COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-157905

Military Flight Training

The Honorable Barry Goldwater
and William Proxmire
United States Senate

This is our report responding to your mutual interest in the possibility of consolidating military flight training as expressed in a February 20, 1974, letter.

We have not obtained formal agency comments on the matters in this report but have discussed the issues with Department of Defense and military service officials.

We do not plan to distribute this report further unless you agree or publicly announce its contents. We invite your attention to the fact that this report contains recommendations to the Secretary of Defense which are set forth on page 19. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House and Senate Committees on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report. When you agree to release the report, we will make it available to the Secretary and the four committees to set in motion the requirements of section 236.

Comptroller General
of the United States

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Contents

ABBREVIATIONS

AFB	Air Force Base
ASW	antisubmarine warfare
DOD	Department of Defense
GAO	General Accounting Office
NAS	Naval Air Station
UNT	undergraduate navigator training
UPT	undergraduate pilot training

COMPTROLLER GENERAL'S
REPORT TO THE HONORABLE
BARRY GOLDWATER AND
WILLIAM PROXMIRE
UNITED STATES SENATE

POTENTIAL FOR CONSOLIDATING PILOT AND NAVIGATOR TRAINING PROGRAMS
Department of Defense

D I G E S T

WHY THE REVIEW WAS MADE

In a February 20, 1974, letter, Senators Barry Goldwater and William Proxmire asked GAO to examine the possibility of consolidating military flight training. GAO agreed to review the services' undergraduate training programs for fixed-wing pilots and navigators to identify present and future training programs, aircraft used and flying hours, length of training programs, current and anticipated use of simulators, and similar elements of training amenable to consolidation. (See p. 1.)

FINDINGS AND CONCLUSIONS

The Air Force and Navy conduct separate undergraduate training programs for fixed-wing pilots and navigators. The Navy trains Marine Corps pilots and navigators; the Army has no undergraduate fixed-wing pilot or navigator training programs.

The potential for consolidating training depends heavily on the extent to which skills required by one service are also required by another. Because of the similarity in the flying skills taught in the services' undergraduate pilot and navigator training programs, GAO believes significant potential exists for consolidating this undergraduate training. [Set ch. 2.)

Although many required skills are very similar, the services use different training methods. (See p. 6.) Under the Air Force's generalized approach, students receive the same training, fly the same aircraft, and may be assigned to units for additional training in any type of fixed-wing aircraft upon graduation. Under the Navy's specialized approach, after students go through a common training segment they receive additional undergraduate training in specific types of aircraft or for specific missions. (See p. 7.)

Because of structural differences in undergraduate programs, GAO believes the present programs of one service probably would not satisfy the requirements of the other and that substantial consolidation would likely require the design of new programs to satisfy common requirements.

There are also differences in

the types of aircraft and equipment used for training and the level of training provided in undergraduate programs. (See ch. 2.) Standardization of aircraft and equipment would greatly enhance the chances for efficient and effective joint programs. (See p. 19.)

Some joint pilot and navigator training programs are probably feasible at this time, depending on whether present differences can be resolved while continuing to use existing training resources. Service parochialism will probably be the most significant obstacle.

RECOMMENDATIONS

The Department of Defense is studying the feasibility of consolidating undergraduate flight training. (See p. 2.) GAO recommends that the Secretary of Defense (1) closely monitor these studies and (2) require the services to implement any recommendations which may lead to more efficient and effective training. (See p. 20.)

CHAPTER 1

INTRODUCTION

The undergraduate segments of military flight training programs provide the basic skills needed to make the transition into operational assignments involving various types of aircraft and missions. At lease $2 billion has been invested in aircraft, equipment, and facilities for undergraduate flight training. The budget for all of the services' undergraduate flight training in fiscal year 1975 is over $1 billion.

On February 20, 1974, Senators Barry Goldwater and William Proxmire asked us to examine the possibility of consolidating military flight training, In response to their request, we reviewed the services' undergraduate training programs for fixed-wing pilots and navigators to identify (1) present and future training programs, (2) aircraft used, (3) elements of training amenable to consolidation, (4) current and anticipated use of simulators, and (5) other factors bearing on the potential for interservice training.

Department of Defense (DOD) interservice training policy requires that, when possible, each service (1) use the training resources of the other services and (2) avoid and eliminate duplication. DOD recognizes interservice training may result in significant savings in facilities, equipment, and personnel. Interservice undergraduate flight training is largely limited to training of (1) Marine Corps pilots and navigators by the Navy and (2) Air Force helicopter pilots by the Army.

The Air Force's Air Training Command and the Navy's Chief of Naval Air Training conduct undergraduate pilot training (UPT) and undergraduate navigator training (UNT). Since naval flight officers and Air Force navigators perform similar duties, in this report they are referred to as navigators. The Army does not have an undergraduate fixed-wing pilot or navigator training program.

The Marine Corps provides navigator training to a small number of enlisted personnel for limited assignments as navigators on C-130 aircraft. The course is 26 weeks and is conducted by Marine Corps personnel using Navy aircraft at Corpus Christi, Texas. Because of the limited nature of this course, we did not review it further.

In a report to the Secretary of Defense, "Need to Assess Potential for Consolidating Undergraduate Helicopter Pilot Training" (B-157905), dated May 3, 1974, we

considered whether the Navy should discontinue fixed-wing training of its helicopter pilots in favor of an all-helicopter program which would permit (1) using excess Army helicopters and (2) consolidating undergraduate helicopter training at one site. We concluded that DOD could use its resources more economically and efficiently and avoid a one-time expenditure of about $19.3 million for aircraft and other support facilities by requiring the Navy to discontinue fixed-wing training of helicopter pilots and consolidating helicopter training at a single site. We recommended that the Secretary consider directing the Navy to take the above actions. DOD was considering that report's recommendations at the time of this review,

CURRENT DOD STUDIES

The Assistant Secretary of Defense (Manpower and Reserve Affairs] initiated a study in May 1974 to insure that DOD installation and activity reductions, realinements, consolidations, and closure efforts consider efficiencies to be gained through

--consolidating or cross-utilizing service troop and pilot training and

--alternative intraservice ways to accomplish troop and pilot training.

This study analyzes current and future training plans and the training bases, personnel, facilities, and funding to support these plans. The study's final phase involves developing detailed plans for alternative training methods. A DOD official said this study has been delayed to consider training-rate decisions made during the fiscal year 1976 budget review and recommendations expected to result from the review discussed in the following paragraph. The study will probably not be finished until mid-1975.

In August 1974 the Flying Training Committee of the Interservice Training Review Board was established and initiated a review of undergraduate flight training to investigate the feasibility, advantages, and mission impact of increased interservice training. The study group has generally agreed that the services' UPT and UNT programs are similar enough to consider combining, and it is performing a cost analysis on several alternatives for interservice training. At the time of our review a consolidation feasibility study was scheduled for completion and submission to the Interservice Training Review Board by June 1975,

SCOPE OF REVIEW

We reviewed the Air Force's and Navy's UPT and UNT programs. We discussed these programs and related matters with officials in the Office of Secretary of Defense, service headquarters, Air Force and Navy training commands, and training sites. We also reviewed recent studies concerning this training and future training plans.

CHAPTER 2

COMMON SKILL REQUIREMENTS INDICATE POTENTIAL FOR CONSOLIDATION

An important factor in determining the potential for consolidating training is the degree to which the skills required by each service ar@ common. Significant consolidation potential exists if the *services* require essentially the same basic flying *skills,* even though skills are taught differently. If the basic flying skills ate very similar, it becomes a matter of structuring a program io effectively satisfy the requirements o% all services. Our review indicates that the services teach many of the same basic flying skills.

~~COMMON PILOT~~ SKILL REQUIREMENTS

As part *of* a major effort *to* define a pilot training system *to* meet its needs through 1390, the Air Force developed a list of 45 Basic skills required in typical operational missions by fully trained pilots. They determined UPT should reach 30 of these skills.

The Navy also conducted a major study to identify training which should be provided in UPT. It identified several hundred behavioral tasks.

With technical assistance from service officials, we compared the skills and *tasks* identified *by* the services and grouped the more specific Navy tasks under one of the Air Force skills when the task or knowledge requirement appeared equivalent. For example, communications--communicating with other crew members, ground crews, and other aircraft using onboard communications equipment and visual skills--is 1 of the 30 basic skills the Air Porte identified. Twenty-five of the Navy's tasks appeared similar to skills identified by the Air Force for its communications requirement.

Using the *above* method we determined that 29 of *the 30* skills are essentially common to both services. These *are* shown in appendix I. Also each service has one apparently unique skill.

The Air Force's unique skill *is* air drop fundamentals--alining the aircraft with a predesignated *track to* the target area and flying *it* along *the* track taking into account wind effect, This requirement includes the basic elements of cargo and personnel drops and high-altitude bombing.

T5e Navy's unique skill relates to the techniques and procedures used *in* landing on aircraft carriers. In carrier landings the Navy's approach descent *is* very gradual, the air speed is constant, an3 the same attitude is maintained throughout the touchdown phase. The Navy teaches this technique in UPT's jet segments. In contrast, the Air Force teaches its pilot to make a "flared" landing, which involves a sharper angle and faster descent. Just before touchdown, the aircraft's nose is elevated slightly to produce a flaring effect and a softer landing. The Navy teaches "flared" landings *in* it5 propeller segment *of* UPT.

COMMON NAVIGATOR SKILL REQUIREMENTS

The services also made studies which were ~sed in determining which skills should be taught in their UNT programs. The Air Force study was tne primary source of the 24 basic navigator skills currently taught in UNT. The Navy study defined requirements more specifically, resulting in a lict *of* 144 undergraduate navigator skills.

With technical assistance from service officials, we determined which navigator skills were similar, considering the tasks and knowledge required of each. The approach used was similar to that used in comparing pilot training; that is, Navy skills were grouped under one or more comparable Air Force skills.

Skill requirements of both services are very similar. Navy requirements were found relating to all but 1 of the 24 Air Force skills, Appendix II lists common skills.

The Navy *die?* not have skill requirements related to the Air Force's low frequency radic skill because Navy aircraft don't have this type of radic. We found comparable skills in the Air Force for all but 27 of *the* 144 Navy skills. Twenty relate to unique Navy missions or operations, primarily antisubmarine warfare (ASW) and carrier operations. Equipment differences and differences of opinion as io the need for certain skills accounted for the remainder.

There are differences, however, as to when the Air Force teaches these similar skills. Of the 117 equivalent Navy UNT skills, the Air Force teaches 79 In its UNT program, 12 in graduate-level schools, and 4 partially in UNT and partially in graduate-level schools. *Seventeen* skills are taught in readiness training programs by the majcr command to which the graduate is initially assigned.

DIFFERENT TRAINING METHODS USED TO TEACH COMMON SKILLS

Although many of the skills are very similar, the services' training programs sometimes differ in the way the skills are taught. Sometimes these differences result from service preferences or practices peculiar to a service. The following example from the Air Force and Navy UPT programs illustrates such a difference.

Both services *provide* aerobatic training in CPT to (1) familiarize the student with the unusual angles possible in an aircraft, (2) teach techniques necessary ea control an aircraft as it approaches its maximum limitations, and (3) instill the self-confidence essential to military pilots, Although the training objectives are essentially the same, there are significane differences in the specific maneuvers used *to* provide aerobatic training, as the partial list below illustrates.

Types of maneuver	Taught in UPT by	
	Air Force	Navy
Lazy eight	x	
Aileron roll	x	x
Loop	x	x
Immelman	x	x
Cloverleaf	x	
Barrel roll	x	x
Cuban eight	x	
Split-S	x	x
Chandelle	x	
Wingover	x	x
1/2 Cuban eight		x
Squirrel cage		x

Service officials attributed differences to the fact that each service had acted independently in selecting the aerobatic training maneuvers. Officials of each service agreed that various combinations of specific maneuvers can achieve the objectives of aerobatic training.

Other differences in UPT and UNT program are discussed in chapter 3.

SERVICE COMMENTS

Air Force and Navy officials generally agreed with our conclusions concerning the degree of similarity in basic skills. However, Navy officials were concerned that this similarity might be cited as evidence that undergraduate training should be consolidated without further study.

CHAPTER 3

DIFFERENCES IN UNDERGRADUATE TRAINING PROGRAMS

PILOT TRAINING

The basic flying skills taught in UPT provide a foundation for additional training in the techniques and procedures of flying aircraft and missions encountered in future assignments. However, the services approach this common objective differently.

Air Force UPT students receive the same training and fly the same aircraft. After graduation, they are "universally assignable;" that is, they may be assigned to units for additional training in any type of fixed-wing aircraft. Navy UPT students go through a common segment of training but, while at UPT, branch out for additional training in either jet, propeller, or rotary-wing (helicopter) aircraft. Navy graduates are assigned according to the branch of training they attend.

The services' UPT programs also differ concerning when certain skills are taught. For example, Navy pilots are taught the basic skills associated with air combat maneuvers in UPT; the Air Force defers this training until after UPT.

Air Force

Before entering UPT all students are screened to identify those who are physiologically unsuited or do not possess the innate abilities necessary for flying. This is done either in Officer Training School, Reserve Officer Training Corps, or while attending the Air Force Academy. The T-41, or a similar small propeller aircraft, is used in this screening.

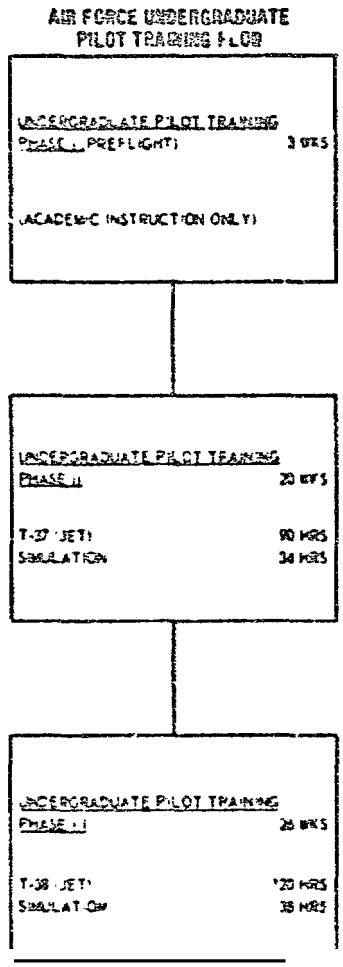
Students selected for UPT receive training at one of nine training sites:

Columbus Air Force Base (AFB), Miss.	Sheppard AFB, Tex.
Craig AFB, Ala.	Reese AFB, Tex.
Laughlin AFB, Tex.	Vance AFB, Okla.
Moody AFB, Ga.	Webb AFB, Tex.
	Williams AFB, Ariz.

The program lasts 49 weeks and includes approximately 210 flying hours in T-37 and T-38 jet aircraft. The T-37 is used in the primary segment and the T-38 in the advanced segment. An additional 72 hours of training is provided in simulators to supplement flying time. The instrument simulators

have no visual or motion capability but accurately portray the actual aircraft cockpits, have fully operational controls, and full instrumentation.

Student flow through UPT is shown below. UPT graduates generally receive additional flight training in readiness training programs conducted by the various Air Force commands.



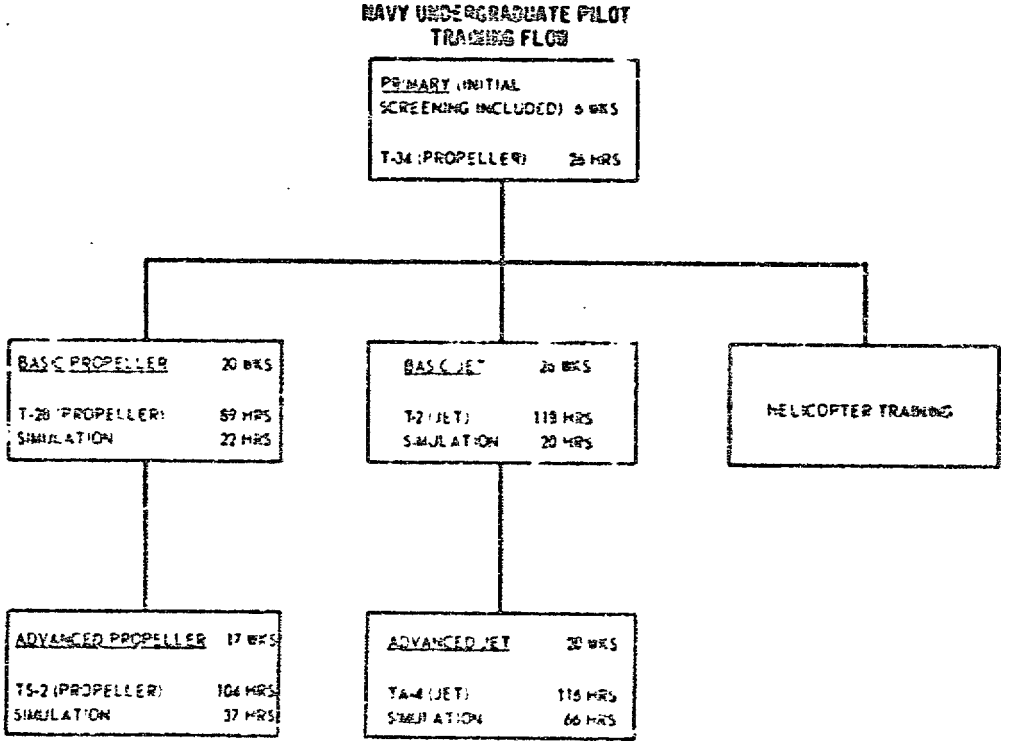
Navy

The Navy's initial screening occurs during a 6-week primary course at the Naval Air Station (NAS), Saufley Field, Florida. Students fly 26 hours in the T-34 propeller aircraft. Upon completing this training, students branch off for additional training in jet, propeller, or rotary-wing aircraft.

The 46-week jet segment has a basic and an advanced phase and is taught at NAS facilities located in Meridian, Mississippi; Kingsville, Texas; Beeville, Texas; and Pensacola, Florida. Students fly 234 hours in T-2 and TA-4 jet trainer aircraft and receive an additional 86 hours in simulators. The two types of simulators used have freedom of motion and can simulate complete flight, emergency, and navigation procedures. Students completing the jet segment are generally assigned to units needing fighter/attack aircraft pilots.

The 37-week propeller segment has a basic phase taught at MAS Corpus Christi, *Texas*, and NAS, Whiting Field, Florida, and an advanced phase taught at Corpus Christi. Students fly 193 hours in the T-28 and TS-2 propeller trainer aircraft and receive an additional 59 hours in simulators. The two types of simulators used have no visual capability, but one does have some freedom of motion. After completing this segment, students are primarily assigned to units needing pilots for multiengine aircraft other than jet fighter/attack aircraft.

Student flow through the Navy UPT program is shown below. Navy UPT graduates generally receive additional flight training in readiness training programs conducted by the major command to which the graduate is assigned.



NAVIGATOR TRAINING

The services have essentially the same objective in their UNT programs but also approach this objective differently. All Air Force UNT students receive *the* same training and are "universally assignable" upon graduation. The Navy *identifies* students after the first segment of UNT with their probable flying assignments upon graduation, and the remainder of their training *is* oriented toward particular types of aircraft and missions. As in UPT, some skills the Navy teaches in UNT are taught after UNT in the Air Force. For example, Navy students selected for fighter aircraft assignments receive familiarization training related to the F-4 fighter during UNT. The Air Force provides this training in readiness training programs.

Air Force

Air Force UNT consists of a 33-week course at Mather AFB, California. The training involves 20 hours of simulator time, 7 hours of flight training in T-37 jet aircraft and 120 hours in T-43 aircraft, and academic training.

Delivery of a new navigation simulator, designated the T-45, is expected to begin in mid-1975 *and* will result in curriculum changes. The new simulator duplicates the student navigator instrumentation found in the T-43 and will enable students to fly simulated missions in any part of the Northern Hemisphere. Et incorporates & digital radar landmass simulation, which allows programing *of* radar navigation problems using map data stored in the simulator computer. Students will receive 80 hours of training in this new simulator; flight time in the T-43 will be reduced to 105 hours. Academic instruction will also be reduced.

Navy

Students begin with a 26-week basic course at Pensacola, Florida. where they are taught basic navigation and voice communication through academic, simulator, and flight training. They fly a total of 43 hours in T-34, T-38, and *T-2* aircraft and recieve 48 hours in the 1D23 simulator. The 1D23 is a computerized navigation simulator similar to the Air Force's T-45. At the time *of* our review, the Navy was modifying the 1D23 to include radar landmass simulation capability similar to that of the T-45.

Following this course a small percentage of students proceed directly to readiness training but *most* continue navigator training in one or more *of* the following UNT program segments.

1. Antisubmarine warfare:

   Two weeks of academic training attended by students selected for ASW aircraft assignments upon graduation. Students completing this segment enter the advanced navigation or advanced jet navigation segments.

2. Advanced navigation:

   This 8-week segment includes academic, simulator, and flight training. Students fly 62 hours in the T-29 aircraft and receive 28 hours of simulation in a computerized navigation trainer. Students completing this segment are assigned to units with propeller-driven ASW aircraft or to units with multiengine cargo-type aircraft.

3. Advanced jet navigation:

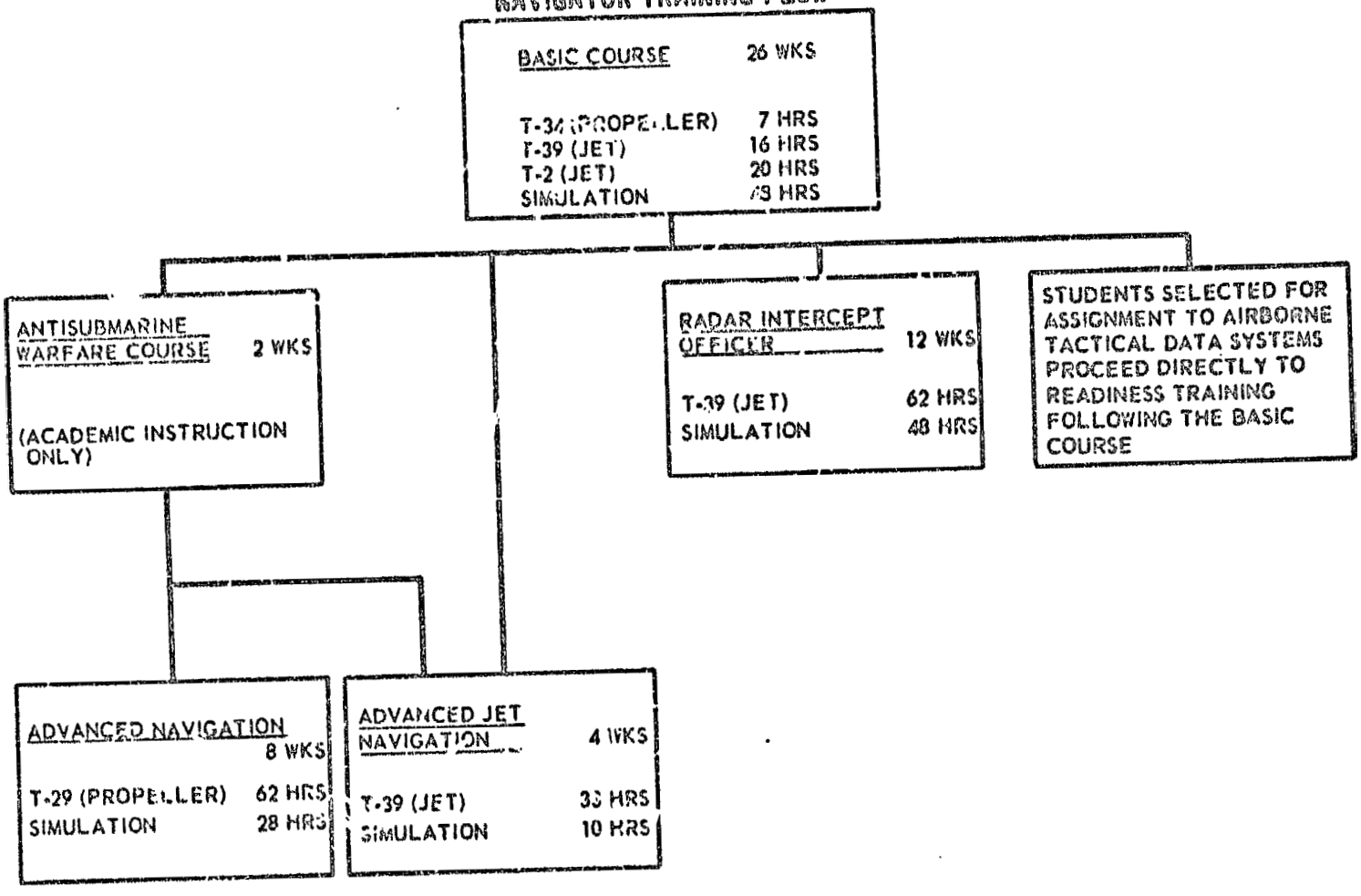
   Four weeks of academic, simulator, and flight training. Students fly 33 hours in T-39 aircraft and receive 10 hours of training in the 1D23 simulator. It emphasizes radar navigation skills. Students receiving this training and the 2-week ASW training are assigned to units with S-3 ASW jet aircraft. Others are assigned to units with attack or reconnaissance jet aircraft or receive additional training after UNT in airborne electronic warfare.

4. Radar intercept operator:

   A 12-week segment of academic, simulator, and flight training. Students fly 6% hours in T-39 aircraft and receive 48 hours of simulated radarscope interpretation. Its purpose is to teach the radar intercept skills needed for transition to fighter aircraft assignments.

Student flow through the Navy UNT program is shown on the next page.

NAVY UNDERGRADUATE NAVIGATOR TRAINING FLOW



OTHER OBSERVATIONS

Flexibility in assignment of graduates

Since the Air Force gives each student essentially the same training, it has the flexibility to meet changing needs of the using commands. For example, after completing training, an Air Force pilot can be assigned to fighter or multiengine aircraft because he is qualified for either. Air Force officials feel flexibility is an important factor in an undergraduate training program.

The Navy, however, cannot respond as quickly to changes in the types of pilots or navigators needed by operational commands because of its early commitment of graduates to specific types of aircraft or missions. When the student graduates, the Navy has already exercised its assignment options and it is too late to make any significant changes without incurring additional training. As long as the Navy has not been required to change assignments on short notice before graduation, the present UPT provides sufficient flexibility,

The Navy agreed it may be more difficult to manage a specialized program but said it has no problem selecting students for initial assignments or managing student flow,

Ease of transition to different aircraft

Students fly jet aircraft in the Air Force OFT program; students completing the Navy UPT's propeller segment have flown only proseller-driven aircraft. Air Force officials believe flight experience in jet aircraft during UPT results in less training later if a pilot after his initial assignment moves from multiengine to high-performance jet aircraft. To achieve this advantage, however, the Air Force pilot receives CPT training he may not need. (See below.) Also, data on career and assignment patterns indicate the extent of transition from multiengine to yet aircraft has been minimal except during the Southeast Asia conflict. Air Force officials said the high cost of transition training limits cross assignment of pilots between different types of aircraft. Also, pilots generally do not fly other aircraft until they have completed their first assignment and about 40 percent leave the Air Force at that time.

Ability to tailor training to needs

Navy programs are designed to provide the pilot with training essential only to his initial assignment. Air Force program provide some training which may not be needed in the pilot's

initial assignment and which he may not use while an Air Force pilot. For example, all Air Force UPT students are taught how to take off in formation, although pilots assigned to multiengine aircraft are not required to do this. Since (1) about 60 percent of all UPT graduates are assigned to multiengine aircraft and (2) later transition to jet fighter aircraft is minimal, there are a significant number of pilots who will probably never use this training.

Ability to provide mission-oriented training

Since the initial assignment decision is made early in the Navy's program, training can be directly related to the mission the student will eventually perform. For example, the Navy introduces fighter intercept techniques in its UNT radar intercept segment. This training, which provides students with skills necessary for an operationally ready navigator, takes place in aircraft where training generally can be provided at a lower cost. The Air Force provides this mission-oriented training after UNT to graduates selected for radar intercept assignments. Under its generalized program all students would receive this training if provided in UNT. Air Force officials agreed that introducing more mission-oriented training is desirable in undergraduate training because it results in a more operationally ready graduate.

Student motivation

The Air Force has experienced some dissatisfaction among graduates assigned to multiengine aircraft because, although its UPT program is oriented toward fighter-type aircraft, only about 40 percent of the graduates are assigned to this type of aircraft. Air Force personnel believe a specialized approach to undergraduate training would increase student and instructor motivation because they would be specifically oriented toward the type of aircraft being flown.

PLANNED CHANGES

The Navy plans to continue its specialized approach and the Air Force its generalized approach to undergraduate flight training. Both services, however, plan to make some changes in future UPT programs.

As part of its Long Range Pilot Training System for 1975-85, the Navy plans to increase flying hours from 26 to 65 in its primary segment of pilot training. This increase allows for more training before deciding the type of aircraft the student will be assigned to fly and will reduce the amount of flying time provided later in aircraft that are more expensive to operate.

To implement its long-range program, the Navy plans to buy new T-34C training aircraft for the primary and basic propeller segment of UPT. The initial 18 aircraft, costing $7 million, have been recommended for procurement in fiscal year 1975; another 278, costing $73.6 million, are planned for procurement in fiscal year 1976 and subsequent years.

There are other changes associated with implementing the Long Range Pilot Training System. One is introducing programed texts, which enable individual students to study specific phases of the curriculum, take a test, and advance to the next topic. Introduction of this proficiency advancement system was essentially complete at our review's conclusion. The Navy also plans to increase the number of films available in its learning centers. Students may use learning centers for individualized training involving video tape, movies, and other multimedia devices.

The Air Force has already established extensive multimedia learning centers and plans *to* develop programed texts and a proficiency advancement system.

Additional use of simulators

The Air Force and Navy expect to increase simulator use in undergraduate flight training. They plan to modify their present simulators and acquire new, more advanced, simulators.

The Air Force recently *awarded* a contract for a new simulator for its UPT program. It anticipates the new simulator will replace approximately 39 instrument training hours now flown in training aircraft. It *is* also testing new *concepts* in simulation to identify training devices best suited *for* UPT and expects to incorporate additional simulation in its program in the 1980s.

The Navy is installing a new simulator for use in the primary jet segments of its UPT program. It also plans *to* purchase visual attachments *with* computer-generated imagery for its jet training simulators and a new simulator for the advanced segment *of* multiengine training.

Both the Air Force and Wavy expect the planned increases in simulation will reduce flying time associated with most phases *of* undergraduate training, but the amount of reduction is uncertain. The services recognize that developing and applying simulator techniques would lend itself to increased interservice cooperation.

PRODUCTION RATES VERSUS TRAINING CAPACITIES

Projected Air Force and Navy production of undergraduate fixed-wing pilots and navigators through fiscal year 1980 is shown below.

Scheduled fixed-wing UPT production

	FY					
Air Force:	1975	1976	1977	1978	1979	1980
Air Force (active)	2,000	1,750	1,650	1,650	1,650	1,650
Air National Guard	89	71	71	71	71	71
Air Force Reserve	34	21	21	21	21	21
Foreign	255	261	151	151	151	151
Total	2,378	2,103	1,893	1,893	1,893	1,893
Navy:						
Navy	746	805	699	694	729	754
Marine Corps	226	144	120	120	120	120
Coast Guard and foreign	61	68	75	57	57	57
Total	1,033	1,017	894	871	906	931
Total production	3,411	3,120	2,787	2,764	2,799	2,824

Scheduled
UNT production

	FY					
Air Force:	1975	1976	1977	1978	1979	1980
Air Force (active)	1,258	900	800	800	800	600
Air National Guard	54	24	24	24	24	24
Air Force Reserve	24	4	4	4	4	4
Foreign	45	45	45	45	45	45
Total	1,373	973	873	873	873	873
Navy:						
Navy	486	460	460	460	460	460
Marine Corps	124	100	100	100	100	100
Foreign	21	54	54	54	54	54
Total	631	614	614	614	614	614
Total production	2,004	1,587	1,487	1,487	1,487	1,487

The capacity to train undergraduate pilots and navigators depend on many factors, including (1) number of runways, (2) availability of facilities, (3) availability of instructors, (4) adequacy of airspace, and (5) number of training aircraft. The curriculum, regarding number of training flights, simulator hours, and total hours, also affects training capacity.

The Air Force estimates it can normally provide undergraduate training to 3,162 pilots and 1,500 navigators each year, and the Navy estimates it can train 1,495 pilots and 950 navigators. These estimates are based on the number of training flights and hours in current programs. The number of training flights which can be flown from existing runways or the availability of airspace at UPT bases was the limiting factor in estimates of pilot capacity; the availability of training equipment limited UNT capacity. In the early 1980s Air Force pilot training capacity will increase to 3,625 as new simulators are installed. The Navy estimates it can train 1,775 pilots when the new T-34L aircraft is introduced in fiscal year 1977.

The above estimates assumed present aircraft and facilities would be sufficient for these production levels. Comparing the

estimates with planned UPT and UNT production shows some excess exists, as the following table shows.

	Percent of capacity to be used		
	FY		
	1975	1976	1977
UPT:			
Air Force	75	67	60
Navy	64	68	50
UNT:			
Air Force	92	65	58
Navy	66	65	65

CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The potential for interservice training programs depends heavily on the extent to which skills required by one service are required by another service. The similarity in flying skills taught in Air Force and Navy OBT and UNT programs indicates a significant potential for consolidating these programs.

A primary benefit that might be derived from joint programs is reduced overall training costs through more efficient use of training resources--facilities, equipment, and personnel. DOD has recognized that the substantial economies resulting from base closures or a reduction in support personnel, equipment, and facilities can be an important savings opportunity. Other potential savings involve future procurement of training aircraft and equipment. Consolidating training program can eliminate duplication in research and development and reduce the cost of new aircraft and equipment. Standardizing equipment can result in lower maintenance, supply, and other logistic support costs.

Because of differences in the structure of present program, we doubt if the UPT or UNT program of one service would adequately satisfy requirements of the other service without some change. Thus, consolidation will likely require the design of new UPT and UNT programs which can satify common requirements without impairing the pilot's or navigator's ability to make the transition into operational assignments and mission-oriented aircraft unique to each service.

The most significant obstacle to consolidation appears to be the services' parochial attitudes concerning whether the training should be generalized or specialized. Despite similar training requirements, these divergent attitudes have resulted in differences in the training programs of each service, including differences in aircraft and equipment and in the type of undergraduate training. The feasibility of joint UPT and UNT programs, at least for the near future, depends on whether present differences can be resolved while continuing to use existing training aircraft and equipment. Some training now provided separately probably can be cost effectively consolidated with existing aircraft and equipment. The Navy's program to procure replacement training aircraft

involves the type of decision which should consider the feasibility of combining training.

DOD studies of flight training programs may help determine the feasibility of joint UPT and UNT programs, but it is too early to evaluate what changes, if any, might be made as a result of these studies.

RECOMMENDATIONS

We recommend that the Secretary of Defense closely monitor DOD studies concerning the feasibility of consolidating flight training programs and require the services to implement recommendations resulting from these studies which will make training more economical and efficient.

COMMON UPT SKILL REQUIREMENTS

1. Ground operations -- Operations accomplished before takeoff and after landing that are necessary for flight. They consist of preflight planning, completing forms, inspecting aircraft, and verifying flight readiness by actuating subsystems.

2. Pretakeoff taxi -- Consists of moving the aircraft under its own power from the parking area to the takeoff runup area before taking off.

3. Takeoff -- Consists of the takeoff roll, rotation for lift-off, and lift-off. It begins when power is advanced eo begin the takeoff roll ani ends when the aircraft stabilizes in a climb attitude following lift-off.

4. Formation takeoff -- Takeoff, where two or more aircraft are taking off simultaneously from a single runway maintaining a predetermined position and pattern in relation to one another.$

5. Climb/level off -- Consists of climbing the aircraft to a given altitude and configuring it for level flight at that altitude.

6. Descent/approach -- Consists of descending the aircraft from its cruising or working altitude to either a landing or another cruising or working altitude.

7. Landing -- Transitioning the aircraft from airborne flight to ground operations. It begins with the landing flare and ends at the end of the landing roll. It includes the flare, touchdown and rollout, and required corrections for crosswind effect,

8. Postlanding taxi -- Consists of moving the aircraft under its own power from one point to another en the airfield after completion of landing rollout.

9. Basic control -- Maneuvers used for basic control of attitude, altitude, heading, airspeed, rate of climb/descent, and rate of turn. They consist of normal turns; descents; climbs; changes in heading, airspeed, or altitude.

10. Precision control -- Maneuvers practiced to develop precision coordination and rate changes in attitude, airspeed, heading, and altitude.

11. Stall recognition and recovery maneuvers -- Maneuvers practiced for the purpose of recognizing the onset of stall, corrections, and learning recovery techniques.

12. Aerobatics -- Maneuvers, where the aircraft is maneuvered through all of its axes at varying airspeeds, for the purpose of instilling confidence and learning control techniques for the aircraft in all attitudes and at all airspeeds.

13. Unusual attitude recovery maneuvers -- Maneuvers used to regain attitude and airspeed control from unusual or vertical flight attitudes without stalling or overstressing the aircraft.a/

14. Pilotage/dead reckoning navigation -- Navigation without radio aids. It consists of pilotage, in which the aircraft is navigated from point-to-point by visual recognition of landmarks along the way, and dead reckoning, in which a course and estimated time of arrival is computed, with visual recognition of the destination as the method of verifying arrival.

15. High-low altitude navigation manual -- Navigation accomplished by manual operation of the aircraft in which position of the aircraft is determined by ground-based navigational aids and/or air- or ground-based radar.

16. Close formation -- Flight, where two or more aircraft ace flown near each other in a predetermined pattern and fixed position under the direction of a single leader.

17. Trail formation — A type of formation in whirl., the distance behind the lead aircraft is increased and maintained through visual contact OK through the use of onboard electronic equipment.

18. Communications -- Operation of onboard airborne communications equipment to accomplish intraplane, airbase, enroute, and tactical communications.

19. Spin recognition and prevention — Maneuvers practiced to recognize the onset of a spin and the techniques needed for recovery.

23. Emergency procedures training -- Contingency training for various aircraft malfunctions.

2%. Tactical formation -- A formation, where the individual pilot within the formation maintains position on his flight lead which will permit him to visually scan 180 degrees of sky surrounding the lead aircraft while maintaining separation so that he can maneuver with the lead aircraft as necessary.b/ and c/

22. Basic fighter maneuvers -- Maneuvers used by a fighter pilot to position himself for the "kill" of an airborne target when his main reference is optical.a/ and b/

23. Air-to-ground fundamentals -- The simulated delivery of unguided air-to-ground weapons.a/ and b/

24. Radar navigation -- The theory and use of onboard airborne radar for weather avoidance and ground map navigation.b/

25. Crew coordination -- Interaction between crew members within the aircraft to accomplish required tasks.b/

26. Formation landing -- A landing performed simultaneously on a single runway by two aircraft while maintaining a fixed and predetermined position relative to each other.a/, b/, and c/

27. Low-level visual navigation -- Visual navigation accomplished under 1,000 feet above ground level.b/

2%. Collision avoidance -- The theory and use of onboard collision avoidance/proximity warning equipment to avoid midair collision.b/

29. Decisionmaking -- The processes that lead to the selection of one alternative from among a "known" set of response alternatives.b/ and c/

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a/ These requirements are valid only for the jet segment of the Wavy UPT program.

b/ The Air Force trains for these requirements in readiness training programs after UPT.

c/ The Air Force plans to include training foe these requirements in its future UPT program to be implemented beginning April 1975.

COMMON UNT SKILL REQUIREMENTS

1a. Perform mission planning and map preparation.

2. Interpret and interrelate mission briefing information

3. Review, interpret, and complete maintenance forms.

4. Inspect and use life-support subsystems.

5. Perform precruise navigation operations.

6. Determine aircraft position by using, individually or in combination, various systems and procedures.

7. Compute and maintain track, altitude, and airspeed.

8. Perform general mission communications.

9. Perform fuel management.

10. Perform inflight mission replanning.

11. Analyze weather systems and direct aircraft along optimal route.

12. Perform low-level navigation operations.

13. Demonstrate knowledge of aircraft emergency procedures.

14. Perform equipment malfunction analysis.

15. Perform postcruise approach and letdown navigation operations.

16. Complete mission debriefing.

17. Develop fundamental knowledge of aircraft systems.

18. Develop fundamental knowledge of aerial delivery procedures.

19. Develop fundamental knowledge of electronic warfare.