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Trends in Navy Initial Skills Training: Evidence from Street-to-Fleet Data

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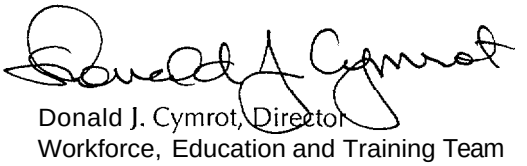

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Trends in Navy Initial Skills Training: Evidence from Street-to-Fleet Data

CNA Support to the Manpower & Personnel IWAR Team

Carol Moore and David Reese

May 2001

As part of the Navy's Manpower and Personnel Integrated Warfare Architecture (M&P IWAR), N81 asked CNA to examine trends in the training recruits receive before their first fleet assignments.

The Navy expects to enlist approximately 55,000 sailors each year in the near future. The Navy's system of training and delivering these recruits to operational billets must be an efficient one. The flow of sailors into the fleet depends on two things: the number of sailors who get there and the amount of time it takes. Accordingly, policy-makers are concerned with both the attrition of recruits during the period of initial training and the lengths of the training pipelines themselves. To examine these trends, we tracked recruits' early career histories from "street to fleet."

This report updates a 1999 CNA analysis, adding recent accessions and reflecting training reengineering that the Navy has undertaken since then. We also examine initial skills training in more detail, looking at all contract lengths (2-, 3- and 5YOs, as well as 4- and 6YOs) and at ratings.

Issues

- How long does it take recruits to reach their first fleet assignments?
  - How much of this time is spent under instruction?
  - Is training reengineering working?
- What percentage of recruits make it to the fleet?

The 1999 CNA analysis[1] found an upward trend in the amount of time it was taking sailors to reach the fleet. Since then, the Navy has implemented a set of initiatives aimed at shortening initial schoolhouse training and cutting the time that students spend not under instruction. These initiatives may also improve attrition from the Navy by improving the efficiency and relevance of training. They include revising curricula, infusing new technology, and applying distance learning. In addition, the creation of new information management systems and organizations have allowed the Navy to better manage the flow of students.

Street-to-fleet statistics can provide evidence of the success of these initiatives. According to the 1999 study, any effects of training reengineering would begin to be apparent with the arrival of the FY98 accession cohort to the fleet. We examine whether time to fleet has since increased, decreased, or stayed the same. How much of this time do recruits actually spend in training, as opposed to enrolled in training, yet not under instruction?

We also track the annual number of arrivals to the fleet (or, conversely, the number who leave the Navy before their fleet assignments). CNA's 1999 analysis uncovered a substantial increase in pre-fleet attrition during the 1990s for both 4YOs and 6YOs. Has pre-fleet attrition increased, decreased, or stayed the same? Where in the initial training program does most attrition occur? Does the amount and timing of attrition differ by obligation?

1. Steven W. Belcher, David L. Reese, and Gregory A. Lewis, *Trends in the Training Recruits Receive Before Their First Fleet Assignments* (CNA Annotated Briefing 99-150), December 1999

Street-to-Fleet Database

- Tracks recruits from bootcamp and into the fleet
- Accession data from DMDC and CNRC
  - Cohorts FY90 through FY99
- Personnel data from the EMR file
  - Career events FY90 through March 2001
- Training data from NITRAS
  - Courses taken FY93 through April 2001

As in the 1999 study, our source was CNA's Street-to-Fleet (STF) database. This unique database combines accession, personnel, and training records. It follows each recruit from bootcamp, through initial schooling, and into the fleet.

The accession data, which come from the Defense Management Data Center (DMDC) and Commander Naval Recruiting Command (CNRC), include the rating, program, and length of contract under which each recruit enlisted. The current version contains all non-prior-service accessions who entered the Navy from FY90 through FY99.

The personnel data, which come from BUPERS' Enlisted Master Record (EMR) file, include rate obtained, date of full-duty status, and, if applicable, date of and reason for separation. The current version of STF contains personnel data through March 2001.

The training data, which come from NITRAS, contain a historical record of the individual courses each recruit took. It tells, for each course, whether the recruit graduated or failed. It also contains the time each recruit spent under instruction, awaiting instruction, awaiting transfer, and in an interrupted instruction status.[1] The current version contains data on courses that were completed between the beginning of FY93 and the end April 2001.

1. Awaiting instruction (AI), awaiting transfer (AT), and interrupted instruction (II) are categories of not-under-instruction (NUI) time.

New Data

- Accessions
  - FY97 and FY98 cohorts of 6YOs
  - FY98 and FY99 cohorts of all others
- Career events
  - Fleet arrival through March 2001
  - Attrition through March 2001
  - Training received through April 2001

Our update of the STF database allows us to analyze additional accession cohorts and to track recruits further into their careers.

In deciding which cohorts to track, we consider the length of time since accession. For instance, data on the characteristics of 6YOs who accessed in FY97 and FY98 were available in time for the original 1999 CNA publication. However, we chose not to examine this cohort, in part because insufficient time had elapsed to draw conclusions about time to the fleet, attrition, or training received. Instead, we limited our analysis of 6YOs to cohorts who entered the Navy in FY96 or earlier.

Here, we include FY97 and FY98 cohorts of 6YOs, excluding those who accessed in FY99 because about one-fifth were still in training at the end of the data period. Included among the new data are the FY98 and FY99 accession cohorts of 2-, 3-, 4YOs.[1] We also include 5YOs among the FY99 accessions we analyze because 95 percent have reached the fleet. However, the 5 percent still outstanding should not be neglected in interpretation. A backup slide details the status of FY99 accessions as of March 2001.

Similarly, we can track each cohort further into their careers. For instance, none of the FY96 and FY97 4YOs had reached their end of obligated service by the time of the 1999 study.

1. We grouped recruits based on their obligations at the time they enlisted. We did not account for recruits whose obligations changed because they were reclassified at bootcamp or failed their original training program and were sent elsewhere with different obligations.

Summary: Trends Since IWAR 1999

- Average time to the fleet has decreased
  - Fairly consistent across rating and contract groups
- Reduction in both UI time and NUI time in A-school
  - 4YOs, 5YOs and 6YOs
  - Most noticeable in technical skills
- Small decrease in training following A-school
- Pre-fleet attrition of rating-promised recruits has increased
  - Mostly because of increase in bootcamp attrition

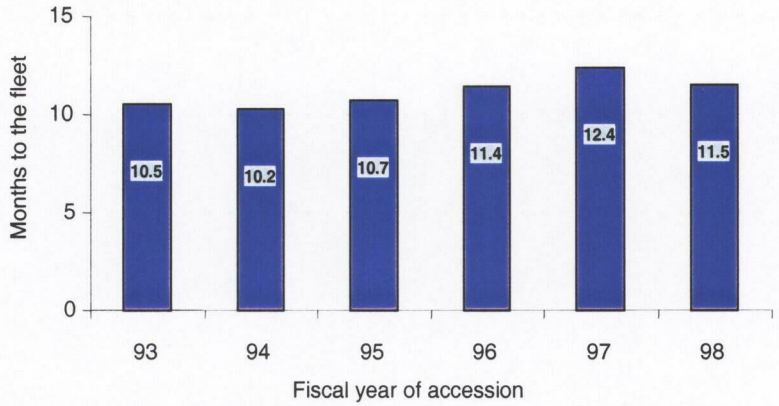
The latest data suggest that the Navy has succeeded in improving the delivery of recruits to the fleet. The time it takes sailors to reach full duty has declined by about a month since the implementation of training reengineering. After creeping up by 2 months between FY93 and FY97, it declined by 1 month for the most recent cohorts. This result is fairly consistent across ratings and enlistment contracts.

The reduction in time to the fleet was driven by changes in training time. Time spent under instruction (UI) decreased, but time not under instruction (NUI) decreased more. Most of the reductions were in A-schools and affected the 4YOs, 5YOs, and 6YOs who attend those schools. Significantly, some of the biggest improvements were in technical ratings.

Another reason for the decline in average time to the fleet may be the decrease in the rate of enrollment in training other than bootcamp or A-school. The duration of follow-on training has changed little, but more recruits are going directly to the fleet from A-school.

The upward trend in pre-fleet attrition has continued, driven by early separations from bootcamp through FY99. The trend includes 5YOs and 6YOs, who are difficult to recruit. Post-bootcamp attrition has held steady.

How Long Does it Take Recruits To Reach Their First Fleet Assignments?



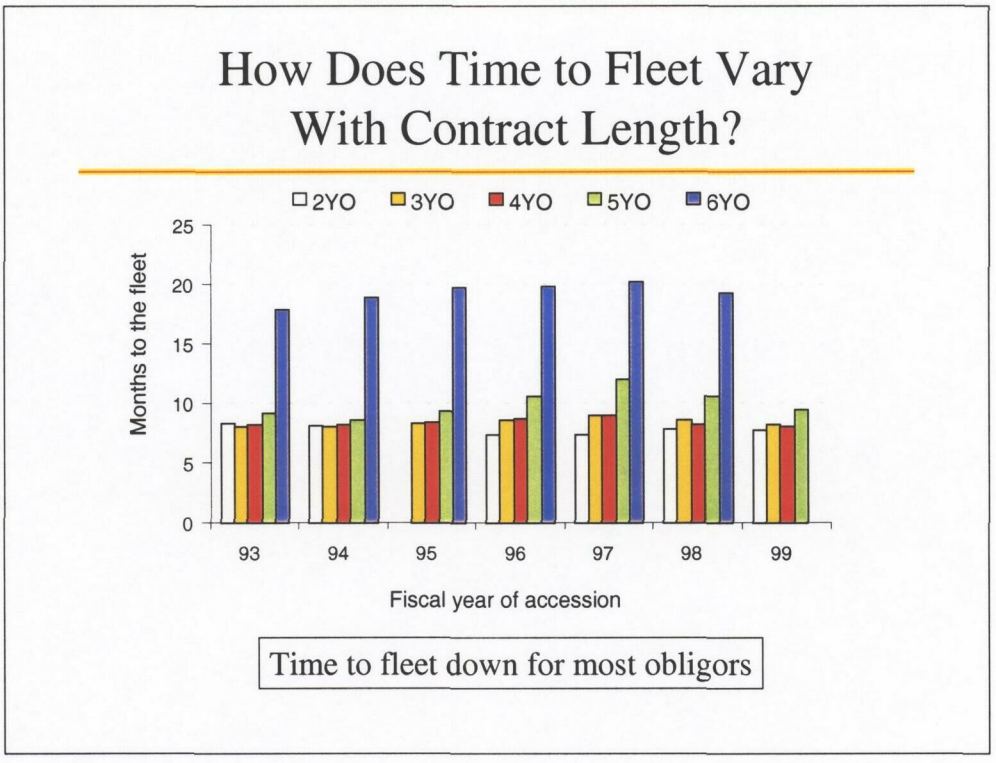
Navy-wide time to fleet down after years of increase

We first look at how long it takes recruits to reach their first fleet assignments. Here we examine the all-Navy trend. We exclude the FY99 accession cohort because its 6YOs have not had a chance to make it to the fleet yet.

Time to the fleet increased by over 2 months between FY94 and FY97. However, the FY98 cohort appears to have reached the fleet more quickly—11.5 months as opposed to 12.4 months for the previous accession cohort. This change may seem small, but it translates into 3,000 additional work-years available in the fleet.

These data include only recruits who reached the fleet; pre-fleet attrites are not counted. As in the 1999 study (cited on page 2), we exclude sailors who reached the fleet as GENDETs—those who enlisted as GENDETs as well as those who were later reclassified as such. If we include GENDETs in the data, the average time to the fleet is lower for each cohort, but the time trend is the same, as shown on this chart.

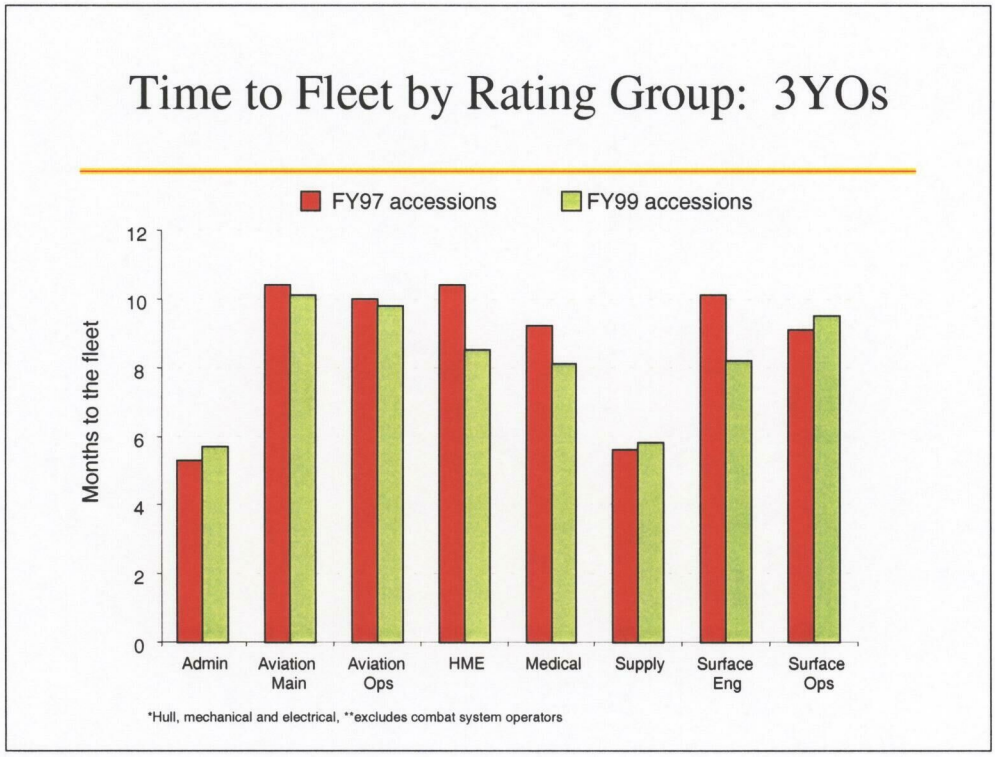
Unless otherwise noted, all charts in this presentation exclude GENDETs and recruits who have not yet reached the fleet.



The 1999 CNA study found that time to the fleet for 6YOs had increased substantially during the 1990s. The FY97 cohort continued the trend as time to the fleet increased slightly to 20.2 months. However, 6YOs who entered the Navy in FY98 averaged only 19.3 months to the fleet.

Time to reach the fleet decreased for other groups as well, and these changes have been sustained through FY99:

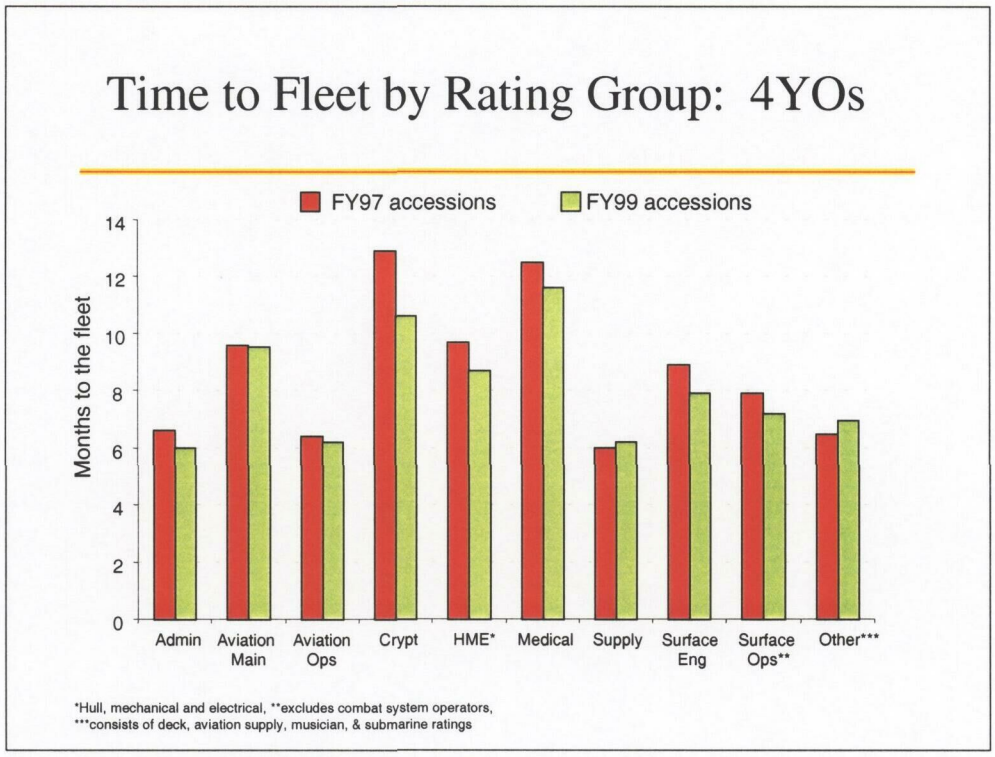
- 5YOs: The FY97 cohort took 11.9 months to reach the fleet, compared to 9.4 months for FY99 accessions.
- 4YOs: After creeping up slightly between FY93 and FY97, time to the fleet has declined from 8.9 to 8.0 months.
- 3YOs: FY97 accessions took 9 months to reach the fleet, compared to 8.2 months for FY99 accessions. The FY99 accession cohort of rated 3YOs includes 625 fleet arrivals.
- 2YOs: This group has shown a slight increase in time to fleet since the FY97 cohort. However, non-GENDET 2YOs are a very small group, consisting mostly of construction ratings.



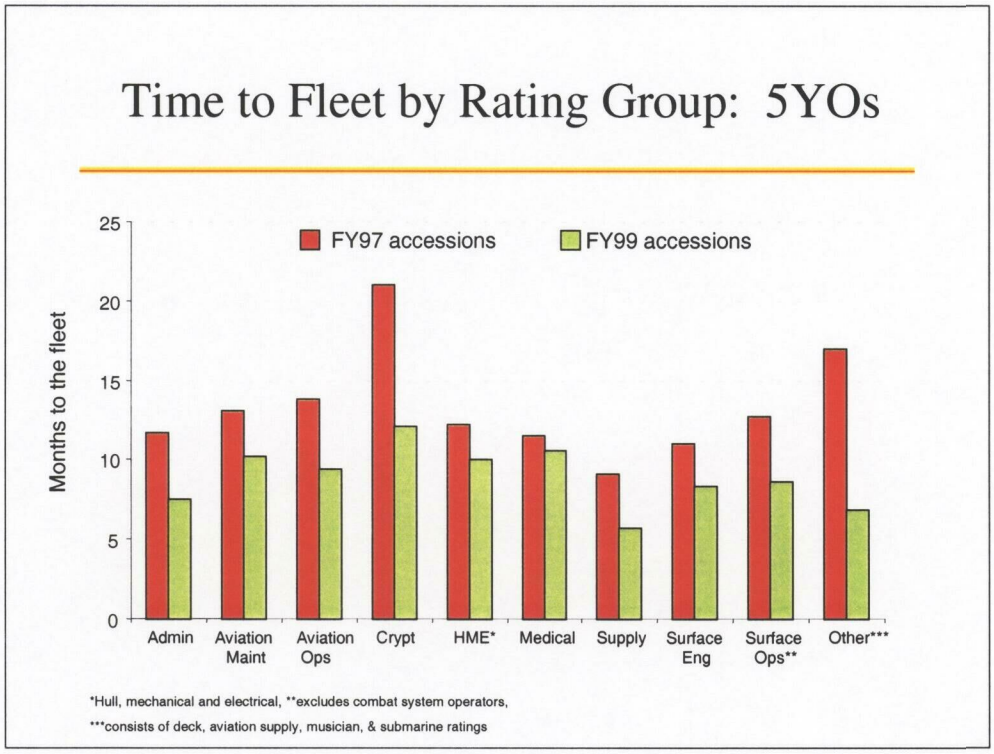
The next few slides detail the changes in average fleet arrival time that have taken place since the FY97 cohort entered the Navy. Training reengineering affects FY98 and subsequent cohorts, so a comparison of FY97 accessions with FY99 accessions provides evidence regarding the success of those initiatives.

We present these data at the level of the rating group and length of original enlistment contract (excluding 2YOs, most of which are not rated). These data, which are for 3YOs, show how the overall decline of .8 months was spread across rating groups. Average time to the fleet increased for 3YOs in admin and supply ratings, but decreased for all other groups. The biggest declines were in hull, mechanical and electrical (HME) ratings (from 10.4 to 8.5 months). There was also a significant drop in surface engineering, but the number of 3YOs in those ratings is very small (49 fleet arrivals from the FY97 cohort and 22 from the FY99 cohort), so the change is difficult to interpret.

Ratings appear in broad categories for purposes of presentation, but data for individual ratings are available. A backup slide gives the ratings included in each group. Another backup slide shows fleet arrival times, by rating group, for each cohort who entered from FY93 to FY99.

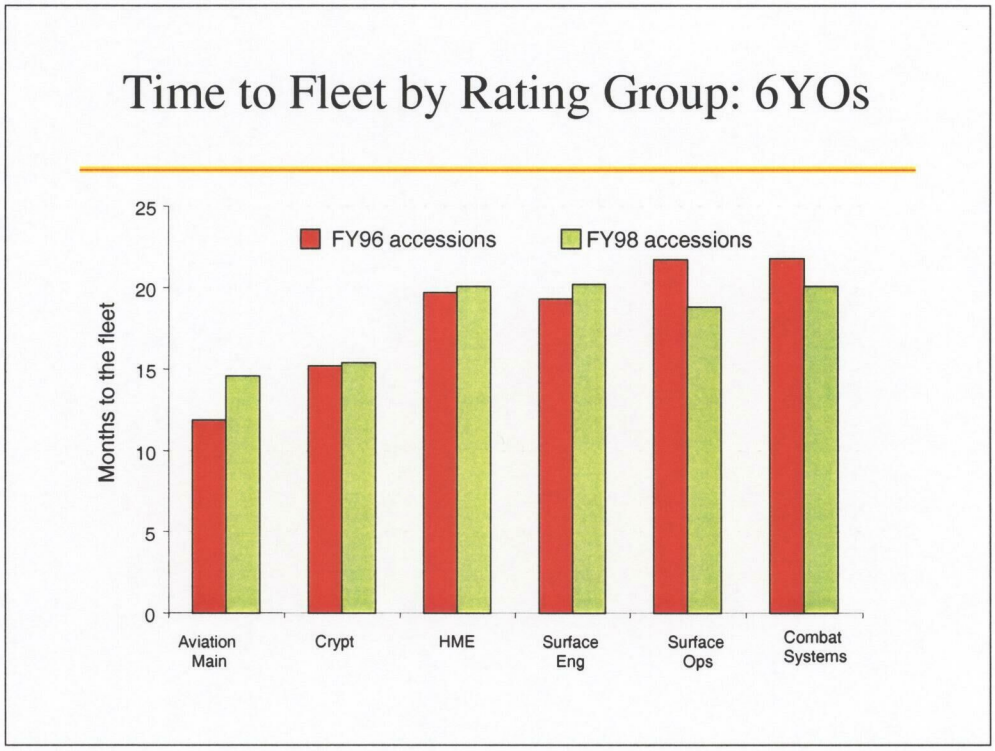


Among 4YOs, all rating groups except aviation maintenance have seen reductions in time to the fleet. The largest change was in the cryptology ratings. For example, FY99 CTIs reached the fleet more than two months earlier than did FY97 accessions who had trained in that field.

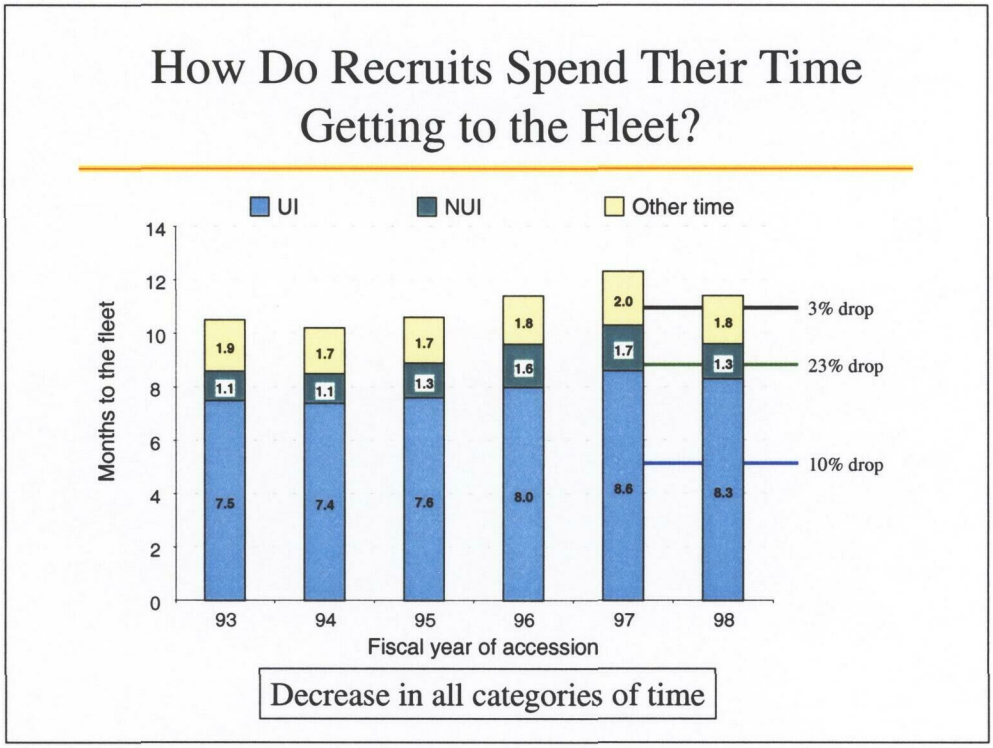


Time to the fleet declined for 5YOs in all rating groups. This change is extremely positive because the longer 5YOs are in the fleet, the greater the Navy's return on the training of these generally high-quality sailors.

The sharp decrease in cryptology is not robust—it is driven by significant changes in the IS and CTT ratings, which together delivered only 10 FY97 accessions to the fleet. Changes in the other groups are based on more sailors and are therefore reliable.



Overall, 6YOs who entered the Navy in FY96 took about a month longer to reach the fleet than did their counterparts two years later. However, this change is concentrated in the two largest groups of 6YOs: surface operations (such as ET) and combat systems (such as FC).

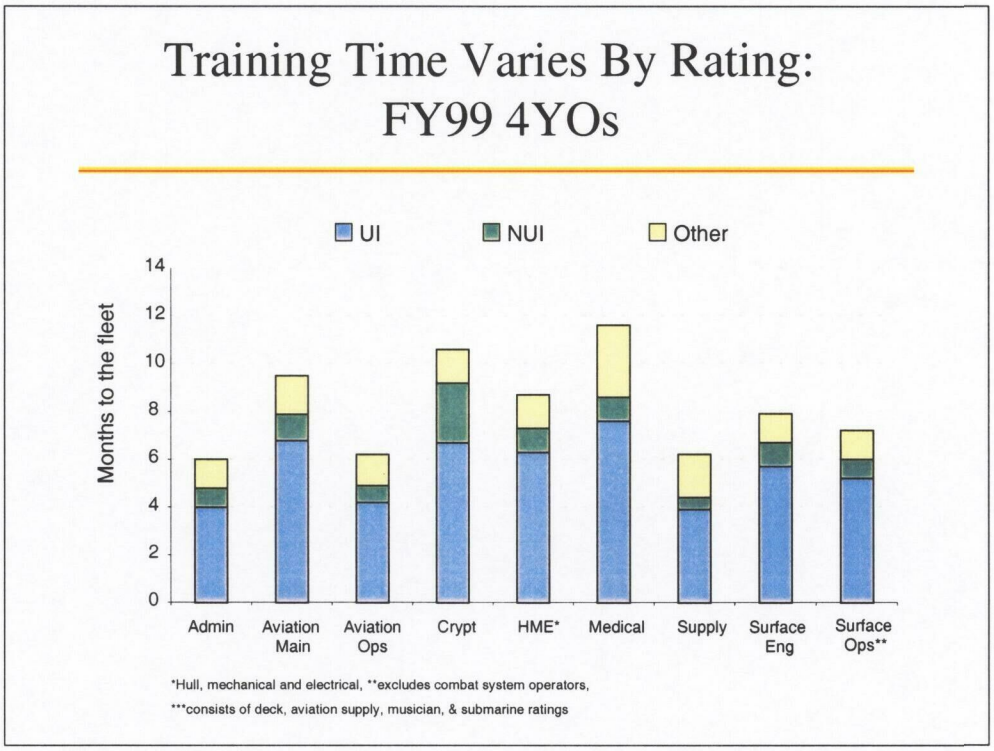


We now turn to the second issue, how recruits spend their time getting to the fleet. How much of this time is spent under instruction, as opposed to enrolled in training but not under instruction, or in other non-school activities?

About three-quarters of the time is spent under instruction, with the remaining 25 percent split about equally between NUI and other time. These proportions have remained roughly constant over time. When UI increases (decreases), NUI tends to increase (decrease) as well.

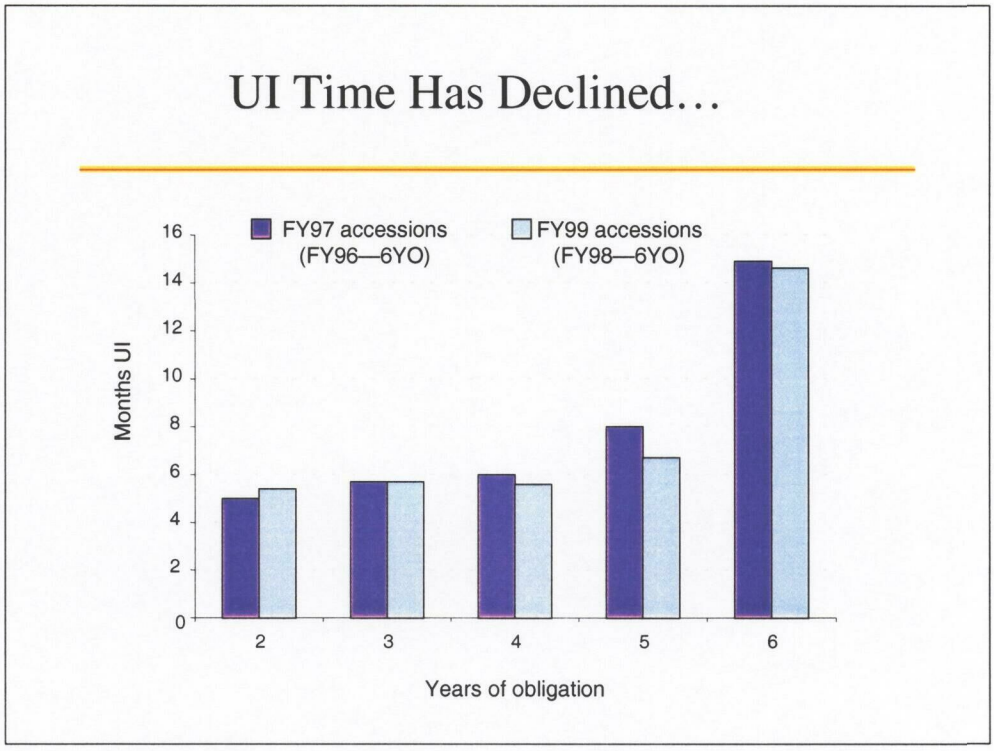
During the 1990s, the time it took recruits to reach the fleet increased as UI time, NUI time, and other time crept upwards. A reversal is apparent with the FY98 accession cohort. All categories of time decreased. The biggest drop was in NUI time, which fell 23 percent from 1.7 to 1.3 months, or 12 days. UI time declined 10 percent from 8.6 months to 8.3 months, or about 9 days. Other time, which includes travel and leave, fell by 3 percent, by .2 month, or 6 days.[1] Taken together, these changes amount to 7.3 percent or 27 (=12+9+6) days. The fact that the biggest drop was NUI time is good news.

1. We computed "other time" as time to fleet less training time. In addition to travel and leave, it may also include training that is not specified at the level of the individual student in NITRAS.



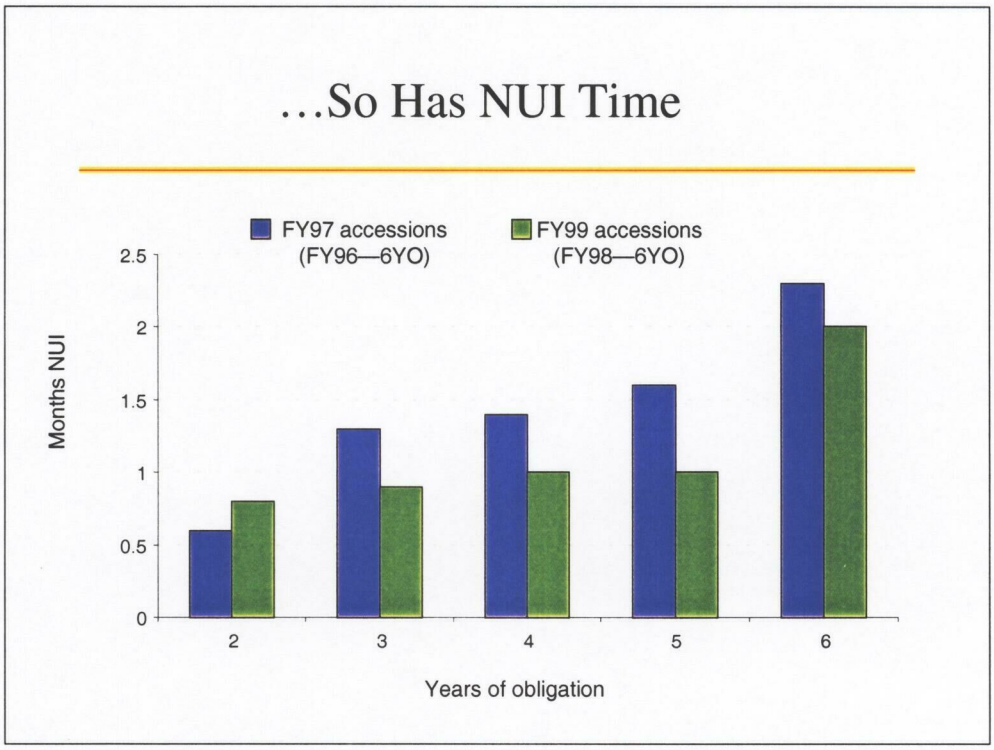
The average time recruits spend under instruction averages about 8 months, or 75 percent of the time it takes to reach the fleet. However, there is significant variation based on both rating group and contract length. We explore these differences by focusing on the FY99 accession cohort (the FY98 cohort of 6YOs). Here we show 4YOs; data for 3YOs, 5YOs and 6YOs appear in the backup section, as does historical UI time by contract length.

Among FY99 4YOs, aviation maintenance, HME, surface engineering, and surface operations ratings spent about three-quarters of pre-fleet time under instruction. However, admin, cryptology, and medical ratings appear to have spent relatively more time in other ways. In particular, the cryptology ratings, (800 sailors) experienced a great deal of NUI time. This ranged from 1 month for the IS rating to 4.2 months for CTT.



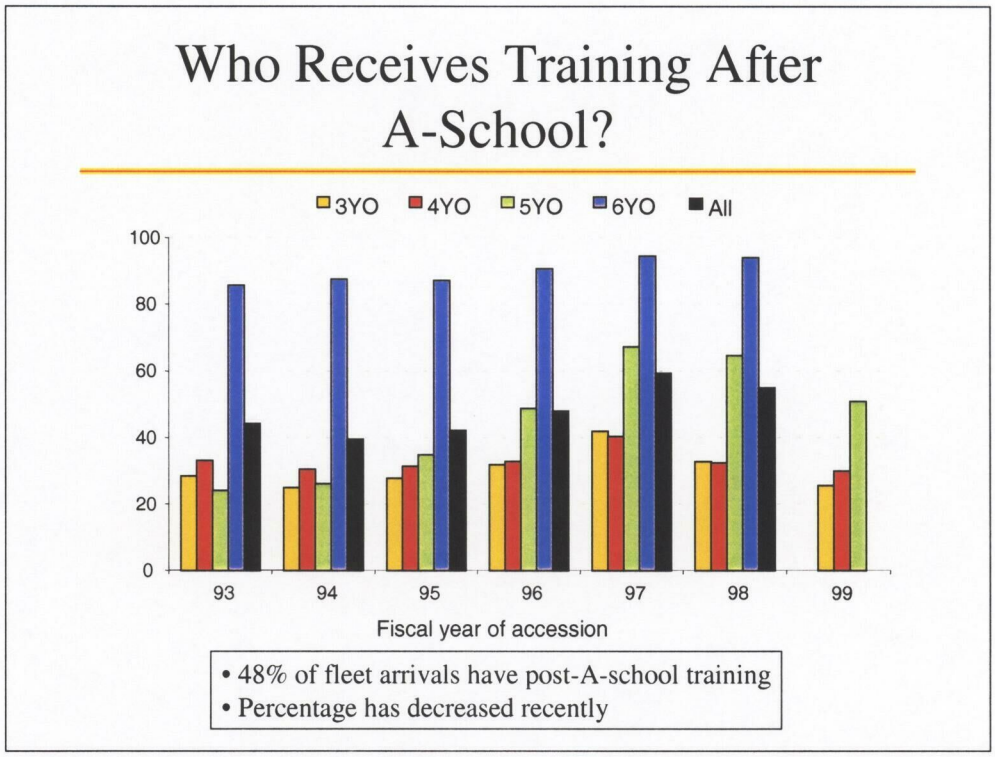
Generally speaking, UI time is proportional to contract length. Recruits with longer contracts are generally in higher-tech ratings with longer pipelines. The FY97 and FY99 cohorts of 6YOs spent over 14 months under instruction.

The reduction in UI time since FY97 was largest for the 5YOs, for whom UI has declined by over a month.



Like UI time, NUI time is proportional to contract length. Again, this is the result of the longer periods of school attendance for the longer obligors. The FY98 cohort of 6YOs experienced 2 months of NUI time before reaching the fleet.

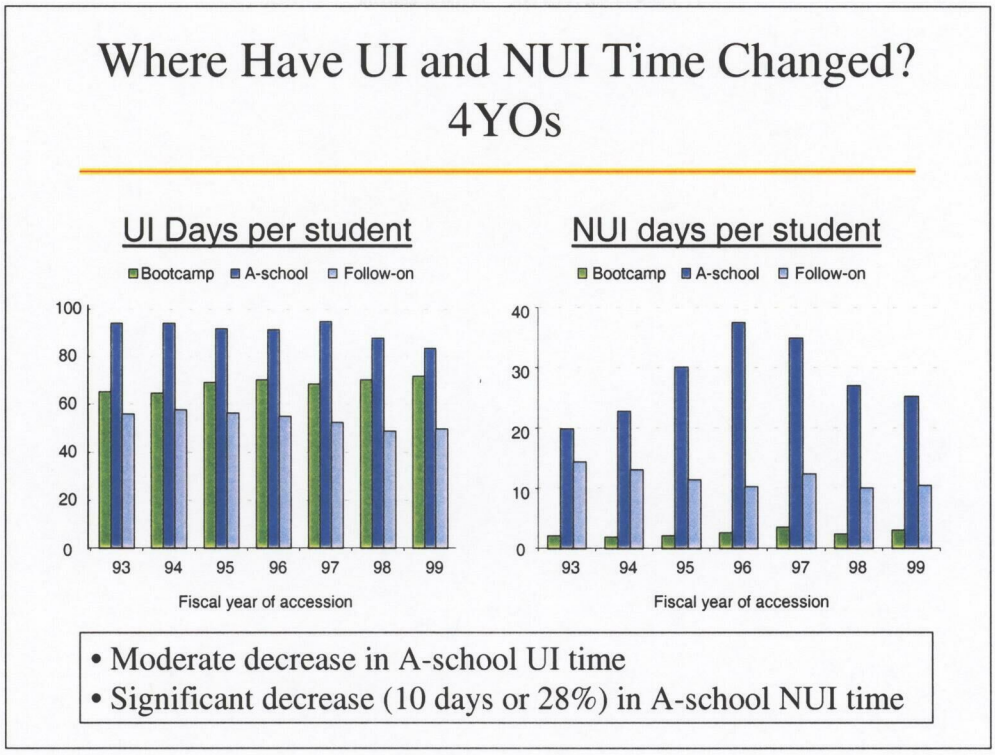
The decline in NUI time that appears Navy-wide is fairly evenly distributed across contract lengths. The exception is 2YOs, for whom NUI time has increased.



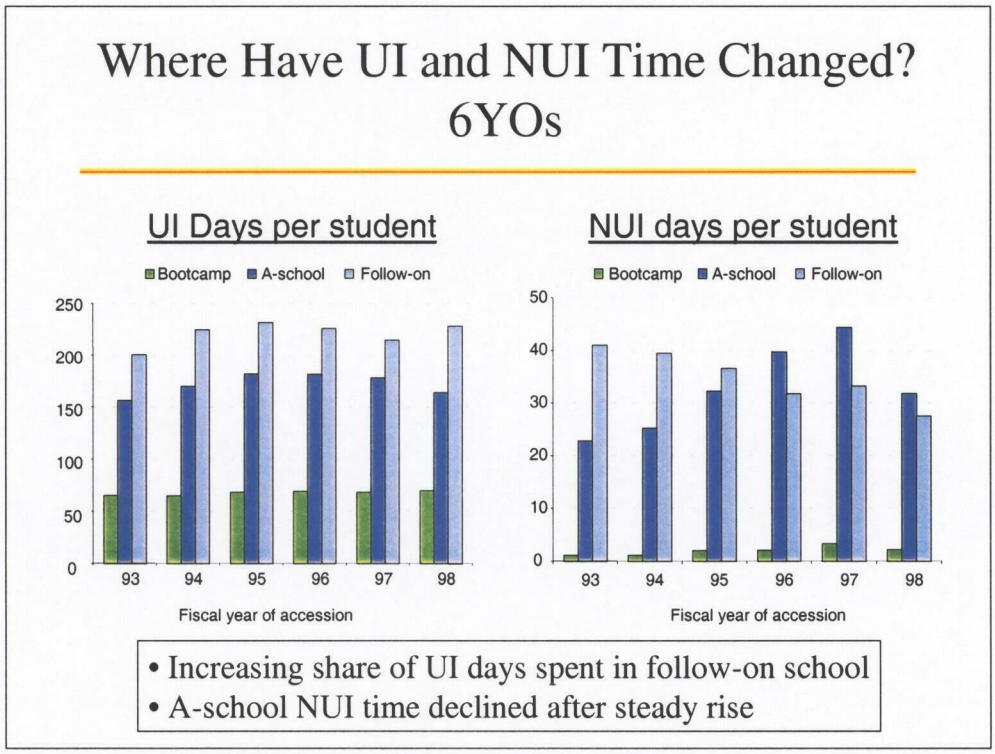
The 1999 CNA study found that about 85 percent of 6YOs, and one-third of 4YOs, receive training as a follow-on to A-school before arriving to the fleet. Combining all contract lengths, the Navy-wide average was 59 percent for FY97 accessions and 54 percent for FY98 accessions.

However, the fraction of sailors receiving pre-fleet, follow-on training has declined since FY97, which may have contributed to the faster arrivals to the fleet:

- 3YO: 41 percent of FY97 accessions had follow-on training, compared with 26 percent of FY99 accessions.
- 4YO: 40 percent of FY97 accessions had follow-on training, while only 30 percent of FY99 accessions did.
- 5YO: 67 percent of FY97 accessions had follow-on training compared with only 51 percent of FY99 accessions and 65 percent of FY98 accessions.
- 6YO: The percentage has increased from 90 percent of FY96 accessions to 94 percent of FY98 and FY99 accessions.



Most of the changes in UI and NUI time occurred in A-schools. Here, we show the pattern for 4YOs. There was a moderate decrease in A-school UI time and a significant decrease in NUI time. All of the decline in UI time for 4YOs occurred in A-school; an increase in bootcamp UI time was offset by a decrease in follow-on UI time.



The 1999 CNA study found that 6YOs receive more instructional time in follow-on training than in A-school. Partly because of reductions in UI time at A-school (182 days on average for FY96 accessions and 164 days for FY98 accessions), follow-on training now constitutes an even greater share of UI days.

As with the 4YOs, 6YOs experienced the biggest reduction in NUI time at A-school. NUI days also declined in follow-on training, but to a lesser extent.

Decreased UI Time: Some Top Ratings

Rating	Fleet arrivals (FY98 cohort)	Decrease in percent	Decrease in months
FT	53	29	4.5
IS	186	19	1.4
HT	172	16	1.1
DT	164	15	0.9
CTO	121	14	0.9
FC	1,033	9	1.6
CTI	116	8	1.6
ET	1,695	7	1.0
EN	527	9	0.6
AW	108	7	1.0

Which training pipelines showed the largest decreases in UI time? These 10 ratings, which together account for about 12 percent of all FY98 recruits who made it to the fleet, showed significant percentage or total reductions in UI time.

The Navy showed large UI time reductions in technical ratings. Perhaps training reengineering has focused on quicker delivery of technical skills to the fleet. However, we can't rule out other interpretations—the improvement may be the result of a reduction in the number of students entering technical pipelines. This is especially true in the case of the FT rating, which delivered only 53 sailors from the FY98 cohort, but 158 from the FY96 group.

The list above is limited to ratings that showed large reductions in both percentage and absolute terms and to ratings that (for the most part) are relatively large. We also tended to exclude ratings that showed large declines in the number of arrivals to the fleet. Among the ratings that could otherwise appear are RP, QM, EW, and CTT.

To measure the change in UI time, we compared FY96 and FY98 for the 6YOs and FY99 and FY97 for everyone else.

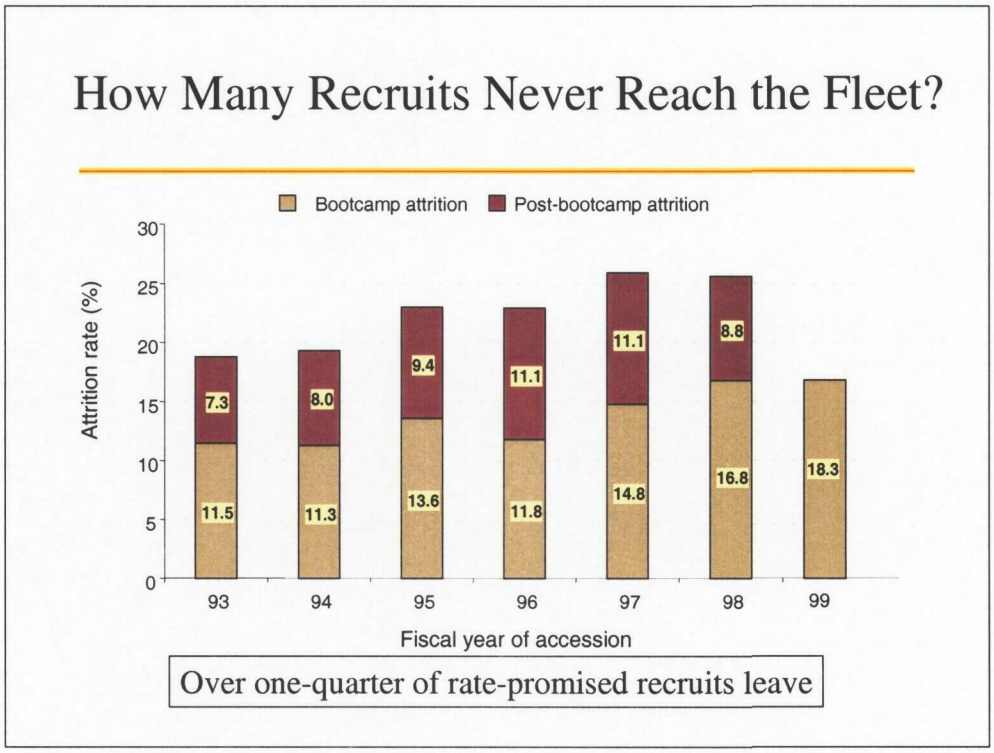
Decreased NUI Time: Some Top Ratings

Rating	Fleet arrivals (FY98 cohort)	Decrease in percent	Decrease in months
CTI	116	57	2.0
AS	263	54	1.3
AW	108	32	1.1
FT	53	48	1.1
AD	473	48	1.0
IC	221	40	1.0
AT	976	38	0.9
AMS	544	53	0.9
GSM	186	44	0.8
MS	705	77	.7

The largest cuts in NUI time appeared in technical ratings, as well. Together, these account for about 10 percent of fleet arrivals from the FY98 accession cohort. As a group, aviation ratings show significant changes. Besides those on this list, they include AE (.8 month), AC (.7 month) and AME (.7 month).

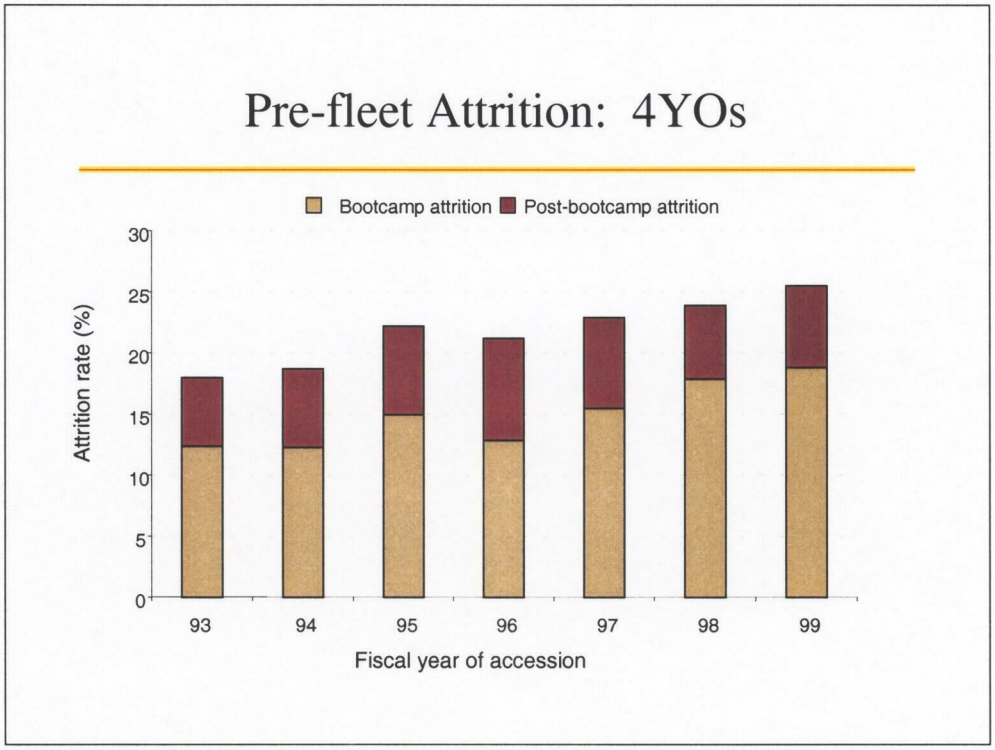
To measure the change in UI time, we compared FY96 and FY98 for the 6YOs and FY99 and FY97 for everyone else.

The FC rating showed no change in NUI time despite efforts to unclog awaiting instruction time in that pipeline.



The third issue we explored is how many recruits leave the Navy before reaching the fleet. These recruits never serve time in the fleet and represent a waste of both recruiting and training resources.

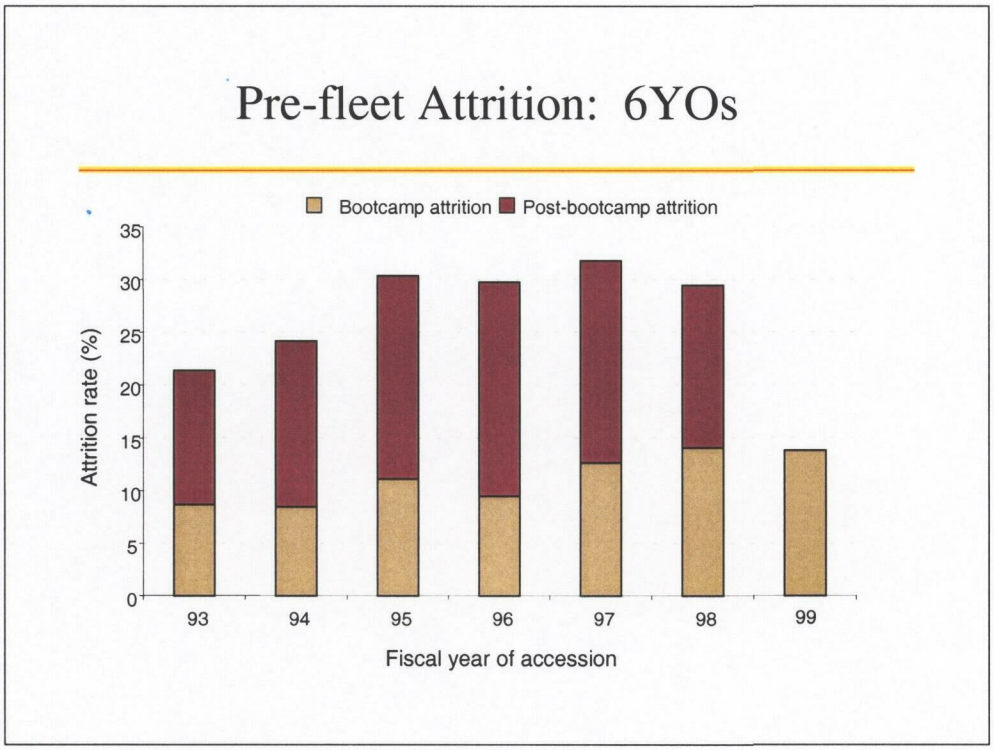
This chart shows the pre-fleet attrition rate, defined as the percentage of accessions who left the Navy before their first fleet assignments. Recruits who entered as GENDETs are excluded from these data—we include only those who were promised a rating. About 25 percent never reach the fleet (the attrition rate for GENDETs is lower, perhaps because their pipeline to the fleet is so much shorter). Most of the attrition occurs in bootcamp. The fraction leaving from A-school appears to have decreased after creeping upward during the 1990s. This is an important improvement, given the expense of training (and recruiting) A-school-qualified sailors.



Attrition trends for 4YOs are typical of the overall pattern. Attrition is on the rise, driven by a steady climb in bootcamp attrition.

Because most attrition occurs from bootcamp and because sailors who attrite are not rated at the time, we analyze attrition behavior by contract length but not by rating group.

Backup slides show attrition trends for 2YOs, 3YOs and 5YOs.



The 1999 CNA study found that the attrition of 6YOs is high and that most of it occurs after bootcamp. This pattern is alarming because 6YOs are generally the most promising recruits and are difficult to attract (and replace). Post-bootcamp attrition of 6YOs is lower among FY98 accessions than among preceding cohorts, but this is offset by an equal increase in bootcamp attrition.

Conclusions

- Data suggest training reengineering has succeeded in
  - Reducing time to fleet
  - Cutting both UI and NUI time
- Increase in bootcamp attrition includes 5YOs and 6YOs as well as less expensive recruits
- Caveats
  - Evidence on training reengineering is indirect
  - Have not included FY00 accessions
  - Handful of FY98 and FY99 accessions still training

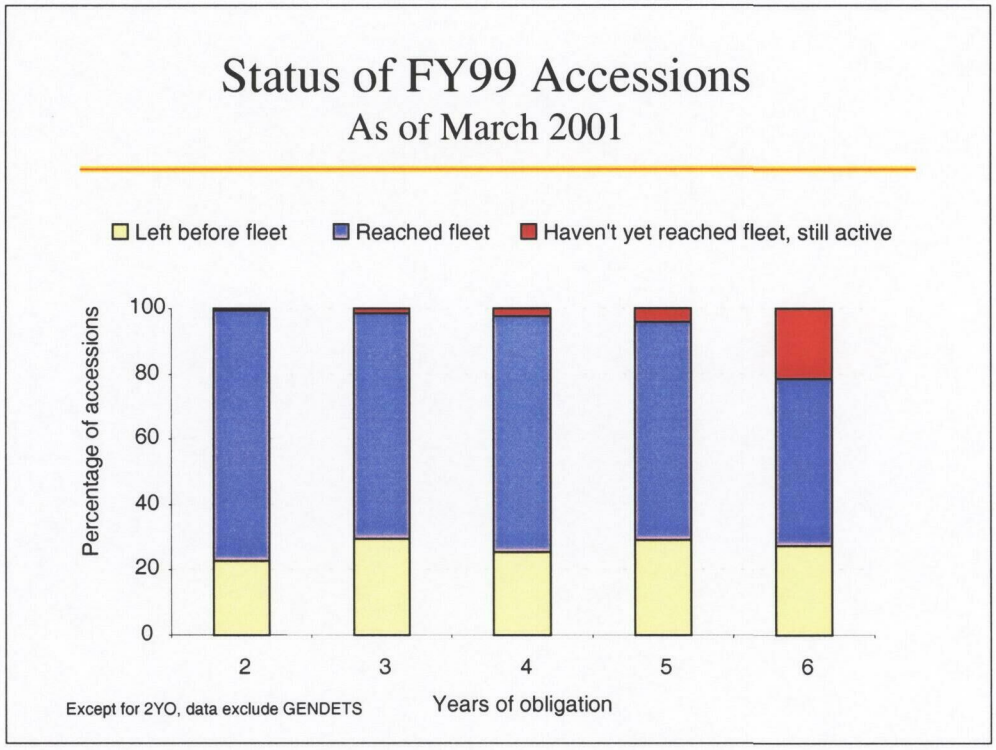
Trends in time to the fleet, UI time, and NUI time suggest that training reengineering has succeeded in improving the Navy's system of initial skills training. Trends in attrition are less positive. Bootcamp attrition continues to increase. In addition, post-bootcamp attrition of 6YOs may still be considered too high, although there is evidence of a decline.

Several caveats apply. Our analysis does not provide direct proof of the success of training reengineering because we have not linked the personnel trends to specific reengineering initiatives. We did not control for confounding factors and their potential influence on the street-to-fleet process. For instance, time to the fleet may have decreased if the quality of mix of students has changed; perhaps fewer students fail A-school and switch training pipelines.

Similarly, some positive effects of training reengineering are not observable with street-to-fleet data. For example, training reengineering may have enabled students to learn more in a given period of time.

We have not included the FY00 accessions in this report. The recent trends may change with an additional year of data. In fact, other sources suggest that bootcamp attrition declined in FY00 and early FY01. Whether this will amount to a drop in overall pre-fleet attrition remains to be seen. In addition, a handful of FY98 and FY99 accessions are still in training; they have yet to either reach the fleet or attrite, so we excluded them from the analysis.

Backup Information



Twenty-two percent of 6YOs who entered the Navy in FY99 were still in training as of the last period of our data, March 2001. We can't estimate the average fleet arrival time or attrition rate for this cohort with so many of its members still in the pipeline. About 5 percent of FY99 5YOs were still in training.

Rating Groups

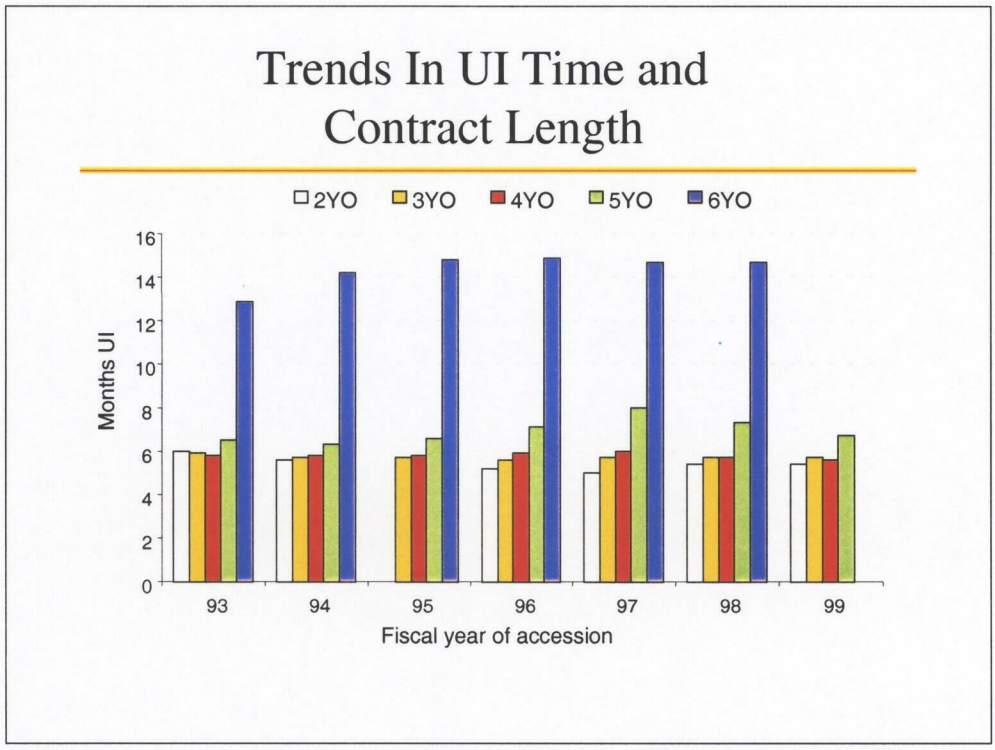
Group	Ratings
Admin	DP, JO, LI, LN, MA, PC, PN, RP, YN
Aviation maintenance	AD, AE, AM, AME, AMH, AMS, AS, AT
Aviation operations	ABE, ABF, ABH, AC, AG, AF, AO, AW, PH
Cryptology	CTA, CTI, CTO, CTR, CTT, IS
Hull, mechanical and electrical	DC, EM, HT, IC, IM, ML, MR, OM, PM
Medical	DT, HM
Supply	DK, MS, SH, SK
Surface engineering	BT, EN, GSE, GSM, MM
Surface operations	ET, OS, RM
Surface combat systems	DS, EW, FC, GMG, GMM, OTA, STG
Other	AK, AZ, PR, BU, CE, CM, EA, EO, SW, UT, BM, QM, SM, FT, MN, MT, MU, STS, TM

The "other" group includes deck, submarine, musician, and aviation supply ratings. We grouped these dissimilar skills because they include small numbers of sailors.

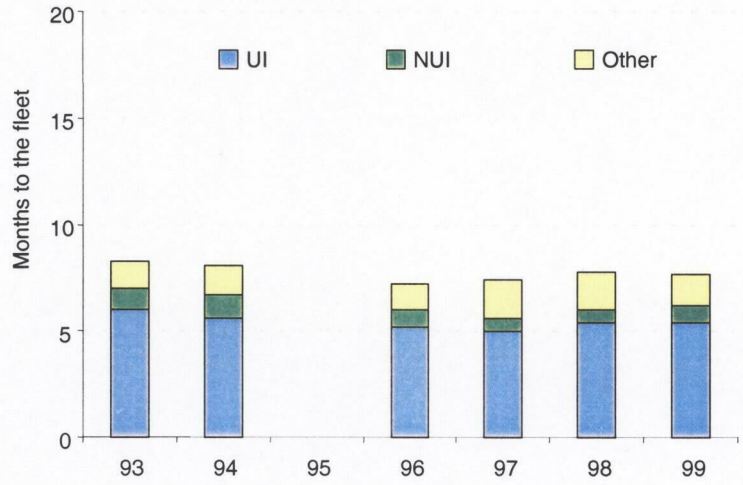
Months to Fleet By Rating Group

Group	93	94	95	96	97	98	99
Admin	6.2	6.2	6.2	6.2	6.2	6.2	NA
Aviation Maintenance	6.3	6.3	6.3	6.3	6.3	6.3	NA
Aviation Ops	6.1	6.1	6.1	6.1	6.1	6.1	NA
Cryptology	6.4	6.4	6.4	6.4	6.4	6.4	NA
HME	6.7	6.7	6.7	6.7	6.7	6.7	NA
Medical	6.8	6.8	6.8	6.8	6.8	6.8	NA
Supply	6.4	6.4	6.4	6.4	6.4	6.4	NA
Surface Eng	10.6	10.6	10.6	10.6	10.6	10.6	NA
Surface Ops	11.2	11.2	11.2	11.2	11.2	11.2	NA
Surf Ops—Combat Sys.	10.1	10.1	10.1	10.1	10.1	10.1	NA
Other Rating	10.1	10.1	10.1	10.1	10.1	10.1	NA
GENDET	10.3	10.3	10.3	10.3	10.3	10.3	NA

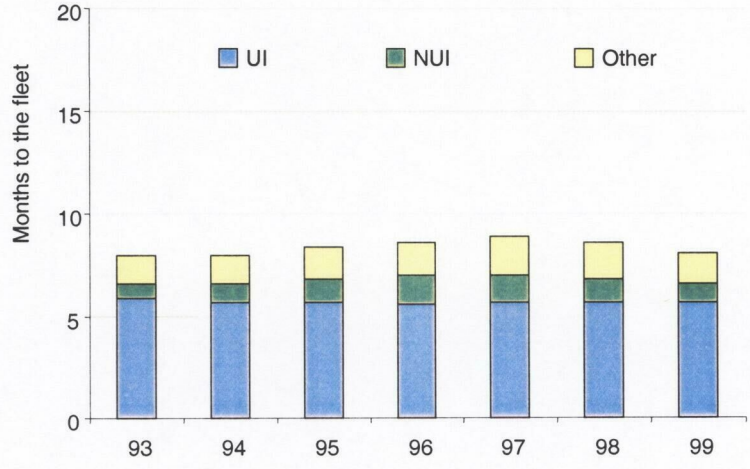
These data include all contract lengths.


Trends In UI Time and Contract Length
2YO
3YO
4YO
5YO
6YO
Months UI
16
14
12
10
8
6
4
2
0
93
94
95
96
97
98
99
Fiscal year of accession

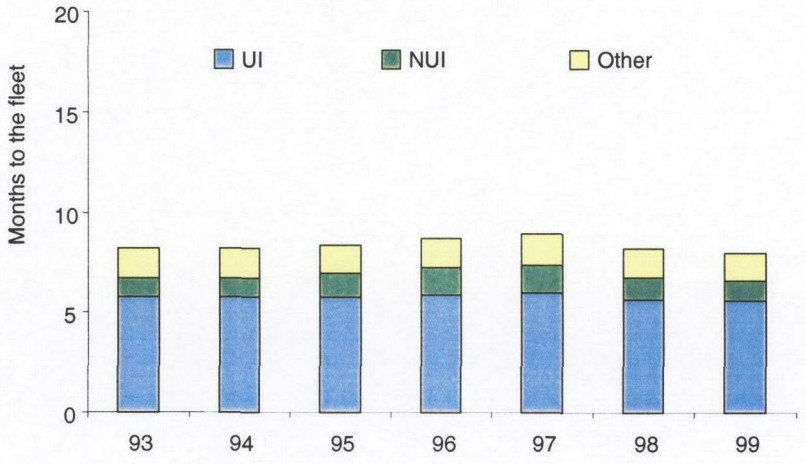
How Recruits Spend Their Pre-fleet Time: 2YOs



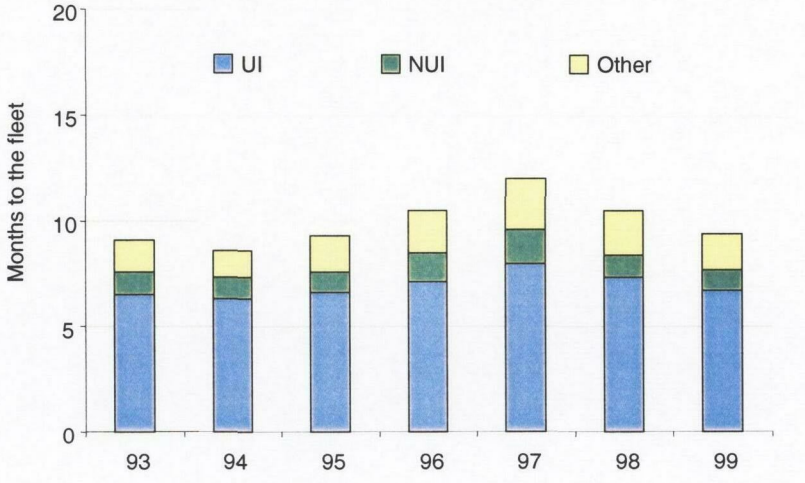
How Recruits Spend Their Pre-fleet Time: 3YOs

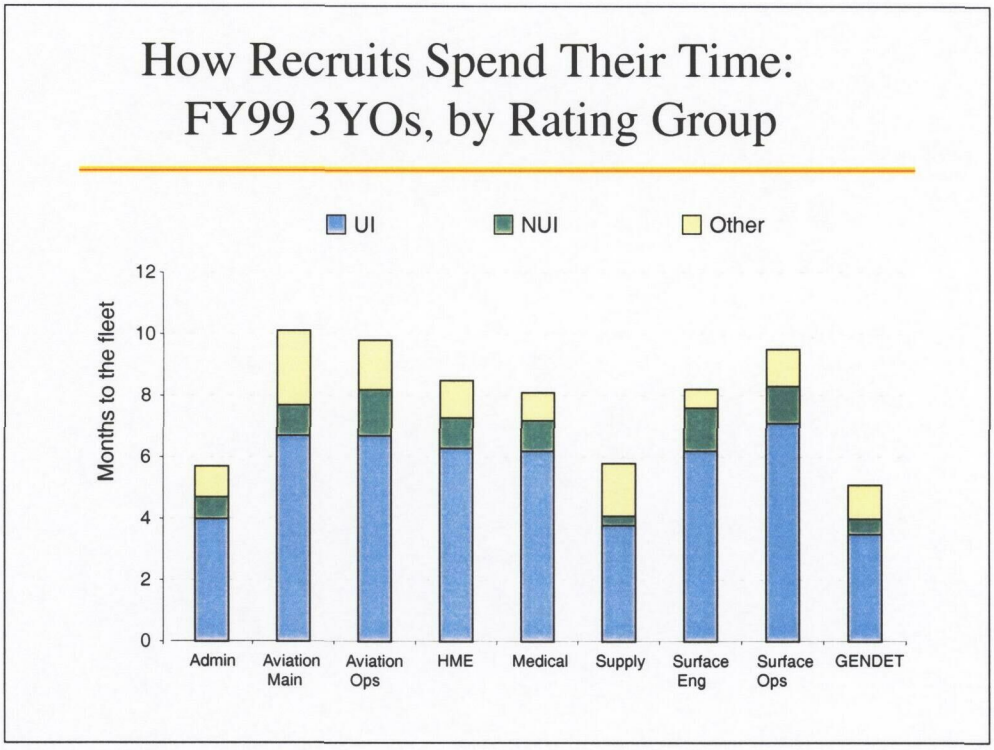


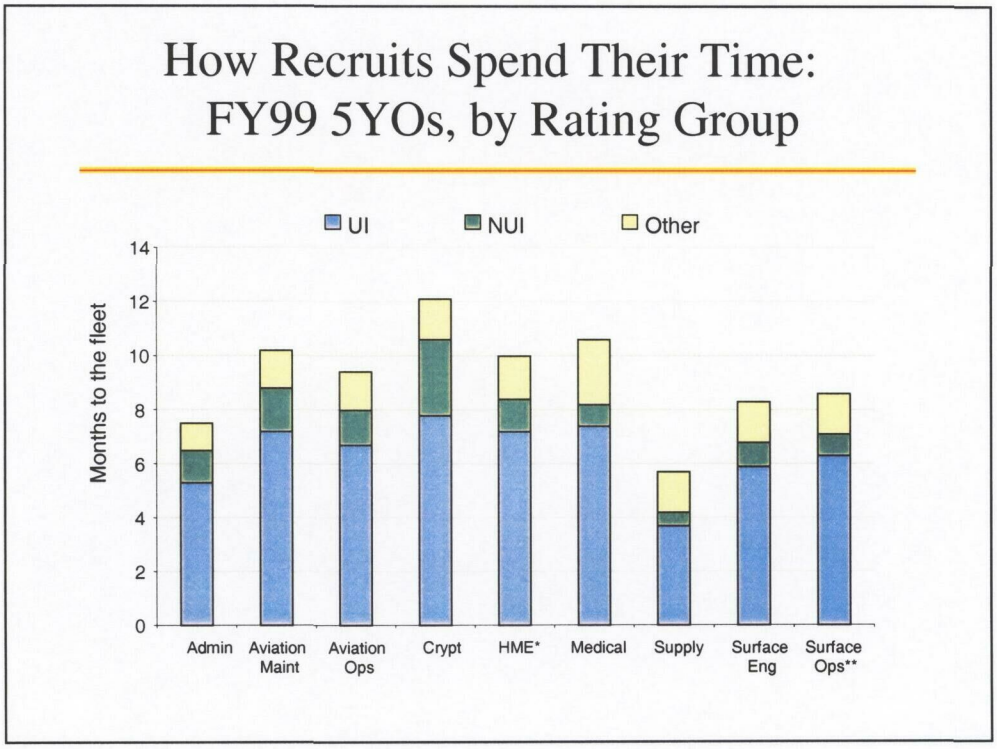
How Recruits Spend Their Pre-fleet Time: 4YOs



How Recruits Spend Their Pre-fleet Time: 5YOs

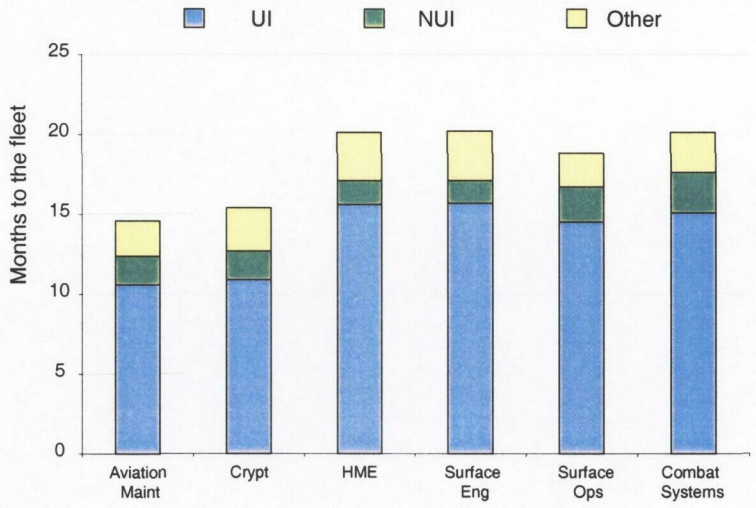




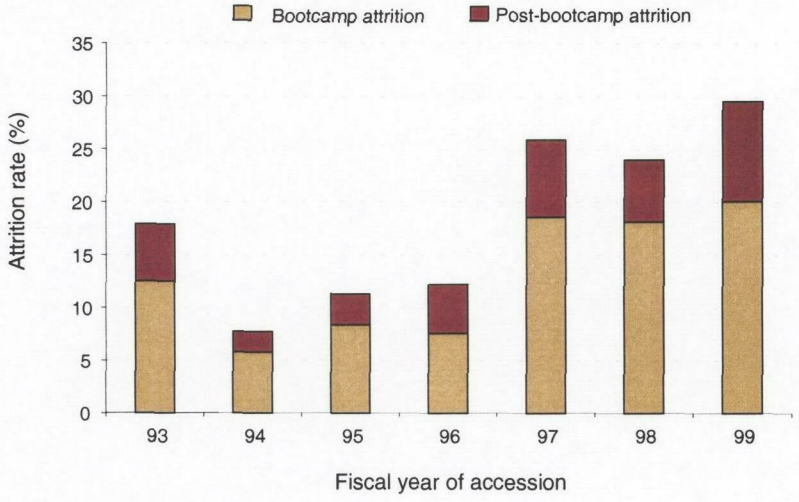


Cryptology stands out with 2.8 months of NUI time (the overall average for the 5YOs is 1 month). However, this average is based on only 12 people, so we can't draw conclusions about the health of the cryptology training pipeline based on this data point.

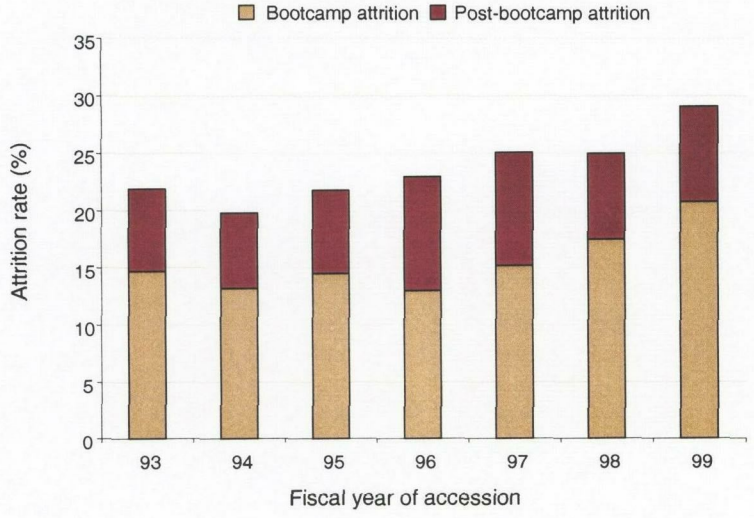
How Recruits Spend Their Time: FY98 6YOs, by Rating Group



Pre-fleet Attrition: 3YOs



Pre-fleet Attrition: 5YOs



Distribution list

Annotated Briefing D0004070.A1

SNDL

CNET PENSACOLA FL
Attn: Terry Halverson (TR1)

OPNAV

N12B
N122
N13T
N131B
N132
N79
N81
N813
N813R

06/25/2001

CAB D0004070.A1 Final