General Purpose Forces Flying Hour Program.

FINDING B: Previous Reviews And Congressional Concerns. The GAO pointed out that, in previous GAO reports, the adequacy of the processes the Navy used to budget and execute the flying hour program were questioned, as follows:

- In 1976, the GAO cited examples of nonessential flights and an inability to determine if readiness standards were being met by aircrews, and concluded that the Navy needed a more effective management of its flying hours. At that time the GAO recommended the Navy improve the accuracy of reports on aircrew readiness, eliminate unnecessary flying, and increase the benefits derived from hours flown. 1/

- In 1979, the GAO reexamined the program and found that the Military Services had improved the flying hour program management systems; however, some areas required further attention. 2/ The GAO concluded that (1) the Navy's standards for P-3 patrol aircraft flying could have been reduced, (2) the central programming of flying hours did not adequately consider the operating environment--i.e., material readiness and maintenance problems, and (3) flying by many supervisory and staff pilots may not have been necessary. At that time the GAO recommended the DoD develop improved guidance for managing the Services' flying hour programs.

- In 1983, the GAO reported 3/ budget estimates were based on formulas that did not represent the missions being funded--i.e., the budget was based on training needs, while much of the Navy's flying was for nontraining activities. At that time the GAO concluded the Navy lacked program goals and performance indicators needed to measure program effectiveness and to develop future budget requests.

The GAO reported that, in April 1988, citing continuing GAO concerns regarding the flying hour program, the House Committee on Armed Services directed the Navy to provide budget justifications, to include (1) measurable mission-related goals and the resources needed to meet each goal, (2) a method for measuring the degree to which the goals are met, and (3) an explanation of the variances between goals and actual results. (p. 3, pp.1 9-10/GAO Draft Report)

Now on pp. 4 and 9-10

DoD Response: Concur.

1/"Flying Hour Programs of the Military Services: Opportunities for Improved Management," June 18, 1976, OSD Case 4245

2/"The Services Can Further Refine Management of Flying Hour Programs," March 27, 1979, OSD Case 5038

3/"The Defense Budget: A Look at Budgetary Resources, Accomplishments, and Problems," April 27, 1983, OSD Case 6192

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FINDING C: Programming and Budgeting Flying Hours and Costs. The GAO reported that, during the programming process, the program manager computes flying hour requirements--i.e., the number of hours needed for each aircraft type, model, and series (TMS). The GAO found that the method of calculating hours varies by program segment; for example, support and administrative flying uses historical aircraft-utilization rates, while each of the four other segments (TACAIR/ASW, carrier-deployable reserves, fleet-replacement squadrons, and undergraduate training) has its own formula. According to the GAO, these formulas are passed, informally, from the outgoing to the incoming program manager and represent the historical practice of past managers. The GAO explained that the formulas use certain values, of which some (like the monthly hours per aircrew) vary by aircraft, and other (such as the reduction for flight-simulator use) were applied to all aircraft. According to the GAO, the need for accurate, objective standards is evidenced by their importance in computing flying hour requirements and, therefore, Navy budget requests. The GAO concluded that inaccurate standards result in overstated or understated requirements computations, which impact resource requests and usage.

The GAO explained the requirements determination/budget process as follows:

- general programming and budgeting of the flying hour program are directed by DoD guidance in the areas of policy, strategy, and force and resource planning as well as fiscal decision-making;

- after determining the number of hours needed per aircraft type, the program manager estimates the cost per flying hour for each and adjusts it for inflation;

- the program manager then multiplies the cost per hour by the number of hours for each aircraft;

- the sum of the hours and costs constitutes the program resources requirements, which appear in justification documents used to support the Navy funding request for aircraft operations in the President's budget;

- funding for aircraft operations is provided primarily through the general purpose forces budget activity of the Navy Operations and Maintenance Account;

- the Navy's congressional budget submission identifies the funds requested for the general purpose forces budget activity and for each general purpose forces category, such as aircraft operations, and identifies total amounts requested for TACAIR/ASW, fleet air training, and fleet air support operations, and the Congress appropriates one amount

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for all Navy Operations and Maintenance activities, which the Navy then allocates to each operations and maintenance budget activity. (pp. 1-2, pp.1 13-16/GAO Draft Report)

DoD Response: Partially concur. The DoD agrees with the basic description of the programming and budgeting of the flying hour program. The method for calculating flying hour requirements does vary by program area (TACAIR/ASW, fleet readiness squadrons, fleet support squadrons, reserve forces, and undergraduate training), since each program area has a unique function and focus. The GAO report is specifically concerned with the budget methodology used for TACAIR/ASW.

The finding that the formulas used to determine flying hours are informally passed from the outgoing program manager to the incoming program manager is incorrect. While there is no Navy-wide directive encompassing all aspects of the flying hour program, the program is managed under defined and documented programming and budgeting guidance applicable to all Navy programs. Additionally, historical records are maintained to provide the program manager insight into past management. The program manager must have a broad knowledge of the guidance and historical documents, as well as a thorough understanding of the Planning, Programming, and Budgeting System (PPBS) process, in order to execute his duties.

The description of the requirements determination/budget process for the TACAIR/ASW portion of the flying hour program provided in the finding is also not fully correct. The process is more accurately described as follows:

- Fiscal guidance is provided by the Secretary of Defense for the overall Department of the Navy program at the commencement of the PPBS process. From this guidance, the Secretary of the Navy develops specific programming guidance for the flying hour program. Prior congressional action and direction that will impact future programming decisions are also considered.

- Programmed/budgeted requirements are stated in terms of hours per crew per month for each type of aircraft, as approved by the Assistant Chief of Naval Operations for Air Warfare. Requests for changes accompanied by justification are submitted to the Assistant Chief of Naval Operations for Air Warfare by the Fleet Commanders on an "as occurring" basis.

- Cost factors are developed using a cost finding system (Flying Hour Program Management System) and DoD-approved escalation indices.

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- Historical data are reviewed to determine any anomalies in execution of type model series aircraft flying hours.

- The Flying Hour Program Projection System is then employed to ensure that the above actions are completed within financial controls. From this system, the supporting budget data is produced by the program manager.

- The Fleet Commanders submit their budget requests and reconcile changes in program and pricing in the OP-5 budget exhibit, which is the primary budget justification material provided in support of the budget request. The budget exhibits are reviewed by the Navy Comptroller and the Office of the Secretary of Defense, and resources are adjusted to reflect fiscal realities. The distribution of funds by type of resources (fuel, aviation depot level repairables (AVDLR) and intermediate maintenance) and by aircraft type model series is reflected in budget supporting material.

- After the President's Budget has been submitted to the Congress, the subsequent congressional action is reflected as the current estimate in the next President's budget. This estimate is the final approved program and the baseline for measuring execution.

FINDING D: Executing the Program. The GAO explained that the Navy Comptroller apportions quarterly obligational authority to the fleet commanders-in-chief, based on their spending plans and prior quarterly obligations (if any quarterly obligation exceeds plans, obligational authority for the remaining quarters may be decreased). According to the GAO, quarterly obligational authority is successively passed down from fleet commanders-in-chief through command channels to squadron commanders. In turn, each commanding officer authorized to expend funds must ensure that hours flown and obligations incurred do not exceed the resources allocated. The GAO reported that the Navy uses two systems to collect data on the program. The Flying Hour Program Management System (FHPMS) is used to maintain data on hours flown and the obligations incurred, while the Navy Flight Record Subsystem is used to maintain data on aircraft maintenance, aircraft inventory and naval officers' flying. The GAO explained that the program manager uses the FHPMS to ensure that obligations match funding, coordinates with the Navy Comptroller on selected program data, reviews major exceptions to planned flying hours and obligations, and prepares a quarterly summary report, which is used to identify significant deviations in funding and flying hours. The GAO further explained that the Navy Comptroller monitors execution of the TACAIR/ASW segment, using quarterly reports prepared by the fleet commanders-

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Now on pp. 14-15

in-chief, which contain data on the number of onboard aircrews and hours flown for four mission areas (training, exercises, contingency operations, and operations and services). The GAO reported that, although controls have been established to monitor hours flown and obligations incurred to ensure they do not exceed resources allocated, program managers are allowed flexibility in deciding where to place their resources. (pp. 16-20/GAO Draft Report)

DoD Response: Concur. However, the GAO description of the financial procedures for the execution is oversimplified. Squadron commanders receive operating target (OPTAR) allocations for fuel and administrative supplies only. Maintenance funding is provided to the supporting Naval Air Station or aircraft carrier. The Flying Hour Program Management System (FHPMS) piggybacks, to some degree, on required financial reporting. Squadron monthly OPTAR reports are used to financially obligate fuel funds. These obligations are then introduced into the cost finding system of FHPMS. The primary reporting system for resources obligated in support of the flying hour program is the official Navy accounting system. The FHPMS organizes these costs by resource category (fuel, AVDLR, maintenance) to allow timely management action as well as future budget projections.

FINDING E: Program Lacks Objective Budget Estimates and Performance Measures. The GAO found flying hour program formulas employ values that have not been objectively tested or demonstrated by the Navy. The GAO reported that the formulas are passed informally from program manager to program manager. The GAO could not locate documented validations of the values or documentation of how the formulas came to be accepted as justification for flying hour requirements. The GAO cited the example of the 25-hour monthly standard that each F-14A aircrew needs to maintain proficiency. The GAO reported that, according to the Navy, this standard is not supported by a study though it has been used from the first year the F-14A became operational. The GAO observed, however, that when the standard was reevaluated, it was found to be less than what was actually needed to maintain proficiency. The GAO noted that Fleet and Reserve commanders are responsible for providing combat-ready aircrews and for insuring that total hours flown and funds spent do not exceed those allocated by the Navy Comptroller. The GAO concluded that current management controls insure that commanders do not exceed dollar allocations in total for the general purpose forces budget activity; however, neither the Navy budget nor its management information system link requirements determination or resource expenditures to any measure of program achievement. The GAO further concluded, because the Navy has not adopted mission-related performance objectives describing what the program is expected to achieve, it cannot determine the effectiveness or efficiency of the program's application of resources. The GAO

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suggested that such measures or performance objectives might be based on (1) the number of combat-ready aircrews trained, (2) the number of mission hours flown developing skills and building proficiency in performing missions like the antisubmarine warfare missions, or (3) the number of hours flown for special operations, such as the Persian Gulf. (p. 2, pp. 22-24, p. 31/GAO Draft Report)

DoD Response: Concur. The values used in determining requirements need to be validated. The finding refers to the use of formulas employing values that have not been objectively tested or demonstrated by the Navy. The GAO is questioning the value of the hours per crew per month requirements for 100 percent Primary Mission Readiness (PMR). The Navy initiated an evaluation of the hours per crew per month standard in May 1988. This ongoing evaluation, involving every aircraft community and requiring Fleet Commanders' concurrence, is expected to be completed by the end of FY 1989. However, this evaluation, in itself, will not meet the intent of the GAO finding. In addition, the Navy will be required to transition to a different budget methodology for TACAIR/ASW flying hours. This transition is considered a major evolution requiring several years. The Navy will initiate this process with the intent of incorporating available indicators in the FY 1992-FY 1993 President's Budget.

The Department also concurs that better performance indicators can be developed to measure readiness. The determination of readiness resulting from training activity is not an entirely objective process. Readiness is measured against a standard derived by applying objective techniques to expert opinion. A matrix of training events is formulated based on a generic threat scenario. Full achievement of the training depicted in this matrix represents the attainment of 100 percent PMR. The hours per crew per month standard for a particular aircraft is related directly to the amount of flying required for a crew to complete this matrix of required training events. The evaluation to validate the determination of program requirements will also result in the development of indicators that measure mission performance for justifying budget resources and measuring execution. The Navy will maintain PMR until the on-going process of developing meaningful measures of requirements and performance is complete and operational.

An on-going research project, sponsored by the DoD and aimed at developing objective linkages between flying hours and indicators of operational performance, is expected to help in these processes. This DoD-sponsored research project, which covers both Navy/Marine Corps and Air Force flying programs, is described in detail in a GAO draft report on Air Force flying programs, entitled "AIRCREW TRAINING: Developing Objective Data to Support Flying Hour Programs" (GAO Code 392373/OSD Case 7842),

dated November 23, 1988. The major research done under this project during 1988 has been analysis of Navy carrier landing grades and Marine Corps bombing scores as a function of pilots' recent and career flying experience. The results indicate that, in these cases, there is a positive relationship between both short-term and long-term flying experience and performance. An extensive program of future research is planned to follow up on these results. Since Naval Aviation is a full partner in this research project, the GAO report on the Navy flying hour program should give recognition to this effort equal to that given to Air Force participation.

In addition to this research project, the Navy has also begun two projects to gain a better understanding of the differential effects of flying hours on aircrew performance during various phases of the deployment cycle. Another study is in preparation with the objective of developing a methodology to determine aircrew readiness for each type of aircraft. For balance, the GAO report should acknowledge these Navy initiatives to improve the effectiveness and efficiency of its flying hour program.

FINDING F: Variances Are Not Evaluated For Program Effects. The GAO reported that the flying hour program is a part of the Navy Operations and Maintenance Appropriations and, as a result, the Navy has the flexibility to reallocate resources among various aircraft to meet unforeseen emergencies. According to the GAO, for the period FY 1983-FY 1987, the Navy's actual flying hours under the program ranged from 2 million to 2.2 million, representing at least 94 percent of the hours requested in the Navy budget. The GAO reported that, over the period, the Navy annually spent at least 90 percent of the $1.8 billion to $3.0 billion requested and, although that overall data implies that program execution parallels the request, individual aircraft statistics show wide variances in flying hours and funds allocated and used. The GAO reported that, although there are variances in program budget and execution, Navy reports do not identify the reasons for the variances, and management does not routinely evaluate the effect of the variances on program operations or ability to carry out missions. According to the GAO, during the period from FY 1984-FY 1987, the Navy data base showed that deployed Atlantic Fleet and Reserve F-14A aircrews flew 23,296 hours more than estimated, resulting in additional costs of $56.3 million; however, the Navy does not have a way of knowing how, if at all, the increased flying hours affected F-14A pilot proficiency or the Navy's ability to conduct tactical air missions. (pp. 1-3, pp. 24-32/GAO Draft Report)

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DoD Response: Nonconcur. The DoD does not agree that variances are not evaluated for program effect. Variances in the flying hour program are reviewed at the level that is meaningful, evaluated for program effect, and reflected in future budget submissions. Since the budget for the flying hour program is developed and justified on a PMR basis, it is appropriate to review and evaluate variances on the same basis. Furthermore, since the TACAIR/ASW portion of the flying hour program is executed primarily by carrier air wings, the PMR review is primarily focused at the carrier air wing level. Carrier air wings are composed of a mixture of type model aircraft and, as units, are responsible for multiple missions. Training to meet these multiple missions requires use of different carrier air wing assets at different times. It is essential that the carrier air wing commander have the flexibility to modify training plans in response to specific threats as scenarios change in deployed operations. When variances occur at the type model series level in a carrier air wing, they are in response to specific training requirements to meet specific threats. The review of variances at the type model series level Navy-wide, as suggested by the GAO, would not fully capture the mission readiness gains afforded to the carrier air wing through increased flexibility. However, the flying hour program review described in the next paragraph may result in improved methods of evaluating program variances.

It is anticipated that the results of the ongoing evaluation to validate determination of program requirements and develop readiness indicators to measure mission performance will also provide a means to address program variances that occur in execution and their effects. The DoD intends to evaluate variances in the flying hour program at a level of detail that will provide meaningful information. The evaluation of the flying hour program is expected to produce a methodology to track the determination of requirements through the budget process to program execution, and will include a review of the best method to address program variances (i.e., carrier air wing, aircraft community). It is projected that the new methodology will be reflected in the FY 1992-FY 1993 President's Budget.

With regard to the methodology used to determine variances in the F-14 case study, the current year column of the President's budget request should be used to measure budget execution (i.e., to measure FY 1984 execution, the FY 1984 current estimate column of the FY 1985 President's budget request

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should be used). For example, the corrected numbers for the Atlantic Fleet are as follows:

FY	HOURS BUDGETED	HOURS FLOWN	DIFFERENCE	PERCENT
1984	46,757	46,747	10	.02
1985	46,648	44,856	1,792	3.84
1986	47,304	45,426	1,878	3.97
1987	45,739	43,945	1,794	3.92
TOTAL	186,448	180,975	5,474	2.93

RECOMMENDATIONS

None.

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