

Enlisted Aviation Warfare Specialist (EAWS) Tutorial UNIT SPECIFIC FOR FIXED-WING PATROL (VP)



Welcome to the VP (P-3) Specific PQS questions and answers. This study guide was designed to aid instructors and students alike. All of the questions were answered from instructions and directives found in NAVEDTRA 43902-1, Personnel Qualification Standard (PQS), Enlisted Aviation Warfare Specialist (EAWS), Unit Specific for Fixed-Wing Patrol Aircraft (VP), (P-3).

Click on the section of the P-3 Specific PQS that you would like to review. Good luck and study hard!

For practice exam, inputs, or if you are interested in developing a web page for your communities

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P-3 Specific PQS Sections:

101: Aircraft Characteristics/Capabilities Fundamentals

102: Avionics/Electrical Fundamentals

103: P-3 Operations Fundamentals

104: Search and Kill Stores Fundamentals

105: Training and Readiness Fundamentals

106: Airframe/Propulsion/Fuel Fundamentals

107: Environmental Fundamentals

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
ACT	Aircrew Coordination Training
AOA	Angle-of-Attack
APU	Auxiliary Power Unit
AWTIP	AW Training Improvement Program
ATC	Air Traffic Control
C2WI	Command and Control Warfare
DFW	Dedicated Field Work
EDC	Engine Driven Compressor
EOS	Electro-Optical System
ESD	Electro-Static Discharge
FCF	Functional Check Flight
GPS	Global Positioning System
HRD	High Rate of Discharge
ICS	Intercommunication System
IDTC	Inter-Deployment Training Cycle
IFT	In-Flight Technician
INS	Inertial Navigation Systems
MADCOMP	Magnetic Anomaly Detection Compensation
MPA	Maritime Patrol Aircraft
MRCI	Mining Readiness Certification Inspection
MTIP	Maintenance Training Improvement Program
NAMP	Naval Aviation Maintenance Program
NAV/COMM	Navigator/Communication
OPTEMPO	Operational Tempo
ORE	Operational Readiness Evaluation
OTPI	On-Top Position Indicator
PBFT	Planning Board For Training
PPC	Patrol Plane Commander
PPCP	Patrol Plane Copilot
PPP	Patrol Plane Pilot
PSLTs	Pressurized Sonobuoy Launch Tubes
QAR	Quality Assurance Representative
SE	Support Equipment
SLTs	Sonobuoy Launch Tubes
SOFRO	Safety Of Flight RADAR Operator
SUS	Signal Underwater Sound
TACCO	Tactical Coordinator
TPC	Tactical Proficiency Course
TR	Transformer Rectifier
WST	Weapon Systems Trainer

101 AIRCRAFT CHARACTERISTICS / CAPABILITIES FUNDAMENTALS

References:

[a] NAVAIR 01-75PAC-1, NATOPS Flight Manual Navy Model P-3A/B/C Aircraft

[b] NAVAIR 01-75PAC-1.1, NFO/Aircrew NATOPS Flight Manual Navy Model P-3A/B/C Aircraft

[c] Squadron Command Historian/Public Affairs Officer

101.1 Describe the physical characteristics of a P-3 aircraft. [ref. a, p. I-1-1]

The P-3 is a four-engine, low wing aircraft designed for patrol, anti-submarine warfare and fleet support. It is in the 135,000 pound gross weight class and powered by four T-56-A-14 turboprop engines. Each engine provides 4,600 SHP (maximum rated) for takeoff. Distinguishing features of the aircraft include surface and subsurface detection gear, including computer interfacing of the detection gear, ordnance and armament systems. The P-3C model is readily identified by the installation of sonobuoy chutes, visible in the lower aft fuselage of the aircraft, and three additional small windows on the starboard side of the fuselage. Also, provisions for carrying a streamlined ESM pod-pylon assembly on a wing station are installed.

101.2 Describe the all-weather capabilities of the P-3 aircraft [ref. a, p. I-2-60]

Ice controls on the P-3 enable the aircraft to perform its mission under various weather conditions and return home safely. Engine bleed air from the 14th stage of the compressor (diffuser assembly) is used to deice the wings and anti-ice the engine air scoop, compressor inlet and torquemeter shroud assembly. Electrical heating circuits anti-ice and/or deice the propellers, empennage, instruments probes, windshields and side windows.

101.3 Describe the purpose of the following aircrew positions [ref. b, pp. VIII-11-3 thru VIII-11-5]

a. Mission Commander

The MC shall be a properly qualified Naval Aviator or Naval Flight Officer designated by appropriate authority. He shall be responsible for all phases of the assigned mission except those aspects of flight safety that are related to the physical control of the aircraft and are considered beyond the qualifications of the MC's designator. The MC shall direct a coordinated plan of action and shall be responsible for the effectiveness of the flight. He shall be responsible for the crew preparation for take-off and that take-off is at the scheduled time. He shall gather and evaluate reports on the aircraft and equipment and direct preparation for flight as necessary. He shall direct the boarding of the aircraft and verify the presence of the crewmembers in their assigned stations. Further, the MC shall sanction armament selection and release. The MC shall ensure the proper EMCON is maintained. NOTE: During certain EMCON conditions the use of radar may jeopardize the crew and aircraft. In these situations the use of radar shall be at the discretion of the MC or PPC if no MC is assigned.

b. Patrol Plane Commander (PPC)

The PPC is responsible for the effectiveness of the aircraft and crew for all matters affecting safety of flight. The PPC is responsible for calling for the appropriate checklist to be read by the copilot and shall respond as necessary. As Aircraft Commander he shall coordinate ASW tactics with the TACCO and position of the aircraft to effectively accomplish the mission.

c. Patrol Plane Pilot (PPP)

The PPP shall assist the PPC in preparing the crew for flight and in ascertaining readiness for flight of the aircraft and aircraft systems. He shall read the checklist, as required by the flight mission. He will pilot the aircraft at all times the PPC is away from his station. The PPP function is specifically patterned as a safety backup for the PPC throughout the entire flight. In this capacity, he shall offer constructive comments and recommendations as necessary throughout the mission in order to maintain the safest and most effective possible flight environment. During the times the PPP is in control of the aircraft, his coordination of crew duties shall be the same as for the PPC.

d. Patrol Plane Copilot (PPCP)

The PPCP shall act as a relief for the PPC or PPP during extended flight operations. In training for the position of PPP, he shall assist the PPC in mission preparation and be assigned duties consistent with his training requirements and experience level. When occupying either the pilot or copilot positions, he shall execute the described duties.

e. Flight Engineer (FE)

Is directly responsible to the Pilot in Command. The FE shall perform exterior and interior checks IAW current NAVAIR pubs and MRCs. During flight the FE shall continually monitor engine and system flight station controls and indicators. The FE should monitor ATC radio transmissions, backup pilots on altitude assignments, and include a watch for conflicting air traffic in his instrument scan. He shall not be assigned duties requiring him to observe surface objects (ships, runways on low visibility approaches and so forth) outside the aircraft. He shall perform such other duties throughout the aircraft as the pilot in command may direct. He shall be thoroughly familiar with all systems and equipment under his control and with their operation during normal and emergency operating conditions. The FE shall conduct a preflight IAW current NAVAIR directives. He shall submit a completed weight and balance form (DD 365-F) to the pilot in command. The FE shall compute take-off data as described in the takeoff planning procedure and the performance data section. He shall ensure that one complete copy of NAVAIR 01-75PAC-1 is onboard prior to takeoff.

f. Second Flight Engineer

Shall act as a relief for the FE during extended flight operations. In training for the position of FE, he shall assist the pilot in command in mission preparation and be assigned duties consistent with his training requirements and experience level.

g. Tactical Coordinator (TACCO)

The TACCO's function is to employ appropriate tactics and procedures to most effectively carry out the mission of the aircraft and its crew. He will initiate a coordinated plan of action for all tactical crewmembers and continuously monitor, review and revise the plan as the situation dictates. He shall make recommendations regarding search and kill store utilization to the MC. He shall ensure the accurate completion, collections and disposition of required magnetic tapes, logs and records. As senior navigator onboard, he is also responsible for ensuring safe and accurate navigation of the aircraft.

h. Navigation Communication Officer (NAV/COMM)

The NAV/COMM's function is to maintain an accurate record of present and past positions, to insert navigation fly-to points, update the geographic position, transmit position reports, and maintain an accurate record of the flight. The NAV/COMM shall inform the pilot and TACCO of station system failures. During a tactical mission, the NAV/COMM is responsible for navigating the aircraft to and from the specified area, monitoring aircraft position and navigation systems. Conducting required tactical communications including authentication and maintaining tactical records. The NAV/COMM shall provide assistance to the TACCO as directed. The NAV/COMM should be familiar with all ASW and ASUW sensors and be prepared to direct the tactical crew should the situation arise.

i. Acoustic Operators (SS1/2)

It is the responsibility of the acoustic operators to detect, classify and report sonobuoy contact data. The acoustic operators shall ensure that audio information is recorded for subsequent mission reconstruction. It is noted that the acoustic operators are the primary operators for the AVX-1 Electro-Optical system.

j. Electronic Warfare Operator (SS3)

The Electronic Warfare (or non-acoustic) Operator is to support the mission by utilizing RADAR, ESM, MAD/SAD, IRDS, and IFF systems and subsystems, as directed by the TACCO, to detect and analyze targets of operational significance and provide radar intercept and navigational information to the TACCO and NAV/COMM.

k. Safety of Flight Radar Operator (SOFRO)

The responsibility of the SOFRO operator is to provide weather, terrain, and aircraft avoidance using radar and IFF systems. The SOFRO crewmember is not qualified to perform tactical duties. NOTE: SOFRO is a secondary position. The crewmember shall maintain a current checkride in a primary position for the checkride to remain valid.

Teaching point: SS-3 operators are required over water transit flights (for example to Puerto Rico, Bermuda, Europe, Etc.). The purpose of the SOFRO qualification is so that other enlisted crewmembers could voluntarily qualify on the RADAR and IFF systems so that they could take over water transit flights and relieving the burden on the SS-3's and provided more options to the squadron in scheduling flight crew members.

l. Ordnanceman

The responsibility of the ordnanceman shall be to obtain the mission search and kill stores required by the TACCO and ensure they are properly loaded. The ordnanceman shall perform a systems check IAW NAVAIR 01-75PAC-12-6. Inflight, the ordnanceman shall perform the loading and unloading of the three PSLTs and free-fall launch procedures as required by the TACCO. Additional inflight duties shall include acting as visual observer and other duties as required. The ordnanceman shall provide the TACCO with a list of all types of stores aboard the aircraft.

Teaching point: The RegNav has done away with using AO's as in-flight ordnanceman and has gone to training other enlisted flight crew members (AW's & AT's) to function in flight as an Ordnance Qualified Crewmember (see item "m" below). Reserve squadrons retain inflight AO's.

m. Ordnance Qualified Crewmember

Shall ensure that the mission search stores required by the TACCO are properly loaded. He shall perform a systems check IAW NAVAIR 01-75PAC- 12-6. In flight, an ordnance qualified crewmember shall perform the loading and unloading of the three PSLTs and free-fall launch procedures as required by the TACCO. Additional inflight duties shall include acting as visual observer and other similar duties as required. The ordnanceman shall provide the TACCO with a list of all types of stores aboard the aircraft. Essentially the difference is that this crewmembers qualified in this position can handle search stores and search stores systems only.

n. Assistant Ordnance Qualified Crewmember

will assist the primary Ordnance Qualified Crewmember with inflight duties as required.

o. In-Flight Technician (IFT)

The IFT is responsible for preflight checks on the data processing system and for inflight repair of all equipment as listed in NAVAIR 01-75PAC-12 series, acting as visual observer and such other duties as may be required.

p. Observer

A P-3 observer is an inflight crewmember qualified to perform basic safety-of- flight duties. An observer is not qualified to fill a primary tactical position.

q. Radio Operator

The function of the radio operator is to maintain HF radio communications as directed by the MC. This position only exists in the P-3A and P-3B models which are no longer in tactical use by U.S. VP forces.

101.4 State the maximum number of ditching stations. [ref. b, p. IV-7-19]

There are 23 ditching stations on the P-3C aircraft except for the Update III model which has had stations 16 & 17 deleted leaving 21 stations.

101.5 State the purpose of engine loiter operations. [ref. a, p. III-8-17]

Two and three engine loiter operations provide a substantial reduction in the fuel usage thereby allowing the aircraft to remain on-station longer. A 1,000 foot minimum altitude is observed during two engine operations. No planned descents below 1,000 feet are allowed with only two engines operating. The purpose of loiter operations are to extend the amount of time the aircraft can stay on-station.

101.6 Describe the general arrangement of the P-3 aircraft as stated on the NATOPS Flight Manual. [ref. a, p. I-1-1]

The fuselage is pressurized from the forward bulkhead of the flight station to the aft bulkhead in the cabin. Entrance to the cabin is by way of the door in the port side of the fuselage. The flight station is entered from the cabin. An electromechanical folding ladder, which stows in the cabin, can be used for personnel loading and unloading at stations where external loading ramps are not available. Emergency exit hatches are located over each wing in the sides of the fuselage, aft of the pilot side windshield panel, and in the top of the flight station. Lavatory, galley, and other convenience facilities are located in the aft fuselage.

101.7 Discuss the maritime patrol history of your squadron. [ref. c]

Patrol Squadron 62 was commissioned on November 1, 1970 as part of the Reserve Force Squadron (RESFORON) concept. The RESFORON concept implemented the structure for the Naval Air Reserve to provide fully manned and equipped squadrons in the event of war or national emergency. VP-62, located at NAS Jacksonville Florida, has operated the SP-2H Neptune, the P-3A, P-3B, P-3BTAC/NAV MOD and the Navy's newest and most formidable maritime patrol aircraft, the P-3C Update III. VP-62 is under the operational and administrative control of Commander Reserve Patrol Wing Atlantic. In 1988 VP-62 became the first reserve squadron to launch a Harpoon air to surface cruise missile and in 1989 deployed to Rota, Spain becoming the first reserve squadron to deploy the P-3C UIII aircraft.

The VP-62 Squadron logo. The "Broad arrow" was created by 16th century English craftsmen. This symbol was used as a hallmark to identify the highest quality, precision-made goods that they produced. Metal smiths, shipbuilders, architects, machinists, and many other tradesmen and artisans identified their finest products with this Broad arrow symbol. It is in keeping with these values of quality and exactness that the men and women of VP-62 adopted the "Broad arrow" symbol as we strive to perfect our precision and performance in the field of Maritime Patrol Aviation. Our mark of excellence is identified by the "Broad arrow."

102 AVIONICS / ELECTRICAL FUNDAMENTALS

References:

- [a] NAVAIR 01-75PAC-1.1, NFO/Aircrew NATOPS Flight Manual Navy Model P-3A/B/C Aircraft
- [b] NAVEDTRA 12329, Aviation Electronics Technician 3
- [c] NAVEDTRA 10348-G, Aviation Electrician's Mate 3 & 2
- [d] NAVAIR 01-75PAA-2-2, Maintenance Instructions Organizational Airframe
- [e] NAVAIR 01-75PAC-1, NATOPS Flight Manual Navy Model P-3A/B/C Aircraft
- [f] OPNAVINST 4790.2F, Naval Aviation Maintenance Program (NAMP), Vol. I

102.1 Define the following acronyms:

a. RADAR [ref. c, app. p. AI-8]

Radio Detection And Ranging.

Teaching Point: The P3-CUIII is equipped with either the APS-115 or APS-137 Radar. Some CDU (Counter Drug Upgrade) aircraft are equipped with the APG-66 Radar.

b. IFF - Identification Friend of Foe. [ref. b, p. 5-10]

This was developed because of the destructive power of modern weapons systems and the speed of their delivery. You cannot always wait to identify a detected radar target. A typical IFF system consists of an interrogator unit, a synchronizer unit and a radar unit which make up the challenging station as well as a transponder unit which makes up the responding station. Ships, airplanes and ground stations may issue IFF challenges but aircraft and ships are usually the only responders.

There are five IFF modes: Modes 1 & 2 are used exclusively by the military for identification. Mode 3/A is used by both civil and military air traffic control stations, Mode 3C is used to report the aircraft's altitude to an air traffic control station and Mode 4 is a military encrypted code which is classified.

Teaching Point: An example of how IFF Mode 1 & 2 is used is as follows: At the brief the tactical crew is informed that they will be working with the USS Scott, a DDG which will be squawking Mode 1 code 1200 and the USS Leyte Gulf, a CG squawking code 1400. After arriving on station the SS3 operator provides a surface plot (a radar picture of all surface contacts) to the TACCO. When the SS3 interrogates all contacts with code 1200, the radar return which is the Scott will be accompanied by a code marker next to the radar blip which tells the SS3 that this contact is the Scott. In this manner, the SS3 can identify all friendly forces in the area.

Mode 3A is assigned to the aircraft by a control tower or an ATC. For example, when giving clearance to the aircraft to takeoff, the tower might say, "LT269 you are cleared for takeoff, runway 27, after departure turn right heading 320, climb to 4,000 feet, squawk 3200 and contact Departure." The 3200 is instructing the pilots to dial 3200 into the Mode 3A IFF so that any ATC or control tower will know that out of all the blips on their radar, the one with the code for 3200 is that aircraft. Mode 3C is on at all times except for when mission requirements call for it to be turned off. It enables our altitude to be displayed along with our mode 3A code on the interrogating stations radar scope.

Remember that all of the five IFF codes we can squawk are dialed in by the copilot in the cockpit. The codes for the four modes we can challenge (we can't challenge an altitude report on 3C) are dialed in or selected by the SS3 at his station and are read there on his radar scope. Remember that the IFF can only interrogate when the radar is on and being used.

c. ADF - Automatic Direction Finder [ref. a, p. VII-10-106]

The ARN-83 low frequency ADF is used for routine point-to-point radio navigation. The ADF operates on AM signals in the 190 to 1750 Khz frequency range. The receiver converts ground radio beacons or commercial broadcasts into bearings for the HSI (Horizontal Situation Indicator) displays.

Teaching Point: Air navigation charts list show ground stations which are labeled with their radio frequency. By tuning into this beacons, the pilots or navigator can get a "point" or direction to that station. By this means they can navigate "point-to-point" using ADF. ADF is can also be used in Search and Rescue to get a point to an emergency beacon from survivors in the water or a ship in distress.

d. TACAN - Tactical Air Navigation [ref. a, p. VII-10-106]

The TACAN set is an airborne receiver - transponder designed to operate in conjunction with surface stations for navigation purposes. The airborne and surface equipment form a radio navigation system that enables aircraft to obtain range and bearing from the selected beacon up to 390 nm away. There is also an air-to-air mode that allows range and bearing information from another aircraft with the same capability. The TACAN system has 99 channels.

Teaching Point: Ground TACAN stations are normally co-located with a VOR (VHF omnidirectional Range) radio beacon used with the ADF. Together, these stations are known as VORTACS and look like the tip of a big white missile coming out of the ground. Air navigation charts show the VORTACS which are labeled with their VOR radio frequency and TACAN Channel. By tuning into these beacons, the pilots or navigator can get a "point" or direction to that station as well as a distance. Using this type of navigation, a pilot always knows the exact location of the aircraft using just this one navigation aid; however, VORTACS are only found in the U.S; therefore, this NAVAID is only useful for overland flights in the U.S. The air-to-air mode is used by aircraft to avoid each other in areas where there is no ATC facility (usually out at sea).

e. IRDS - InfraRed Detection System [ref. a, p. VII-10-325]

The IRDS system converts infrared radiation emanating from a heat source and converts it to a black and white television like image at the SS-3 station.

Teaching Point: On the P-3, the Irds turret retracts into the chin of the aircraft below the radome. When lowered, the turret is controlled by a joystick at the SS3 station. Be aware that there are other names used for IR systems such as FLIR (Forward Looking InfraRed) but that all these are IR systems using the same type of technology.

WARNING - The window on the IR turret presents a possible radiological hazard. Make no attempt to clean an IR window when the coating appears to have a flaking condition. Should damage / breakage be sustained, the area surrounding the nose of the aircraft should immediately be secured.

f. MAD - Magnetic Anomaly Detection [ref. a, p. VII-10-292]

The ASQ-81 Mad system employs a helium magnetometer that detects submarines by measuring changes (anomalies) in the earth's magnetic field caused by the submarine. The detected anomalies are registered on a paper recorder located at the SS3 station.

Teaching Point: The large boom extending from the rear of the aircraft is the MAD boom which houses the magnetometer. Know that the MAD system is for short ranges under best cases and is degraded as sunspot activity (the alpha index) increases. This sensor is usually used to "pinpoint" the subs location and is often the preferred indication for when to drop the weapon on a submarine.

g. ESM - Electronic Support Measures [ref. a, p. VII-10-303]

The ESM set detects and analyzes low and high band radar signals and measures the RF, PRF, pulse width and relative bearing of the intercepted radar signal. The parametric data of the processed signal is displayed at the SS3 station and bearing lines to the source can be displayed on the SS3 and TACCO MPD's. ESM is a totally passive system meaning that it does not emit any signal that can be detected by the enemy.

Teaching Point: Some of our airplanes use the ALQ-78 ESM set while others use the ALR-66. Based on the parameters of the intercepted radar signal, the Electronic Warfare Operator (the SS3) can identify the category of radar (search, fire control, navigation, etc) and in many instances, the specific type of radar (i.e. a U.S. SPS-41 radar or a Soviet "Owl Screech" radar). Based on the type of radar the operator can often times identify the class of ship or aircraft emitting the radar signal.

h. ISAR - Inverse Synthetic Aperture Radar. [ref. a, p. VII-10-334]

The ISAR is a radar processing system that generates true, recognizable, two- dimensional images of any selected ship target. These two-dimensional views aid the radar operator in recognizing and classifying target images.

Teaching Point: The ISAR is a more highly sophisticated radar system than the APS-115 with which most P-3C's are still equipped. Most P-3 squadrons have two or three ISAR aircraft with the balance being equipped with APS-115 radars.

102.2 Discuss the importance of the Aircraft Static Dissipation System. [ref. d, p. 3-115]

Static dischargers are used on P-3 aircraft to allow continuous satisfactory operation of onboard navigation and radio communication systems during adverse charging conditions by limiting static potential buildup on the aircraft and by controlling interference generated by the corona.

Static dischargers are not lightning arresters. They are attached to numerous points on the aircraft and are fabricated with a wick or wire to provide a high resistance discharge path between the aircraft and the air.

102.3 State the purpose of the P-3 Electrical Power Supply system as stated in the NATOPS Flight Manual. [ref. e, p. I-2-2]

The electrical power supply system provides the necessary AC and DC power for aircraft requirements. Aircraft AC power is furnished by three engine driven generators and one additional generator driven by the APU. DC power is supplied by three Transformer Rectifiers which convert AC power to DC power.

103 P-3 OPERATIONS FUNDAMENTALS

References:

- [a] COMPATWINGSLANTINST 3500.24E, Training and Readiness Manual
- [b] COMPATWINGSPACINST 3500.24C, Training and Readiness Manual
- [c] NAVAIR 01-75PAC-1, NATOPS Flight Manual Navy Model P-3A/B/C Aircraft
- [d] OPNAVINST 4790.2F, Naval Aviation Maintenance Program (NAMP), Vol. I
- [e] NAVAIR 01-75PAC-1.1, NFO/Aircrew NATOPS Flight Manual Navy Model P-3A/B/C Aircraft

103.1 What are the seven primary mission areas of Maritime Patrol Aircraft (MPA)? [ref. a, ch. 2; ref. b, ch. 2]

1. Anti-Surface Warfare (ASuW)
2. Anti-Submarine Warfare (ASW)
3. Command & Control Warfare (C²W)
4. Command, Control & Communications (CCC)
5. Intelligence (INT)
6. Mine Warfare (MIW)
7. Mobility (MOB)

Teaching Point: The P3-C also has other missions such as Search & Rescue, etc.

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

a. Instrument training:

Provides proficiency training for pilots and NFO's in radio communications/navigation procedures and flight publications usage and interpretation. The proficiency in flight instruments usage is necessary for IFR type flights and IMC flight conditions.

b. Dedicated Field Work (DFW):

The Dedicated Field Work program provides pilots the opportunity to enhance their piloting skills in all phases of flight, as well as flying adequate hours each month to maintain proficiency and build required experience levels. All pilots should:

1. Complete one DFW per month with a minimum of six landings.
2. Complete one night DFW per quarter with a minimum of six landings.
3. Complete one Instructor DFW per quarter which includes a three engine, two engine, and no flap landing, etc.

c. NATOPS Instrument evaluation:

Administered to Pilots and NFO's. NFO's take only a written exam while pilots take a written and flight evaluation which evaluates their ability to fly an instrument approach and interpret / use flight publications.

d. Airways training:

Encompasses many types of flights such as logistic flights (logruns), airlifts, "sleigh rides," and other flights. Provides proficiency training in flights filed under IFR flight plans and conducted along ATC controlled flight routes.

103.3 Describe the basic purpose of the following common flights related to Aircrew operational proficiency:

a. Crew Training [ref. a, annex. D]

COMPATWINGSLANTINST 3500.24E notes on page 5-1-2 that "The concept of a crew event is founded on the premise that a tactical crew, training as an entity over time, achieves a higher degree of mission area effectiveness through crew coordination."

b. NATOPS evaluation flight [ref. c, par. 26.1]

An evaluation flight in which a Squadron NATOPS Instructor evaluates the knowledge and proficiency of a crewmember for a specific position in the aircraft. The evaluation or "checkride" is conducted in accordance with the OPNAV 3510 (NATOPS Evaluation Form) for that seat position.

1034. Describe the basic purpose of a Magnetic Anomaly Detection Compensation (MADCOMP) check. [ref. c, p. VIII-11-46]

The various MAD checks incorporated in the checkflight are designed to provide in-flight checks to validate the repair of previous MAD discrepancies and to determine the need for MAD compensation.

5. Describe the following NATOPS conditions of flight: [ref. c, ch. 24]

a. Condition I - Battle

All stations are manned for low altitude ASW, localization, mining, attack or rigging. Each crewmember should proceed immediately to their predesignated station. Headsets shall be worn during this condition.

b. Condition II

Surveillance / High altitude ASW / Transit Stations manned as necessary for routine search, patrol, high altitude ASW operations or for overland / over water transit. Passengers may get up and move about the cabin.

c. Condition III - Operational Check

All stations shall be manned by primary operators who will obtain an ICS check and equipment status and report status to the TACCO.

d. Condition IV - Aircraft Inspection

Crewmember designated by the aircraft commander during the briefing leaves his/her ditching station, inspects the physical integrity of the aircraft and reports the results in person to the pilot and flight engineer. The following are inspected: (1) Doppler well, main load center and HSC for leaks, smoke, fumes and obvious discrepancies; (2) visible external surfaces of the aircraft, and (3) check security of weapons using bomb bay viewing window.

e. Condition V - Takeoff / Landing

All crewmembers and passengers shall take assigned ditching stations. Passengers shall don appropriate survival gear prior to takeoff/landing over water.

104 SEARCH & KILL STORES FUNDAMENTALS

References:

- [a] NAVEDTRA 12309, Aviation Ordnanceman 3, 2, & 1
- [b] NAVAIR 01-75PAC-1.1, NFO/Aircrew NATOPS Flight Manual Navy Model P-3A/B/C Aircraft
- [c] NAVEDTRA A60-01-45-86, Aviation ASW Operator 3 & 2, Module 1
- [d] OPNAVINST 8600.2B, Naval Airborne Weapons Maintenance Program, Vol. II
- [e] NAVAIR 01-75PA-75, Airborne Weapons/Stores Loading Manual

104.1 What is the purpose of the following?

a. Search Stores [ref. c, ch. 7]

Search stores are those deployable stores that are used in searching for and localizing a submarine target. This particular family of devices consists of compact electronic receiver/transmitters that are dropped from the aircraft into the ocean at a predetermined point. The devices receive the sounds in the ocean and transmit them to the aircraft. The on-board processor converts and displays the sound energy at the acoustic operator's station.

Teaching Point: Search stores are usually sonobuoys which are described by the reference material. Sonobuoys are both "active" and "passive." Active buoys are basically mini-sonars which "ping" for submarines and transmit the information up to the aircraft. Passive buoys are essentially an underwater microphone (hydrophone) which passively listen to all sounds in the water. Sonobuoys are preset and loaded into the underside of the rear fuselage of the aircraft. More are carried internally and can be launched out of the three pressurized chutes or the free fall chute.

b. Kill stores [ref. a, p. 15-20]

Kill stores consist of torpedoes, mines, bombs, rockets and guided missiles

Teaching Point: The primary kill store against a submarine is the ASW homing torpedo. The primary kill store against warships is the Harpoon anti-ship missile. Mines may be deployed in choke points (narrow strips of water such as the straits of Gibraltar or the Hormuz Straits) against submarines or surface ships or aircraft may be used to mine other areas such as harbors.

104.2 Define the following acronyms associated with ordnance: [ref. a, ch. 3]

a. AGM

AGM stands for Air launched, surface attack, guided missile

Teaching Point: The AGM-84A Harpoon missile is the only AGM normally utilized by the P-3. The P-3 can carry up to six harpoon missiles externally. The P-3 can also carry the AGM-65 Maverick missile.

b. ATM

ATM stands for Air launched, training, guided missile

c. CATM

CATM stands for Captive Air Training Missile. CATMs are used for pilot training in aerial target acquisition and aircraft controls/displays. They have both tactical and training components.

104.3 What is the purpose of the following? [ref. d, ch. 2.1]

a. MK 20 (Rockeye)

Cluster bombs presently in the Navy inventory are the MK-20 series ROCKEYE. Cluster bombs are dispensers which contain a number of bomblets for use against armored vehicles, personnel or small craft.

b. BDU-45 (572lb practice bomb)

The BDU-45 is an inert, full scale practice bomb. Full scale practice bombs are representative of service bombs in size and weight.

c. MK 80 series (Depth bombs)

MK-80 series are Low Drag General Purpose bombs used in the majority of bombing operations where maximum blast and explosive effects are desired. These bombs are designed to be aerodynamically streamlined.

104.4 What types of air-laid mines are utilized by the P-3 aircraft? [ref. e, ch. 10]

(NFO/Aircrew NATOPS 1-4-9): The P-3 can carry the following air-laid mines: MK-25, MK-36, MK-52, MK-55, MK-60, MK-62

104.5 State the purpose of the following missiles: [ref. a, ch. 3]

a. AGM-84 Harpoon [p. 3-9]

The Harpoon cruise missile is an all weather anti-ship attack weapon.

b. AGM-65 Maverick [p. 3-15]

Is a laser guided, rocket propelled, air-to-ground missile used against fortified ground installations, armored vehicles or surface combatants

c. AGM-84E SLAM [p. 3-9]

The Stand-off Land Attack Missile is a cruise missile like the Harpoon except it is designed for use against land targets.

104.6 What two types of torpedoes are utilized by the P-3 aircraft? [ref. b, fig. 4-1]

The MK-46 or MK-50 torpedoes.

104.7 What are the three basic types of sonobuoys? [ref. c, p. 7-1]

Passive

essentially an underwater microphone (hydrophone) which passively listen to all sounds in the water.

Active

basically mini- sonars which "ping" for submarines and transmit the information up to the aircraft.

Special purpose

Examples of special purpose buoys are the BT (bathythermograph) buoy which measures the ocean temperature from the surface to 1,000 feet deep, the Ambient Noise buoy which measures in decibels, the level of ambient noise in that area of the ocean in which it is dropped.

104.8 What is the purpose of a MK 84 Signal Underwater Sound (SUS) device? [ref. c, ch. 7]

The MK-84 is a sea water activated signaling device used to communicate with a submerged submarine during exercises. The SUS produces one of five electroacoustical codes recognizable from short to medium range by the subs sonar.

104.9 What are three types of deployable countermeasures? [ref. b, p. VII-10-360]

1. Chaff to create radar decoys or to confuse radar seekers.
2. Flares to decoy heat seeking missiles.
3. Jammers to interfere with or "jam" radars

104.10 What is a pyrotechnic device? [ref. a, ch. 4]

A pyrotechnics are fireworks adapted to military use. They are devices which produce their effects by burning and are consumed in the process. Specifically, the military uses these items to produce bright lights or smoke for signaling.

Teaching Point: Examples of Navy pyrotechnics are emergency flares and smokes in survival vests, marine markers and parachute flares.

104.11 What are the two types of marine locations markers? [ref. a, ch. 4]

MK-25 and MK-58 marine markers which are dropped by the aircraft to provide visual marks on the oceans surface. These may be used to mark the position of a submarine during an ASW mission or a survivor in the water during SAR missions.

104.12 State the purpose of the following:

a. Bomb rack [ref. e, ch. 2]

Aircraft bombs, torpedoes, mines, missile and other stores are suspended internally or externally from pylons by bomb racks. Bomb racks carry, arm and release stores.

b. Pylon [ref. e, ch. 2]

A pylon is used to suspend launchers or bombs from the aircraft wings, fuselage or bomb bay.

c. LAU-117 missile launcher [ref. b, p. 10-183]

Is used to mount the AGM-65E Maverick Missile onto the P-3

d. Sonobuoy Launch Tubes (SLTs) [ref. a, ch. 15, p. 15-21]

These are the 48 tubes visible in the bottom of the fuselage towards the aft end of the aircraft in which sonobuoys are externally loaded and launched.

e. Pressurized Sonobuoy Launch Tubes (PSLTs) [ref. a, ch. 15, p. 15-21]

These are the 3 pressurized tubes in which sonobuoys are loaded and launched from inside the aircraft.

105 TRAINING AND READINESS FUNDAMENTALS

References:

- [a] COMPATWINGSLANTINST 3500.24E, Training and Readiness Manual
- [b] COMPATWINGSPACINST 3500.24C, Training and Readiness Manual
- [c] OPNAVINST 4790.2F, Naval Aviation Maintenance Program (NAMP), Vol. I

105.1 Explain the following terms associated with the Squadron Training Cycle:

a. Inter-Deployment Training Cycle (IDTC) [ref. a, ch. 3]

For the RegNav is a cycle of training between deployments which takes into account known operational and administrative commitments, aircraft modifications and maintenance schedules, leave cycles, prospective TACNUC gains/losses and any other factors which must be considered in the scheduling of individual and crew training, so that an acceptable level of crew readiness is maintained during the IDTC and readiness of at least C2 is reached prior to the next deployment.

For Reserve Squadrons, CRPW has a policy called "Just in time" training which allows the reserve squadrons to target theater specific training qualifications for their aircrews between detachment cycles. For example, reserve crews detaching to Keflavik, Iceland must have current basic qualifications plus ASW qualifications; however, crews detaching to Puerto Rico for counter-narcotics operations need not have current ASW qualifications. This flexible policy allows our reserve squadron to target our inter-detachment training cycle plan to achieve theater specific training first.

b. Operational Readiness Evaluation (ORE) [ref. a, ch. 4, sec. 2]

All RegNav Fleet Patrol Squadrons shall undergo an ORE 45 - 60 days before each deployment. The ORE shall be conducted in four phases: (1) examinations for AW's, IFT's and officers; (2) flight phase of at least one tactical mission per crew; (3) WST phase of at least one WST per crew, and (4) Weapons phase consisting of a Conventional Weapons Technical Proficiency Inspection. There is no ORE for Reserve Squadrons.

c. Tactical Proficiency Course (TPC) [ref. a, ch. 5, sec. 6]

This course emphasizes crew coordination, tactical awareness, and in-flight standardization . Following a one day squadron level course, a wing level evaluation of crews shall be conducted during crew qualification events ASW-3 (Diselex), ASW-4 (Nucex) and ASU-5 (Anti-Surface Coordinated Operations). All crews shall complete TPC instruction during each inter-Deployment Training Cycle (IDTC). Reserve aircrews must meet these requirements.

d. Maintenance Training Improvement Program (MTIP) [ref. c, ch. 21]

Is a management system which, through diagnostic testing procedures, identifies training deficiencies. Qualitative assessment through individual evaluation, of technical knowledge skills allow corrective action to enhance technical knowledge levels and improve existing training programs.

Relative to the Squadron training cycle, the MTIP program allows the squadron to identify and schedule both individual and group training needs.

e. AW Training Improvement Program (AWTIP) [ref. a, ch. 4, sec. 8]

Written and practical assessment examinations will be scheduled twice each Inter-Deployment Training Cycle. Results are used to identify deficiencies and focus training in those areas.

f. Aircrew Coordination Training (ACT) [ref. a, ch. 5, sec. 7]

ACT is intended to improve mission effectiveness and reduce aircraft mishaps by enhancing crew coordination through increased awareness of specifically defined associated behavioral skills. Crewmembers must complete ACT within 60 days of checking aboard and annually after that.

g. Weapons Systems Trainer (WST) [ref. b, ch. 5, sec. 2]

A WST is formed when a 2F87(F) and 2F140(T) are operated in a coupled mode allowing a cockpit crew to participate in the 2F140(T) tactical exercise while engaged in simulated flight within the 2F87(F). The coupled mode provides a more realistic operating environment for all crewmembers and further develops and exercises crew coordination.

105.2 Define the difference between crew qual and crew currency. [ref. a, ch. 5, sec. 1;ref. b, ch. 5, sec. 1]

COMPATWINGSLANTINST 3500.24E page 5-1-2 states that "...CREWQUAL events are designed to demonstrate the ability of the critical crewmembers to coordinate their efforts in order to effectively employ the P-3 as a weapons system." "CREWCURR events are designed to ensure proficiency is maintained in those skills considered most perishable."

Teaching Point: An example of a Crew Currency event is an exercise in tracking a nuclear submarine which is a team event where skills are highly perishable as opposed to a qual for firing a harpoon which is not as difficult and the skills are not as perishable.

105.3 Explain the purpose of the Squadron Planning Board for Training (PBFT) [ref. b, ch. 4, sec. 2]

The purpose is to coordinate planning among all departments. The plan must be based on aircraft availability and known operational and training commitments.

105.4 State the highest and lowest levels of readiness. [ref. a, ch. 6, par. 6007;ref. b, ch. 6]

For aircrews R-4 is lowest indicating that the crew is NOT combat ready. R-1 indicates that they have achieved the highest degree of overall training and combat readiness. Must be at least R-2 to be sent on an operational detachment. For the squadron, C-4 is the lowest and C-1 is the highest. Squadron must be at least C-2 to deploy.

106 AIRFRAME / PROPULSION / FUEL FUNDAMENTALS

References:

- [a] NAVAIR 01-75PAC-1, NATOPS Flight Manual Navy Model P-3A/B/C Aircraft
- [b] NAVAIR 01-75PAA-2-2.1, Corrosion Control, Cleaning, Painting, and Decontamination
- [c] NAVEDTRA 12300, Aviation Machinist's Mate 3 & 2
- [d] NAVEDTRA 10348-G, Aviation Electrician's Mate 3 & 2
- [e] NAVAIR 01-75PAA-3-1, Organizational and Intermediate Level Maintenance P-3A/B/C Aircraft
- [f] NAVAIR 01-75PAA-2-1, General Information and Servicing P-3A/B/C Aircraft

106.1 Discuss the corrosion prone areas of the P-3. [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 areas and around cadmium plated steel fasteners. Other corrosion prone areas of the aircraft are located on unpainted surfaces of actuating mechanisms, painted surfaces that are chipped or peeled, skin seams, lap joints and areas where dirt and grime can collect. Rub strips, access doors, cowling areas and crevices are corrosion prone due to their affinity for accumulating moisture and cleaning compound residues.

106.2 Discuss the purpose of the Aircraft Automatic Flight Control System: [ref. a, p. I-2-24; ref. d, ch. 8]

The AFCS is 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.

106.3 State the type and model of the P-3C engine. [ref. a, p. I-1-1]

The P-3 is powered by four T56-A-14 turboprop engines.

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

The purpose of a constant speed propeller is to maintain a pre-selected RPM automatically. Suppose the aircraft is heading into a gradual climb. The constant-speed propeller 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. Now, should the aircraft assume a nose down attitude, the propeller blades move automatically to higher blade angle; hence, the propeller takes a larger bite of air. In other words, increase the load on the engine and the propeller takes a smaller bite of air. Decrease the engine load and the propeller takes a larger bite of air. This function will keep the turboprop engine at 100-percent rpm.

106.5 Discuss the P-3 aircraft fueling methods: [ref. a, p. I-3-1]

The P-3 aircraft is designed to be fueled by two methods: Center-point pressure fueling and overwing gravity feed. The normal fueling for the P-3 aircraft will be accomplished with the center-point pressure system, which is designed to accept 600 gallons of fuel per minute from two fuel trucks pumping simultaneously or from one truck at 300 gallons per minute (gpm). The pressure fueling connectors and control panel are located on the lower surface of the starboard wing immediately outboard of the fuselage and just forward of the flaps. Fueling with the APU running is considered normal fueling, NOT HOT REFUELING.

106.6 Discuss the type construction used by the P-3 aircraft? [ref. e, p. 1-4]

The P-3 aircraft is of all metal construction. The primary construction of the wing consists of a box beam comprising two main spars with upper and lower surfaces of integrally stiffened skins. Ribs are provided at frequent intervals to stabilize the structure and maintain contour. The fuselage is of semimonocoque construction consisting of skins, stringers, longerons and bulkheads or frames.

106.7 Describe the type of landing gear used on the P-3 aircraft. [ref. f, wp003, p. 13]

The landing gear is a fully retractable tricycle type gear consisting of two main gears and a nose gear. Each gear extends down and aft so that in the event of a hydraulic failure, gravity, assisted by air loads and a bungee spring, extends the gear.

107 ENVIRONMENTAL FUNDAMENTALS

References:

[a] NAVAIR 01-75PAC-1, NATOPS Flight Manual Navy Model P-3A/B/C Aircraft

[b] NAVEDTRA 10401, Aviation Structural Mechanic E 2

107.1 Discuss the purpose of the aircraft cabin pressurization and air conditioning. [ref. a, p. I-2-70]

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

Teaching Point: Oxygen is required above 10,000 feet of altitude in an unpressurized cabin. The P-3 pressurization system allows the crew to move about freely in the airplane at altitudes above 10,000 because the system keeps the cabin pressurized to the equivalent of an altitude less than 10,000 feet. The pressure controller is in "Hg" or inches of mercury. The pressurization system can tolerate a max differential of 13.3 Hg between the outside air pressure and the cabin air pressure.

107.2 Discuss the purpose of aircraft oxygen systems. [ref. a, p. I-2-77;ref. b, ch. 4, pg. 4-1]

The oxygen system is designed to supply an active flight crew of three members for approximately 3.5 hours at an altitude of 25,000 feet. Seven portable bottles are stored at tactical stations and the rear of the aircraft. With the user experiencing little or no exertion, approximately 22 minutes of oxygen is available.

Teaching Point: While the cockpit oxygen system is primarily for emergency use, non-emergency situations may exist which result in the aircraft having a cabin altitude of 10,000 or higher. In such situations, the flight deck crew (pilot, copilot and flight engineer) are required to be on oxygen. The portable oxygen bottles for the tactical crew are strictly for emergency situations.

