



**NONRESIDENT
TRAINING
COURSE**



July 2000

AIRMAN

NAVEDTRA 14014

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

Although the words “he,” “him,” and “his” are used sparingly in this course to enhance communication, they are not intended to be gender driven or to affront or discriminate against anyone.

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

PREFACE

By enrolling in this self-study course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program.

THE COURSE: This self-study course is organized into subject matter areas, each containing learning objectives to help you determine what you should learn along with text and illustrations to help you understand the information. The subject matter reflects day-to-day requirements and experiences of personnel in the rating or skill area. It also reflects guidance provided by Enlisted Community Managers (ECMs) and other senior personnel, technical references, instructions, etc., and either the occupational or naval standards, which are listed in the *Manual of Navy Enlisted Manpower Personnel Classifications and Occupational Standards*, NAVPERS 18068.

THE QUESTIONS: The questions that appear in this course are designed to help you understand the material in the text.

VALUE: In completing this course, you will improve your military and professional knowledge. Importantly, it can also help you study for the Navy-wide advancement in rate examination. If you are studying and discover a reference in the text to another publication for further information, look it up.

*2000 Edition Prepared by
AMSC(AW/NAC) Archie Manning*

*Reissued on November 2001 to correct
minor discrepancies or update
information. No significant changes
have been made to content.*

Published by
NAVAL EDUCATION AND TRAINING
PROFESSIONAL DEVELOPMENT
AND TECHNOLOGY CENTER

**NAVSUP Logistics Tracking Number
0504-LP-022-4050**

Sailor's Creed

"I am a United States Sailor.

I will support and defend the Constitution of the United States of America and I will obey the orders of those appointed over me.

I represent the fighting spirit of the Navy and those who have gone before me to defend freedom and democracy around the world.

I proudly serve my country's Navy combat team with honor, courage and commitment.

I am committed to excellence and the fair treatment of all."

TABLE OF CONTENTS

CHAPTER	PAGE
1. Mission and History of Naval Aviation.....	1-1
2. Organization of Naval Aviation.....	2-1
3. Principles of Flight.....	3-1
4. Aircraft Basic Construction	4-1
5. Aircraft Hardware	5-1
6. Aircraft Power Plants	6-1
7. Aircraft Avionics.....	7-1
8. Aircraft Ordnance.....	8-1
9. Support Equipment.....	9-1
10. Line Operations and Safety.....	10-1
11. Aircrew Survival Equipment	11-1
12. Crash Rescue and Fire Fighting	12-1
APPENDIX	
I. Glossary	AI-1
II. References Used to Develop the TRAMAN.....	AII-1
III. Answers to Embedded Questions.....	AIII-1
INDEX	INDEX-1

INSTRUCTIONS FOR TAKING THE COURSE

ASSIGNMENTS

The text pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions. Pay close attention to tables and illustrations and read the learning objectives. The learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

SELECTING YOUR ANSWERS

Read each question carefully, then select the BEST answer. You may refer freely to the text. The answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the course.

SUBMITTING YOUR ASSIGNMENTS

To have your assignments graded, you must be enrolled in the course with the Nonresident Training Course Administration Branch at the Naval Education and Training Professional Development and Technology Center (NETPDTC). Following enrollment, there are two ways of having your assignments graded: (1) use the Internet to submit your assignments as you complete them, or (2) send all the assignments at one time by mail to NETPDTC.

Grading on the Internet: Advantages to Internet grading are:

- you may submit your answers as soon as you complete an assignment, and
- you get your results faster; usually by the next working day (approximately 24 hours).

In addition to receiving grade results for each assignment, you will receive course completion confirmation once you have completed all the

assignments. To submit your assignment answers via the Internet, go to:

<http://courses.cnet.navy.mil>

Grading by Mail: When you submit answer sheets by mail, send all of your assignments at one time. Do NOT submit individual answer sheets for grading. Mail all of your assignments in an envelope, which you either provide yourself or obtain from your nearest Educational Services Officer (ESO). Submit answer sheets to:

COMMANDING OFFICER
NETPDTC N331
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32559-5000

Answer Sheets: All courses include one "scannable" answer sheet for each assignment. These answer sheets are preprinted with your SSN, name, assignment number, and course number. Explanations for completing the answer sheets are on the answer sheet.

Do not use answer sheet reproductions: Use only the original answer sheets that we provide—reproductions will not work with our scanning equipment and cannot be processed.

Follow the instructions for marking your answers on the answer sheet. Be sure that blocks 1, 2, and 3 are filled in correctly. This information is necessary for your course to be properly processed and for you to receive credit for your work.

COMPLETION TIME

Courses must be completed within 12 months from the date of enrollment. This includes time required to resubmit failed assignments.

PASS/FAIL ASSIGNMENT PROCEDURES

If your overall course score is 3.2 or higher, you will pass the course and will not be required to resubmit assignments. Once your assignments have been graded you will receive course completion confirmation.

If you receive less than a 3.2 on any assignment and your overall course score is below 3.2, you will be given the opportunity to resubmit failed assignments. **You may resubmit failed assignments only once.** Internet students will receive notification when they have failed an assignment—they may then resubmit failed assignments on the web site. Internet students may view and print results for failed assignments from the web site. Students who submit by mail will receive a failing result letter and a new answer sheet for resubmission of each failed assignment.

COMPLETION CONFIRMATION

After successfully completing this course, you will receive a letter of completion.

ERRATA

Errata are used to correct minor errors or delete obsolete information in a course. Errata may also be used to provide instructions to the student. If a course has an errata, it will be included as the first page(s) after the front cover. Errata for all courses can be accessed and viewed/downloaded at:

<http://www.cnet.navy.mil/netpdtc/nac/neas.htm>

STUDENT FEEDBACK QUESTIONS

We value your suggestions, questions, and criticisms on our courses. If you would like to communicate with us regarding this course, we encourage you, if possible, to use e-mail. If you write or fax, please use a copy of the Student Comment form that follows this page.

For subject matter questions:

E-mail: n315.products@cnet.navy.mil
Phone: Comm: (850) 452-1001, Ext: 1714
DSN: 922-1001, Ext: 1714
FAX: (850) 452-1370
(Do not fax answer sheets.)
Address: COMMANDING OFFICER
NETPDTC (CODE N315)
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32509-5000

For enrollment, shipping, grading, or completion letter questions

E-mail: fleetservices@cnet.navy.mil
Phone: Toll Free: 877-264-8583
Comm: (850) 452-1511/1181/1859
DSN: 922-1511/1181/1859
FAX: (850) 452-1370
(Do not fax answer sheets.)
Address: COMMANDING OFFICER
NETPDTC (CODE N331)
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32559-5000

NAVAL RESERVE RETIREMENT CREDIT

If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For Naval Reserve retirement, this course is evaluated at 18 points. These points will be credited in units as follows: Unit 1: 12 points upon satisfactory completion of Assignments 1 thru 8. Unit 2 : 6 points upon satisfactory completion of Assignments 9 thru 12. (Refer to *Administrative Procedures for Naval Reservists on Inactive Duty*, BUPERSINST 1001.39, for more information about retirement points.)

COURSE OBJECTIVES

When you complete this course you will be familiar with the mission and history of naval aviation as well as the organization of naval aviation. You will also have knowledge of the principles of flight, aircraft construction, aircraft hardware and power plants, aircraft avionics and ordnance, support equipment, line operations and safety, aircrew survival equipment, and crash rescue and fire fighting.

Student Comments

Course Title: Airman

NAVEDTRA: 14014 Date: _____

We need some information about you:

Rate/Rank and Name: _____ SSN: _____ Command/Unit _____

Street Address: _____ City: _____ State/FPO: _____ Zip _____

Your comments, suggestions, etc.:

Privacy Act Statement: Under authority of Title 5, USC 301, information regarding your military status is requested in processing your comments and in preparing a reply. This information will not be divulged without written authorization to anyone other than those within DOD for official use in determining performance.

NETPDTC 1550/41 (Rev 4-00)

CHAPTER 1

MISSION AND HISTORY OF NAVAL AVIATION

INTRODUCTION

Today's naval aircraft have come a long way from the Wright Brothers' flying machine. These modern and complex aircraft require a maintenance team that is far superior to those of the past. You have now joined this proud team.

You, the Airman Apprentice, will get a basic introduction to naval aviation from this training manual. In the *Airman* manual, you will learn about the history and organization of naval aviation; the design of an aircraft, its systems, line operations, and support equipment requirements; and aviation safety, rescue, crash, and fire fighting.

In this chapter, you will read about some of the historic events of naval aviation. Also, you will be introduced to the Airman rate and different aviation ratings in the Navy. You will find out about your duties as an Airman. Leadership and training are going to become an everyday part of your life while you are in the Navy. With your basic naval training completed, you have a chance to experience some of the other types of training available to you. Leadership is an important aspect of any military organization. Leadership and teamwork go hand-in-hand, starting right here in the Airman rate.

THE MISSION OF NAVAL AVIATION

LEARNING OBJECTIVE: Identify the overall mission of naval aviation.

Other countries look upon the United States as the leader of the free world. This accomplishment comes partly through our military strength achieved through sea power. The ability to fight in World War II, the Korean War, and the Vietnam War came directly from the Navy's sea power.

The mission of naval aviation is to support our naval forces. This support helps keep vital sea lanes open and denies their use to enemy forces in time of war. To accomplish this task, naval aviation has a primary function. The primary function of naval aviation is to closely coordinate with other naval forces

in maintaining command of the seas. Accomplishing this task takes five basic operations:

1. Eyes and ears of the fleet. Naval aviation has over-the-horizon surveillance equipment that provides vital information to our task force operation.

2. Protection against submarine attack. Anti-submarine warfare operations go on continuously for the task force and along our country's shoreline. This type of mission includes hunter/killer operations to be sure of task force protection and to keep our coastal waterways safe.

3. Aid and support operations during amphibious landings. From the beginning to the end of the operations, support occurs with a variety of firepower. Providing air cover and support is an important function of naval aviation in modern, technical warfare.

4. Rapid logistic support for ground forces. Logistic support aircraft strongly support the mobility of the ground forces. Providing logistic support aircraft is another required function of naval aviation.

5. Search and rescue operations. During sea missions, the possibility of a downed aircraft or man overboard always exists. Search and rescue helps reduce the number of lives lost.

As you can see, naval aviation plays many critical roles in the support of the Navy's mission. The overall mission of the United States Navy depends on the use of highly complex aircraft.

Q1-1. What is the mission and primary function of naval aviation?

THE HISTORY OF NAVAL AVIATION

LEARNING OBJECTIVE: Recognize some of the important events in naval aviation.

The Navy's interest in airplanes as a naval weapon dates back to 1898. Several naval officers became members of an interservice board. Their job was to observe and investigate the military possibilities of the new flying machine. In 1908 and 1909, naval officer observers were present at the public demonstrations staged by the Wright brothers.

The following paragraphs chart the history of naval aviation from 1910 to the present.

1910

The first successful launch of a aircraft from a ship was made by Eugene Ely, who flew a Curtiss biplane from a specially built 83-foot wooden platform on the forecastle of the cruiser *Birmingham*. See figure 1-1.

1911

On 8 May 1911, the Navy purchased its first aircraft from Glenn Curtiss—the A-1 *Triad*. This date of purchase became the official birthday of naval aviation. The Wright brothers soon sold the Navy another aircraft. Curtiss and the Wrights agreed to train a pilot and a mechanic.

Eugene Ely landed on a 120-foot wooden platform built on the after turret of the *Pennsylvania* (fig. 1-2). Then, Ely launched from the wooden platform and flew back to shore. The day of the "aircraft carrier" had arrived. By the end of 1911, the U.S. Navy had three aircraft, four pilots, and one naval air station located at Greenbury Point, near Annapolis, Maryland. The station eventually moved to North Island, California. Later, the Naval Aeronautic Station, Pensacola,

Florida, was established and became the primary training facility for all naval aviators and enlisted aircrew personnel.

1917

When the U.S. declared war on Germany on 6 April 1917, naval aviation had 48 officers and 239 enlisted men. There were 54 aircraft, 1 airship, 3 balloons, and 1 naval air station. By the end of WWI, naval aviation had 6,716 officers, 30,693 enlisted men, 252 land aircraft, and 1,865 flying boats and seaplanes. Naval aviation had grown enormously and was well on its way.

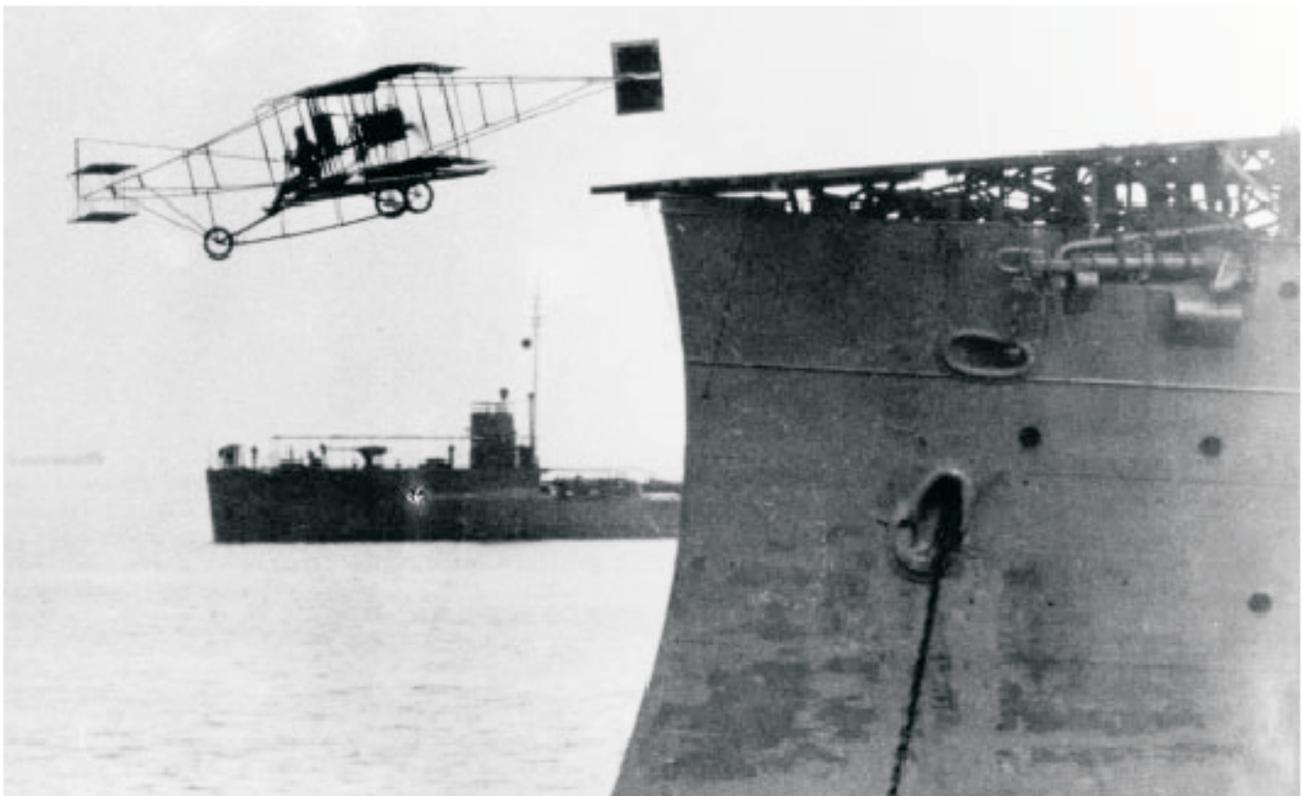
1922

The converted collier ship *Jupiter* (AC-3) was renamed USS *Langley* and commissioned. It became the first official aircraft carrier (CV-1) supporting fighter and torpedo bomber squadrons. See figure 1-3.

1940s

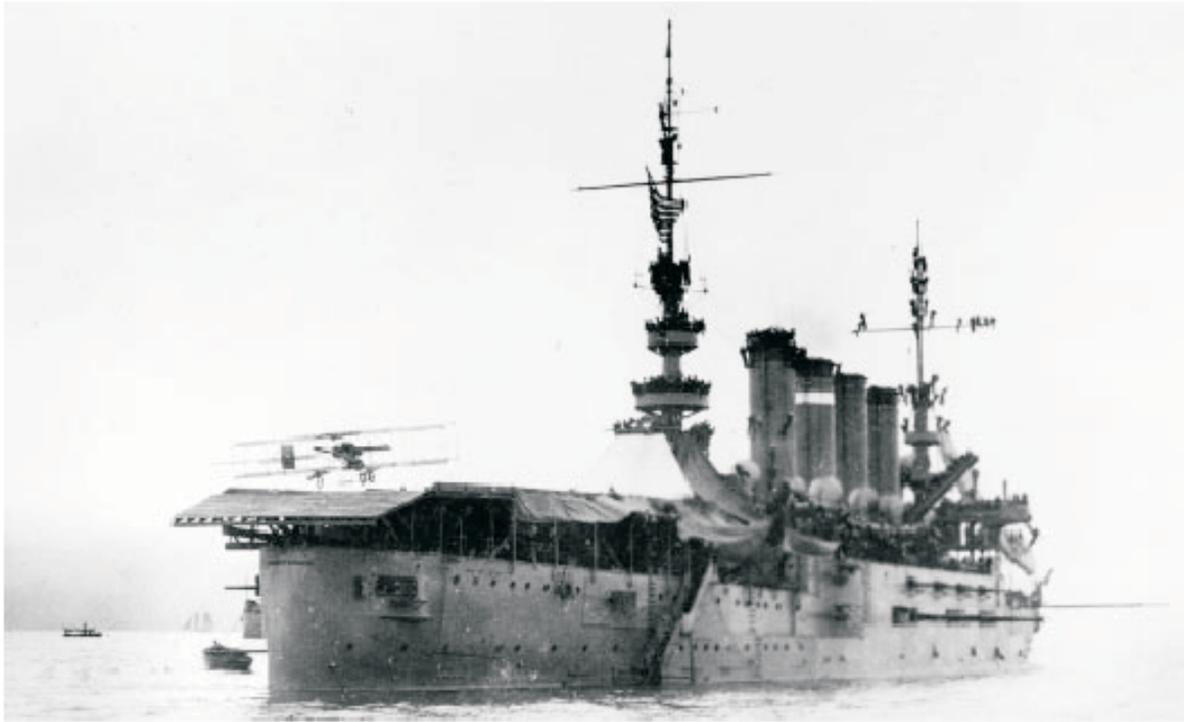
Five more aircraft carriers joined the carrier task force before the outbreak of World War II.

1941. The U.S. Congress declared a state of war with Japan. During World War II, the F-6F *Hellcat*,



ANF0101

Figure 1-1.—Eugene Ely in the first takeoff from a ship, November 14, 1910.



ANF0102

Figure 1-2.—Ely in Curtiss byplane comes aboard the USS Pennsylvania in the first shipboard landing on January 18, 1911.

F-4U *Corsair*, SB-2C *Helldiver*, and TBM *Avenger* were carrier based. Patrol aircraft consisted of the PBV/PBM *Mariner*, PB-4Y, and PV *Ventura* aircraft. The R-4D *Skytrain* was used for transport and cargo.

Naval aviation strength was 5,233 aircraft, 5,900 Navy and Marine Corps pilots, and 21,678 enlisted men.

1942. The **Battle of Coral Sea** caused the Japanese to abandon their attempt to land at Port Moresby. Carrier-based aircraft attacked the Japanese task force and their landing forces. This was the first major battle without opposing ships making contact.

The **Battle of Midway** was the turning point of the war in the Pacific. Japan suffered heavy losses to their



ANF0103

Figure 1-3.—The first Naval aircraft carrier USS Langley (CV-1).