ENLISTED AVIATION WARFARE SPECIALIST (EAWS)

FIXED-WING RECONNAISSANCE (VQ EP-3)

Welcome to the EAWS EP-3 Specific PQS questions and answers. This study guide was designed to aid instructors and students alike. Study information on this site was provided by AT1 Bob Mador . All of the questions were answered from instructions and directives found in NAVEDTRA 43902-19 , Personnel Qualification Standard (PQS), Enlisted Aviation Warfare Specialist (EAWS), Unit Specific for Fixed-Wing Reconnaissance(VQ EP-3).

The EAWS (Core) program was designed to encompass basic areas of study applicable to the entire Navy. Just click on the section of the PQS that you would like to review. Good luck and study hard!

Special Thanks to AT1 Bob Mador for providing me with the material.

EP-3 PQS EAWS Sections

For questions or comments please contact:

blackcat@iname.com
AE1(AW) Thomas Coleman

ACRONYMS USED IN THIS PQS

Not all acronyms or abbreviations used in this PQS are defined here. The Subject Matter Experts from the Fleet who wrote this Standard determined the following acronyms or abbreviations may not be commonly known throughout their community and should be defined to avoid confusion. If there is a question concerning an acronym or abbreviation not spelled out on this page nor anywhere else in the Standard, use the references listed on the line item containing the acronym or abbreviation in question.

ADB	**Aircraft Discrepancy Book**
ATC	**Air Traffic Control**
C2W	**Command and Control Warfare**
DFW	**Dedicated Field Work**
FCF	**Functional Check Flight**
MTIP	**Maintenance Training Improvement Program**
NAMP	**Naval Aviation Maintenance Program**
OPTEMPO	**Operational Tempo**
PBFT	**Planning Board For Training**
QAR	**Quality Assurance Representative**

101 Aircraft Characteristics/Capabilities Fundamentals

References:
[a] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft

101.1 Describe the physical characteristics of the EP-3E aircraft. [pp. I-1-1 thru I-1-5]

The EP-3E aircraft is a four-engine, low-wing, electronic warfare and reconnaissance aircraft utilizing state-of-the-art surveillance equipment for it's primary mission. Four Allison T56-A-14 turboprop engines power the aircraft. The originally configured P-3C bomb bay has been modified to accommodate an extendable radome for a radar antenna. Additional housings have been installed on the top and bottom of the fuselage for other antennae. The wingtips have been modified to provide for ESM antennas, receivers, and cabling. Other antennae mounted on the underside of the wings and fuselage provide for a myriad of other functions. The interior of the aircraft is divided into six general areas: flight station, NAV/COM and Secure Com, ESM stations, Special stations, Lavatory, and Crew Rest. There are 27 numbered seating positions, of which 19 are crew stations and 24 are ditching stations. The aircraft is 99ft 8in long, with a wingspan of 105ft 11in. The height at the top of the vertical fin is 34ft 3in and the clearance of the radome under normal conditions is 12 inches.

101.2 What is the EP-3E total fuel capacity in US gallons? [p. 3-3]

9,200 US gallons

101.3 State the purpose of the following aircrew positions: [pp. 16-2 thru 16-13]

a. Mission Commander (EWAC/MC)

Responsible for all phases of the assigned mission except for matters affecting safety of flight

b. Electronic Warfare Aircraft Commander (EWAC)

Responsible for all matters concerning the safe operation of the aircraft from preflight to mission completion. Ensure crewmembers are thoroughly briefed on all aspects of the mission and must ensure all passengers are fully briefed on safety/survival equipment and procedures.

c. Co-Pilot (2P)

Safety backup for the pilot throughout the flight spectrum. Makes recommendations as necessary throughout the mission in order to maintain the safest possible flight environment. Also performs communication duties and reads checklists.

d. Flight Engineer (FE)

Perform exterior and interior preflight checks. Monitors engine and system flight station controls and indicators.

e. Navigator/Communicator (NAV/COM)

Responsible for navigating the aircraft along a specified route. Also drafts, authenticates, encrypts and transmits messages released by either the aircraft or mission commander.

f. Secure Communications Operator (SECURE COMM)

Responsible for ensuring that secure communications are rapid, effective and in accordance with prescribed doctrine.

g. Senior Evaluator (SEVAL)

Prepares the mission brief. Responsible for the review of pertinent tasking messages and shall be thoroughly familiar with the objectives of the mission and cognizant of high-interest areas.

h. Tactical Evaluator (EVAL)

Directs the ESM operators and coordinates these activities with the SEVAL. Drafts and releases messages as directed by the SEVAL.

i. Special Evaluator (COMEVAL)

Directs the special operators and coordinates these activities with the SEVAL.

j. Radar/ESM Operator (Big Look)

Responsible for detecting and identifying data of mission significance. Also plots suitable radar fixes as navigational and weather/obstacle avoidance aids.

k. Laboratory Operator (Lab Op)

Responsible for detecting and identifying data of mission significance. Compiles and organizes information for postmission reporting.

l. ESM Operator (EWOP)

Responsible for detecting and identifying data of mission significance.

m. Special Operator Supervisor

Responsible for monitoring the activities of the special operators to avoid duplication of effort.

n. Special Operator

Responsible for detecting and identifying data of mission significance.

o. Record Station

Responsible for making digital recordings of mission significant data as directed by the Lab Op.

p. Science and Technology Operator (S&T)

Responsible for detecting and identifying data of mission significance and operating prototype equipment installed for testing purposes.

q. In-flight Technician (IFT)

Responsible for maintaining the operating capabilities and performing in-flight repair of ESM, Special, and NAV/COM equipment. Responsible for aircraft cleanliness, as well as other preflight and postflight duties.

r. Observer

Reports all tactical information to the SEVAL or pilot/copilot as required.

101.4 State the maximum number of ditching stations. [p. 11-1]

24 ditching stations

101.5 State the purpose of engine loiter operations. [p. 7-21]

Two- and Three-Engine Loiter operations provide a substantial reduction in the fuel flow required to maintain loiter airspeed.

101.6 Discuss the danger areas of the EP-3E. [pp. 3-12, 3-13]

Propeller area (Prop Arc)
Propeller Jet-Blast area
Engine Compressor and Turbine area
APU/Air Multiplier area
Radar Radiation area
Noise Hazard areas
Wing/Flap Danger areas

102 Training and Readiness Fundamentals

References:
[a] COMPATWINGSLANTINST 3500.24E, Training and Readiness Manual
[b] COMPATWINGSPACINST 3500.24C, Training and Readiness Manual
[c] FAIRECONRONONEINST 5400.1J/FAIRECONRONTWOINST 5400.1N Standard Organization and Regulations (SORM)

102.1 Discuss the responsibilities of the training department. [ref. c]

The training department will supervise or conduct all squadron training with the exception of that training directly related to advancement in rate. Will coordinate GMT and professional training with other departments. Will emphasize operational training to achieve a high level of mission readiness and individual proficiency, and insure the squadron maintains sufficient qualified personnel to meet mission requirements.

102.2 Explain the following terms associated with the Squadron Training Program: [refs. a, b]

a. Mission Oriented Protective Posture (MOPP)

4 levels that require use of protective equipment for CBR.

b. Mission Avionics System Trainer (MAST)

A computer-simulated trainer for aircraft backend operators.

c. Pre-deployment training

Site specific, so that aircrew going to each area knows what to expect, so the squadrons first weeks of deployment will not be degraded.

d. Maintenance Training Improvement Program (MTIP)

Is a primary means to train and qualify assigned aircrew and maintenance personnel.

e. Aircrew Coordination Training (ACT)

Communications training amongst aircrew members.

f. Required Operational Capabilities (ROC)

Minimum manning levels to accomplish the mission.

102.3 Explain the purpose of the Squadron Planning Board for Training (PBFT). [ref. c]

Responsible to the CO for developing a unit's training program with the ultimate goal of well-trained and qualified personnel.

102.4 State the highest and lowest levels of readiness. [ref. a, ch. 5; ref. b, ch. 6]

Highest to Lowest: T1, T2, T3, T4
R1, R2, R3, R4

102.5 State the purpose of the following flight crew progress boards: [ref. a, ch. 5;ref. b, ch. 5]

a. Officer Professional Development Board (OPDB)

Track the professional development of all aircrew officers.

b. Enlisted Aircrew Professional Development Board (EAPDB)

Review the records of individuals who fail to qualify within expected time limits, due to prolonged medical problems, psychological problems or any other problems that affect a trainee's progress.

c. Mission Board (MB)

For all EVAL, EWAC, and SEVAL trainees. The EVAL MB is not a pass/fail, but rather is used to determine progress and note deficiencies. EWAC and SEVAL boardees may receive a Conditional Qual (CQ) on any one of the board mission areas. If they receive two CQ's they will be required to reboard on all mission areas. If they receive any Unqualified grades, it will require a reboard on all mission areas.

d. Training Review Board (TRB)

Forum utilized to identify an aircrew member's training deficiencies, recommend remedial training or recommend disqualification from duties involving flying.

103 EP-3 Operations/Naval Air Training and Operating Procedures Standardization (NATOPS) Fundamentals

References:
[a] COMPATWINGSLANTINST 3500.24E, Training and Readiness Manual
[b] COMPATWINGSPACINST 3500.24C, Training and Readiness Manual
[c] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft
[d] OPNAVINST C3501.280, Naval Warfare Mission Areas and Required Operational Capability (ROC) and Projected Operational Environment (POE) Statements For Fleet Air Reconnaissance Squadrons
[e] FAIRECONRONONEINST 5400.1J/FAIRECONRONTWOINST 5400.1N, Standard Organization and Regulations (SORM)
[f] Naval Doctrine Publication 2, Naval Intelligence

103.1 What is your command's Area of Responsibility (AORs)? [ref. d]

VQ1 Third Fleet, Fifth Fleet, and Seventh Fleet
VQ2

103.2 Discuss the responsibilities of the operations department. [ref. e]

The operations department schedules, manages and employs the squadron's aircraft and aircrew to accomplish the squadron's mission as directed by higher authority. Additional functions include:

a. Management of the squadron's OPTAR funds
b. Aircrew logs and records maintenance
c. Maintenance of Fleet Operating Orders (OPORDS); germane to squadron operations
d. Maintenance of squadron navigation office

103.3 Define the duties, responsibilities, and authority of the NATOPS department. [ref. e]

The Safety/NATOPS department exists to enhance squadron operation readiness by:

a. Identification and elimination of hazards to the command and to naval aviation in general through development, implementation and administration of the command safety program.

b. Ensuring standardized training and minimum flight performance standards are met and maintained by all aircrew through the command NATOPS program.

c. Ensuring command programs comply with higher directives pertaining to safety and NATOPS.

103.4 Describe the basic purpose of the following common flights related to aircraft flight proficiency: [ref. a, annex D; ref. b]

a. Instrument training – Utilization of aircraft instruments to maintain proficiency.

b. Dedicated Field Work (DFW) – Must maintain a certain number of day landings, night landings, emergency landings, and touch and go's.

c. NATOPS Instrument Evaluation – FAA and Navy annual instrument checks for pilots. Graded evaluation and standardization for instrument flying.

103.5 Describe the following NATOPS conditions of flight: [ref. c, pp. 16-1, 16-2]

a. Condition 1 – Evasion/Rigging
b. Condition 2 – Normal Flight
c. Condition 3 – Equipment Check
d. Condition 4 – Aircraft Inspection/Integrity Check
e. Condition 5 – Takeoff/Landing

103.6 Define the following acronyms: [ref. f]

a. COMINT [p. 62]
b. ELINT [p. 63]
c. SIGINT [p. 67]

104 Airframe Fundamentals

References:
[a] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft
[b] NAVAIR 01-75PAA-2-2.1, Corrosion Control, Cleaning, Painting, and Decontamination
[c] NAVAIR 01-75PAA-3-1, Organizational and Intermediate Level Maintenance EP-3E Aircraft
[d] NAVAIR 01-75PAA-2-3, Hydraulic Power Supply System
[e] OPNAVINST 4790.2G, Naval Aviation Maintenance Program (NAMP), Vol. I
[f] NAVAIR 01-75PAA-2-2.2, Landing Gear

104.1 Define the following acronyms:

a. HSC [ref. d, p. 12]	Hydraulic Service Center
b. HSU [ref. e]	Hydraulic Service Unit
c. MLB [ref. f, WP 2, p. 8]	Main Landing Gear
d. AVGFE [ref. e]	Aviation Gas Free Engineering

104.2 Discuss the corrosion prone areas of the EP-3E aircraft. [ref. b, p. 3-1]

Corrosion on P-3 aircraft has been found to exist principally along the seams of 7075-T6 aluminum alloy structures, in box beam skin centroid risers, and around cadmium-plated steel fasteners. Other corrosion prone areas of the aircraft are located on unpainted surface actuating mechanisms, painted surfaces that are chipped or peeled, skin seams, lap joints, and areas where dirt and grime can collect. Areas subjected to frequent contact with fluids and cleaning compound residue.

104.3 Discuss the type of construction used in the EP-3E aircraft. [ref. c, p. 1-4]

The P-3 aircraft is of all metal construction. The primary structure of the wing consists of a box beam comprising two main spars with upper and lower surfaces on integrally stiffened skins. The fuselage is of semimonocoque construction consisting of skins, stringers, longerons, and bulkheads or frames. The primary structure of the horizontal stabilizer consists of a two cell box beam. The primary structure of the vertical stabilizer consists of a two cell box below vertical stabilizer 69 and a one cell box above this station.

104.4 Describe the type of landing gear utilized on the EP-3E. [ref. a,pp. 2-99 thru 2-104]

Comprised of two main landing gear and the nosegear. Each gear consists of dual wheels and forward retracting struts. The gear is designed to free-fall and lock in the down position in the event of loss of hydraulic pressure. The landing gear is also designed so that, when on the ground, the weight of the aircraft on the gear keeps it down and locked.

105 Propulsion Fundamentals

References:
[a] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft
[b] NAVEDTRA 12300, Aviation Machinist's Mate 3 & 2
[c] NAVAIR 01-75PAA-2-4, Powerplant and Related Systems

105.1 Define the following acronyms:

a. RPM [ref. a, p. 40]	rotations per minute/revolutions per minute
b. QEC [ref. c, p. 3]	quick engine change
c. APU [ref. a, p. 37]	auxiliary power unit
d. EDC [ref. a, p. 38]	engine driven compressor
e. TIT [ref. a, p. 40]	Turbine Inlet Temperature
f. SHP [ref. a, p. 40]	Shaft Horsepower

105.2 State the type and model of the EP-3E engine. [ref. a, p. I-1-1]

Allison T56-A-14 turboprop

105.3 Discuss the purpose of the constant speed propeller. [ref. b, p. 8-11]

Maintains the selected RPM automatically by turning the propeller blades to a lower angle. That is, the propeller takes a smaller bite of air when the load on the engine is increased.

105.4 Discuss the EP-3E aircraft fueling methods. [ref. a, p. 3-1]

1. Center-point pressure fueling – designed to accept 600 gallons of fuel per minute from two fuel trucks at 55 psi. The pressure fueling connectors and control panel are located on the lower surface of the starboard wing immediately forward of the flaps.

2. Overwing Gravity Feed – may be fueled through the overwing gravity filler wells in each main wing tank.

106 Avionics Fundamentals

References:
[a] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft
[b] NAVAIR 01-75PAE-1.1, Supplemental NATOPS Flight Manual Navy Model EP-3E Aircraft
[c] MIL HDBK 263B, Electrostatic Discharge Control Handbook

106.1 Define the following acronyms:

a. ADF [ref. a, p. 37]	Automatic Direction Finding
b. GPS [ref. a, p. 38]	Global Positioning System
c. ESM [ref. a, p. 38]	Electronic Support Measures
d. SSIP [ref. a, p. 39]	Sensor System Improvement Program
e. VOR [ref. a, p. 41]	VHF Omnidirectional Ranging
f. CRT [ref. a, p. 37]	Cathode Ray Tube
g. DCMS [ref. a, p. 38]	Digital Communications Management System
h. RADALT [ref. a, p. 40]	Radar Altimeter
i. CMS [ref. a, p. 37]	Communications Security Material System
j. ESD [ref. c, ch. 3.22, p. 12]	Electrostatic Sensitive Device / Electrostatic Discharge

106.2 Discuss the two systems that comprise mission avionics. [ref. b, p. 15-1]

ESM and Special

106.3 Discuss the four radio communication sets used on the EP-3E aircraft. [ref. a,p. 14-1]

ARC-94 HF radio sets
URR-74(V)2 HF radio receiver
ARC-182 VHF/UHF radio set
ARC-206 UHF radio set
ARC-187 VHF/UHF radio sets (SSIP ONLY)

107 Electrical Fundamentals

References:
[a] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft

107.1 Define the following acronyms:

a. AFCS [p. 37]	Automatic Flight Control System
b. MELC [p. 2-52]	Main Electrical Load Center
c. AOA [p. 37]	Angle of Attack
d. INS [p. 37]	Inertial Navigation System

107.2 Discuss the Electrical Power Supply System. [pp. 2-33 thru 2-39]

Aircraft electrical power is supplied by three 90 kVA engine driven generators, as well as a 60 kVA APU generator. Additionally, a 24-volt, 31-ampere-hour battery is provided to supply dc power. The generators supply 120-volt, three phase power at 400 Hz.

108 Survival / Environmental Fundamentals

References:
[a] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft
[b] NAVAIR 13-1-6.1-2, Inflatable Survival Equipment
[c] NAVAIR 13-1-6.7, Aircrew Personal Protective Equipment
[d] OPNAVINST 4790.2G, Naval Aviation Maintenance Program (NAMP), Vol. I

108.1 Define the following acronyms:

a. LPP [ref. b, p. v]	Life Preserver Personal
b. LPA [ref. b, p. ii]	Life Preserver Assembly
c. SV-2 [ref. c, p. vi-a]	Survival Vest
d. EDC [ref. a, p. 38]	Engine Driven Compressor
e. HRD [ref. a, p. 39]	High Rate of Discharge
f. CAD [ref. d]	Cartridge Actuated Device

108.2 Discuss the purpose of aircraft cabin pressurization and air conditioning. [ref. a,p. 2-168]

The air-conditioning and pressurization system provides crew environment control and electronic equipment cooling both in flight and on the ground.

108.3 Discuss the purpose of aircraft oxygen systems. [ref. a, p. 2-166]

The oxygen system is designed to supply an active flightcrew of three members for approximately 3.5 hours at an altitude of 25,000 feet. There are three portable oxygen bottles that will supply 100% oxygen for 22 minutes, when experiencing little or no exertion. There are also 18 solid-state emergency oxygen packs located throughout the aircraft that provide 20 minutes of oxygen flow.

201 Airframe Systems

References:
[a] NAVEDTRA 12338, Aviation Structural Mechanic (H&S) 3 & 2
[b] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft
[c] NAVAIR 01-1A-17, Aviation Hydraulics Manual

201.1.1 Aircraft structure: [ref. a, pp. 1-1 thru 1-5]

a. Fuselage – The fuselage is the main structure or body of the aircraft to which all other units attach. It provides room for the crew, passengers, cargo, most of the accessories, and other equipment.

b. Empennage – The stabilizing surfaces of an aircraft consist of vertical and horizontal airfoils. These are known as the vertical stabilizer (or fin) and the horizontal stabilizer. These two airfoils, together with the rudder and elevators, form the tail section.

c. Wing – The wings of an aircraft are designed to develop lift when they are moved through the air. The particular wing design depends upon many factors for example, size, weight, use of the aircraft, desired landing speed, and desired rate of climb. In some aircraft, the larger compartments of the wings are used as fuel tanks.

201.1.2 Flight control/surfaces: [ref. b, pp. 2-92 thru 2-98]

a. Flaps – the wing flaps are of a high-lift Fowler type. This type of flap utilizes a combination of aft movement to increase the wing area and a drooping movement to change the airfoil section. Their function is to provide lift and are located on the wings.

b. Ailerons – located on the wings and are used to provide aircraft roll

c. Rudder – located on the vertical stabilizer and is used to provide aircraft yaw

d. Elevators – located on the horizontal stabilizers and are used to provide aircraft pitch

e. Trim Tabs – located on the ailerons, elevators, and rudder. The trim tabs are used to neutralize the aircraft movement. Controls for the trim tabs are located in the center control pedestal in the flight station.

201.1.3 Hydraulics: [ref. b, pp. 2-92 thru 2-98]

a. Pumps – System #1 is powered by two motor-driven hydraulic pumps who's output is made available to every hydraulically operated function of the aircraft. Pump 1B is dc powered and is used primarily for charging the brake accumulator. System #2 is powered by one motor-driven pump and is used to assist in the operation of the wing flaps, radome, ailerons, rudder, and elevator booster units. Located in the HSC

b. Reservoirs – each system has it's own reservoir. No. 1 reservoir has a capacity of 5.6 gallons. No. 2 reservoir has a capacity of 1 gallon. Reservoirs are located in the HSC.

c. Booster assemblies – there are three booster assemblies which assist with aircraft control movement. The aileron boost package is located in the HSC. The rudder boost package is located in the aft fuselage. The elevator boost package is also located in the aft fuselage.

d. Actuators – regulates the flow and direction of fluid to the actuating cylinder, located with each booster assembly.

201.1.4 Airframe components: [ref. b, p. 1-1]

a. Forward radome – houses the color weather radar located at the nose of the aircraft.

b. Aft radome – houses a high-band radar antenna located on the bottom of the aircraft aft of the wings.

c. Upper canoe – house various antennas located on the top middle to aft of the wings.

d. Lower canoe – houses various antennas on the lower fuselage with a removable center section to provide access to the HSC door.

e. Extendable radome (M&M) – houses a radar antenna located on the bottom of the aircraft, aft of the nose wheel well.

201.5.1 What are the precautions associated with pressurized hydraulics components? [ref. c, p. ix]

WARNING – Extreme caution shall be taken when trouble-shooting hydraulic systems under pressure to avoid accidental injection of fluid under the skin. Fluid injection can result in serious injury and great pain; seek immediate medical attention.

202 Propulsion Systems

References:
[a] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft

202.1.1 Engine: [pp. 2-1, 2-2]

a. Power section – compressed air flows through a diffuser, which directs if to six combustion liners. Fuel is introduced and the fuel-air mixture is ignited. Combustion produces hot gases that discharge through the aft ends of the combustion liners into the four-stage turbine rotor section, causing the turbine to rotate. The turbine rotor drives the compressor, the engine accessories and the propeller reduction gear assembly.

b. Engine accessory section – the engine accessory drive pad is mounted on the bottom of the compressor air inlet housing and is driven by a compressor extension shaft via a bevel gearing assembly. It consists of the engine fuel pump, fuel control unit, speed sensitive control, speed sensitive valve, main oil pump and the scavenge oil pump.

c. Reduction gear assembly – the reduction gearbox reduces the high-rpm, low-torque output of the power section to a low-rpm, high-torque output to be utilized by the propeller shaft.

202.1.2 Aircraft Propeller systems: [p. 2-17]

The four-bladed Hamilton Standard 54H60-77 propeller provides an efficient and flexible means of converting engine shaft horsepower to thrust. The propeller consists of two main sections: the rotating section and the non-rotating section. It is a constant speed, variable-pitch, full-feathering propeller.

202.1.3 Four main sub-assemblies of the propeller: [p. 2-17]

a. Barrel – serves as a structural foundation for the propeller blades, the dome and the control assemblies.

b. Dome – incorporates a pitch-control piston and a cam and gear train that convert linear travel of the piston into rotary motion of the blades.

c. Blade assembly

d. Control assembly – consists of the various components necessary for control of propeller blade angle

202.1.4 Auxiliary Power Unit (APU) [p. 2-177]

A gas turbine compressor driving a 60 kVA generator (GTCP95-2 or GTCP95-3). Air bled from the compressor is used for engine starting and ground air-conditioning. The gas turbine engine is a self-contained power source that requires only the aircraft battery for starting.

202.1.5 Five sub-systems that comprise the fuel system: [pp. 2-23, 2-24]

a. Fuel tanks – five fuel tanks (two in each wing and one in the fuselage)

b. Fueling system – permits conventional overwing fueling or pressure fueling and defueling under the wing

c. Transfer system – transfers fuel as needed from tank No. 5 (fuselage) to the four wing tanks

d. Crossfeed system – permits any wing tank to supply fuel to any engine

e. Dump system – provides a means for dumping fuel overboard from fuel tank No. 5 when desired

202.5.1 What safety precautions must be observed during fueling operations? [p. 3-1]

a. RF transmission is a potential source of fuel ignition. Use of transmitting equipment during fueling operations should be avoided.

b. Allow at least 3 minutes following refueling before using the dipstick. Failure to do so may result in static discharge.

c. Fueling must be halted immediately if during the pressure fueling cycle any of the following occur:

1. Wing tank or tank No. 5 is overfilled
2. Wing tank fuel spills from a wingtip vent.
3. Loud or unusual noise is accompanied by wing vibrations or aircraft decking vibrations

203 Avionics Systems

References:
[a] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft
[b] NAVAIR 01-75PAE-1.1, Supplemental NATOPS Flight Manual Navy Model EP-3E Aircraft
[c] NAVAIR 01-75PAC-1.1, NFO/Aircrew NATOPS Flight Manual Navy Model P-3A/B/C Aircraft

203.1.1 Communication equipment:

a. Digital Communications Management System (DCMS) [ref. a, p. 2-128]

An airborne, solid-state, audio/data distribution system used to process audio and/or data throughout the aircraft. Provides an interface between digital and analog devices and the operator/user.

b. Ultra High Frequency (UHF) [ref. a, p. 14-1]

Provides two-way UHF communication for various data and voice operational modes. The system transmits and receives AM and FM signals over the 225.00 to 399.975 MHz range.

c. Very High Frequency (VHF) [ref. a, p. 14-8]

Provides two-way VHF/UHF radio communications. The system transmits and receives AM and FM signals over the frequency range of 30 to 399.975 MHz.

d. High Frequency (HF) [ref. a, p. 14-13]

Permits transmission and reception of radio signals in the frequency range of 2 to 29.999 MHz. Operates in AM, USB, LSB, DATA, and CW modes.

e. Satellite Communication (SATCOM) [ref. c, p. VII-10-21]

Secure voice SATCOM, used only with the UHF-1 system, in conjunction with the KY-58 and the antenna switching assembly.

f. Secure communications [ref. a, p. 14-1]

All radios except HF 1, HF 2, and UHF 3 can transmit and receive in the plain and secure voice modes. UHF and VHF/UHF radios utilize the KY-58 system for secure voice.

203.1.2 Navigation equipment [ref. a]

a. Tactical Air Navigation (TACAN) [p. 14-19]

An airborne interrogator-responder designed to operate in conjunction with an appropriate surface beacon for navigation purposes. Enables aircraft to obtain continuous indications of bearing and distance from the selected surface beacon within 300 nm or line of sight.

b. Global Positioning System (GPS) [pp. 14-73 thru 14-76]

Computes accurate position coordinates, elevation, speed, and time information from signals transmitted by NAVSTAR GPS satellites.

c. Automatic Direction Finder (ADF) [p. 14-9]

The AN/ARA-50 direction finder group determines the relative bearing of a received UHF signal and indicates the bearing on the pilot and copilot HSIs.

d. VHF Omnidirectional Ranging/Instrument Landing System (VOR/ILS) [p. 14-15]

Provides a means of airway radio navigation, communications reception and ILS approaches. The ILS receiving equipment enables the pilot to make approaches during low visibility conditions.

e. APN-234 Color Weather Radar [p. 14-31]

Provides continuous en route weather information relative to cloud formation, rainfall rate, thunderstorms, and icing conditions. Provides storm detection at distances up to 240 miles.

f. AMS-1 Stormscope [p. 14-28]

Is a thunderstorm mapping instrument to help pilots avoid the dangerous turbulence and other hazards of thunderstorms. The display allows the pilot to observe any electrical discharge activity within an area of 150,000 square miles and steer clear of the areas of electrical discharge activity by providing specific real-time thunderstorm data.

203.1.3 ESM Mission Avionics Equipment [ref. b]

a. ALR-81 Countermeasures Receiving Set [p. 15-37]

Detects RF signals within its frequency range, displaying signal activity and providing IF, video, and audio signals as outputs.

b. ALR-76 ESM system [p. 15-34]

Passively detects, processes, and identifies electromagnetic signals in the microwave frequency region with particular emphasis on radar signals of short duration.

c. ULQ-16 Pulse Analyzer system [p. 15-83]

Performs automatic or manual analysis on signals to extract fundamental signal parameters for ESM purposes.

d. APS-134 Radar Set [p. 15-57]

An I-band pulse compression radar system providing all-weather, long range surface surveillance and high-resolution detection and localization capabilities.

e. OE-319 Antenna Group [p. 15-132]

Receives electromagnetic radiation in six frequency bands and passes it to the OA-9301/A RF distribution group. It also transmits and receives UHF signals for the APX-76 or ALQ-108, as selected, and transmits and receives radar signals for the APS-134.

f. OE-320 Antenna Group [p. 15-135]

Are airborne DF antenna systems that serve as the primary receiving antenna systems for the ALR-44 and ALR-81 countermeasure receiving sets.

g. IP-1159 Pulse Indicator [p. 15-117]

Is a five trace synchroscope that can simultaneously display processed or unprocessed video signals from a receiver.

h. USH-33 Recorder-Reproducer Set [p. 15-95]

A 28 track video recorder-reproducer that receives, records and reproduces data in the 400 Hz to 2 MHz frequency range.

203.1.4 Special Mission Systems [ref. b]

a. ALD-9 Direction Finder (DF) Set [p. 15-18]

A DF set that calculates the direction of arrival for received HF, VHF, and UHF signals.

b. ARR-81 Countermeasures Receiver Set [p. 15-71]

Detects RF signals within its frequency range, displaying signal activity and providing IF, video, and audio signals as outputs.

c. USH-34 Recorder-Reproducer Set [p. 15-143]

A four-channel, four track audio tape recorder designed for monitoring and recording information in the audio frequency range.

203.1.5 Common Systems [ref. b]

a. Video Distribution [p. 15-185]

Provides amplification, selection and distribution of video signals.

b. RF Distribution (RF) [p. 15-165]

Eight RF distribution groups in the aircraft (5 ESM / 3 Special). Provides amplification, selection, and RF distribution of RF signals in all tuner bands (TBs).

c. Computer functional group [p. 15-193]

203.1.6 SSIP: [ref. b, p. 15-1]

a. Story teller

b. Story book

c. Story classic

203.5.1 State the precautions used when activating a Radar system on the flight line. [ref. a,p. 3-13]

204 Electrical System

References:
[a] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft
[b] NAVAIR 01-75PAC-2-13.1, Electrical Power Generation and Distribution

204.1.1 Power Distribution

a. Aircraft Battery [p. 2-36]

One 24-volt, 31-ampere battery is located in the aft section of the nose wheel well. Normally used for starting the APU. Under normal operation, the battery receives a continuous charge from Transformer Rectifier #3.

b. Main Generator [p. 2-33]

Generates three-phase, 120 Vac, 400 Hz power in the AC windings. One each engine and on the APU.

c. Transformer Rectifier(TR) [pp. 2-35, 2-36]

Rectify the ac input to a 27 Vdc output for use in the aircraft. Located in the MLC.

d. Supervisory Panel [p. 2-34]

Each generator has its own supervisory panel. Supervisory Panels contain voltage regulators and provides overvoltage, undervoltage, off-frequency, and feeder fault protection. Located in the MLC.

e. AC Power [p. 2-35]

AC power distribution is controlled by a transfer and runaround system. The transfer relays ensure a power source is connected to main AC buses A and B. The runaround relays ensure a source of power to the Flight Essential AC (FEAC) and Monitorable Essential AC (MEAC) buses.

f. DC Power [p. 2-35]

Consists of three, 27-volt, 200-ampere transformer rectifiers, six DC buses, an inverter, a 24-volt battery and two power blocking diodes.

204.1.2 Exterior Lighting System [pp. 2-71, 2-72]

a. Rotating Beacons – installed along the centerline on the aft fuselage, top and bottom, provide anti-collision warning to other aircraft.

b. Wing Tip Lights – installed on each wing tip (Port wing = Red / Starboard wing = Green)

c. Tail Lights – located on the top and bottom of the aft fuselage.

d. Landing Lights – installed on the trailing edge of the wings, between the engine nacelles. The lights can be retracted when not in use but can be operated in any position.

e. Taxi Lights – installed on the left and right side of the nosegear strut.

204.1.3 Panel Lights [p. 2-72]

a. Advisory – Green is for normal operating mode of a system or transitioning state.

b. Caution – Yellow is of a cautionary nature indicating action by the pilots may be required.

c. Warning – Red is a warning of potentially hazardous situation or impending danger and immediate action by the pilots must be taken.

204.1.4 Automatic Flight Control System

a. PB-20N [p. 2-119]

Designed to maintain the aircraft on any selected heading while keeping it stabilized in pitch, roll, and yaw attitude. The aircraft can be made to climb, descend, or make coordinated turns by means of the pitch and turn controls on the center control pedestal, or by use of control wheel steering in pitch and roll.

b. ASW-31 [p. 2-123]

Controls and stabilizes the aircraft about its three axis (pitch, roll, and yaw). This is performed throughout the aircraft's speed, altitude, and maneuvering envelopes, at all permissible weights, centers of gravity, aerodynamic configurations, and engine power settings.

204.1.5 Navigation systems:

a. Inertial Navigation Systems (INS) [p. 14-37]

b. Periscope sextant [p. 14-88]

204.5.1 State the precautions for working with energized circuits. [ref. b, p. 1-3]

Disconnect electrical power before working on electrical or electronic equipment, and before removing and installing units or components. Voltages dangerous to life are present.

205 Survival / Environmental System

References:
[a] NAVAIR 01-75PAE-1, NATOPS Flight Manual Navy Model EP-3E Aircraft

205.1.1 Aviation Life Support System (ALSS) [pp. 11-44 thru 11-47]

a. LPP-1 – single compartment, yoke-type flotation assembly. Contains a whistle, dye marker, and a steady-burning, water-activated distress light.

b. SV-2 – survival vest which contains 11 required survival items. Worn by the aircrewmen.

c. Life Rafts – aircraft contain two 12-man life rafts that are located by each overwing exit.

d. Anti-Exposure Suits – provided for all flight personnel and worn if the water temperature is below 50°F or air temperature is below 32°F. All suits are stowed in the crew rest area.

e. Parachutes – backpack type parachute with a 28-foot flat canopy. The ripcord is located on the left side of the harness and there are 24 parachutes located throughout the aircraft.

205.1.2 Pressurization System[pp. 2-168 thru 2-174]

a. Cabin Air Compressor (EDC) – mounted on the generators of engine Nos. 2 and 3, are single-stage, centrifugal-type compressors coupled directly to the reduction gearbox accessory drive train.

b. Cabin Exhaust Fan – Cabin air is drawn through the electronics compartments by the cabin exhaust fan and exhausted overboard through the outflow valve.

c. Outflow Valve – has four operating positions (OPEN, CLOSE, AUTO, OFF) to control cabin pressurization.

205.1.3 Air Conditioning System [pp. 2-168 thru 2-174]

a. Refrigeration Turbine – Two, two-stage air cycle cooling units are installed in the nose wheel well

b. Heat Exchanger –

c. APU Air Multiplier Package – takes in ambient air, compresses it, combines it with APU bleed air then routes it to the air cycle cooling system.

205.1.4 Fire Extinguishing Systems [pp. 2-14 thru 2-16]

The aircraft is equipped with two independent, electrically controlled high-rate-of-discharge fire-extinguishing systems, one for each side of the aircraft. When activated, a fire-extinguishing chemical is discharged simultaneously into all three zones of the engine selected. Each system includes two extinguishing agent container bottles located forward of the firewall in the inboard engine nacelles.

205.1.5 Oxygen System [p. 2-166]

The oxygen system is designed to supply an active flightcrew of three members for approximately 3.5 hours at an altitude of 25,000 feet. There are three portable oxygen bottles that will supply 100% oxygen for 22 minutes, when experiencing little or no exertion. There are also 18 solid-state emergency oxygen packs located throughout the aircraft that provide 20 minutes of oxygen flow.

205.5.1 What warning is associated with the use of a portable fire extinguisher? [p. 11-14]

Extinguishment of fire by HALON 1301 may produce decomposition by-products, characterized by sharp, acrid odor, that may be harmful.

206 Warfare Mission Area

References:
[a] OPNAVINST C3501.280, Naval Warfare Mission Areas and Required Operational Capability (ROC) and Projected Operational Environment (POE) Statements for Fleet Air Reconnaissance Squadrons
[b] FAIRECONRONONEINST 5400.1J/FAIRECONRONTWOINST 5400.1N, Standard Organization and Regulations (SORM)

206.1.1 State and explain your command's mission statement. [ref. b]

VQ1
Fleet Air Reconnaissance Squadron ONE, in defense of our great nation, operates, maintains, and supports the Navy's finest Combat Reconnaissance Crews and aircraft, fully responsive to the needs of our warfighters.

VQ2

206.1.2 Discuss the history of your squadron. [ref. b]

VQ1

VQ-1 started as two PBY-5A Catalina's modified for electronic reconnaissance during WWII. The unit formally established as the Special Electronics Search Project at NAS Sangley Point, Republic of the Philippines, in October 1951. By 13 May 1953, the squadron was redesignated Detachment Able of the Airborne Early Warning Squadron One (VW-1), operating four P4M-1Q Mercator aircraft. When Detachment Able was reorganized into Electronic Countermeasures Squadron One (VQ-1) at Iwakuni, Japan on 1 June 1955, it was the first squadron dedicated to EW. The A-3 Skywarrior, served the squadron for the next three decades. In 1960, VQ-1 was moved to Atsugi, Japan and redesignated Fleet Air Reconnaissance Squadron One. The last Mercator was retired and replaced by the first of many WV-2Q Super Constellations. The WV-2Q would remain the backbone of VQ-1's long-range, land-based reconnaissance efforts through the Vietnam Era and into the 1970's. VQ-1 was awarded the Navy Unit Commendation (NUC) for their role in the Gulf of Tonkin incident of 2-5 August 1964. For the next nine years, VQ-1 would operate from Danang, Cubi Point, Bangkok, aircraft carriers on patrol at Yankee Station, and other bases in Southeast Asia. Aircrews supported countless air strikes and are credited with assisting in the destruction of numerous MiG aircraft and Komar patrol boats. On 14 April 1969, an EC-121 Super Constellation was shot down of the coast of North Korea, 31 crewmembers died. The first EP-3E ARIES I joined the squadron in 1969, beginning the replacement program for the Super Constellations, which was completed in 1974. In 1971, VQ-1 moved its homeport to NAS Agana, Guam. At that time it absorbed Heavy Photographic Squadron SIXTY ONE (VAP-61) and its former parent unit, VW-1. For a time VQ-1 consisted of thirty aircraft: sixteen Skywarriors, twelve Super Constellations, and two Orions. After the departure of the last Skywarrior in the late 1980's, the squadron flew the EP-3 ARIES I exclusively. In 1991 the squadron closed its permanent detachment in Atsugi, Japan after 30 years and move to Misawa, Japan. Also in 1991, VQ-1 received the first EP-3E ARIES II, an upgraded version of the ARIES I using modified P-3C airframes. In Operation Desert Shield and Desert Storm, VQ-1 played a key role. Despite the harsh, difficult maintenance environment and 30-year-old aircraft, VQ-1 amassed nearly 1400 combat flight hours with a 100% mission completion rate. Tasking included strike support, combat search and rescue, communications and over-the-horizon targeting support to coalition forces. In 1994, VQ-1 was notified of the homeport change to NAS Whidbey Island, Washington. In July 1994, VQ-1 retired the Navy's oldest operational P-3, EP-3E ARIES I aircraft, BUNO 148887. Its retirement also marked VQ-1's transition to all EP-3E ARIES II mission aircraft. Today VQ-1 provides electronic reconnaissance from the East coast of Africa to the West Coast of the United States. The squadron maintains a permanent detachment in Misawa, Japan and has maintained a continuous presence in the Arabian Gulf since July 1992.

VQ2

206.1.3 State the command's operational chain-of-command. [ref. b]

VQ1

Operational control of the squadron is accomplished by Commander, Patrol and Reconnaissance Force, SEVENTH Fleet and Commander, Patrol and Reconnaissance Force, FIFTH Fleet.

VQ2

206.1.4 What are the EP-3E's primary warfare missions? [ref. a, enc. 1]

a. AAW – Anti-Air Warfare
b. ASUW – Anti-Surface Warfare
c. C3 – Command, Control, and Communications
d. EW – Electronic Warfare
e. FSO – Fleet Support Operations
f. INTEL – Intelligence
g. MOB – Mobility
h. STW – Strike Warfare

206.1.5 Define the term AAW. [ref. a, enc. 1]

Detection, tracking, destruction, or neutralization of enemy air platforms and airborne weapons whether launched from air, surface, sub-surface, or land.

206.1.6 Discuss the role of the EP-3E in an AAW mission. [ref. a, enc. 1]

Detect, track, and identify air targets, using visual reconnaissance and ESM (Electronic Support Measures) that utilize radar and passive sensors.

206.1.7 Define the term ASUW. [ref. a, enc. 1]

Detection, tracking, destruction, or neutralization of surface combatants or merchant ships.

206.1.8 Discuss the role of the EP-3E in an ASUW mission. [ref. a, enc. 1]

Detect, localize, and track surface contacts with radar, ESM, or visual methods, and to provide OTH (Over-the-Horizon) targeting.

206.1.9 Define the term C3. [ref. a, enc. 1]

Provide communications and related facilities for coordination and control of external organizations or forces and control of own units capabilities.

206.1.10 Discuss the role of the EP-3E in a C3 mission. [ref. a, enc. 1]

Support the C3 planes, such as a C3 aircraft will cover all the planes in the area and will know the basic capability of those aircraft. The C3 aircraft will then ask for amplified information and confirmation of identification which the EP-3E will then provide.

206.1.11 Define the term ELW. [ref. a, enc. 1]

Search for and intercept electro-magnetic energy signals and emissions.

206.1.12 Discuss the role of the EP-3E in an ELW mission. [ref. a, enc. 1]

206.1.13 Define the term FSO. [ref. a, enc. 1]

206.1.14 Discuss the role of the EP-3E in a FSO mission. [ref. a, enc. 1]

206.1.15 Define the term INT. [ref. a, enc. 1]

206.1.16 Discuss the role of the EP-3E in an INT mission. [ref. a, enc. 1]

206.1.17 Define the term MOB. [ref. a, enc. 1]

206.1.18 Discuss the role of the EP-3E in a MOB mission. [ref. a, enc. 1]

206.1.19 Define the term STW. [ref. a, enc. 1]

206.1.20 Discuss the role of the EP-3E in a STW mission. [ref. a, enc. 1]

206.1.21 What are the EP-3E's secondary warfare missions? [ref. a, enc. 1]

206.1.22 Define the term ASW. [ref. a, enc. 1]

206.1.23 Discuss the role of the EP-3E in an ASW mission. [ref. a, enc. 1]

LIST OF REFERENCES USED IN THIS PQS

COMPATWINGSLANTINST 3500.24E, Training and Readiness Manual
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MIL HDBK 263B, Electrostatic Discharge Control Handbook
NAVAIR 01-1A-17, Aviation Hydraulics Manual
NAVAIR 01-75PAA-2-2.1, Corrosion Control, Cleaning, Painting, and Decontamination
NAVAIR 01-75PAA-2-2.2, Landing Gear
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NAVAIR 01-75PAC-1.1, NFO/Aircrew NATOPS Flight Manual Navy Model P-3A/B/C Aircraft
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