

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 air craft, and 1,865 flying boats and seaplanes. Naval aviation had grown enormously and was well on its way.

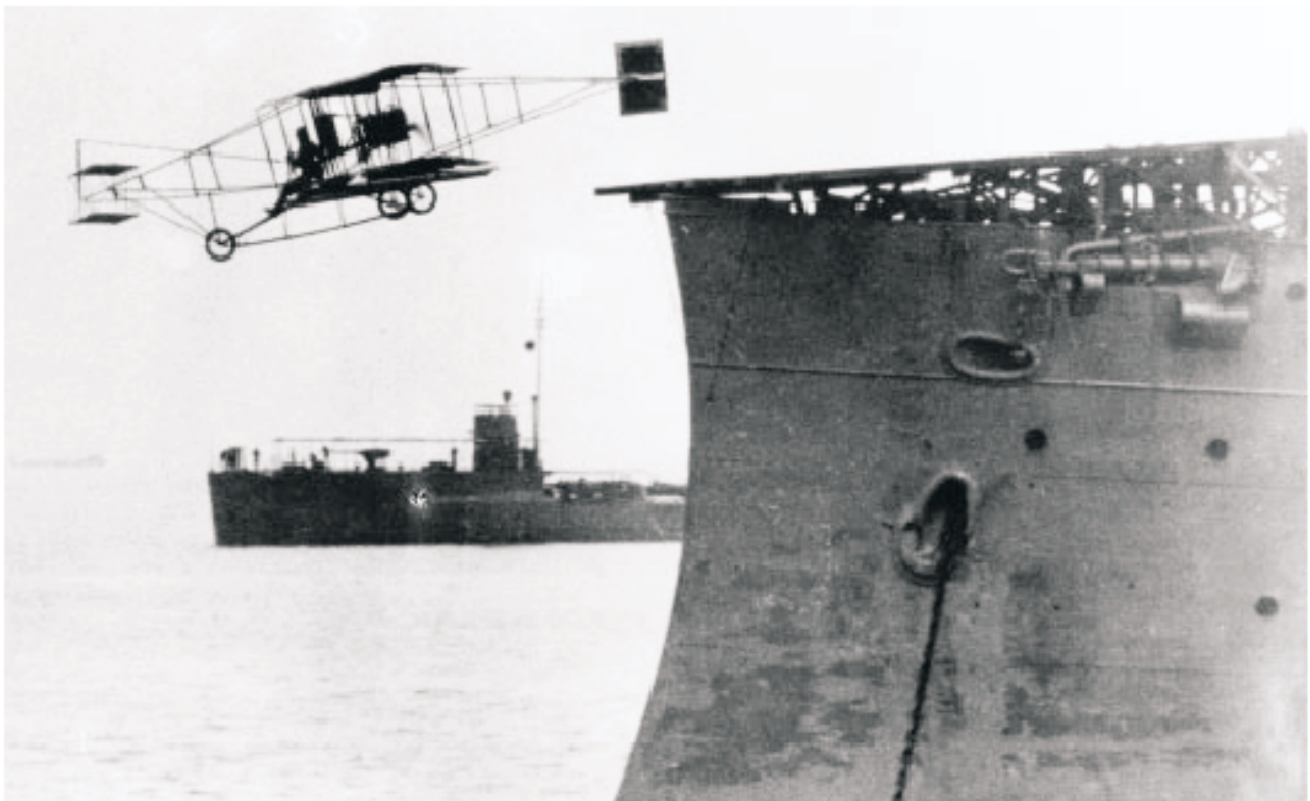
1922

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

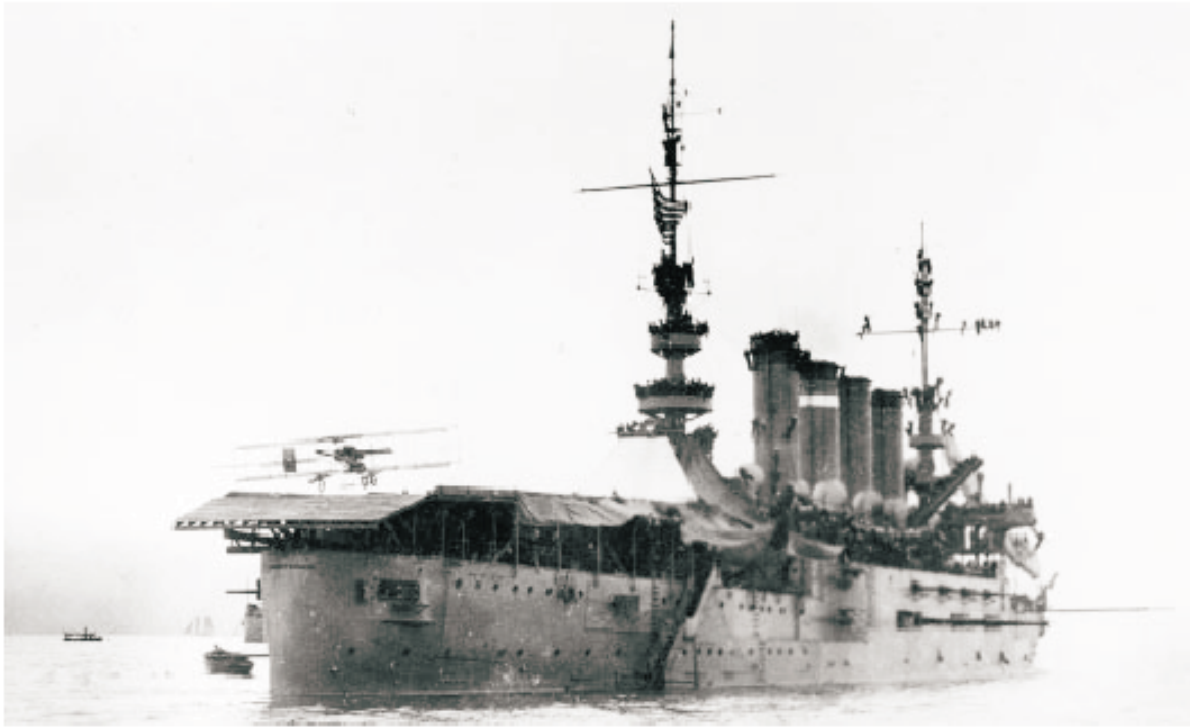
Five more aircraft carriers joined the carrier task force before the outbreak of World War II.

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



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



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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



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

surface force, their aircraft, and experienced aircraft pilots.

Five carriers took part in the **Battle of Guadalcanal**. Carrier-based aircraft flew interceptor patrols, offensive missions against shipping, and close air support for ground forces until the island was secured.

1943. U.S. Navy enters the helicopter field of aviation by purchasing helicopters from U.S. Army. Also, the Navy purchased a helicopter manufactured to Navy specifications from the Sikorsky Helicopter Company—the YR-4B. Westinghouse developed the first turbojet engine (19A) for the Navy.

1948. The Navy commissioned its first helicopter squadron—the HU-1, and the first carrier landing was made by a U.S. Navy jet (the FJ-1 *Fury* lands aboard the USS *Boxer*).

1949. The first use of a pilot ejection seat for an emergency escape was made from an F2H-1 *Banshee*. Also, a new fighter aircraft was added to the Navy inventory (the F9F-2/5 *Panther*), and was manufactured by Grumman Aircraft Company.

1950s

Carrier aircraft went into action in the Korean conflict, which ended July 27, 1953.

1953. Naval aircraft conducted initiation test operations aboard the Navy's first angled deck carrier, the USS *Antietam*.

1954. Guided, air-to-air and air-to-surface missiles were perfected and placed into operation. The Polaris, Sidewinder, Sparrow, and Petrel missiles became standard equipment.

1957. The first successful Automatic Landing System test was done on the USS *Antietam*. It was designed to bring planes aboard the ship in all weather without help from the pilot. Also, the first F8U-1 *Crusader* was delivered to the fleet. The first operationally equipped jet plane in history to fly faster than 1,000 mph.

1959. Four naval aviators were selected as prospective astronauts under Project *Mercury*—a program of space exploration and manned orbital flight. The Sikorsky HSS-2 amphibious, all weather, antisubmarine helicopter made its first flight.

1960s

Naval Aviation was approaching its golden anniversary, and support of the space program was made a priority as manned orbital flight became a reality. Also, recovering space vehicles became one of the Navy's responsibilities. A carrier recovery ship, carrier-based helicopters, and specially trained crews carried out this mission.

1961. The United States becomes officially involved in the Vietnam conflict. Naval aviator, Alan B. Shepard Jr., became the first American to go into space by completing a flight reaching 116 miles high and 302 miles down range before recovery by a Navy HUS-1 helicopter and the USS *Lake Champlain*. Also, the world's first nuclear-powered aircraft carrier, the USS *Enterprise* (CVAN-65), was commissioned.

1962. The Naval Aviation Museum was established at the Naval Air Station, Pensacola, Florida, by the Secretary of the Navy.

1964. Vertical replenishment by helicopters and picking up stores and delivering them to other surface combat ships began with the commissioning of the combat stores ship USS *Mars* (AFS-1).

1965. The United States is fully involved in the Vietnam conflict. Seventh fleet air units begin operation *Rolling Thunder*, a systematic bombing of military targets throughout North Vietnam waged by land and sea based A-4 *Skyhawks*, F-4 *Fanthsoms*, A-6 *Intruders*, and A-7 *Corsair* aircraft.

1967. Fire broke out on the flight deck of the USS *Forrestal* (CV-59) and soon spread below decks igniting bombs and ammunition. Heroic efforts brought the fire under control but damage to the ship and aircraft was severe. These were 132 dead, 62 injured, and two missing and presumed dead. Also, the Aircraft Intermediate Maintenance Department (AIMD) was established by the Chief of Naval Operations (CNO) on all operating aircraft carriers except the one operating with the Naval Air Training Command.

1969. *Apollo 11* lands on the moon with naval aviator Neil Armstrong; Edwin Aldrin, USAF; and Michael Collins, USAF. Armstrong and Aldrin walked on the moon 20 and 21 July.

1970s

Naval aviation beginning its seventh decade heavily embroiled with Vietnam and a growing crisis in the Middle East re-emphasized the importance of the U.S. Navy to keep the sea lanes open. This required the

reliability of established and upgraded weapons systems and materials.

1971. Navy takes delivery of the AV-8 *Harrier*, a fixed wing, vertical takeoff and landing (V/STOL) jet aircraft used for combat, and the EA-6B *Prowler*, the newest carrier-based sophisticated electronic warfare aircraft. The Navy also received the new CH-53A *Sea Stallion*, a helicopter devoted exclusively to mine countermeasures. By towing specially designed magnetic and acoustical equipment, the CH-53 locates and activates enemy mines.

1972. The Navy receives its first new fighter aircraft in 14 years, the F-14 *Tomcat*, which replaces the aging McDonnell Douglas F-4 *Phantom II*. The war continued in Vietnam. Navy and Marine Corps pilots were being rescued, over land and at sea, by Search and Rescue (SAR) helicopter crews.

1973. The Vietnam cease-fire was announced, and U.S. forces start to withdraw. The Navy lost 529 fixed-wing aircraft and 13 helicopters, and the Marine Corps lost 193 fixed-wing aircraft and 270 helicopters in enemy actions. Operation *Homecoming* begins, which provides for the repatriation of prisoners of war (POWs). The *Blue Angels* became the Navy Flight Demonstration Squadron, located at Naval Air Station, Pensacola, Florida.

1974. The Navy receives its new highly advanced, carrier-qualified, jet powered, turboprop S-3 *Viking* antisubmarine warfare aircraft that works in tandem with the SH-3 *Sea King* and SH-2 *Seasprite* helicopters in locating and tracking submarines.

1976. The Navy's last operational HU-16 *Albatross* seaplane, S-2 *Tracker* antisubmarine warfare, and C-117 *Douglas DC-3* transport aircraft were stricken from service. All arrived or departed NAS Pensacola, Florida, and can be found at the Naval Aviation Museum, Pensacola, Florida, or Davis Monthan Air Force Base, Arizona, the boneyard for obsolete military aircraft.

1979. Navy carrier forces and air wings responded to five crisis situations around the world. USS *Constellation* to a conflict between North and South Yemen; USS *Saipan* during the Nicaraguan turmoil; USS *Nassau* involved in response to Russian combat troops in Cuba; USS *Kitty Hawk* on alert in Korea; USS *Kitty Hawk* and USS *Midway* conduct contingency operations during the Iranian hostage crisis.

1980s

As Naval Aviation approaches its "Diamond Anniversary" decade, war erupts between Iraq and Iran as U.S. carrier forces maintain their deployment cycles in support of the Iranian crisis in the Arabian Sea, provide humanitarian support to Cuban refugees in the Caribbean, and defense capabilities for the Panama Canal. An increase in new technology and research produce new versions of the F/A-18 *Hornet*, SH-60 *Seahawk*, OV-10 *Bronco*, MH-53 *Sea Stallion*, and the V-22 *Osprey*, a fixed-wing, tilt-rotor aircraft.

1981. The first flight of the Space Shuttle (*Columbia*), with an all-Navy crew, launched from Cape Canaveral, Florida.

1983. Combat amphibious assault operations commence on the island of Grenada. Navy and Marine Corps air support was provided by Carrier Air Wing Six (CVW-6) aboard USS *Independence*.

1986. Naval aviation celebrates its 75th anniversary while U.S. carrier forces attack Libyan targets with HARM, Harpoon, and Shrike missiles. The F-14 *Tomcat*, F-18 *Hornet*, and A-6 *Intruder* aircraft conducted low-level bombing and fighter support for the operation.

1988. Helicopter Squadron (HCS-5) was established. The first of its kind, with a primary mission of combat search and rescue (strike rescue) and special warfare support. It operates the HH-60 *Seahawk*.

1990s

This decade begins with a "new world" order. The collapse of the Soviet Union left the United States as the world's only superpower. In the Middle East, Iraq invades Kuwait, a massive armada of U.S. Naval and Allied Forces converge on the region in support of "Operations Desert Shield and Desert Storm."

1991. The Navy launches massive aerial attacks with *Tomahawk* cruise missiles at predetermined targets in Iraq and Kuwait. U.S. Naval, Marine Corps, Air Force, and Allied aircraft of all types made a quick and decisive blow to the Iraqi ground and air forces, resulting in the liberation of Kuwait and the end of the Persian Gulf War.

1992. The USS *Lexington*, the Navy's unsinkable "Blue Ghost" of World War II, was decommissioned and turned into a memorial museum ship. The Navy takes delivery of its newest training aircraft, the T-45 *Goshawk*, which will replace the aging T-2 *Buckeye* and TA-4 *Skyhawk*.

1993. Secretary of Defense lifted the ban on combat flights for women and allows assignments on combat vessels. U.S. Naval surface and air forces maintain a vigilant presence in the Persian Gulf in support the United Nations Security Councils "No-Fly" zone over Iraq.

1994. The first of many "female" naval aviators successfully pass fleet carrier qualifications in combat aircraft. The USS *Eisenhower* becomes the first combat ship to receive permanently assigned women.

1995. The first female Naval Aviator goes into space, and the F-117A *Stealth* fighter/bomber is operational. The entire U.S. Armed Services has regionalized and downsized, and U.S. forces maintain support for operations in Bosnia and other areas of the world. New technology and the national interest will determine the future of the Navy, and Naval Aviation will always have a major role.

Q1-2. The Navy purchased its first aircraft from what company on what date?

Q1-3. Who was the first Naval Aviator to fly into space?

Q1-4. What year did the Secretary of Defense lift the band allowing women into combat roles?

THE AIRMAN RATE

LEARNING OBJECTIVES: Identify the growth of the Airman rate from the beginning of the rate to the present day. Identify the aviation general ratings and those general ratings that include service ratings, and recognize the duties of these ratings. Recognize the general principles of good leadership as they apply to the Airman.

During the early years of naval aviation, enlisted personnel came from similar surface ratings in the Navy. The first requirement was for aircraft mechanics. Personnel came from the Machinist's Mate rating and became Machinist's Mate (Aviation). Later, this rating became the Aviation Machinist's Mate (AMM) rating.

Special training was necessary during World War II. These specialties became part of a basic rating. There were several specialties that became part of the Aviation Machinist's Mate (AMM) rating.

In 1948, there was a major change in the aviation rating structure. The Airman rate came into being. The titles and/or initials of some aviation ratings changed. For example, the initials for the Aviation Machinist's

Mate rating changed from AMM to AD. The specialties moved to the basic AD rating or other basic ratings. The letter D in the Aviation Machinist's Mate initials (AD) avoids confusion with the Aviation Structural Mechanic (AM). Personnel in the AMMC, AMMF, AMMP, and AMMT specialties became ADs.

The AMMHs became a part of the Aviation Structural Mechanic (AM) rating. The AMMIs became a part of the Aviation Electrician's Mate (AE) rating. Many other titles and changes to ratings occurred at that time.

New ratings were established after 1948. They are the Aviation Maintenance Administrationman, Aviation Support Equipment Technician, Aviation Antisubmarine Warfare Operator, and Aviation Antisubmarine Warfare Technician. In 1958, additional E-8 and E-9 paygrades (senior and master chief) were established.

During this period, the title of the Airman rate has not changed. The advancement of aviation has caused the requirements of the rate to change. The requirements will continue to change in the future. You can find the requirements for all ratings in the *Manual of Navy Enlisted Manpower and Personnel Classifications and Occupational Standards*, NAVPERS 18068.















AVIATION RATINGS

A basic knowledge of the duties and skills of the Airman rate is necessary. You can obtain this knowledge either at a service school or by experience and self-study.

The **general aviation ratings** identify personnel from paygrades E-4 through E-9. Exceptions do exist where a general rating begins and/or ends at other paygrades. An example of a general rating that does not have any service ratings is the Aviation Ordnanceman (AO) rating. An example of a general rating that begins at paygrade E-6 instead of E-4 is the Aviation Support Equipment Technician (AS) rating.

The **aviation service ratings**, subdivisions of a general rating, require specialized training within that general rating. For example, the Aviation Boatswain's Mate (AB) rating has three service ratings (ABE) (ABF) and (ABH). The Aviation Structural Mechanic (AM) rating has three service ratings (AME) (AMH) and (AMS). These service ratings begin at paygrade E-4.

The aviation ratings career progression paths are shown in figure 1-4.

RATING TITLE	E-4	E-5	E-6	E-7	E-8	E-9
 AEROGRAPHER'S MATE	AG3	AG2	AG1	AGC	AGCS	AGCM
 AIR TRAFFIC CONTROLLER	AC3	AC2	AC1	ACC	ACCS	ACCM
 AIRCREW SURVIVAL EQUIPMENTMAN	PR3	PR2	PR1	PRC	PRCS	PRCM
 AVIATION WARFARE SYSTEMS OPERATOR	AW3	AW2	AW1	AWC	AWCS	AWCM
 AVIATION BOATSWAIN'S MATE	ABE3 ABF3 ABH3	ABE2 ABF2 ABH2	ABE1 ABF1 ABH1	ABEC ABFC ABHC	ABCS	ABCM
 AVIATION ELECTRICIAN'S MATE	AE3	AE2	AE1	AEC	AECS	AVCM
 AVIATION ELECTRONICS TECHNICIAN	AT3(I) AT3(O)	AT2(I) AT2(O)	AT1(I) AT1(O)	ATC(I) ATC(O)	ATCS(I) ATCS(O)	AVCM
 AVIATION MACHINIST'S MATE	AD3	AD2	AD1	ADC	ADCS	AFCM
 AVIATION MAINTENANCE ADMINISTRATIONMAN	AZ3	AZ2	AZ1	AZC	AZCS	AZCM
 AVIATION ORDNANCEMAN	AO3	AO2	AO1	AOC	AOCS	AOCM
 AVIATION STOREKEEPER	AK3	AK2	AK1	AKC	AKCS	AKCM
 AVIATION STRUCTURAL MECHANIC	AME3 AMH3 AMS3	AME2 AMH2 AMS2	AME1 AMH1 AMS1	AMEC AMHC AMSC	AMCS	AFCM
 AVIATION SUPPORT EQUIPMENT TECHNICIAN	ASE3 ASM3	ASE2 ASM2	AS1	ASC	ASCS	ASCM
 PHOTOGRAPHER'S MATE	PH3	PH2	PH1	PHC	PHCS	PHCM

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Figure 1-4.—Paths of advancement for enlisted personnel.

DESCRIPTION OF AVIATION RATINGS

The following paragraphs contain a description of each aviation rating.

Aerographer's Mate (AG)

A description of the AG rating includes the following:

- Observe, collect, record, and analyze meteorological and oceanographic data.
- Make visual and instrumental observations of weather and sea conditions.
- Operate meteorological satellite receivers and interpret and apply satellite data.
- Interpret meteorological and oceanographic codes and enter data on appropriate charts.
- Operate ancillary computer equipment for the processing, dissemination, and display of environmental data.
- Perform preventive maintenance on meteorological and oceanographic equipment.
- Prepare warnings of severe and hazardous weather and sea conditions.
- Forecast meteorological and oceanographic conditions.
- Prepare and present briefings concerning current and predicted environmental conditions and their effect on operations.

Air Traffic Controller (AC)

A description of the AC rating includes the following:

- Perform air traffic control duties in air control towers, radar air traffic control facilities, and air operations offices ashore and afloat.
- Operate radiotelephones, light signals and systems, and direct aircraft under Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) conditions.
- Operate surveillance radar, precision radar, and identification equipment (IFF).
- Operate ground- and carrier-controlled approach systems.

- Assist pilots in the preparation and processing of flight plans and clearances.
- Maintain current flight-planning information and reference materials.

Aircrew Survival Equipmentman (PR)

A description of the PR rating includes the following:

- Inspect, maintain, and repair parachutes, survival equipment, and flight and protective clothing and equipment.
- Pack and rig parachutes.
- Pack and equip life rafts.
- Repair and test oxygen regulators and liquid oxygen converters removed from aircraft.
- Fit and maintain oxygen masks, flight clothing, antiexposure suits, and anti-G suits.
- Operate and maintain carbon dioxide transfer and recharge equipment.
- Conduct inspections of survival equipment; supervise operation of parachute lofts and survival equipment work centers.

Aviation Warfare Systems Operator (AW)

The AW rating consists of three service ratings, E-4 through E-6 paygrades. These ratings are the AWA (Acoustic), the AWH (Helicopter), and the AWN (Nonacoustic) ratings. A description of these ratings is as follows:

- Perform general flight crew duties.
- Operate ASW sensor systems to extract, analyze, and classify data obtained.
- Perform specified preflight, inflight, and postflight diagnostic functions, using manual techniques, built-in test equipment (BITE), and computer routines to isolate faults and optimize system performance.
- Operate tactical support center systems to analyze and classify ASW data.
- Assist in aircrew briefing and debriefing.
- Provide database information to the tactical commander for use in prescribing mission objectives and tactics.

Aviation Boatswain's Mate (AB)

The AB rating is made up of the three service ratings, E-4 through E-7 paygrades. These ratings are the ABE, ABF, and the ABH ratings.

AVIATION BOATSWAIN'S MATE, LAUNCHING AND RECOVERY EQUIPMENT (ABE).—A description of the ABE rating includes the following:

- Operate, maintain, and perform organization maintenance on hydraulic and steam catapults, barricades, arresting gear, arresting gear engines, and associated equipment ashore and afloat.
- Operate catapult launch and retract panels, consoles, firing panels, water brakes, chronographs, blast deflectors, and cooling panels.
- Rig, inspect, proof-load cables and fittings, and pour wire rope sockets.
- Perform aircraft-handling duties related to the operation of aircraft launching and recovery equipment.

AVIATION BOATSWAIN'S MATE, FUELS (ABF).—A description of the ABF rating includes the following:

- Operate, maintain, and perform organizational maintenance on aviation fueling and lubricating oil systems in CVs (aircraft carriers), LPHs (amphibious assault ships), and LPDs (amphibious transport docks), including aviation fuel and lubricating oil service stations and pump rooms, piping, valves, pumps, tanks, and portable equipment related to the fuel system.
- Operate, maintain, and repair valves and piping of purging and protective systems within the air department spaces aboard ship.
- Supervise the operation and servicing of fuel farms, and equipment associated with the fueling and defueling of aircraft ashore and afloat.
- Operate and service motorized fueling equipment.
- Maintain fuel quality surveillance and control in aviation fuel systems ashore and afloat.
- Train, direct, and supervise fire-fighting crews, fire rescue teams, and damage control parties in assigned fuel and lubricating oil spaces.

- Observe and enforce fuel-handling safety precautions.

AVIATION BOATSWAIN'S MATE, AIRCRAFT HANDLING (ABH).—A description of the ABH rating includes the following:

- Direct the movement and spotting of aircraft ashore and float.
- Operate, maintain, and perform organizational maintenance on ground-handling equipment used for moving and hoisting of aircraft ashore and afloat.
- Supervise the securing of aircraft and equipment.
- Perform crash rescue, fire fighting, crash removal, and damage control duties.
- Perform duties in connection with launching and recovery of aircraft.

Aviation Electrician's Mate (AE)

A description of the AE rating includes the following:

- Maintain electrical and instrument systems, including power generation, conversion, and distribution systems, aircraft batteries, interior and exterior lighting.
- Maintain electrical control systems of aircraft, including hydraulic, landing gear, flight control, utility, power plant and related systems.
- Maintain instrument electrical systems, such as aircraft engine, flight, and noninstrument-type indicating and warning systems to include automatic flight control and stabilization systems, aircraft compass systems, attitude reference systems, and inertial navigation systems.

Aviation Electronic Technician, AT(I) and AT(O)

A description of both AT ratings include the following:

- AT(I) performs intermediate-level preventive and corrective maintenance on aviation electronic components supported by conventional and automatic test equipment, including repair of weapons replaceable

assemblies and shop replaceable assemblies. AT(I) also performs microminiature component repair and test equipment qualification and associated test bench preventive and corrective maintenance.

- AT(O) performs organizational-level preventive and corrective maintenance on aviation electronics systems to include communications, radar, navigation, antisubmarine warfare sensors, electronic warfare, data link, fire control, tactical displays, and associated equipment.

Aviation Machinist's Mate (AD)

A description of the AD rating includes the following:

- Maintain aircraft engines and their related systems, including induction, cooling, fuel, oil, compression, combustion, turbine, gas turbine compressor, exhaust, and propeller systems.
- Preflight aircraft.
- Conduct inspections on engine and engine-related systems.
- Field-test and adjust engine components, including fuel controls, pumps, valves, and regulators.
- Remove, repair, and replace compressor and turbine blades and combustion chamber liners.
- Preserve and depreserve engines, engine accessories, and components.
- Supervise engine work centers.

Aviation Maintenance Administrationman (AZ)

A description of the AZ rating includes the following:

- Perform administrative, managerial, and clerical duties required in implementing and supporting the Naval Aviation Maintenance Program (NAMF).
- Plan, program, and coordinate scheduled and unscheduled maintenance tasks and the incorporation of changes and modifications to aircraft and equipment.
- Set up and maintain status boards.

- Collect, compile, analyze, and record data pertaining to the history, operation, maintenance, configuration, receipt, and transfer of naval aircraft and related aeronautical equipment.
- Prepare reports and correspondence.
- Determine requirements for the requisition, control, and issue of change kits.
- Requisition departmental instructions, forms, and technical data.
- Organize, maintain, and operate technical libraries.
- Perform other duties as required when attached to organizational, intermediate, and depot maintenance activities or aviation staff commands.

Aviation Ordnanceman (AO)

A description of the AO rating includes the following:

- Inspect, maintain, and repair armament equipment, including aircraft guns, gun accessories, noncomputing gunsights, aerial-towed target equipment, and handling equipment; and aviation ordnance equipment, including ammunition suspension, release, launching, and arming equipment.
- Store, maintain, assemble, load, and fuze aviation ammunition.
- Load nuclear weapons and aerial mines and torpedoes.
- Load supplementary stores.
- Assemble, test, load, and maintain air-launch guided missiles.
- Operate small arms ranges.
- Supervise the operation of armories, aviation ordnance shops, and aviation ammunition storage facilities.

Aviation Storekeeper (AK)

A description of the AK rating includes the following:

- Receive, identify, store, and issue aviation supplies, spare parts, and stocks of technical aviation items.

- Confirm shipments and make reports of excesses, shortages, or damages.
- Classify and stow materials, using the required protective measures.
- Pack, tag, and inspect equipment and parts.
- Conduct inventories.
- Prepare and maintain records pertaining to stock control and issuance of aviation equipment and materials.
- Process allowance changes, validate requirements, and monitor supply requests.
- Maintain control of status and location of repairable components and retrograde components.

Aviation Structural Mechanic (AM)

The AM rating consists of three service ratings, E-4 through E-7 paygrades. These ratings are the AME, AMH, and the AMS ratings.

AVIATION STRUCTURAL MECHANIC, SAFETY EQUIPMENT (AME).—A description of the AME rating includes the following:

- Maintain safety belts, shoulder harnesses, and integrated flight harnesses in aircraft; inertia reels; seat and canopy ejection systems; gaseous and liquid oxygen systems; lift raft ejection systems; fire-extinguishing systems, excluding fire detection systems; portable fire extinguishers; emergency egress systems; air-conditioning, heating, cabin and cockpit pressurization, ventilating, and anti-G systems; visual improvement systems; other utility systems; and associated lines, fittings, rigging, valves, and control mechanisms.
- Replenish liquid and gaseous oxygen systems.
- Remove and install oxygen system valves, gauges, converters, and regulators.
- Inspect, remove, install, and rig ejection seats, shoulder harnesses, lap belts, and face-curtain mechanisms.
- Inspect, remove, install, and adjust firing mechanisms and cartridges for ejection seats, lap belts, and canopies.
- Operate and maintain liquid nitrogen and liquid and gaseous oxygen shop transfer and recharge equipment.

- Perform preflight, postflight, and other periodic aircraft inspections.

AVIATION STRUCTURAL MECHANIC, HYDRAULICS (AMH).—A description of the AMH rating includes the following:

- Maintain hydraulic systems, including main and auxiliary power systems and unit actuating subsystems; landing gear, excluding wheels and tires; brakes; and related pneumatic systems, including reservoir pressurization, emergency actuating systems, and associated pumps, valves, regulators, actuating cylinders, lines, and fittings.
- Service pressure accumulators, emergency air bottles, oleo struts, reservoirs, and master brake cylinders.
- Inspect, remove, and replace components of hydraulic systems.
- Bleed hydraulic systems.
- Adjust brakes, and replace linings and pucks.
- Replace gaskets, packing, and wipers in hydraulic components.
- Perform daily, preflight, postflight, and other aircraft inspections.

AVIATION STRUCTURAL MECHANIC, STRUCTURES (AMS).—A description of the AMS rating includes the following:

- Maintain aircraft fuselages, wings, fixed and movable surfaces, airfoils, empennages, seats (except ejection seats), wheels and tires and their components, controls, and mechanisms.
- Remove, install, and rig flight control surfaces.
- Fabricate and assemble metal parts, and make minor repairs to aircraft skin.
- Install rivets and metal fasteners.
- Build up wheels and tires.
- Paint.
- Perform dye penetrant inspections.
- Perform daily, preflight, postflight, and other aircraft inspections.

Aviation Support Equipment Technician (AS)

A description of the AS rating includes the following:

- Service, test, and perform organizational- and intermediate-level maintenance and repair of automotive electrical systems in mobile and self-propelled aviation support equipment and aviation armament-handling equipment. This includes generating, starting, lighting, and ignition systems; electrical components and wiring in auxiliary electrical power units used in servicing aircraft; electrical control systems in gas turbine compressor units and air-conditioning systems; and electrical and electronic circuits and components in general aircraft-servicing equipment.
- Service and maintain storage batteries.
- Perform maintenance inspections of aviation support equipment.
- Service, test, maintain, and repair gasoline and diesel engines and associated automotive systems, hydraulic systems, pneumatic systems, and structural components in mobile and self-propelled aviation support equipment.
- Maintain gas turbine compressor units and air-conditioning systems used in servicing aircraft.
- Maintain and operate gas turbine compressor unit test stands.
- Maintain hydraulic test and service equipment, air compressors, jacks, workstands, and associated equipment.
- Perform body and fender metalwork and painting.
- Weld, braze, solder, cut, shape, and patch metal.
- Adjust and repair brake systems.
- Inspect and replace tires and tubes.
- Operate hydraulic test stands.

Photographer's Mate (PH)

A description of the PH rating includes the following:

- Inspect and maintain cameras and camera control equipment, laboratory equipment, and related photographic equipment and accessories.
- Accomplish photographic work required by the naval service.

- Record actual and simulated battle operations.
- Make pictorial records of historic and newsworthy events aboard ship and ashore.
- Expose and process light-sensitive negative and positive material.
- Arrange, compose, and illuminate photographic subjects
- Make finished prints, mosaics, and strip photographs.
- Maintain associated photographic files, records, and supplies.

AIRMAN DUTIES

The five major duties you will perform as an Airman are as follows:

1. Maintain support equipment, compartments, and buildings.
2. Stand security watches.
3. Move aircraft.
4. Participate in working parties.
5. Perform routine duties involved in the operation of a naval aviation activity afloat or ashore.

You will probably have to perform some duties that don't fall into any of the above categories. However, these five duties cover the majority of the tasks you will have to perform.

It's only natural that your first duties will be relatively basic and routine. As you gain knowledge and skill, you will earn more complex responsibilities. You may become a member of the line maintenance crew. At first, you will probably chock the aircraft's wheels and tie the aircraft down at the end of the flying day. Later, you get more responsible jobs to handle on the line, such as giving taxi signals to pilots, refueling aircraft, and inspecting aircraft. Your job may be helping petty officers with certain phases of aircraft line maintenance. The way you perform your job will have a direct bearing on how soon you will receive more advanced assignments. Learn everything you can about each job. Ask questions and observe how qualified personnel accomplished things.

Sometimes you may think there are no other job possibilities for the Airman except washing aircraft, standing watches, and cleaning spaces. This type of work is necessary, and all personnel do it at sometime.

Your own efforts will determine your readiness for other jobs. The Navy needs well-trained personnel, so work in an inspired manner regardless of your chosen rating.

Likewise, when you get aboard ship, you will probably think that your job is only moving aircraft from one spot to another. As with your work ashore, you will have more responsible jobs as you learn your duties afloat.

ASSIGNMENTS

As an Airman Recruit, you will work in one of the more progressive areas of the naval service—naval aviation.

As an Airman Apprentice or Airman, you can expect various assignments. Your job may be on an aircraft carrier as ship's company, where you will work in a variety of jobs. You may work in an operating carrier squadron. Carrier squadrons are shore based, but when the air wing goes aboard a carrier, the squadron will accompany it. You may work in a patrol squadron. Patrol squadrons are on naval air stations in the United States and deploy to overseas bases. You may also work in a training squadron. Your assignment could be with fixed-wing or rotary-wing aircraft.

Shore assignments include naval air stations, naval air facilities, or aircraft intermediate maintenance departments. There are other billet possibilities for the Airman, but those are the major ones. The team assignment is not the important thing. The important thing is to become an integral part of the team. Always do your best to make your team the Navy's finest.

LEADERSHIP

In the Navy, leadership begins early. As an Airman Recruit or Airman Apprentice, you have a limited leadership role. However, you should begin to find out the principles of good leadership. For you to perform your responsibilities as a petty officer, you must display the qualities of good leadership. Why not learn as much as possible about leadership now. Leadership is learned. Those who have become Navy leaders have done so through the application of the principles of leadership from an early age.

This training manual does not present an extended leadership course. However, you will find some of the general principles of leadership in the following paragraphs. If you wish to read more about this subject, refer to *Basic Military Requirements*, NAVEDTRA 12018, and *Military Requirements for Petty Officer*

Third Class, NAVEDTRA 12044. Both of these training manuals contain information about leadership.

Military Requirements for Petty Officer Third Class, NAVEDTRA 12044, is primarily for personnel who are preparing for petty officer third class. You may wish to study it to get a head start in leadership training. The *Bibliography for Advancement Examination Study*, NAVEDTRA 10052, provides titles and sections of publications you should study when preparing for the examination. No single publication can give you all the information you need. Your divisional training petty officer or the Educational Services Office (ESO) will assist you.

A thorough knowledge of the work a person is doing is a decided advantage to the prospective leader. It is important that you learn everything you can about the rate requirements of an Airman. You may find yourself in a position where your shipmates come to you for assistance with a problem. When you are able to help with their problems (without embarrassing them), you are on your way to becoming a leader.

You may even be able to do the right things automatically. In this case, it will be a relatively easy job for you to become the type of leader the Navy needs. However, as stated previously, leadership is learned. If you have to think about how you are conducting yourself when giving help, you are normal.

- Q1-5. *The initial Machinist Mate (Aviation) rate came from what rating?*
- Q1-6. *Major changes to the aviation ratings structure took place in what year?*
- Q1-7. *What manual lists the requirements for all aviation ratings?*
- Q1-8. *What general rating begins at paygrade E-6 instead of E-4?*
- Q1-9. *What are aviation service ratings?*
- Q1-10. *What officer or office should you contact for assistance in finding the publications you need to study for advancement?*

SUMMARY

The history and mission of naval aviation tells of its importance, both yesterday and today. By learning about what happened in the past, you gain insight into today's world of naval aviation. Further, knowing yesterday's role of naval aviation will help you know what is expected of you as you work in the aviation field.

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ASSIGNMENT 1

Textbook Assignment: "Mission and History of Naval Aviation," chapter 1, pages 1-1 through 1-13.

- 1-1. Leadership and what other element are now a part of your everyday life in the Navy?
1. Training
 2. Motivation
 3. Maintenance
 4. Organization
- 1-2. What attribute is the most important aspect of a military organization?
1. Size
 2. Leadership
 3. Mobility
 4. Teamwork
- 1-3. The mission of the United States Navy is to guard and ensure which of the following task is accomplished?
1. Every ocean has a large naval fleet to defend it
 2. The use of the sea lanes is denied to our enemies during peacetime
 3. Sea lanes of the world are kept open and safe
 4. Our Navy's surface ships guard aircraft carriers
- 1-4. What is the primary function of naval aviation?
1. To supply the fleet with aircraft for deployment on aircraft carriers
 2. To provide the fleet with aircraft pilots and aircrewman
 3. To coordinate with other armed forces in maintaining command of the seas
 4. To support amphibious landing operations
- 1-5. What total number of basic operations are there in the primary function of naval aviation?
1. Five
 2. Six
 3. Seven
 4. Eight
- 1-6. In addition to open ocean protection, naval aviation also provides task force protection to keep our coastal waterways safe?
1. True
 2. False
- 1-7. What is the final basic operation in maintaining command of the seas?
1. Scouting the forward area
 2. Antisubmarine warfare
 3. Search and rescue
 4. Logistic support
- 1-8. In what year was the Navy first interested in airplanes as a naval weapon?
1. 1888
 2. 1898
 3. 1910
 4. 1911
- 1-9. Who staged the first demonstration of the new flying machine?
1. Glenn brothers
 2. Wright brothers
 3. Ely brothers
 4. Curtiss brothers
- 1-10. Eugene Ely first flew a biplane from a wooden platform off of what ship?
1. USS *Pennsylvania*
 2. USS *Langley*
 3. USS *Birmingham*
 4. USS *Jupiter*
- 1-11. The Navy purchased its first aircraft on what date?
1. June 14, 1910
 2. October 30, 1911
 3. May 8, 1911
 4. April 21, 1898

- 1-12. At the end of 1911, what total number of aircraft did the Navy have?
1. One
 2. Two
 3. Three
 4. Four
- 1-13. What was the name of the first aircraft carrier commissioned?
1. USS *Pennsylvania*
 2. USS *Jupiter*
 3. USS *Langley*
 4. USS *Birmingham*
- 1-14. What major battle in 1942 was the first of opposing ships NOT making contact with each other?
1. Midway
 2. Coral Sea
 3. Guadalcanal
 4. Iwo Jima
- 1-15. On 16 October 1943, the Navy accepted its first helicopter. What designation was assigned to that helicopter?
1. F6F
 2. YR-4B
 3. PB4Y
 4. TBM
- 1-16. The Westinghouse 19A jet engine was developed for the Navy in what year?
1. 1943
 2. 1953
 3. 1963
 4. 1973
- 1-17. On March 1948, the Navy's first jet carrier landing was made on what aircraft carrier?
1. USS *Lexington*
 2. USS *Saratoga*
 3. USS *Langley*
 4. USS *Boxer*
- 1-18. In what year was the first use of a pilot ejection seat used for emergency escape?
1. 1943
 2. 1945
 3. 1949
 4. 1951
- 1-19. What was the name of the Navy's first angled deck aircraft carrier?
1. USS *Pennsylvania*
 2. USS *Langley*
 3. USS *Lexington*
 4. USS *Antietam*
- 1-20. What was the first operationally equipped jet plane in history to fly faster than 1,000 mph?
1. F8U-1 *Crusader*
 2. F9F-2/5 *Panther*
 3. FJ-1 *Fury*
 4. F2H-1 *Banshee*
- 1-21. In 1959, four naval aviators were selected as prospective astronauts for what space project?
1. Gemini
 2. Saturn
 3. Apollo
 4. Mercury
- 1-22. Who was the first American and naval aviator to go into space?
1. Neal Armstrong
 2. Alan B. Shepard Jr.
 3. Edwin Aldrin
 4. Michael Collins
- 1-23. What was the name of the worlds first nuclear-powered aircraft carrier?
1. USS *Coral Sea*
 2. USS *Forrestal*
 3. USS *Enterprise*
 4. USS *Nimitz*
- 1-24. In 1962, the Naval Aviation Museum was established by the Secretary of the Navy and is located in what city?
1. Washington, DC
 2. Philadelphia, PA
 3. Pensacola, FL
 4. San Diego, CA
- 1-25. Vertical replenishment by helicopters and picking up and delivering stores to other surface combat surface ships began with the commissioning of the USS *Mars* in what year?
1. 1942
 2. 1956
 3. 1964
 4. 1962

- 1-26. Who established the Aircraft Intermediate Maintenance Department (AIMD) on all operating aircraft carriers in 1967?
1. Secretary of the Navy
 2. Secretary of Defense
 3. Chief of Naval Operations
 4. President of the United States
- 1-27. In 1971, the Navy received the new CH-53A *Sea Stallion* helicopter. This helicopter is devoted exclusively to what mission?
1. Mine countermeasures
 2. Heavy-lift vertical replenishment
 3. Search and rescue operations
 4. Combat troop transport
- 1-28. What do the S-3 *Viking*, SH-3 *Sea King*, and SH-2 *Seasprite* have in common?
1. All are helicopters
 2. Their mission is to locate and track submarines
 3. They are used for troop transport
 4. They are built by the same aircraft manufacturer
- 1-29. What is the name of the first Space Shuttle to fly with an all-Navy crew?
1. *America*
 2. *Enterprise*
 3. *Challenger*
 4. *Columbia*
- 1-30. In what year did Naval Aviation celebrate its 75th anniversary?
1. 1979
 2. 1981
 3. 1983
 4. 1986
- 1-31. What name was given to the U.S. military and Allied Forces operation in the Middle East involving the invasion of Kuwait by Iraq in 1990?
1. Operation Provide Comfort
 2. Operation Desert Fox
 3. Operation Iron Eagle
 4. Operation Desert Shield and Desert Storm
- 1-32. In what year did the Secretary of Defense lift the band allowing women into combat roles and combat ship assignments?
1. 1991
 2. 1992
 3. 1993
 4. 1994
- 1-33. What was the first combat ship to receive permanently assigned women?
1. USS *Nimitz*
 2. USS *Eisenhower*
 3. USS *Stennis*
 4. USS *Washington*
- 1-34. What is the primary mission of the F-117A *Stealth* aircraft?
1. Fighter/bomber
 2. Reconnaissance
 3. Strike/attack
 4. Antisubmarine warfare
- 1-35. The first requirement for an enlisted rating in aviation pertained to what type of work?
1. Mechanics
 2. Electrical
 3. Radio
 4. Ordnance
- 1-36. In what year was the Airman rate established?
1. 1911
 2. 1942
 3. 1948
 4. 1958
- 1-37. In what year was the paygrades E-8 and E-9 (senior and master chief petty officer) established?
1. 1911
 2. 1942
 3. 1948
 4. 1958
- 1-38. The general aviation ratings identify personnel from what paygrades?
1. E-4 through E-9
 2. E-5 through E-7
 3. E-1 through E-6
 4. E-7 through E-9

- 1-39. Into what total number of service ratings is the Aviation Boatswain's Mate (AB) divided?
1. One
 2. Two
 3. Three
 4. Four
- 1-40. What rating makes visual and instrumental observations of weather and sea conditions?
1. AX
 2. AG
 3. AW
 4. AS
- 1-41. What rating packs and rigs parachutes and life rafts?
1. PR
 2. AW
 3. AD
 4. AT
- 1-42. What rating operates tactical support center systems to analyze and classify data?
1. AG
 2. AK
 3. AZ
 4. AW
- 1-43. The ABF rating operates, maintains, and performs maintenance on aviation fueling and lubricating oil systems?
1. True
 2. False
- 1-44. The ABH rating is responsible for performing which of the following tasks?
1. Operate aviation fueling systems
 2. Operate catapult launch and retract panels
 3. Direct the movement and spotting of aircraft
 4. Rig, inspects, and proof-load cables and fittings
- 1-45. What rating is responsible for performing microminiature repair?
1. AT(O)
 2. AT(I)
 3. AE
 4. ET
- 1-46. Which of the following ratings maintains aircraft engines and related systems?
1. AD
 2. AE
 3. AO
 4. AS
- 1-47. Which of the following tasks is NOT a responsibility of the AZ rating?
1. Maintain aircraft status boards
 2. Operate technical libraries
 3. Prepare reports and correspondence
 4. Identify, store, and issue aviation supplies and spare parts
- 1-48. What rating is responsible for inspecting, maintaining, and repairing armament equipment?
1. AA
 2. AG
 3. AO
 4. AM
- 1-49. The AM rating consists of how many service ratings?
1. One
 2. Two
 3. Three
 4. Four
- 1-50. What rating maintains aircraft hydraulic systems?
1. AMS
 2. AME
 3. AS
 4. AMH
- 1-51. Removing, installing, and rigging the flight control surfaces on a naval aircraft is the responsibility of what rating?
1. AMS
 2. AS
 3. AMH
 4. AME
- 1-52. What rating maintains and repairs gasoline engines and associated automotive systems?
1. AMS
 2. AS
 3. AMH
 4. AME

- 1-53. Which of the following ratings is responsible for accomplishing photographic work required by the naval service?
1. PH
 2. AK
 3. PR
 4. AW
- 1-54. As a member of a line maintenance crew, what are your first duties as an Airman?
1. Move aircraft
 2. Participate in working parties
 3. Stand security watches
 4. All of the above
- 1-55. To what training manual(s) should you refer to study general principles of leadership?
1. *Military Requirements for Petty Officer Third Class*, NAVEDTRA 12044
 2. *Basic Military Requirements*, NAVEDTRA 12018
 3. Both 1 and 2 above
 4. *Blue Jackets Manual*
- 1-56. Which of the following manuals should you use to find information about the minimum performance task you should be able to do before you can be considered for advancement?
1. *List of Training Manuals and Correspondence Courses*, NAVEDTRA 10061
 2. *Manual of Navy Enlisted Manpower and Personnel Classifications and Occupational Standards*, NAVPERS 18086
 3. *Bibliography for Advancement Examination Study*, NAVEDTRA 10052
 4. *Basic Military Requirements*, NAVEDTRA 12018

