



**NONRESIDENT
TRAINING
COURSE**



June 1993

**Aviation Electronics
Technician 1
(Organizational)**

NAVEDTRA 14030

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.

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.

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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.”

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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.advancement.cnet.navy.mil>

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. 1713
DSN: 922-1001, Ext. 1713
FAX: (850) 452-1370
(Do not fax answer sheets.)
Address: COMMANDING OFFICER
NETPDTC (CODE N315)
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32509-5237

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 15 points. Points will be credited in units upon satisfactory completion of the assignments as follows:

12 points upon satisfactory completion of assignments 1 through 8.

3 points upon satisfactory completion of assignments 9 and 10.

(Refer to *Administrative Procedures for Naval Reservists on Inactive Duty*, BUPERSINST 1001.39, for more information about retirement points.)

COURSE OBJECTIVES

In completion this nonresident training course, you will demonstrate a knowledge of the subject matter by correctly answering questions on the following: communica-

tions, navigation, radar, antisubmarine warfare, indicators, infrared, weapons systems, computers, automatic carrier landing system, and the electrostatic discharge program.

Student Comments

Course Title: Aviation Electronics Technician 1 (Organizational)

NAVEDTRA: 14030 **Date:** _____

We need some information about you:

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

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

Your comments, suggestions, etc.:

<p>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.</p>
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NETPDTC 1550/41 (Rev 4-00)

CHAPTER 1

COMMUNICATIONS

As an Aviation Electronics Technician, you will be tasked to operate and maintain many different types of airborne communications equipment. These systems may differ in some respects, but they are similar in many ways. As an example, there are various models of AM radios, yet they all serve the same function and operate on the same basic principles. It is beyond the scope of this manual to discuss each and every model of communication equipment used on naval aircraft; therefore, only representative systems will be discussed. Every effort has been made to use not only systems that are common to many of the different platforms, but also have not been used in the other training manuals. It is the intent of this manual to have systems from each and every type of aircraft in use today.

RADIO COMMUNICATIONS

Learning Objective: Recognize the various types of radio communications. Identify the various frequency bands and their uses and limitations.

In basic terms, communication is defined as the meaningful transfer of information from one location (the sender, source, originator) to another location (the destination or receiver). Electronic communication uses electrical energy to transmit the information to be communicated. Since this electrical energy travels at the speed of light, the transfer can occur within a fraction of a second. The information must be converted from its original form of sound, light, or mechanical energy into electrical energy. This electrical energy can then be transmitted via wires or radiated through space to a receiver. The receiver must then convert the electrical energy back into its original form to complete the communication cycle.

TYPES OF RADIO COMMUNICATIONS

Radio communications has become a highly sophisticated field of electronics. All Navy aircraft have the capability to use the commonly used ship-to-ship, ship-to-air, air-to-air, air-to-ground, and ship-to-shore

communication circuits. These operations are accomplished through the use of compatible and flexible communication systems.

Radio is the most important means of communicating in the Navy today. There are many methods of transmitting in use throughout the world. This manual will discuss three types. They are radiotelegraph, radiotelephone, and teletypewriter.

Radiotelegraph

Radiotelegraph is commonly called CW (continuous wave) telegraphy. Telegraphy is accomplished by opening and closing a switch to separate a continuously transmitted wave. The resulting "dots" and "dashes" are based on the Morse code. The major disadvantage of this type of communication is the relatively slow speed and the need for experienced operators at both ends.

Radiotelephone

Radiotelephone is one of the most useful military communication methods. It is used by aircraft, ships, and shore stations because of its directness, convenience, and ease of use. The equipment used for tactical purposes usually operate on frequencies that are high enough to have line-of-sight characteristics. This cuts down not only on the possibility of the enemy intercepting the messages, but also cuts down on the distance between the transmitter and receiver.

Teletypewriter

Teletypewriter (TTY) signals may be transmitted by either landlines (wire), cable, or radio. The Navy uses radio teletypewriter (RTTY) for high-speed automatic communications. The keyboard used with a TTY system is similar to that of a typewriter. When the operator strikes a key, a sequence of signals is transmitted. At the receiving station, the signals are translated back into letters, figures, and symbols that are typed onto paper for use.