

## **The P-8 Poseidon - A Primer**

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### **Introduction**

Since the end of the Second World, the vast majority of designed-for-purpose land-based, fixed-wing Maritime Patrol (MP) and Anti-Submarine Warfare (ASW) aircraft worldwide trace their roots directly back to, or at least through, an airliner or a transport aircraft design. The Boeing P-8 *Poseidon*, as the latest to enter the field, is derived from the mainly civilian-pattern Boeing 737 airliner. To the ancient Greeks, *Poseidon* presided not only over the seas but also storms, earthquakes, and horses. To the Romans, Poseidon was known them as *Neptune*; there remained the link to the sea (and horse racing) while both traditions portray him as holding a trident. *Poseidon* is therefore an apt name to give a MP / ASW aircraft.

### **The Boeing 737 in Military Roles**

Approximately thirty countries have operated Boeing 737 variants in either a military or governmental role. These have usually been in small numbers and acquired directly in their civil airliner or business jet form. Specific purpose-built military variants have been rarer, with a lengthy gap between those from the Second Generation 'Classic' family to those from the more recent Third Generation or "Next Generation (NG)" series.

Twenty-one T-43A 'Flying Classrooms' served with the United States Air Force (USAF) initially as Navigator/Combat System Operator Trainers from 1973 until 2010; with some in later years being converted to CT-43A staff / command transports. Based on the 737-200 series, these aircraft had fewer fuselage windows and a more extensive antennae suite externally with the interior fitted out with trainee/trainer workstations. Also based on the 737-200 series were three 737-2X9 *Surveillers* for the Indonesian Air Force in a dual MP / Transport role, which were delivered from 1982 and remain in service. Unlike the T-43 variant, these Indonesian aircraft retained all of their cabin windows and most of the seating, as well as gaining a 16 ft (4.87m) long bulged antenna on each side of the upper rear fuselage for a Motorola Side-Looking Multi-Mission Airborne Radar (SLAMMAR) with the ability to track small ships in heavy seas at a distance of around 115 mi (185 km) from a height of 30,000 ft (9,144 m). However, the *Surveiller* variant has no ability to carry or drop offensive stores, markers or rescue equipment.

From 2001 onward, the United States Navy (USN) started to take delivery of what became a total of seventeen C-40A *Clipper* aircraft derived from the 737-700C for use in the high priority personnel and cargo transport role. In 2018, the United States Marine Corps purchased two second-hand 737-700Cs to

operate in the same role. Although they have not adopted the 'Clipper' name (nor any other) the USAF also has four C-40Bs and seven C40Cs, which entered service from 2002. All are based on the 737-700BBJ series with the C-40Bs having a VIP /Business Class interior along with an advanced secure communications fit, while the C-40Cs were bought "off-the-shelf"; their cabins can be reconfigured from a low (forty-one) to a high (one-hundred and eleven) passenger seating capacity.

The Boeing 737 AEW&C (Airborne Early Warning & Control) or ( *E-7 Wedgetail / Peace Eagle / Peace Eye* depending on the nation) was based on the 737-700ER variant minus windows and with an electronically scanned AEW and surveillance radar located in a dorsal fin on top of the fuselage, which is dubbed the "top hat" by some and which is designed for minimal aerodynamic effect. Initial deliveries were made to the Royal Australian Air Force as the launch customer starting in 2009.

### **The P-8 Poseidon's Origin**

In 2004, Boeing won the bid to replace the USN's Lockheed P-3 *Orion*, which had been in service there and with eighteen other countries for forty years, with a modern airframe and associated systems. Once perhaps considered mainly as an Anti-Submarine Warfare (ASW), Anti-Surface Warfare (AsuW) and / or Search and Rescue (SAR) asset, the modern MP aircraft has evolved into wider responsibilities such as for Intelligence Surveillance Target acquisition and Reconnaissance (ISTAR). So diverse is the current capability that what used to be ASW, and had become MPA, is in the evolving language of today now MMA or Multi-Mission Aircraft.

The new USN MMA aircraft design was designated P-8A early in 2005 and named *Poseidon* at the beginning of the following year. It first flew in 2009 and entered operational service with the USN starting in 2012. Boeing's bid was based on the 737-800ERX, which combined the -800 fuselage with strengthened -900 wings albeit with the more swept raked style wing-tips from the Boeing 767-400ER. The fuselage was strengthened for low-level operations, and other than door and escape hatch ports, the only cabin windows are visual scanner positions on either side of the forward fuselage aft of the cockpit. Power is provided by a pair of Pratt & Whitney CFM-56-7BE engines and, to provide the additional electrical power required for aircraft systems, the engine nacelles and mountings have been redesigned to accommodate more powerful generators.

A five-station internal weapon bay is located in the lower fuselage aft of the wing with a further two stores pylons under each wing and another two stations on the centreline. These provide a capability to carry various versions of the AGM-84 *Harpoon* ASM, Mk 54 torpedo, including the High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) system, giving it a stand-off PGM capacity, various bombs and depth charges, and SAR kit. Sonobuoys can be discharged from three in-flight reloadable rotary launchers in the rear cabin along with a further three single-shot tubes. As the buoys used are far more efficient than earlier generations the aircraft can monitor them from greater heights rendering Magnetic Anomaly Detection (MAD) less efficient and so this is not fitted as standard. Some references also mention a Hydrocarbon Detector for 'sniffing' out burnt or spilled fuels. A retractable MX- 20EO/IR (Electro Optical / Infra-Red ) turret is installed below the forward fuselage. The P-8 is equipped with a Raytheon AN/APY-10 Multi- Mission Surface Search Radar with a data fusion system integrating this with Sonics, Wescam MX- 20 EO/IR turret, Electronic Support and Countermeasures (ESM and ECM), as well as the aircraft's wider defensive countermeasures abilities. An extensive communications system with data-link is also fitted and includes potential for controlling UAV operations over a wider area or at lower altitudes, for which they can be equipped with MAD.

With a six-screen glass cockpit, the P-8 is normally operated by two pilots on the flight deck with another seven members of the crew operating the mission systems from consoles in the cabin, of which originally five (but later upgraded to seven) can be installed. The P-8's maximum speed is 490 knots / 564mph (908 kph), it has a service ceiling of 41,000 ft (12,500 m), and an unrefuelled range of 4,500 miles (7250 km).

Endurance is around ten hours but this can be doubled with Air-to-Air Refuelling (AAR) although, unusually for a USN aircraft, only the flying boom method is provided for, as opposed to that service's long-standard use of the probe-and-drogue method.

Besides the USN, the P-8 Poseidon has also been selected by the Royal Australian Air Force, the Royal New Zealand Air Force, the Royal Air Force, along with the Air Forces of Norway, Germany and South Korea.

### **The P-8 Poseidon for the RCAF**

In a statement published on March 27, 2023, the Canadian government announced the intended acquisition the Boeing P-8A *Poseidon* MP aircraft, with the type set to replace the RCAF's existing Lockheed CP-140M *Aurora* fleet. This selection came as the culmination of the Canadian Multi-Mission Aircraft (CMMA) project, a part of the national defence policy.

In total, Canada is seeking to acquire up to 16 P-8As, along with associated equipment and initial servicing activities, as well as access to intellectual property and technical data relevant to the platform. The *Poseidon's* selection comes after the Canadian Department of National Defence issued a Request for Information (RFI) to industry in February 2022 to explore prospective solutions to fulfil its CMMA requirements. In its March 27, 2023 statement, the Canadian government outlined that it selected the P-8A because it was "the only currently available aircraft that meets all of the CMMA operational requirements, namely anti-submarine warfare and C4ISR [Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance]. Having already selected the *Poseidon*, the Canadian government disclosed that it had submitted a Letter of Request (LOR) to the US government's Foreign Military Sales (FMS) program, outlining the nation's CMMA requirements and requesting an offer on the planned purchase of up to 16 P-8As. In response, the USN has subsequently given a contract to Boeing to commence work on 14 P-8 aircraft for the RCAF.



*These are artists representations of what the RCAF P-8 Poseidon CMMA might look like - Images courtesy of Boeing*



## Canada's next Multi-Mission Aircraft

Canada will replace its legacy CP-140 Aurora fleet with the P-8A Poseidon.



### Payload

- 5 anti-submarine torpedoes
- 4 anti-ship missiles
- 129 A-size sonobuoys
- 5 air-droppable survival kits

### Current operators

United States, United Kingdom, Australia, New Zealand (all Five Eyes allies) and other defence partners.

### Basing

14 Wing Greenwood, N.S.  
19 Wing Comox, B.C.



First Delivery	2026
Fleet size	Up to 16
Crew	8
Ferry Range	7,242 km
Air-to-Air Refuellable	Boom
Max Gross Take-off Weight	85,820 kg
Max Speed	907 km/h
Ceiling	12,496 m
Wingspan	37.7 m
Height	12.83 m
Length	39.5 m

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