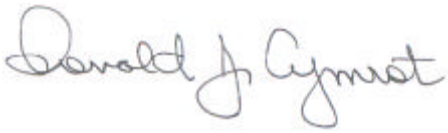
CAB D0006693.A2/Final
September 2002

Officer Street-to-Fleet Database

Ann D. Parcell • John Maitrejean, LT, USN
Carol S. Moore

4825 Mark Center Drive • Alexandria, Virginia 22311-1850

Approved for distribution: September 2002



Donald J. Cymrot, Director
Workforce, Education and Training Team
Resource Analysis Division

CNA's annotated briefings are either condensed presentations of the results of formal CNA studies that have been further documented elsewhere or stand-alone presentations of research reviewed and endorsed by CNA. These briefings represent the best opinion of CNA at the time of issue. They do not necessarily represent the opinion of the Department of the Navy.

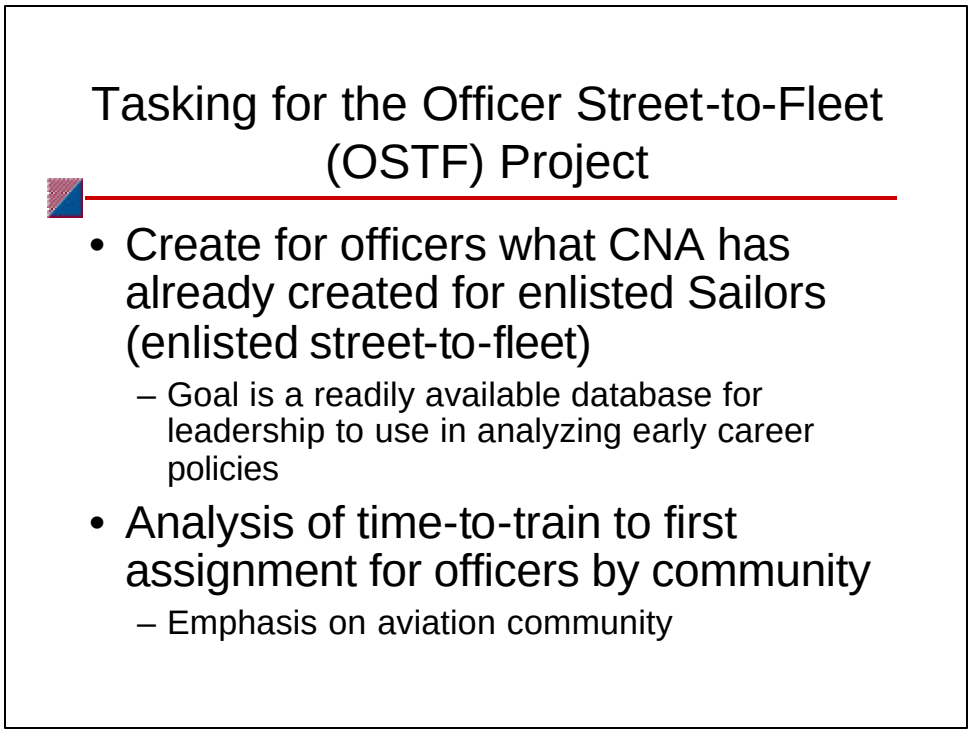
Officer Street-to-Fleet Database

September 2002

Ann Parcell
John Maitrejean, LT (USN)
Carol Moore

Center for Naval Analyses

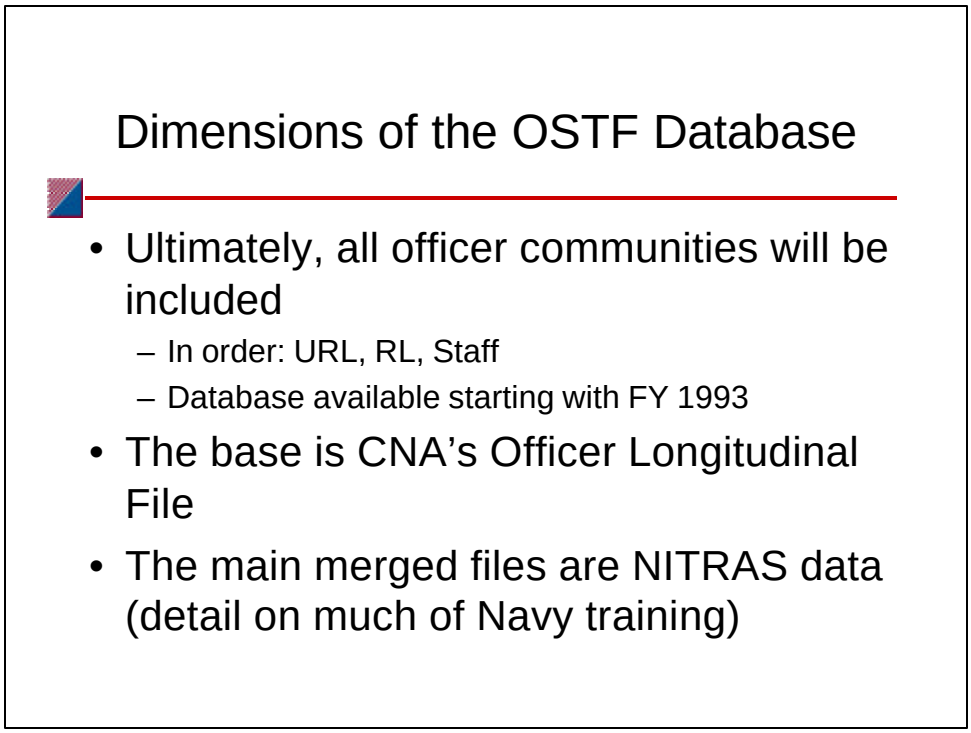
This study is sponsored by N81 for preparation of the 2002 Training and Education IWAR.



CNA's enlisted street-to-fleet database has proved useful for analyzing virtually any part of a Sailor's career—from bootcamp, to time at sea, to leaving the Navy. At the aggregate (Navy-wide) level, the database has helped set the standard for computing attrition statistics; it analyzes the efficiency of training pipelines and determines the effect of changes in training on success in the fleet.

N81 recognized the value of having a similar database for officers and asked CNA to create it. N81 also asked us to use the database to calculate time-to-train (TTT) to first assignment (the division officer (DIVO) tour) for each officer accession cohort. The early training pipeline for officers consumes many manpower and training resources and is a logical place to focus on improving efficiency.

TTT to first assignment is different for each community and must be calculated separately. N81 has a particular interest in calculating TTT to first assignment for the aviation community because it is the largest community and has the longest and most expensive early training pipeline. According to Navy estimates, each aviator who serves a DIVO tour in a squadron has already received $1 million to $5.6 million worth of training, depending on the type of aircraft.



We were originally asked to calculate TTT for each officer community, but we had only enough time and resources to calculate TTT for the large unrestricted line (URL) communities. We also present some basic early training information for the supply community.

To construct a complete database, CNA must start with FY 1993 accessions, which constrains our analysis to the mid- and post-drawdown Navy. Making TTT comparisons between the pre-and post-drawdown Navy would be problematic even if we had complete data for earlier accession cohorts because the officer corps differed greatly in size and composition across those two periods. At the time of this report, CNA had on hand officer accession information through FY 2001. Because the TTT to first assignment can be as long as 3 to 4 years (for jet pilots, for example), we can observe all the completed training outcomes for only the FY 1993–96 accessions. For officer communities with shorter training pipelines, we can include data for the accession cohorts of more recent fiscal years. We will update the database annually or as resources allow.

CNA receives Navy officer personnel file extracts (Officer Master Tapes (OMTs)) in March and September of each year. Using the September extracts, CNA has created a longitudinal officer file (LOF) that follows the career of every officer who has accessed since FY 1976. The personnel data contain information about each officer at accession, the history of billets held, and Navy career milestones. They contain far less information on specific training details, such as when and where an officer took a particular class and what the outcome was. Instead, the detailed training information for each officer is found in the Navy Integrated Training Resources Administration System (NITRAS) II database. However, data from NITRAS II are available only from FY 1993 forward. We merged officer accessions from 1993 forward from the LOF with the NITRAS data to create the OSTF database.

Dimensions of the Analysis

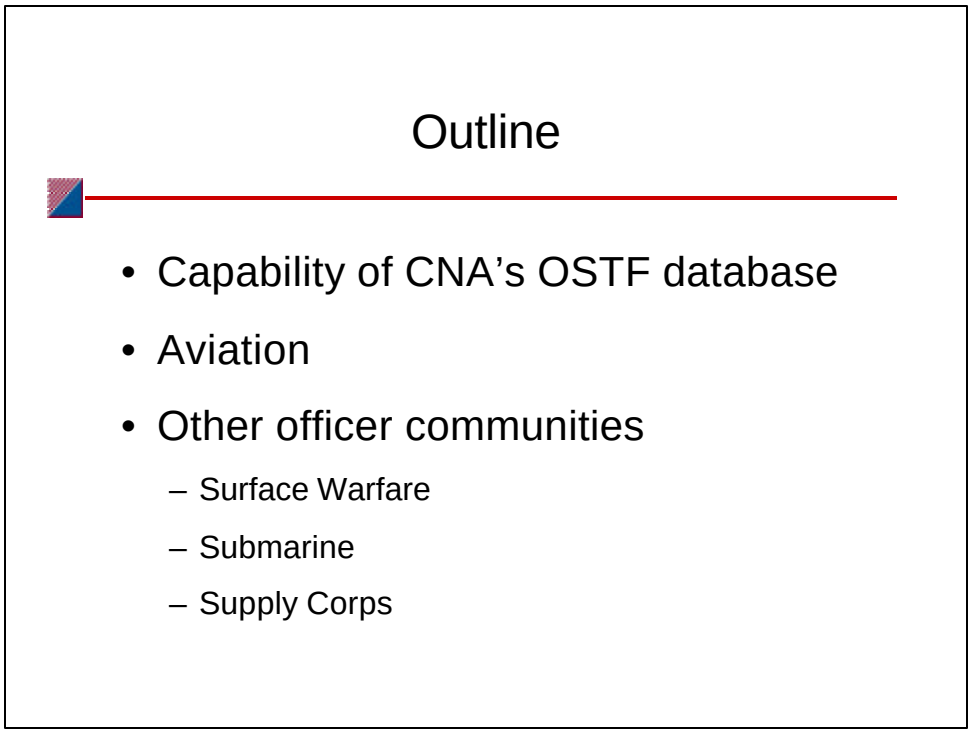
- Measures of TTT to first assignment only
  - Need to know required training pipeline for each community
  - How has TTT changed over time?

The sponsor asked that the database initially be used to calculate TTT to first assignment. This is a critically important metric to monitor over time because early Navy training, although essential to readiness, is very costly. Every officer receives training before his or her DIVO tour, the training pipeline can be long, and effective training can require expensive resources. As a result, efficiency gains in early training are likely to have a significant impact on the budget— especially for the naval aviation community.

We can use TTT calculations in two ways. First, we can calculate TTT for the accession cohort of a given fiscal year and compare it to an "optimal" training path, or the time it takes an officer to complete the minimum coursework and other instruction he or she must have before reporting to the fleet. Second, we can compare TTT over time to determine whether TTT for successive accession cohorts improves or gets worse. The sponsor asked us to focus our efforts on the latter comparisons.

As we'll see in later slides that summarize the data from FY 1993 and after, TTT for most URL communities was larger in the early years, but it declines in later years. Although we are unable to accurately calculate TTT before FY 1993, problems with high TTT may well have existed before then.

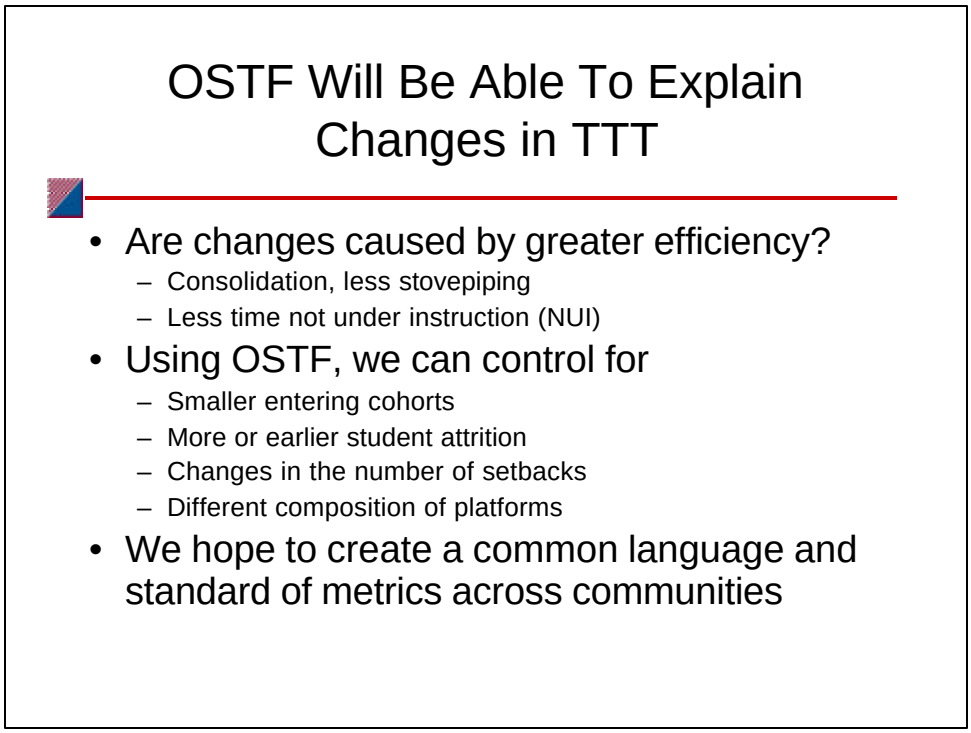
In future work, we will be able to add analytical sophistication to our TTT measures that can control for other factors, such as accession cohort size and various attributes of the officers in a cohort.



This annotated briefing is organized as follows. First, we describe the information that the database can provide now and what information it will be able to provide in the future.

The next section of the brief focuses on the aviation community. During the drawdown years, the early aviation training pipeline had become increasingly inefficient. To address these expensive inefficiencies, the Navy set up the Naval Aviation Production and Process Improvement (NAPPI) system in 1998. A cross-code group was asked to develop goals that would ensure the timely delivery of fully trained aviators to the fleet. The group was also asked to create an "early warning" system of metrics to help identify where slowdowns in the aviator production process were occurring. (Appendix A contains a more detailed description of the NAPPI system.) In the aviation section of the main brief, we compare some reported NAPPI aviation production results to similar metrics from CNA's OSTF database.

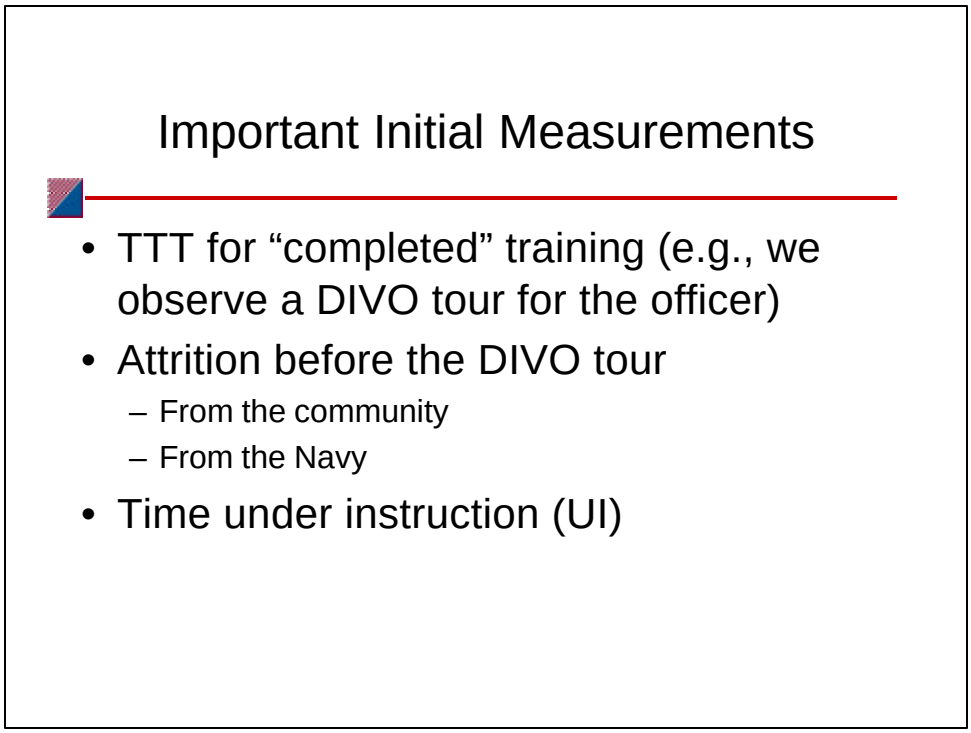
Finally, we summarize TTT to first assignment for other officer communities and discuss further development of the database.



One goal of the project is to develop a set of useful TTT metrics that can be easily understood and replicated, and are comparable across officer communities. This is especially important for those who have decision-making responsibilities for training across the officer corps. We also plan to update the metrics annually (or as resources allow) to provide an ongoing picture of TTT to first assignment.

If we find that TTT to first assignment improves over time, we need to determine whether the changes can be attributed to true efficiency gains. Only then can decision-makers design effective policies. For example, we may be able to trace an improvement in TTT to a consolidation of courses with similar content, which would be a true efficiency gain. By contrast, a change in accession policy that increases the fraction of lower quality officers in a cohort may shorten the average TTT for the cohort, but not necessarily because of an efficiency gain. It could be that TTT falls because the number of officers attrited from the pipeline increases and the remaining students can train more quickly. Similarly, reorganizing the pipeline to move some training from before entry to the fleet to after shouldn't be considered a true efficiency gain.

We organized the OSTF database to mirror the organization of our enlisted street-to-fleet database—that is, by each officer's Navy experience from accession to first assignment. We can readily calculate the percent distribution of TTT to first assignment for each accession cohort. Organizing the database in this way will allow us to control for the effect of the different size and composition of accession cohorts, for changes in the attrition rate, for changes in the DIVO billet structure that require more students to complete longer or shorter training sequences, and for other factors unrelated to true training efficiency gains.



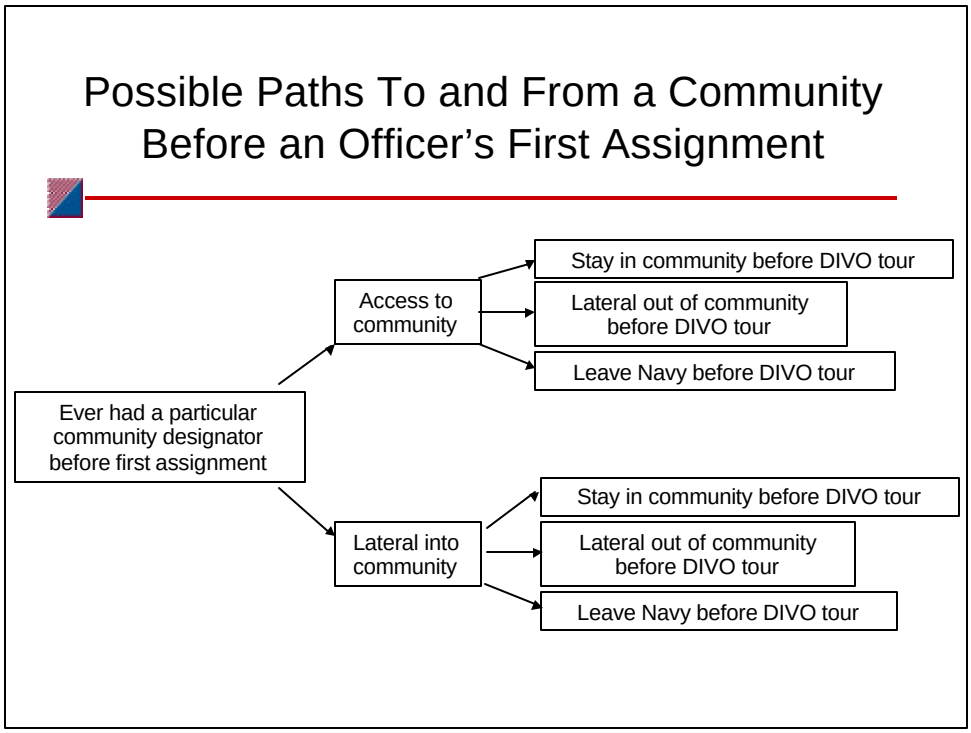
Our basic metric is TTT to first assignment, which we define as time from accession to the start of the DIVO tour. We calculate the percent distribution of TTT for accession cohorts that have had enough time to complete training and compare the distribution across cohorts. We do this to avoid comparing the TTT of older cohorts, for whom we can observe all outcomes from the training pipeline with more recent accession cohorts that still have some members in training.[1] A limitation to this method is that it can take a long time to collect the relevant completed training data for an accession cohort.

Except when noted, we account separately for lateral outs and Navy losses before their first assignment. Officers who lateral into a community before their first assignment also receive separate treatment. This allows us to compare TTT for those who directly accessed into the community with TTT for those who lateral into the community. The advantage of this method is that changes in losses from or gains to each community over time do not create "false" improvement or deterioration in TTT for completed spells of training.

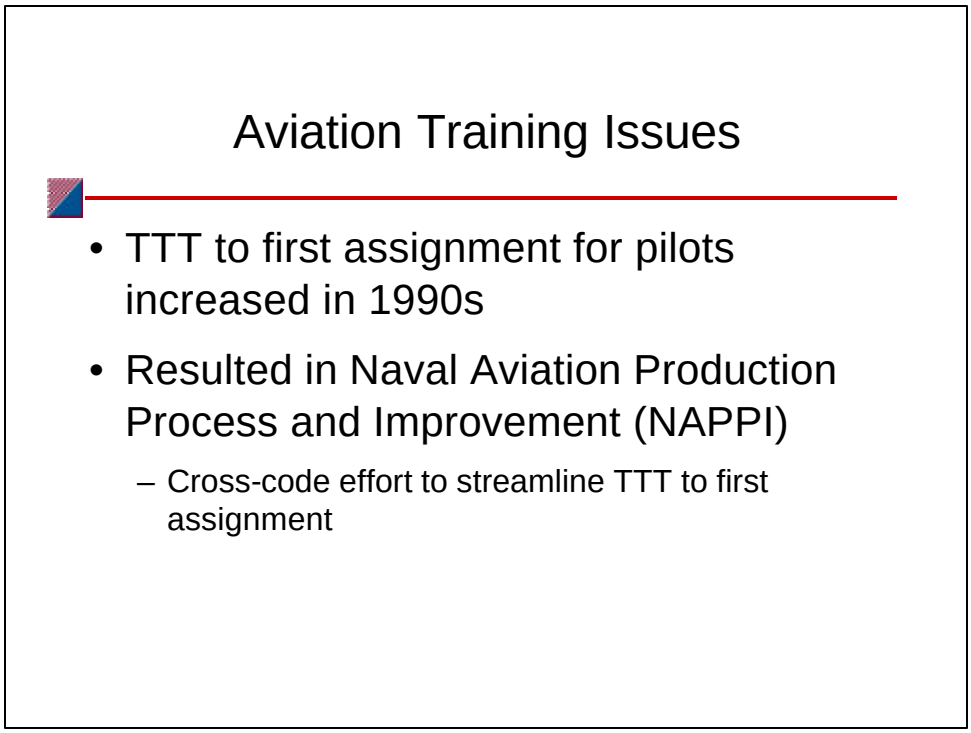
Matching the NITRAS data to the personnel files allows us to account for time under instruction (UI) and time not under instruction (NUI) for the period of time that an officer is assigned to a training command. At the accession cohort level, the NITRAS data can help determine whether average time NUI and average time spent outside the training commands (i.e., in a "stash" situation) are changing over time.

---

1. For more recent cohorts, we can report only the portion of the cohort that has finished training in a particular amount of time (e.g., we observe that 25 percent of the cohort finished training in 8 months). We can compare this to the same measure for earlier cohorts.



The tree diagram defines all the paths that an officer can take from accession to first assignment for any particular officer community.



In the mid-1990s, naval aviation leaders noticed that the amount of time required to train aviators had been increasing. Naval aviators were not completing the prescribed syllabus in the allotted time, and, as a result, the fleet was not getting enough first-tour aviators. Relative to stated fleet needs, naval aviation produced 200 fewer aviators each year in each of the 6 years before the inception of NAPPI. At the same time, it had 600 more aviators in training (roughly 23 percent of all aviator trainees) than was optimal.

In 1998, a cross-code group representing the major stakeholders involved in naval aviation training met to implement needed change. Their efforts resulted in the creation of NAPPI. The group identified the most pressing problems in aviation training and took steps to improve TTT to first assignment. We give an overview of the NAPPI process in appendix A. The next few slides outline some basic aviation training information and contain a comparison of some NAPPI and OSTF results.

Aviation Pipeline 101

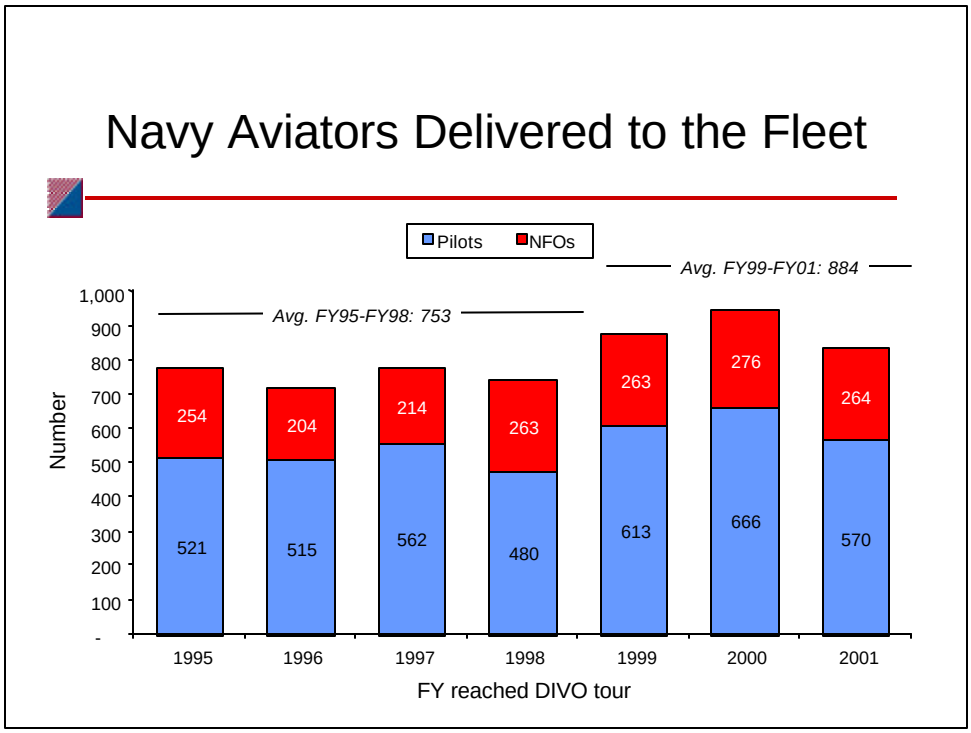
Phase	Course	Provider	When Taken
Flight school leading to designation as naval aviator (winging)	Preflight, aka API	CNATRA	First
	Water safety	BUMED	Before flight
	Physiology	BUMED	Before flight
	Primary	CNATRA	After Preflight
	Intermediate	CNATRA	After Primary
	Advanced	CNATRA	After intermediate
Category I training related to operational platforms	Basic Officer Leadership	CNET	After winging*
	FRS	AirLANT, AirPAC	After winging
	SERE	FASOPAC/ LANT	After winging
	Firefighting	CNET	While in FRS

* Beginning FY 03, BOLTC will be taken as part of preflight requirement.

Naval aviators undergo a long and arduous program of training that is split into two phases. Flight school (or "undergraduate flight training") begins with Aviation Preflight Indoctrination (API) and ends when the aviator finishes an advanced strike, maritime, or helicopter course and is designated a Naval Aviator or a Naval Flight Officer (NFO). In the second phase of training (called Cat I training for newly winged aviators), aviators learn to fly their chosen operational aircraft (e.g., F/A–18s, P–3s, EA–6Bs) in a Fleet Replacement Squadron (FRS). Between winging and FRS completion, aviators complete the Basic Officer Leadership Training Course (BOLTC), a firefighting course, and survival training (SERE).

This chart displays the typical pipeline. Notable permutations follow. E-2/C-2 NFOs don't get their wings until the middle of their FRS training. Certain strike pilots take a combined intermediate-advanced course in one aircraft, whereas others must master two aircraft. Aviators who experience setbacks in training or switch pipelines (e.g., from strike to maritime) have more complex training records. Finally, there are differences in the order and number of water safety and physiology courses that aviators must take.

Four commands provide aviation training. The Bureau of Navy Medicine (BUMED) provides training in water safety and aviation physiology; the Chief of Naval Air Training (CNATRA) provides the core courses of Preflight, Primary, Intermediate, and Advanced flight; and the Chief of Naval Education and Training (CNET) offers firefighting and BOLTC. The FRSs are controlled by AirPAC and AirLANT. There is no overarching "boss" of the entire process.

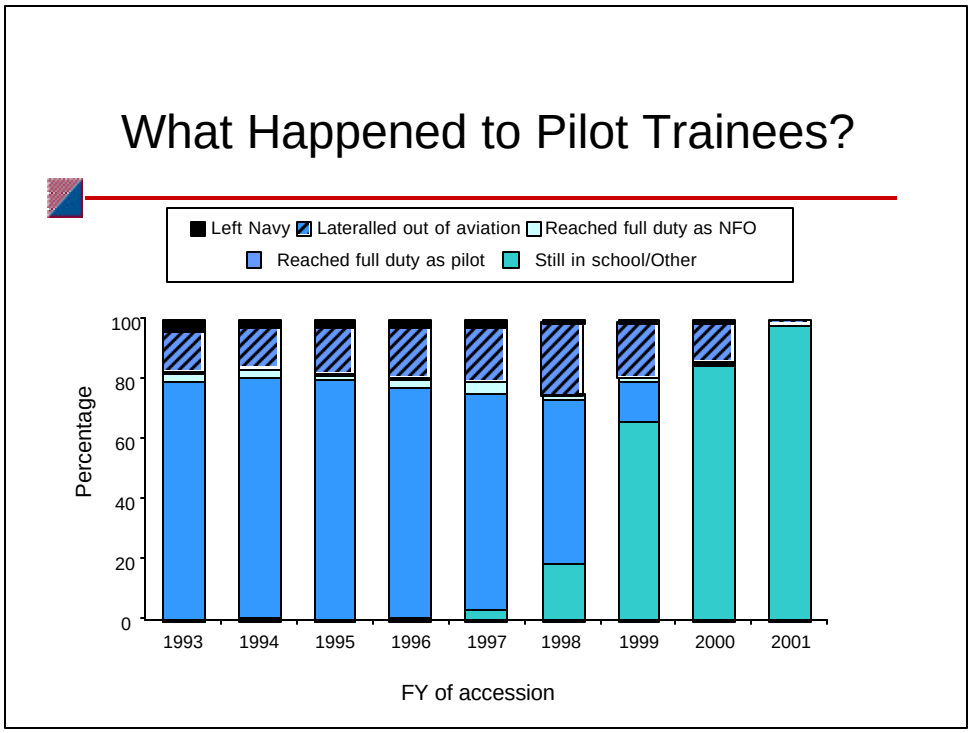


What does the OSTF database indicate about changes in the aviation pipeline? One way to assess improvements in the pipeline is to track aviators by the year they reached their first DIVO tour. OSTF indicates a significant increase in the number of fully trained aviators delivered to the fleet. For example, between FY 1999 and FY 2001, the Navy delivered an average of 884 aviators to the fleet each year. This is an increase of 130 aviators over the previous 4-year average and an increase of 141 aviators relative to FY 1998.

Between 1 percent and 7 percent of the aviators who start DIVO tours each year are lateral ins from other officer communities. These counts include lateral ins. In addition, the aviators included in these counts have all earned their wings, completed FRS training, and began serving in a DIVO billet.

Note that the improvement in production is consistent with the initiation of NAPPI policies, but we can't verify that they were the result of NAPPI (or any other policy) without further analysis. Other factors to consider include student quality, funding, weather, fuel costs, and the many variables unrelated to NAPPI that determine aircraft and instructor availability.

Note that these data go back only as far as FY 1995. This is because NITRAS data, which we use to produce this chart, go back only to FY 1993.



An efficient pipeline not only delivers the appropriate number of aviators to the fleet but conserves training resources as well. How many aviators received training but never made it to a DIVO tour?

This chart shows the status, as of September 2001, of officers who started aviation training as pilots between FY 1993 and FY 2001.

On average, 18 percent of officers who received pilot training do not complete training in aviation: about 16 percent lateral out of aviation and about 2 percent leave the Navy. About 2.5 percent of pilot trainees make it to the fleet as NFOs.

There is no obvious trend, but the FY 1998 cohort seems to be attriting (either lateralling out or leaving the Navy) at a higher rate than the others. Nearly 24 percent have already left aviation training. Because 19 percent are still in the pipeline—and are at risk for attrition—the final tally for FY 1998 will probably be even higher.

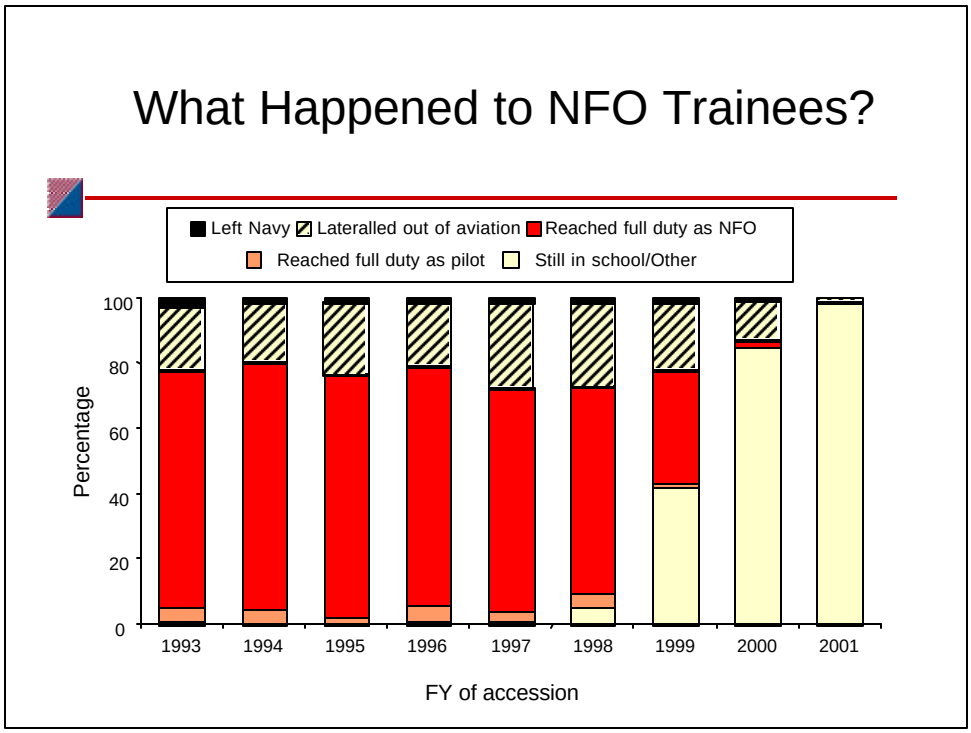
Because the aviation pipeline is so long (as many as 5 years), it can take a long time to discern the impact of training reengineering initiatives, such as NAPPI. The vast majority of recently accessed pilots are still in training. In fact, over 4 percent of the pilot trainees who accessed in FY 1997 were still in training as of September 2001. We can only make cohort-level comparisons among those who entered in FY 1996 and earlier.

This chart depicts all aviators who ever held a designator of 1390, 1395, 1310, or 1315. Because designator information is sometimes entered with a lag, we also include aviators who took a pilot course. These courses were offered by CNATRA and are course type "V2," "V3," or "V4," CNET's indicators for prop, jet, and helo pilot courses. ("V5" refers to NFO courses.)

Note that the data include some aviators who may have also trained as NFOs—either before or after receiving pilot training—and may have reached the fleet as NFOs. However, we exclude laterals into aviation from other officer communities.

Officers who ever held designators of 130X are counted as laterals out of aviation because they are not qualified to fly and few regain their qualifications. Most 130Xs eventually lateral into another Navy community.

Conventional wisdom holds that there are a sizable number of pilot trainees who switch to NFO early in the pipeline. However, this chart indicates a relatively small number. The reason may lie in an apparent time lag in the recording of officer designators. For reasons that are not clear, some aviators are designated as 110X (General Unrestricted Line) for their first several months of commissioned service, even though they are slated to train as pilots or NFOs. We have made every effort to adjust for this and identify officers' true training designators. It is possible, however, that some officers switched out of pilot training before the 139X designator was ever recorded. Such a person would not necessarily be counted as having received pilot training in this chart. If most transitions from pilot to NFO occur very early in the training pipeline, we may not observe their pilot training experience. Our data show that they have 110X designators instead of 139X. Courses offer no clues. Early in the pipeline, they take Preflight or Primary instead of the later, pilot-specific courses. However, we do count them as NFO trainees; their data are reported in the following slide.



This chart shows the status of officers who trained as NFOs between FY 1993 and FY 2001. On average, 23 percent of officers designated 137X do not complete training in aviation: about 21 percent lateral out of the aviation community, and about 2 percent leave the Navy. Again, there is no obvious trend, but attrition seems particularly high for the FY 1998 cohort—26 percent, with 6 percent still in the pipeline as of September 2001.

The NFO pipeline is about a year shorter than the pilot pipeline, but it is still longer than that of other URL communities. Because NFO training can take 4 years (or more), we can make cohort-level comparisons only among those who entered in FY 1997 and earlier.

The data include all aviators who ever held a designator of 1370, 1375, 1320, or 1325. Because designator information is sometimes entered with a lag, we also include aviators who took at least one NFO course. These courses were offered by CNATRA, and they contain the keywords "NFO" or "NAVIGATOR," or are of course type "V5," CNET's indicator for an NFO course.

Some of the individuals represented on this chart also trained as pilots and are counted in the previous chart as well. Their records indicate some NFO training—they either held an NFO training designator or took an NFO course. The data indicate that an average of 3.7 percent of the aviators who trained as NFOs—about 10 people per year—actually reached the fleet as pilots.

Officers who ever held designators of 130X are counted as laterals out of aviation.

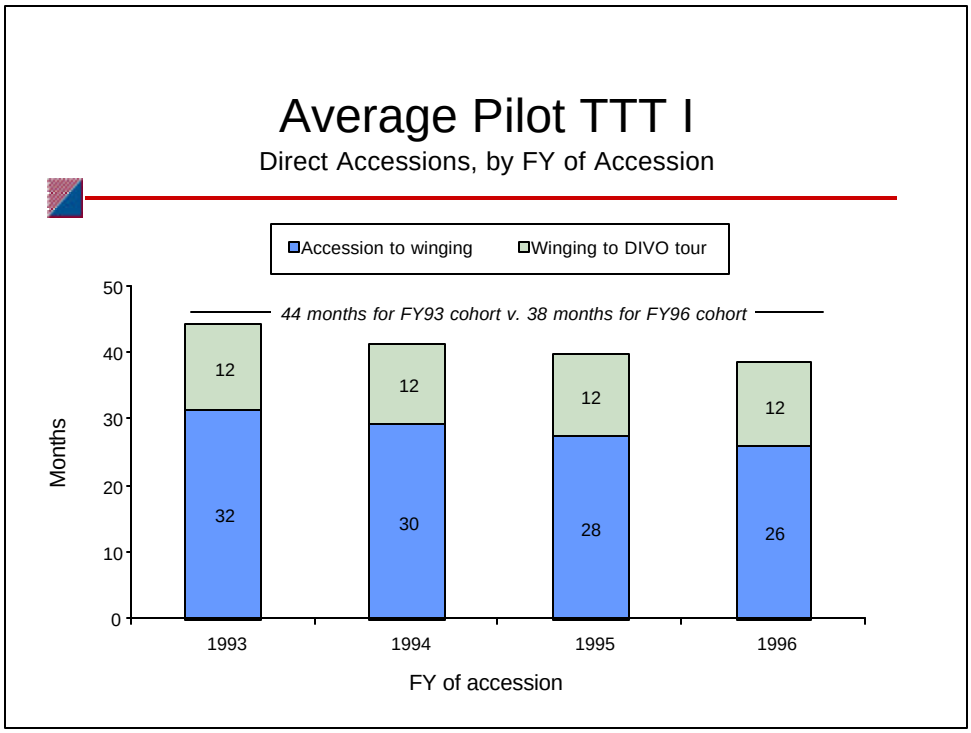
Ways To Measure TTT

Start points	End points	
• Date Preflight convened • Date earned commission	Flight school	• Date designator changed to 131X or 132X • Date finished last advanced CNATRA course
	All training	• Date completed last course before DIVO tour • Date started DIVO tour

How long did aviators take to reach their DIVO tours? There are several possible start and end dates for measuring aviation TTT. A natural start date would be when the officer's Preflight course convened, but OSTF indicates that students take Preflight an average of 4 months after earning their commissions. Such lags reflect the condition of the training pipeline and should be included as TTT, so we start the TTT clock at the date an officer gets commissioned. We also start the clock at commissioning for officers who lateral *within* aviation (between the pilot and NFO communities). However, for officers who lateral into aviation from Surface Warfare or other communities, we use the date their Preflight course convened to mark the start of training.

There are two ways to mark the end of flight school. When an aviator is winged, his or her designator changes from 139X to 131X (pilots) or from 137X to 132X (NFOs). The date associated with this designator change is an obvious candidate; unfortunately, it is often inaccurate. The date that appears in the LOF shows when an administrator recorded the change—not when winging actually occurred. The time lag can be significant. By this measure, many officers appear to earn their wings *after* reaching their DIVO tours as aviators, which is not correct. Instead, we use the date that the officer graduated from his or her advanced CNATRA course (advanced strike, helo, multi-engine, E-2/C-2, NFO strike, NFO strike/fighter, or navigator). However, we exclude aviation officers who ultimately failed to gain operational qualifications—whose histories show a training designator followed by the 130X designator.

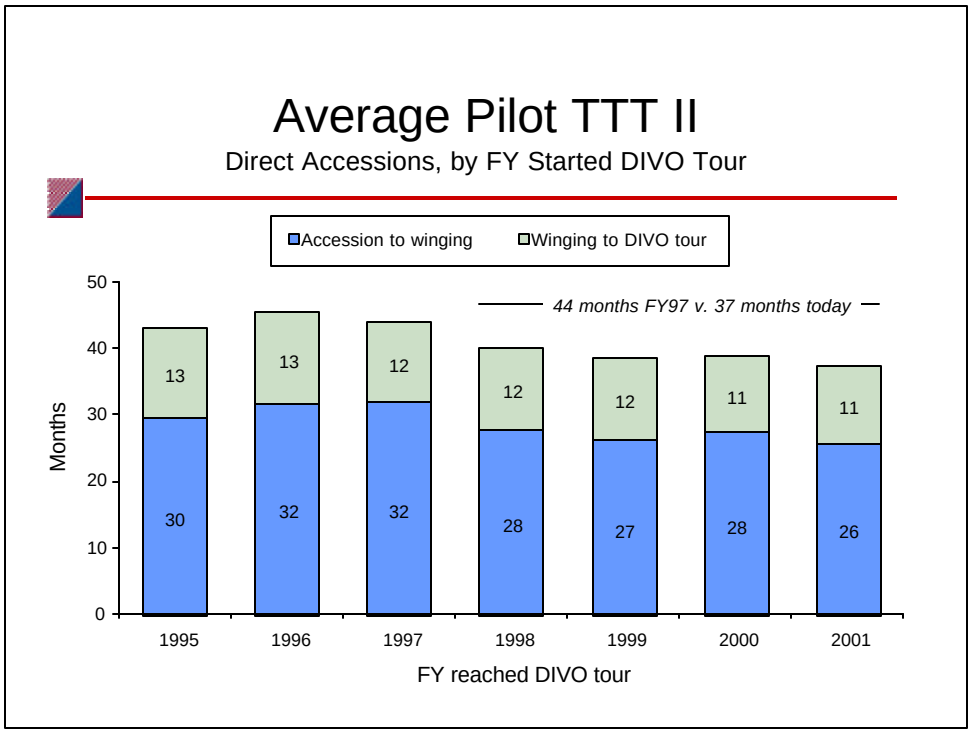
To mark the end of all pre-DIVO training, we use the start date of the aviator's first DIVO tour—the first squadron tour on record that occurs after the winging date. This date is in keeping with the Navy's interest in delivering trained pilots to the fleet. Our TTT start and end points are the same as NAPPI's.



TTT has declined steadily among pilot accession cohorts. Aviators who were commissioned in FY 1993 took an average of 44 months to reach DIVO tours as fully trained pilots. Those who entered in FY 1996 took only 38 months. The reduction occurred in the time between accession and winging. The duration of average FRS training appears to be unchanged. This chart includes officers who started as NFOs but who earned their wings as pilots. However, it excludes officers who lateralled in from outside the aviation community.

Again, we can't determine the extent to which these improvements were caused by NAPPI (or any other policy) without further analysis. However, they are consistent with NAPPI. Pilots who entered the Navy in FY 1993 are unlikely to have been exposed to NAPPI (the vast majority finish training in less than 5 years). Those who entered in FY 1996 and who completed training will have experienced NAPPI initiatives for 1 year or more (most are exposed to NAPPI initiatives for more than 2 years). This chart suggests that the more training that occurred since the inception of NAPPI, the faster the training was completed.

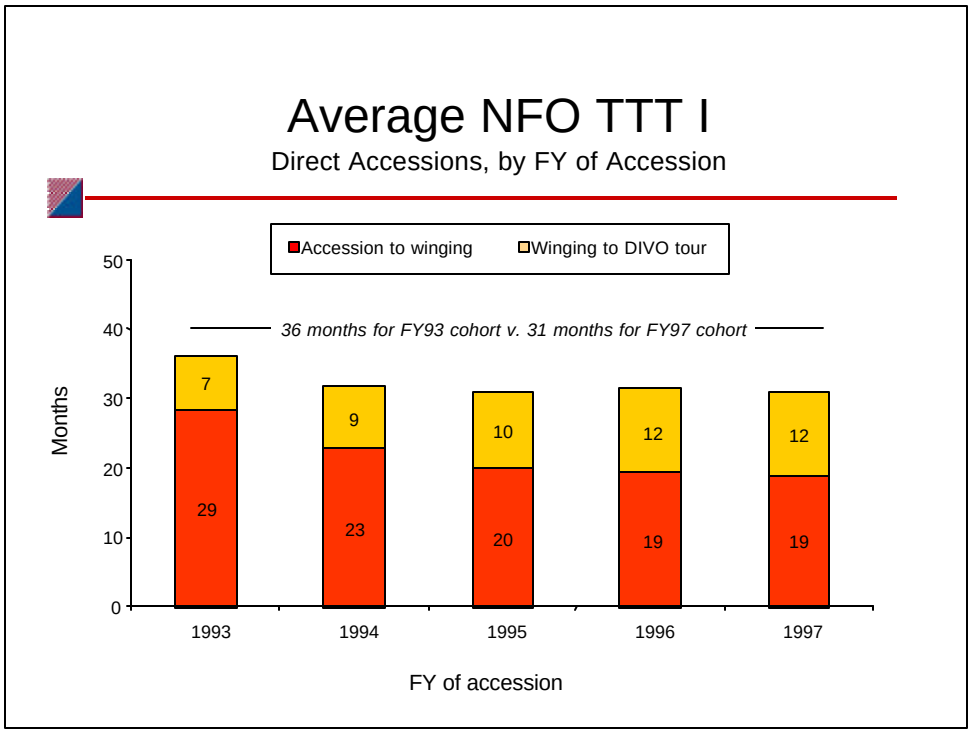
A backup slide shows the TTT distribution (not just the average) for cohorts of pilot trainees.



The OSTF database allows users to examine trends in several ways. They can arrange the data by the year aviators entered the Navy, as we showed in the previous slide. An alternative is to present the data by the fiscal year in which aviators reach their DIVO tours. This breakdown allows us to examine more years of data and makes it easier to discern the impact of recent policy changes.

The average pilot who reached full squadron duty in FY 2001 completed training in 37 months—26 months for flight school, and 11 months between winging and the start of the DIVO tour. This compares favorably with the pre-NAPPI year of FY 1997 (44 months) and NAPPI's first year, FY 1998 (40 months). OSTF indicates that the biggest change has occurred in time to winging between FY 1997 and FY 1998. The FRSs have seen more modest declines in time to train.

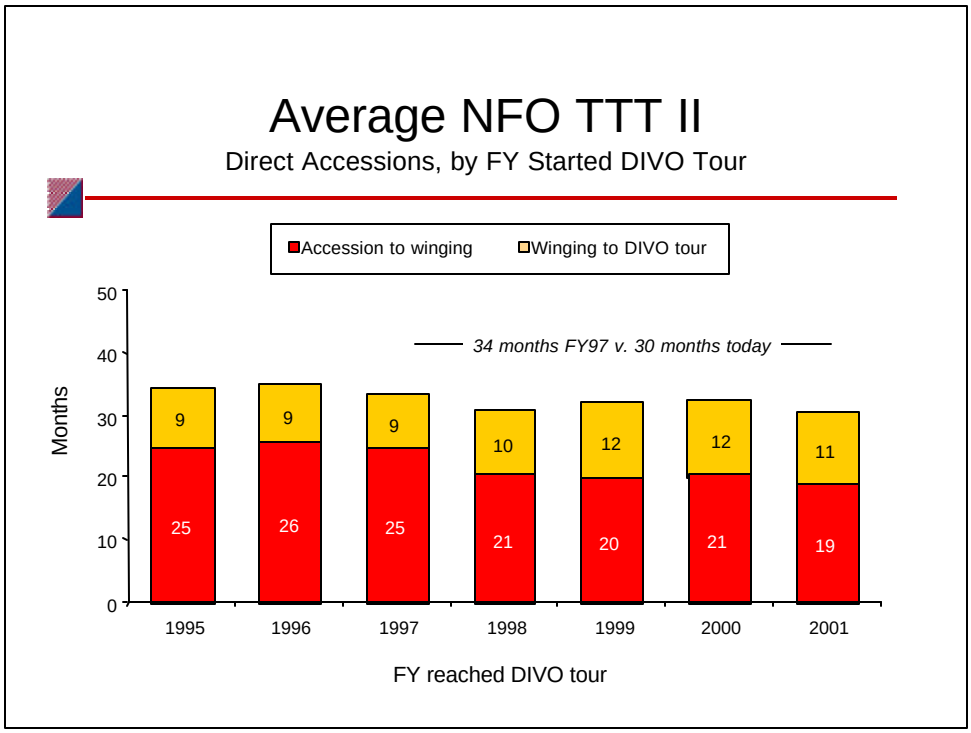
These computations are limited to direct accessions into aviation. Again, we go back only to FY 1995. Our winging variable is constructed from NITRAS training data, so that can only identify winging dates as far back as FY 1993. Because post-winging training can take 2 years, we only have complete information on those who arrived to the fleet in FY 1995 or later. As in the previous slide, these data include officers who started as NFOs but earned their wings as pilots; officers who lateralled in from outside aviation are excluded.



TTT has declined among NFO accession cohorts as well. NFOs who entered the Navy in FY 1993 took an average of 36 months to reach DIVO tours as fully trained aviators. Those who entered in FY 1997 took only 31 months. TTT has declined less steadily for NFOs than for pilots. For example, FY 1996 accessions averaged TTT of 31 months, which was slightly longer than the average of the previous cohort. The reduction occurred in the time between accession and winging. The duration of average FRS training appears not to have made the sustained decline as the portion of training from accession to winging. In fact, for the FY 1996 accession cohort, the duration of average FRS training appears to have increased and then leveled off.

This chart includes officers who started as pilots but who earned their wings as NFOs. However, it excludes officers who lateralled in from outside aviation.

A backup slide shows the entire TTT distribution for cohorts of NFO trainees.



NFOs who reached their first squadron tours in FY 2001 took an average of 30 months to train—19 months of flight school and 11 months of FRS time. Again, like pilots, NFO TTT has declined compared with FY 1997, but improvements have been less steady. The biggest drop occurred between 1996 and 1998.

As in the previous slide, these data include officers who started as pilots but earned their wings as NFOs; officers who lateralled in from outside aviation are excluded.

Comparison of OSTF and NAPPI Metrics

	NAPPI	CNA's OSTF
Data characteristics	Some Marines included Grads of USN/USMC FRSs TTT: 2-month moving average	No Marines All USN squadrons TTT: annual mean
Aviators reaching fleet		
FY98	751[a]	743[a]
FY99	923[a]	876[a]
FY00	977[a]	942[a]
Time to train		
FY97	N/A	178 weeks
FY98	180 weeks	160 weeks
FY99	160 weeks	159 weeks
FY00	146 weeks	160 weeks

[a] See slide 42 in appendix A for more detail on personnel included.

One way to check the quality of OSTF data is to compare them with existing data from other sources. Here, we place metrics from OSTF and NAPPI side by side. We expect the results to be similar—to move in the same direction and to be of the same magnitude—but not exact. The NAPPI universe includes nearly all naval aviators, certain Marine aviators trained in Navy squadrons, and one USMC training squadron (VMFAT-101). OSTF includes all naval aviators but excludes Marines (see slide 42 for squadrons included). NAPPI reports a 2-month moving average; we report an annual average. Other less obvious differences are likely to exist. The two sources confirm that the number of aviators delivered to the fleet increased each year between FY 1998 and FY 2000: NAPPI shows growth of about 30 percent, and OSTF shows growth of 27 percent. These are roughly comparable numbers given the differences in the squadrons used to compile the data described above.

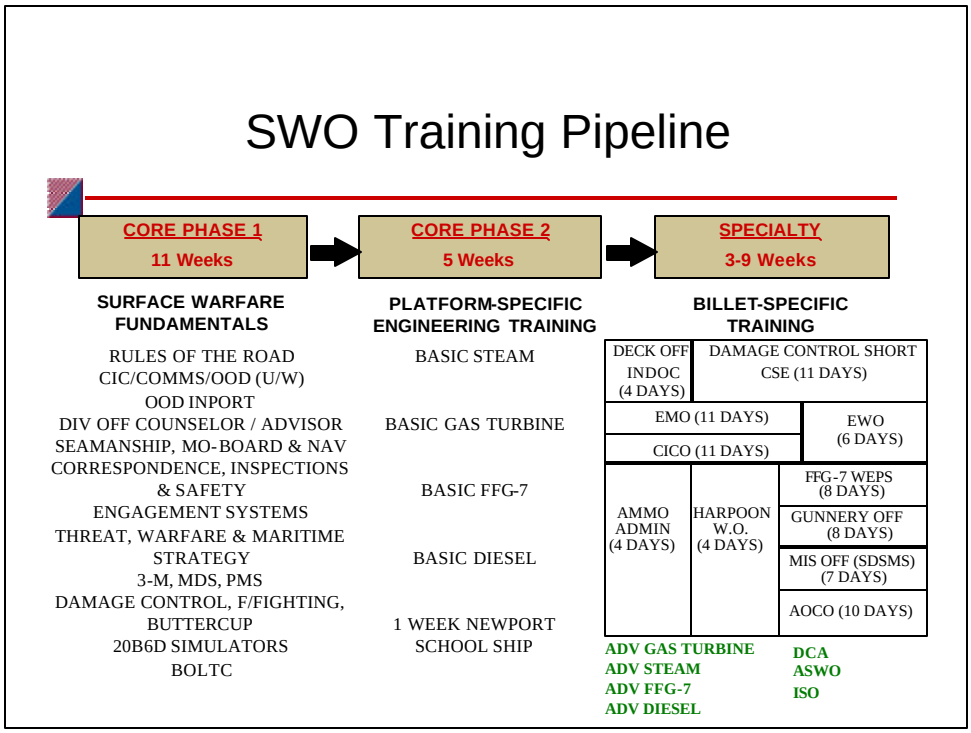
The TTT averages are of similar magnitude, which suggests that the basic formulae and data are in order. Unlike the counts, however, the OSTF and NAPPI TTT data do not follow the same time trend. These differences are likely explained by different methods of computing TTT, but, at this point, we can only speculate about the reasons. Note, however, that a goal of the NAPPI program is to identify changes in TTT as quickly as possible at any point in the training pipeline, so it's likely that the NAPPI metric is constructed to meet that goal.

One possibility is that NAPPI average TTT is calculated for each phase of training in a given fiscal year, so that no single aviator's TTT record is used across all phases of training. Instead, the flow of aviators who passed through primary training in, for example, FY 2001, is used to calculate an average TTT for FY 2001 primary training. The flow of aviators who passed through intermediate training in FY 2001 would be used to calculate an average TTT for intermediate training, and so on. Average TTT for each phase of training is then summed to create an average TTT over the whole pipeline. Again, we caution readers that we cannot confirm that the NAPPI TTT calculation is constructed in this way.

By contrast, for this exercise, the TTT metric in OSTF *is* constructed using the training time of each aviator that reached the fleet in FY 2001. That is, we are able to follow each aviator from accession to the start of the DIVO tour to construct an average training time. Note that the OSTF database is flexible enough to calculate other types of TTT metrics; we chose here to calculate average TTT for aviators reaching the fleet because it was the closest comparison to the NAPPI TTT metric.

Consider what would happen if a NAPPI or other training initiative were instituted to shorten primary training in FY 2001. If the NAPPI average TTT is constructed as described above, it will pick up the effect of the initiative because it uses data on the flow of aviators through primary training in FY 2001 as part of its overall average TTT. However, the OSTF metric used in this exercise won't pick up the effect of the initiative in its FY 2001 metric because it doesn't use the experience of students who take primary training in FY 2001 to calculate its overall FY 2001 average TTT. It uses the training information of aviators who reach the fleet in FY 2001, which means their primary training was completed some 2 to 4 years earlier, well before the initiative was instituted. In fact, the effect of the initiative won't show up in the OSTF TTT metric until later, when aviators who took primary training FY 2001 actually reach the fleet.

The benefit of a NAPPI type of metric that we've described is that it provides the most recent picture of average TTT. The drawback is that it may signal a false improvement in overall average TTT if, for example, a training initiative has the effect of shortening one part of the training pipeline but lengthening a later part of the pipeline. In that case, an OSTF type of metric will properly report no overall improvement in the average TTT, but it will take some time to collect the data to show this. Thus, the tradeoff is that the OSTF TTT average will tend to lag behind the NAPPI figure, signaling the same changes in TTT later, but perhaps with greater certainty. We see every reason to inform policy-makers of *both* types of metrics.

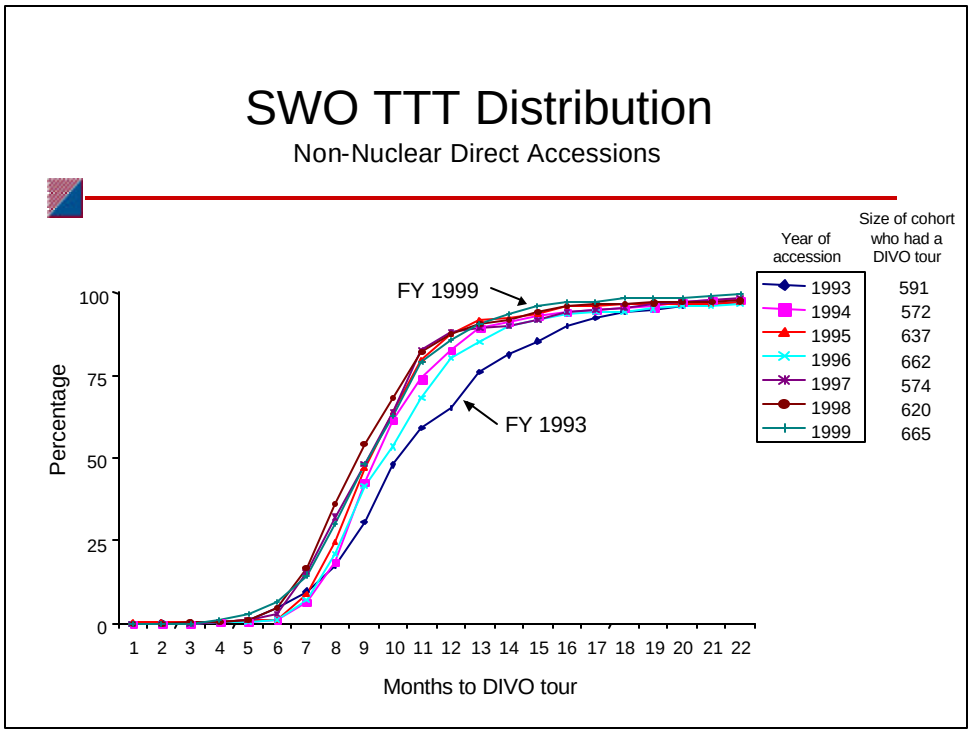


This flowchart details the surface warfare division officer course (SWOSDOC), which is offered in Newport, Rhode Island. All commissioned officers must take a minimum number of these courses before reporting to division officer billets. (Exceptions to attending SWOSDOC can be made for limited duty officers (LDOs) or warrant officers who switch to an 1110, 1115, 1160, or 1165 designator after they already have significant experience at sea.)

In general, all attendees of SWOSDOC must take surface warfare fundamentals (CORE Phase I) and at least one course of platform-specific engineering training (CORE Phase II). The number of courses an officer needs to take in the billet-specific part of the training pipeline is determined by the specific jobs he or she will be required to perform as a DIVO.

Several other courses that fall outside the typical SWOSDOC curriculum may be required of a small number of officers before they report for a DIVO tour. These are often specialized courses designed to give training for certain collateral duties to the DIVO billet. One example is the "legal officer" course.

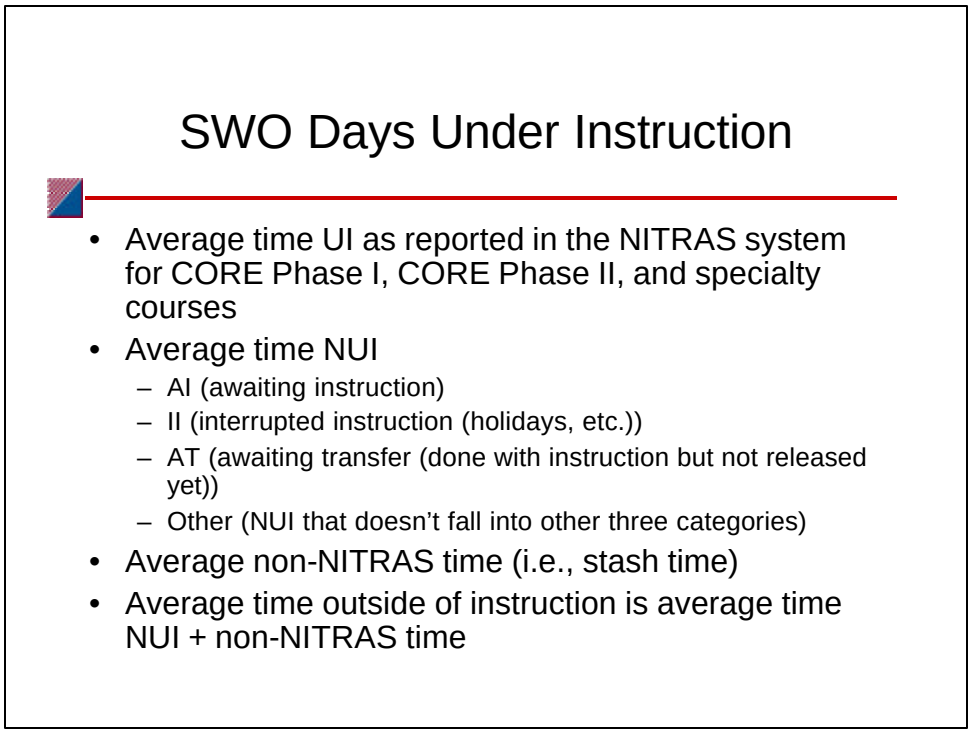
There are several other ways that a SWO can spend time before taking a DIVO billet. If an officer cannot report to SWOSDOC immediately after commissioning, he or she may be "stashed" for several months on his or her ship, at a command, or on a staff. There the junior officer performs whatever duties are required and gains some on-the-job training (OJT). Stashes while awaiting SWOSDOC, time in SWOSDOC, and any other training for collateral duties make up the bulk of TTT to first assignment for SWOs.



This slide shows the distribution of time from accession to DIVO tour for officers who accessed and stayed in the surface warfare community until the DIVO tour. By selecting only officers who directly accessed to the community and who began their DIVO tours as SWOs, we avoid any TTT changes that might be attributable to changes in the number of early lateral ins/outs. (A less-detailed version of this SWO illustration is shown side-by-side with other URL communities in slide 32).

We observe an improvement in the distribution of TTT to first assignment for a more recent accession cohort if a higher percentage of its officers are trained in a fixed amount of time (e.g,, by 8 months) than an earlier cohort. This corresponds to a left shift in the TTT curve.

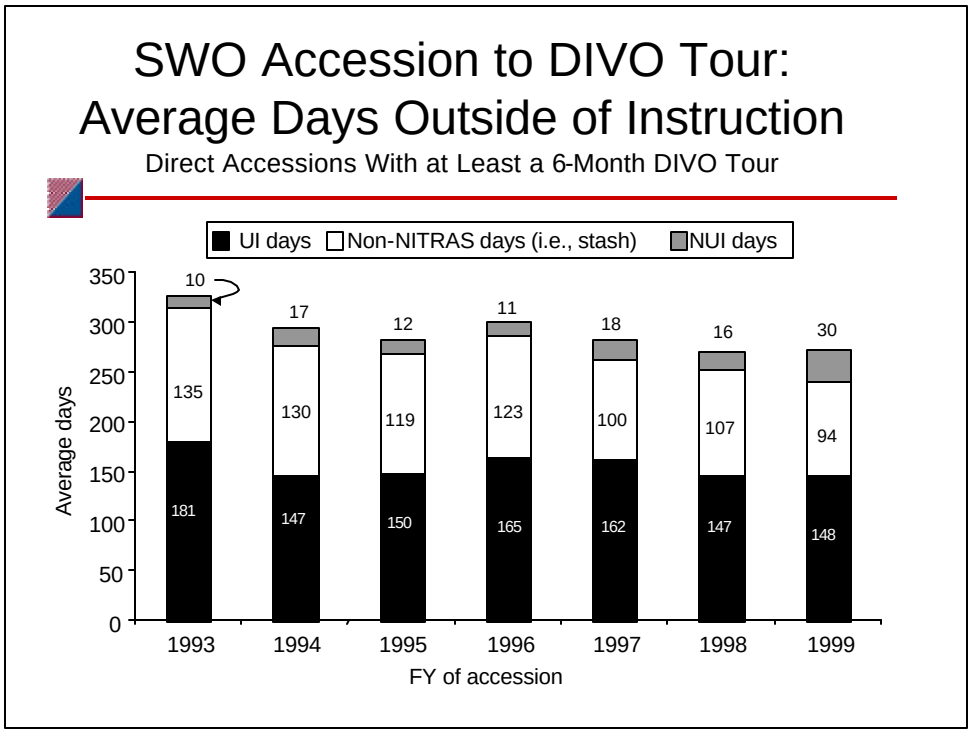
The distribution of TTT to first assignment shows that about 75 percent of FY 1999 direct accessions started their DIVO tours in about 10 months or less. This is a significant improvement over FY 1993 direct accessions, in which barely half of the accessions had begun their DIVO tours in 10 months or less. The detail on accessions since FY 1993 shows that improvements in TTT began as early as FY 1994.



When an officer reports to a training facility, the time spent there is recorded to the NITRAS II system. The NITRAS database can be used to find what courses an officer took, when he or she took the courses, and what the course outcome was. The database allocates all time in training as under instruction (UI) or not under instruction (NUI). NUI can be described further as time awaiting instruction (AI) (e.g., the student has reported to training but has not begun coursework), interrupted instruction (II) (holidays are accounted for here), awaiting transfer (AT) (e.g., the student has finished training but has not reported to a new command), and all other NUI (time NUI that does not fall into the other three categories). For very junior SWOs who have directly accessed to the community, the time at SWOSDOC typically makes up the majority of their time reported in the NITRAS system.

We also calculate average non-NITRAS days, which largely encompasses stash situations. We combine the non-NITRAS days and the NUI days to compute average *days outside of instruction*.

Although TTT improvements could show up in any measured time from commissioning to the DIVO tour (non-NITRAS time, NUI, and UI), UI may be the most difficult part in which to identify true TTT improvements. For example, average UI may fall because material is condensed into a shorter time, or because more officers take fewer or shorter billet specialty courses. Thus, for this study, we limit our definition of TTT improvement to declining average days outside of instruction for successive accession cohorts.

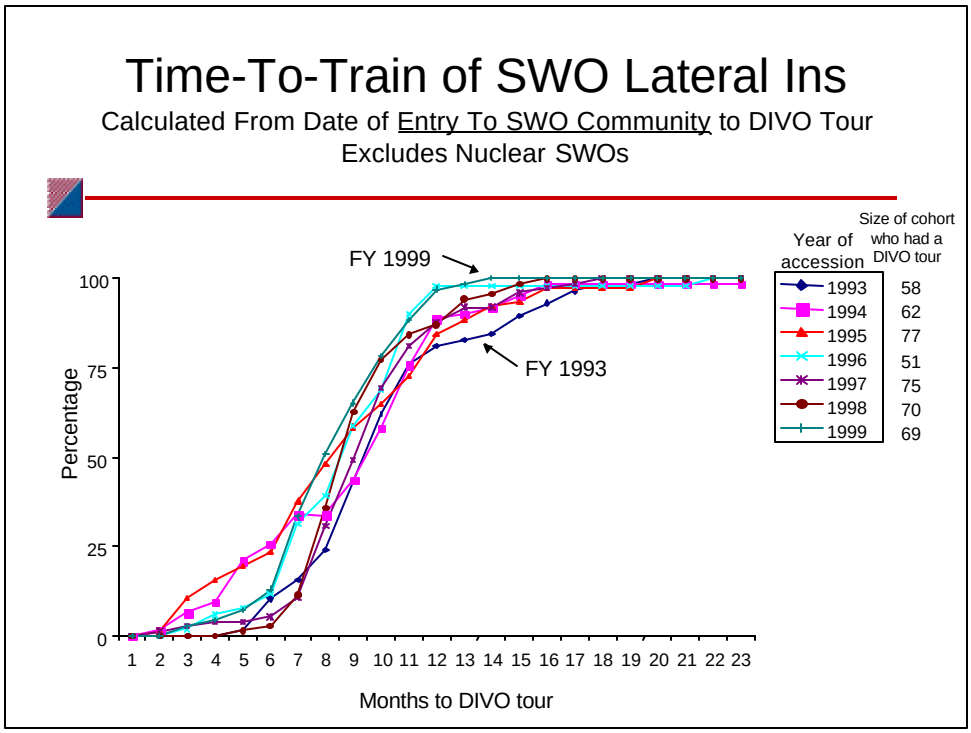


This graph shows the improvement over the decade in the time from accession to DIVO tour for officers who directly accessed to the SW community. We have further broken down the time by average number of days spent under instruction, not under instruction, and outside the NITRAS reporting system (i.e., in a stash situation.)

Although increases in NUI have offset decreases in non-NITRAS (i.e., stash) days, the net effect has been an overall decline in days outside of instruction (NUI plus non-NITRAS days.) SWOs who accessed in FY 1993 spent an average of 145 days outside of formal instruction (135 non-NITRAS days and 10 NUI days.) However, SWOs who accessed in FY 1999 spent an average of 124 days outside of formal instruction (94 non-NITRAS days and 30 NUI days). The increase to an average of 30 NUI days for the FY 1999 accessions appears to be an outlier. As more data become available for more recent cohorts, we will be able to tell whether the increase in average NUI is a trend.

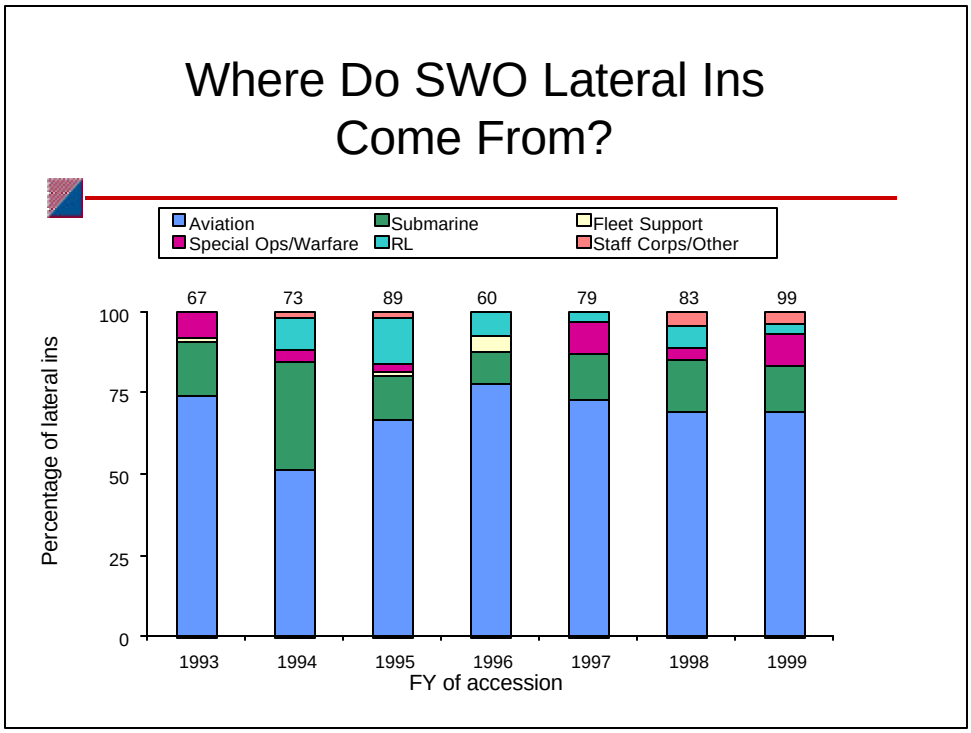
Note that stash time may be considered more productive than time awaiting instruction or time awaiting transfer (elements of NUI) because stash time represents on-the-job training. If so, then a switch from lower average stash time to higher average NUI time is not necessarily good.

There has also been a decline in average UI days, but, without further analysis, it is difficult to know whether this might be the result of a change in the mix of billet specialty courses taken (from longer to shorter courses, for example) or whether this reflects efficiency gains from training curriculum improvements or streamlining.



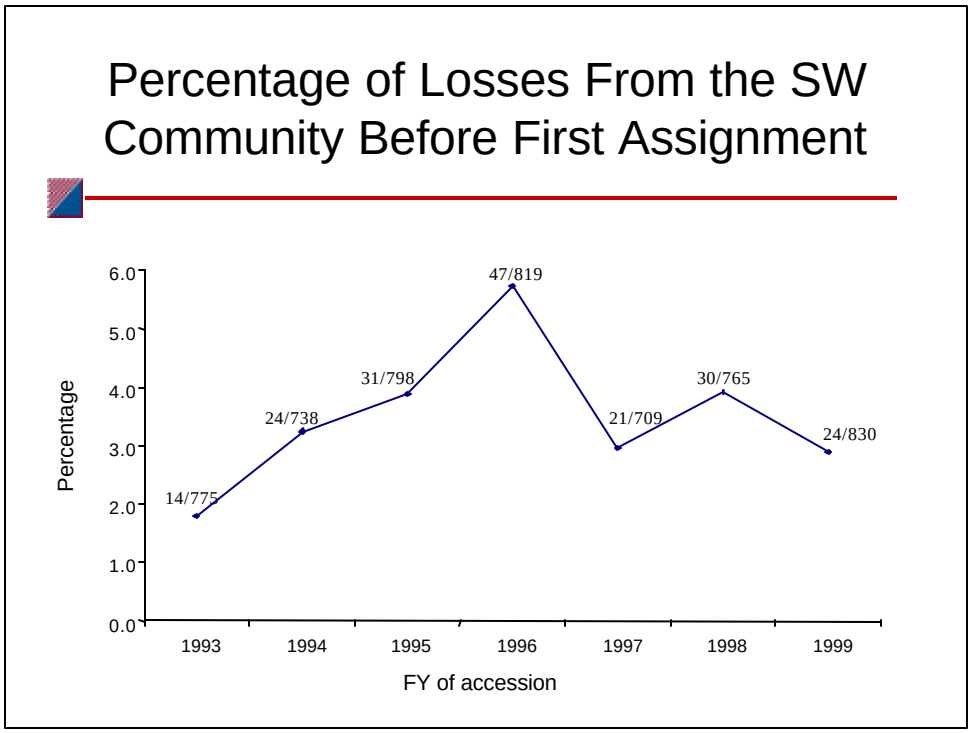
This graph shows the distribution of time to first assignment for surface warfare officers who lateraled into the community. Here we measure the time to first assignment *from the time of switching to a SW designator* (1110, 1115, 1160, or 1165.)

Using this definition of time to first assignment, the SW officers who lateral into the community have an early training experience similar to those officers who directly access to the community (see slide 25). There have been improvements in incorporating officers who lateral into the SW community into the early SW training pipeline. In 1993, 50 percent of the officers who lateraled into SW started their DIVO tours in 9 months or less. By 1999, 50 percent of the officers who lateraled into SW started their DIVO tours in 7 months or less. The improvement in time to deliver at least half of the lateral-in SW officers to the fleet began in 1994, and every year since has been an improvement over the 1993 accession cohort.

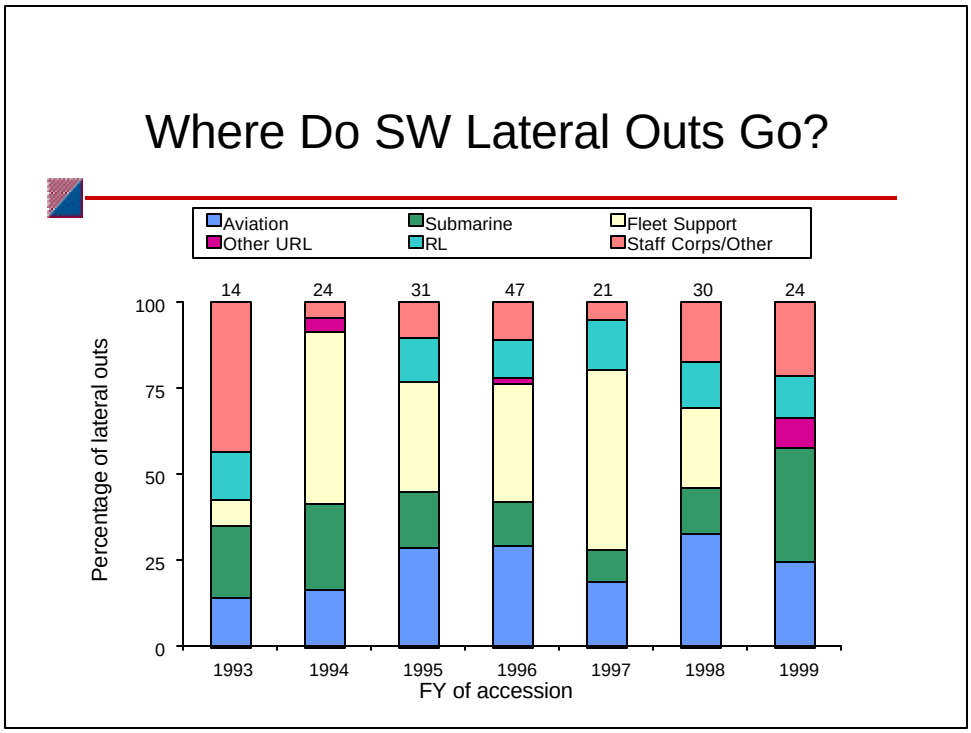


Many of those who transfer into the SW community before their first assignment come from the aviation community. Former aviators make up 50 percent of lateral ins who accessed in FY 1994 to as much as 75 percent of lateral ins who accessed in FY 1996. In fact, we expect that the vast majority of lateral ins will come from the URL because many of these officers will still be under their minimum service obligation and, barring medical issues, will be expected to serve as line officers. It takes a special board to approve lateral ins to the URL from the RL or staff corps and vice versa.

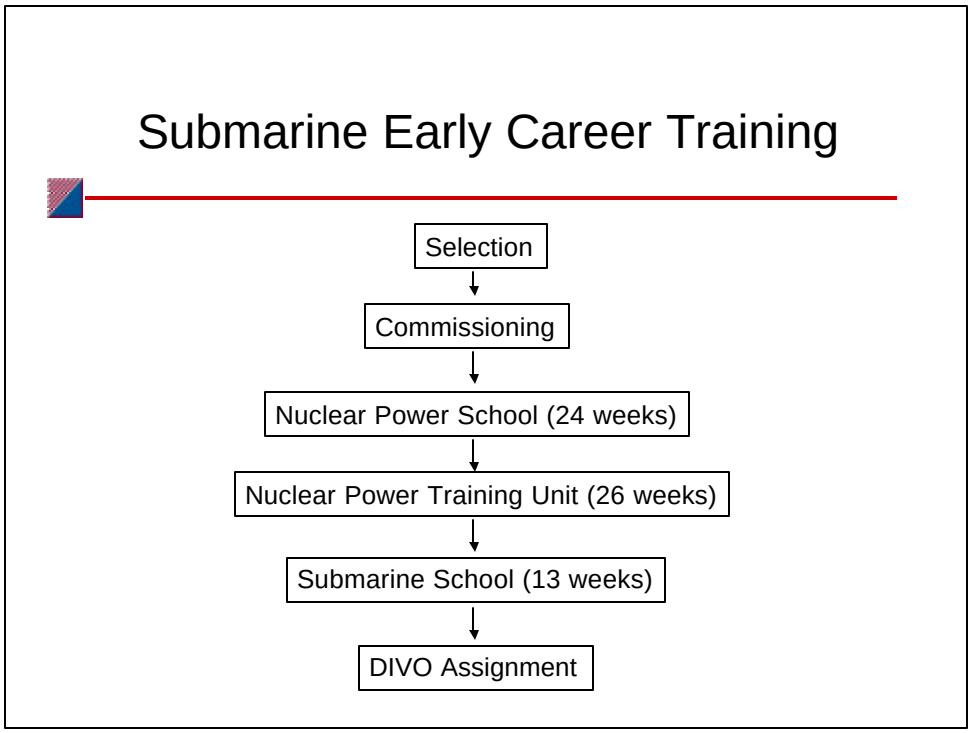
The graph shows the fiscal year of accession of the SW lateral in rather than the fiscal year of lateral in. For many officers who lateral into a new community before their first assignment, the lateral-in year is within one year of fiscal year of accession.



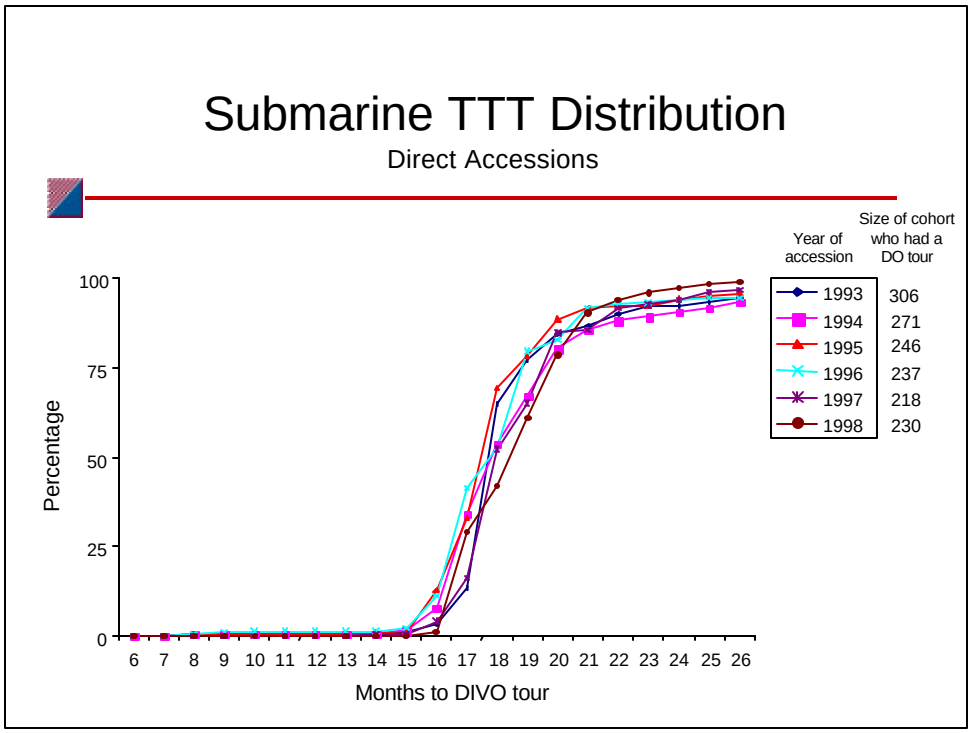
This graph shows that the number of students who lateral out of the SW community before their first assignment is fairly small. (The number of SW lateral outs later in the career path is substantially higher.) Early lateral outs as a percentage of those who have a SW designator before their first assignment (including losses to the Navy) never exceeds 6 percent, and the trend in recent years shows that this percentage is falling.



Early lateral outs from the SW community go to many other communities. Note, however, that it takes special board action to approve a lateral out to a non-URL community.

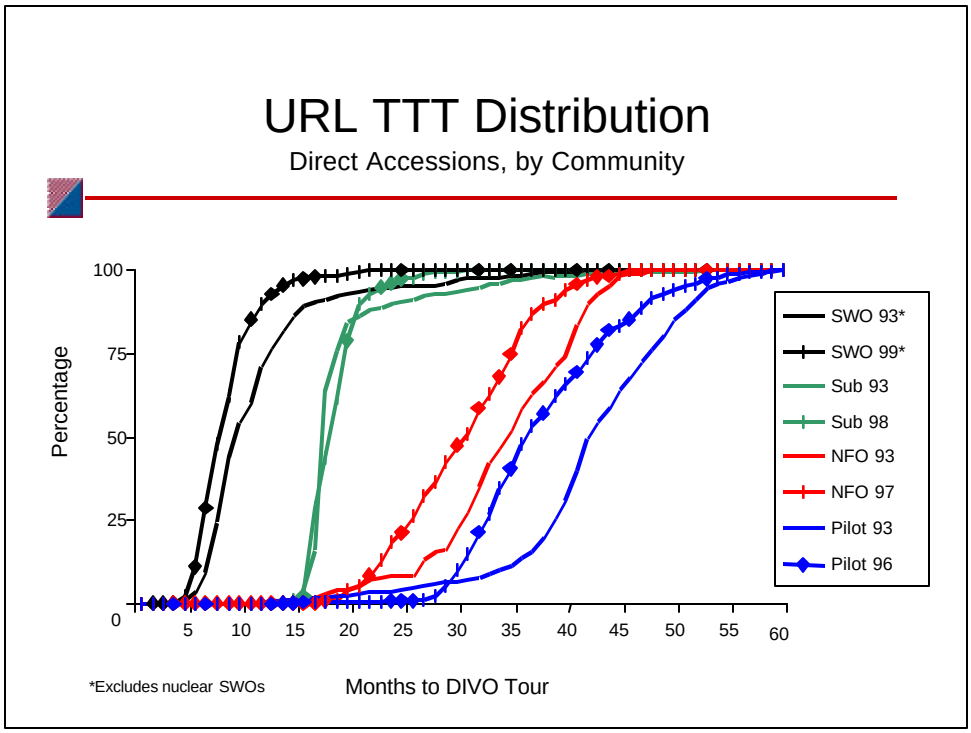


This chart shows the training pipeline for submarine officers. Although it is not listed separately on the chart, the 2-week Basic Officer Leadership Training Course (BOLTC) is a requirement for submarine officers, along with the rest of the officer corps.



This is detailed graph of the changes in the submarine TTT to first assignment distribution. The changes in TTT over time for the submarine community are quite small relative to the changes we see in the other URL communities. Slide 32 displays a less detailed version of the submarine TTT distribution side-by-side with other URL communities.

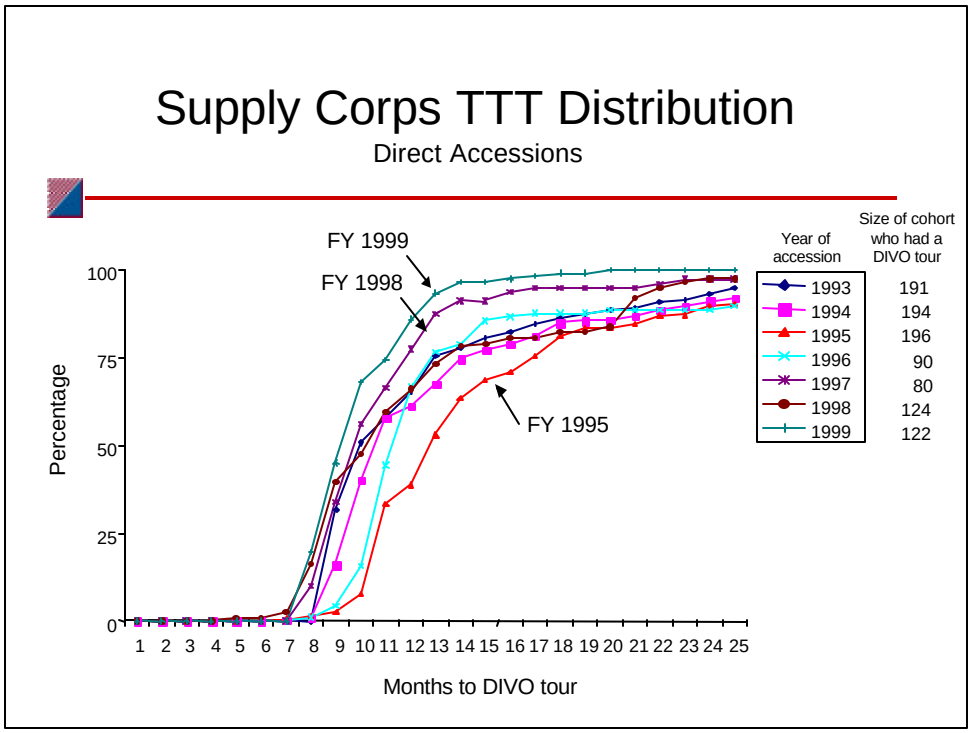
We also tabulated UI and NUI time for the schoolhouse portions of the TTT to first assignment for submariners. We don't report those findings here because they changed very little across accession cohorts, and NUI is consistently less than 2.5 percent of total TTT.



This graph summarizes the changes in TTT to first assignment since FY 1993 for most URL officers. The graph shows the training results for the largest URL communities and includes only officers who do not lateral in or out of their original accession community before their first assignment. All officers in the graph completed training for the DIVO tour, so we include only those accession years for which we can observe all of the training outcomes. The length of training pipeline differs by community, and at the time of this brief, we have officer data only through FY 2001. The most recent accession cohort that we can compare to FY 1993 is FY 1996 for pilots, FY 1997 for NFOs, FY 1998 for submariners, and FY 1999 for surface warfare officers (SWOs).

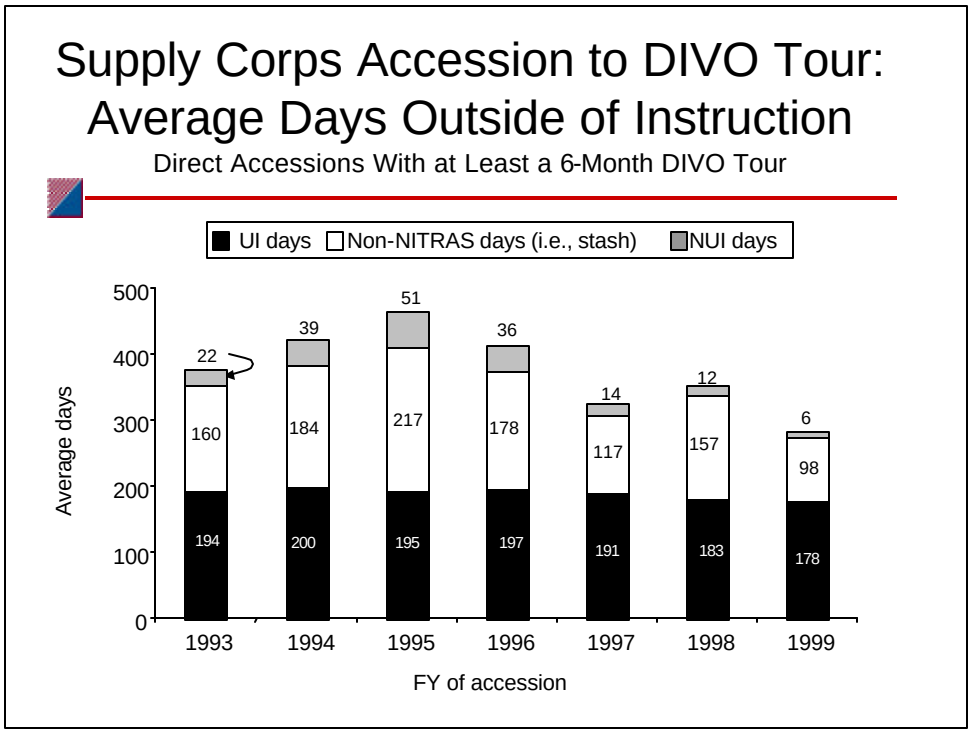
The pilot community shows a clear TTT improvement. About 50 percent of the FY 1993 pilot accessions who completed training reported to the fleet in 42 months or less. For the FY 1996 pilot accessions who completed training, nearly 75 percent reported to the fleet in 42 months or less, and 50 percent reported to the fleet in 37 months or less. The NFO community shows similar improvement.

Each community shows improvement in TTT to first assignment since FY 1993, although some communities show more dramatic changes than others. The submarine community has the most consistent distribution of TTT to first assignment. The FY 1998 submarine accession cohort shows an improvement over the FY 1993 cohort only for the tail end of the TTT distribution; that is, there is improvement only for the roughly 20 percent of accessions with the longest TTT. By contrast, the SWO community shows improvement from the FY 1993 to the FY 1999 cohort for the whole TTT distribution.



This graph summarizes the TTT distribution for direct accessions to the supply corps from FY 1993 to FY 1999. Here we see that TTT to first assignment worsened from FY 1993 to FY 1995, but it has improved substantially since then. We see significant improvements in TTT for the last two cohorts we can observe (FY 1998 and FY 1999), even though there was an increase in the size of the cohort.

Supply corps officers are usually required to take one 6-month course, Basic Supply, before reporting for their DIVO tours. In addition, since FY 1996, they have been required to take BOLTC.

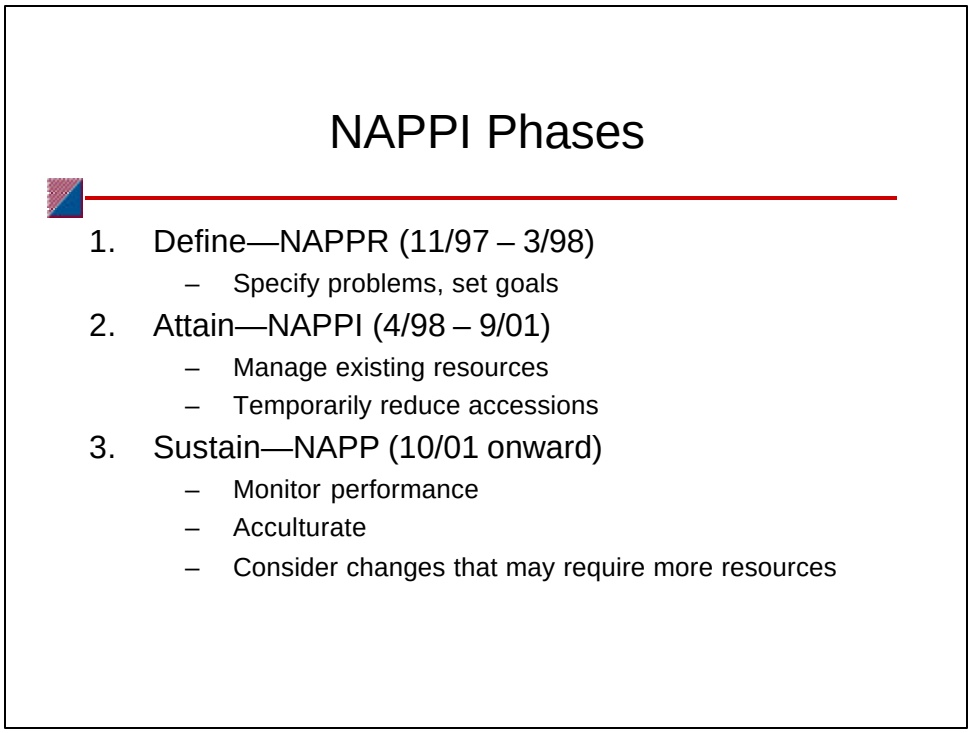


This graph breaks down the time from accession to DIVO for direct accessions to the supply corps by average number of days spent under instruction, not under instruction, and outside the NITRAS reporting system (i.e., in a stash situation.) We define days outside of instruction as the sum of NUI days and non-NITRAS days.

For the supply corps early trainees, we see decreases in both average NUI and average non-NITRAS days. Supply corps officers who accessed in FY 1993 spent an average of 188 days outside of formal instruction (160 non-NITRAS days and 22 NUI days.) Average time outside of instruction grew to 268 days for the FY 1995 cohort but has steadily improved since then. The FY 1999 accession cohort spent, on average, only 104 days outside of instruction (98 non-NITRAS days and 6 NUI days).

Average days under instruction were nearly constant for the FY 1993 to the FY 1997 cohorts. There have been recent decreases in average days UI since then.

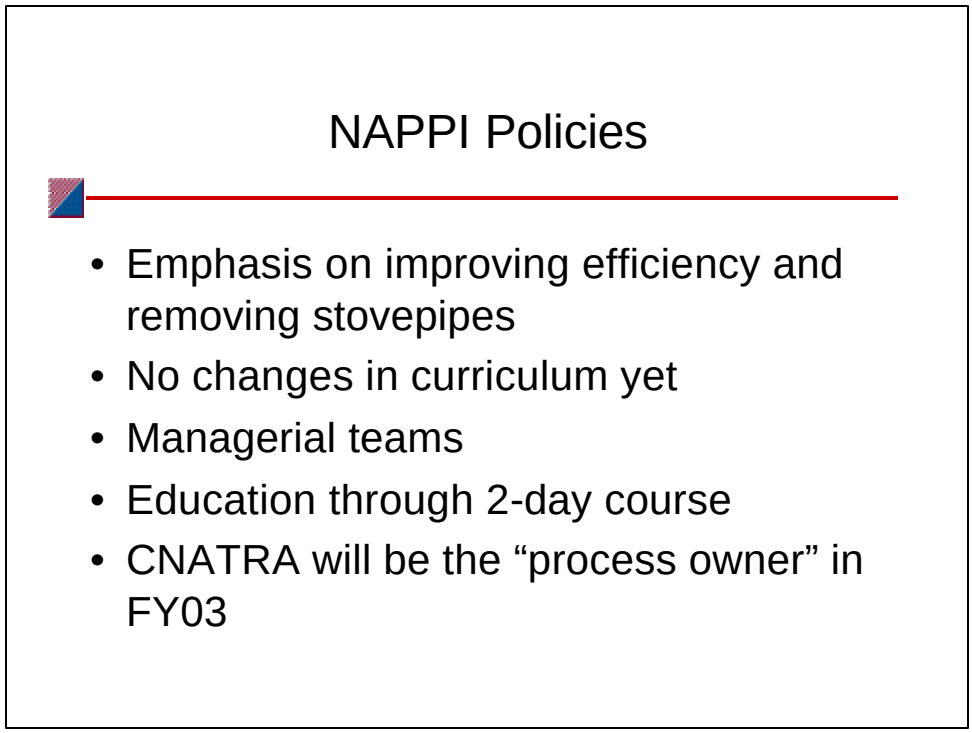
Appendix A: NAPPI Overview



Starting in late 1997, the Navy enlisted the help of outside consultants to evaluate the entire training process and recommend changes that would make the training system more efficient. This started the problem-definition phase of the program, which is known as the Naval Production and Process Review (NAPPR).

The second phase is one of improvement—the "I" in NAPPI. Starting in early 1998, the Navy instituted procedural changes and developed metrics to monitor the results. A key step was to temporarily cut the number of starters in order to reboot, or clear, places in the training pipeline where large numbers of trainees were awaiting instruction or awaiting transfer. For the most part, however, improvements in aviator production are credited to better management of existing resources rather than to changes in the number of students.

The program is now in the sustainment phase. The follow-on phase of NAPPI (called simply NAPP) will monitor the TTT metrics for each squadron and will continue to guide leadership on a range of aviation training resource decisions. One goal of this phase is acculturation. There is concern that the NAPPI system will be discarded once the current leaders have completed their work. Making people aware of the NAPPI system and training people who are involved in the process are critical to making it a permanent feature of aviator training.

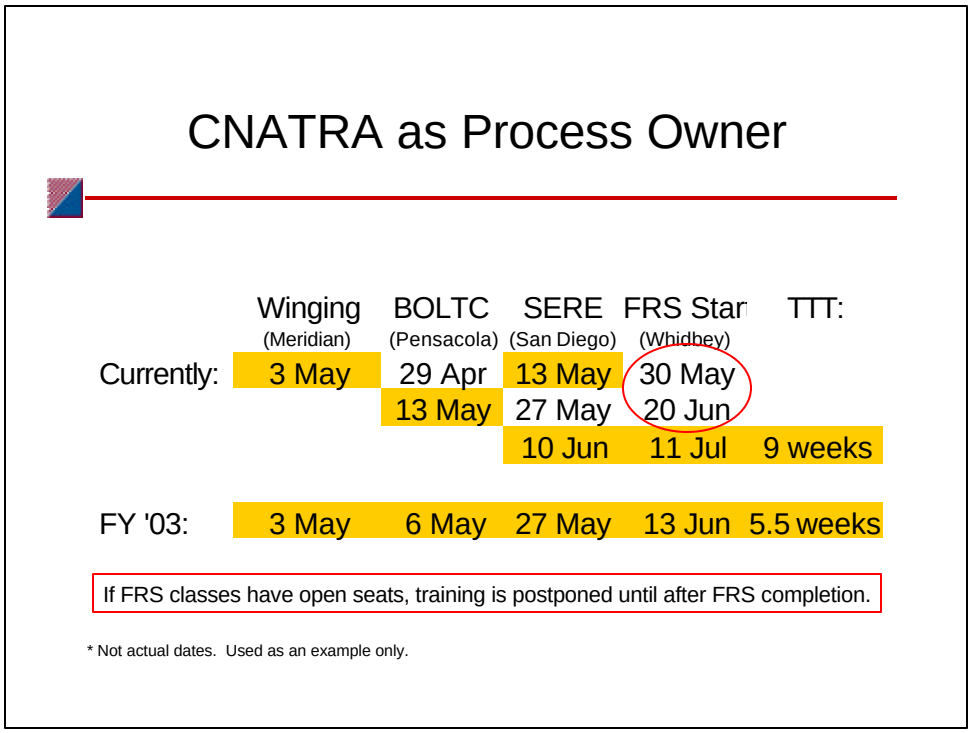


The first responsibility of the NAPPI program is to meet the fleet’s requirements for newly trained aviators in a timely manner. NAPPI TTT begins when the officer is commissioned and ends when the aviator completes FRS training and enters the fleet.

NAPPI policies have focused on removing stovepipes and making better use of existing resources. There have been no changes in curriculum yet. Leadership consists of three managerial teams. The Naval Aviation Production Team (NAPT) is composed of flag officers who meet monthly to provide regular oversight of the process. Cross Functional Teams (CFTs) consist of three mid-level groups that work in different areas of training and meet weekly to coordinate various parts of the process. Examples of CFT objectives include identifying more efficient ways to deliver airplane parts to commands and alerting senior leadership about inconsistent course start times in the training schedule. As recommendations emerge, Barrier Removal Teams (BRTs), which are led by flag officers, meet as required to help coordinate the operations and schedules of the stakeholders.

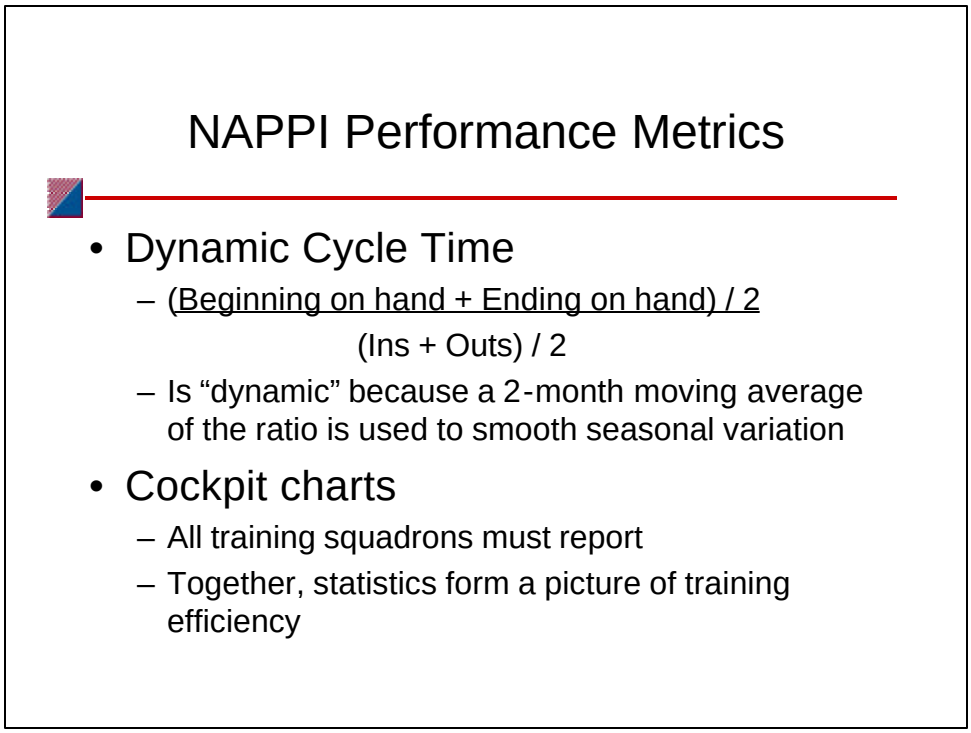
As we have seen, four commands have authority over parts of aviation training (CNATRA, BUMED, CNET, and the fleet.) Because there are few incentives for owners to coordinate their schedules, trainees can spend a lot of time waiting for the next phase of training—a costly practice. In FY 2003, CNATRA will become the single “process owner” of flight training. It will work with each command to adopt training and course schedules that meet the needs of all stakeholders. The goal is to minimize unproductive time in the pipeline.

Although they are not directly under NAPPI supervision, CNATRA has efforts under way to evaluate attrition. If the timing of attrition changes, this would have an effect on TTT to first assignment regardless of curriculum or equipment changes.



The mock training schedule at the top of the graph illustrates how the current "multiple owners" of the process, in which every command controls its own schedule and no one has authority over the other, can lead to inefficient use of student time. The schedule at the bottom of the graph shows how a single owner of the process, due in FY 2003, may be able to minimize downtime. For example, CNATRA could enforce standardized winging dates and FRS start dates. After these dates are determined, CNATRA can work with CNET (the owner of BOLTC) and FASO (the owner of SERE) to try to convene classes on dates that are better synchronized.

The FY 2003 numbers are probably optimistic. Currently, CNATRA is given 6 to 8 weeks to get a newly winged aviator from advanced training to the FRS with BOLTC and SERE completed en route. However, experience has shown that when the fleet must call up newly winged aviators as quickly as possible, CNATRA rarely has 8 weeks to accomplish this training. Also, the FRSs will not allow seats to go empty under any circumstances, so some training may be postponed until after FRS completion.



CNATRA, along with outside consultants, has developed a way to track the progress of student aviators. Dynamic Cycle Time (DCT) is a metric that reflects the average flow of students through a phase of training. Based on the needs of the fleet for new aviators, NAPPI also sets an optimal flow through various parts of the pipeline. The actual average flow of students can be compared to the optimal flow for any phase of training.

The current state of the overall training process is measured by cockpit charts—that is, a collection of DCT measurements displayed relative to the optimal flow for each phase of the training pipeline. The cockpit charts include information on the flow through API, intermediate classrooms and training flight time, the advanced sections of training, and, finally, the flow of aviators to the fleet. The cockpit charts also include information on the flow of instructors through parts of the pipeline and on aircraft availability.

The data needed to calculate the average flow metrics are collected monthly. To smooth month-to-month seasonal variation, data are presented as a 2-month moving average. About 18 months of data are presented in each chart; the newest data replace the oldest each month. Each squadron is responsible for reporting to the NAPPI system. The data can be viewed separately for each squadron or can be aggregated across squadrons.

The advantage of this approach is that the production capability of the training pipeline is monitored as frequently as possible. This allows CNATRA or other stakeholders to focus as quickly as possible on potential problems with delivering aviators to the fleet. The limitation of this approach is that no individual student is monitored through the system. Any information about students that may be related to their success in training falls outside this system.

What's on a NAPPI Cockpit Chart?

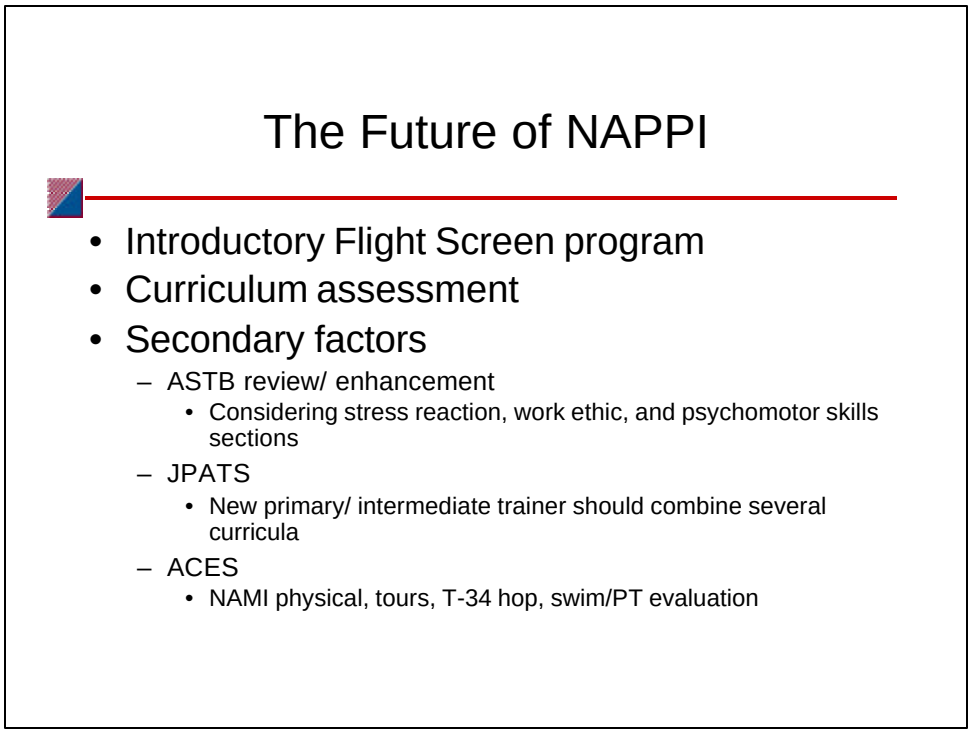
Type of information (per squadron)	On charts?
Number of trainees relative to goal	Yes
On-time delivery to the fleet	Yes
Number of grads relative to goals	Yes
Aircraft and instructor availability	Yes
Flight hours	Yes
Distinction between NUI and UI time	No
Location and size of pools	?
Attrites (medical and other)—number in process or completed	No
TTT extremes (e.g., percent > 6 months for a course)	No

This chart details some of the information that is easily found in the cockpit charts and some that is more difficult to find or is not reported at all. Cockpit charts report the outputs—trained pilots—together with such drivers as aircraft and instructor availability. Read together, the data give a complete picture of the efficiency and the quality of training. Data from different charts that present an inconsistent picture should alert those monitoring the system. For example, an increase in pilot production that is accompanied by a reduction in available aircraft might raise questions about whether the commanding officer has made inappropriate cuts in the training syllabus.

The size and location of student pools are not easily determined from the cockpit charts. Attrites—in process or completed—are not separately reported but are instead built into other statistics (a student who is being considered for attrition is counted in the number of students being trained until he or she is officially attrited by CNATRA). Student UI and NUI time (e.g., due to weather or maintenance) do not appear on the cockpit charts.

In most cases, these information gaps can be filled through other sources. CNATRA maintains a Web site containing detailed historical and current data on attrition. In other cases, however, the data are not readily available. NITRAS contains data fields on UI and NUI time; recent years' inputs appear to be accurate for most courses, but most FRSs do not report to NITRAS.

Finally, the metric of choice for the NAPPI system is *average* student flow; cockpit charts do not report the extremes in the distribution of time to train. Suppose the goal for average time to complete a segment of the training pipeline is 12 months. It could be that most students finish that training in about 12 months. Alternatively, it may be the case that half the students finish the segment in 7 months and half finish in 17 months. In either scenario, the average student flow meets the goal of 12 months per student, but, in the latter case, the extremes of the distribution may indicate problems.

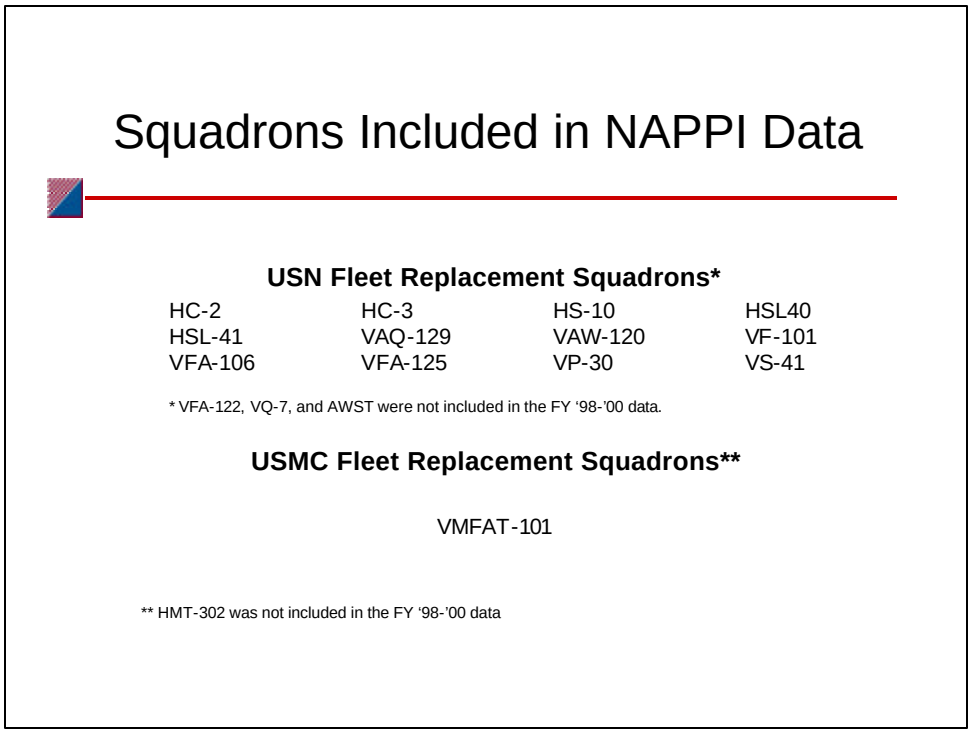


The Navy is experimenting with the Introductory Flight Screen (IFS) program, a NAPPI initiative under which prospective student naval aviators train at civilian flight schools. The goal is to conserve resources for students who have the best chances of making it through Preflight, Primary, and the other courses.

NAPPI's sustainment phase will include a review of the curriculum, and changes in both course content and equipment are possible.

The Navy has embarked on several programs that, although not part of NAPPI, will support it. Reviewing the Aviation Selection Test Battery (ASTB) and improving its predictive power is a priority. The Navy is considering the addition of tests of stress reaction, work ethic, and psychomotor skills. To the extent that such tests result in a better screen, we would expect lower attrition and, potentially, a more efficient pipeline. CNATRA is currently trying to get funding for this improvement.

ACES, the Aircrew Certification and Examination System, was instituted for a time but has been discontinued. ACES allowed an aviation candidate to go to Pensacola, Florida, to get a flight physical, a tour of the base, swim and physical fitness evaluations, and a T-34 flight. The program was envisioned as a means of giving candidates a brief but tangible introduction to naval aviation well before their training began and to determine areas of weakness to help them prepare for training. In practice, candidates seldom went through ACES until shortly before they reported to training. Although the program has been temporarily discontinued, CNATRA is still considering the program for the future.

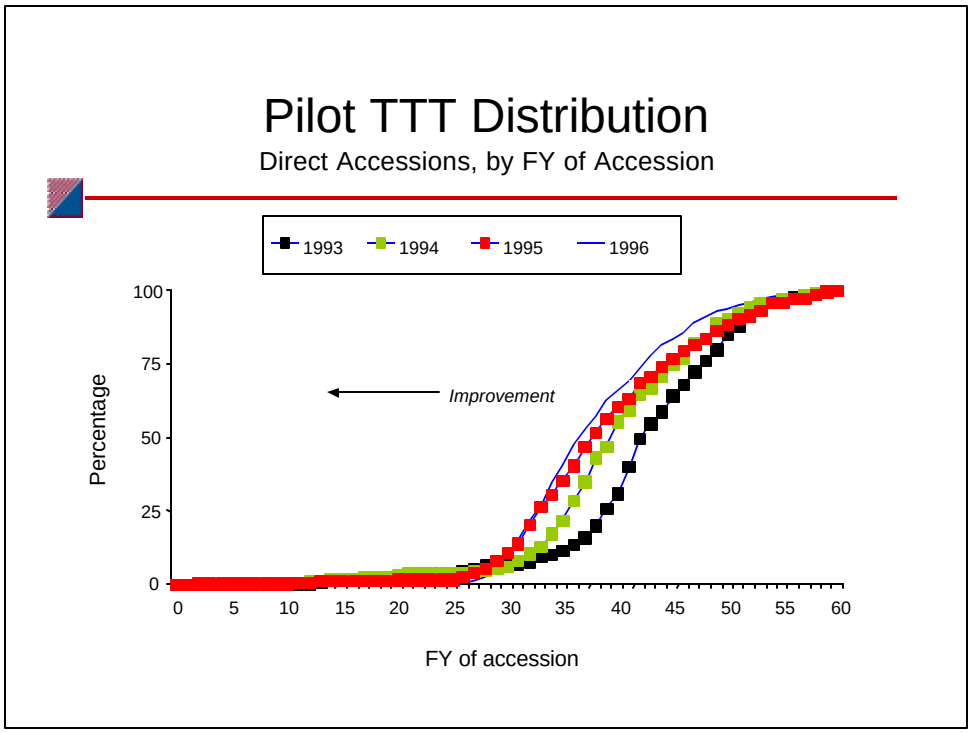


The NAPPI information provided on page 19 includes the graduates of 12 USN FRSs and 1 USMC FRS for several fiscal years. Although the NAPPI and OSTF data cannot be directly compared, it is possible to account for groups of students that are excluded from both studies to make a rough comparison.

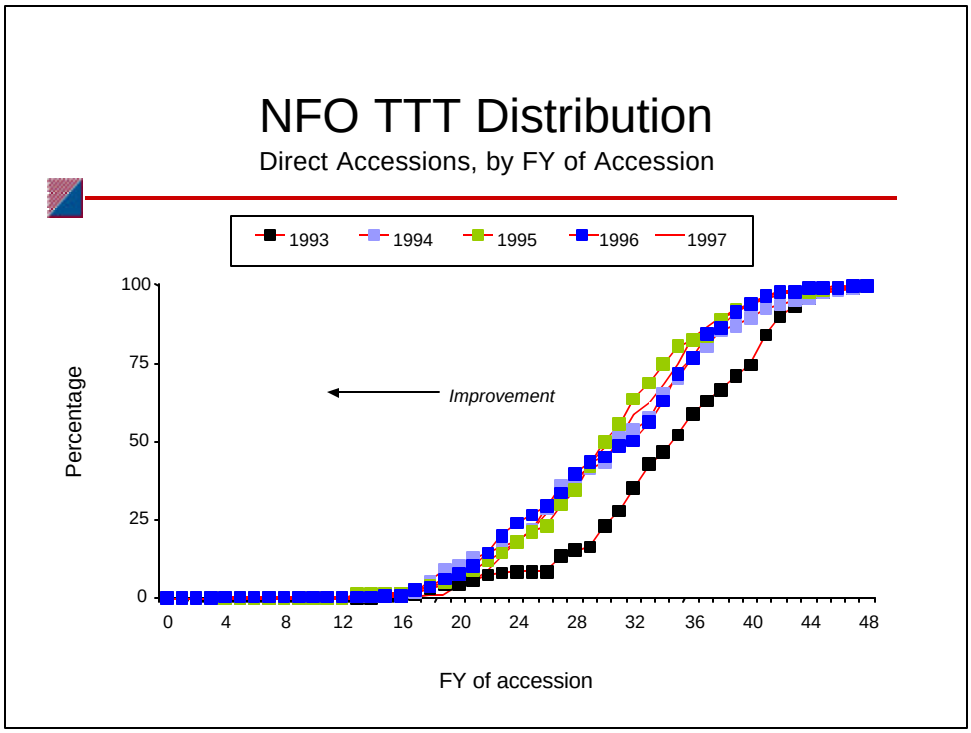
The NAPPI data include certain Marines but do not include every naval aviator who completed FRS training in that fiscal year. Every training squadron within CNATRA trains USMC aviators as well as USN aviators. VAQ-129, VFA-106, VFA-125, and VMFAT-101 train both Navy and Marine aviators for service in the EA-6B and F/A-18. USMC aviators who received training at any of these four squadrons are included in NAPPI data, but aviators who were trained for service in the E-6 and H-53E platforms (they trained in VQ-7 and HMT-302 (now AWST)) are *not* included in the NAPPI numbers for these fiscal years.

The data in the OSTF database are for USN aviators only, including aviators who trained in the E-6 and H-53E platforms. When the approximate number of USMC officers trained in the four squadrons and the approximate number of
E-6 and H-53E aviators were considered, we were able to reconcile the differences in the NAPPI and OSTF number of aviators reaching the fleet.

Backup Information



This chart provides a slightly different view of TTT. It shows the entire distribution, not just the average. There is a clear shift in the distribution to the left, which signals improvement. Although the biggest 1-year improvement occurred for the 1994 accession cohort, each successive cohort of pilots has spent less time in training.



The NFO TTT distribution shows improvement as well. Like the rest of our NFO data, however, these data suggest a significant one-time reduction as opposed to steady progress.