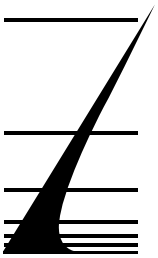
The Market for Western-Built Special Mission Military Aircraft

Product Code #F618

A Special Focused Market Segment Analysis by:



FORECAST INTERNATIONAL

Analysis 4
The Market for Western-Built Special Mission Military Aircraft 2011-2020

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PROGRAMS

The following reports are included in this section: (**Note:** a single report may cover several programs.)

Airbus A330 MRTT/KC-45A
Boeing F/A-18E/F Super Hornet
Boeing KC-767
Boeing P-8A Poseidon
Kawasaki C-2/P-1
Northrop Grumman E-2D Advanced Hawkeye

Introduction

The special mission aircraft is a diverse segment of the military aircraft market and is essentially a collection of individual markets. The segment includes maritime patrol aircraft designed for direct combat with enemy warships and submarine forces, but special mission aircraft are generally designed to support and enhance the effectiveness of aircraft, naval, and ground forces engaged in combat operations against the enemy.

There are exceptions to this general rule. Aerial tankers may be used to refuel aircraft in flight, but they also may be used to transport fuel to air bases. Airborne early warning aircraft are used to spot enemy forces in combat, but are also used in civilian roles for disaster relief operations and to spot aircraft engaged in smuggling. However, support of combat aircraft is the primary reason why nations acquire these aircraft.

This analysis forecasts production of new, fixed-wing aircraft designed for the special mission market. The analysis includes forecasts for fixed-wing aircraft used in the following missions:

- Aerial Tanker
- Airborne Early Warning (AEW)
- Anti-Submarine Warfare (ASW)
- Electronic Warfare (EW)
- Electronic/Signals Intelligence (ELINT/SIGINT)
- Maritime Patrol and Anti-Surface Warfare
- Search and Rescue (SAR)

These same missions are also often handled by specialized helicopters. For example, the Horizon battlefield radar has been fitted to the Eurocopter Cougar helicopter, and every navy employs specialized naval helicopters that engage in search-and-rescue and anti-submarine warfare operations. Rotary-wing aircraft, however, are not covered by this analysis. Helicopter-based mission systems tend to be less potent than those used on fixed-wing aircraft because of their lighter weight and lower power-generation capabilities. Helicopters are also less suited to the long-range efficiency associated with fixed-wing platforms, so, while rotary-wing aircraft do provide a similar type of capability, they are typically not true competitors with fixed-wing aircraft.

There is also a sizable market for used civil aircraft converted to the special mission role following service with civilian operators. To create a Phalcon AEW system, for example, it is not necessary to purchase a new aircraft from a manufacturer. Instead, an aircraft can be purchased at a much lower cost from an airline that is retiring the aircraft from passenger service. The interior is then stripped and converted, with aircraft modifications made by specialized facilities and mission systems installed. What emerges is an aircraft that will likely be substantially cheaper to acquire than a new-build aircraft. Although modifications of existing aircraft to add new mission systems comprise a significant part of the overall special mission market, these programs are generally covered by Forecast International's *Airborne Retrofit & Modernization Forecast* and by applicable forecast products that cover the mission systems themselves, such as radar systems, ASW systems, and the like.

For example, the government of Thailand's recent order for two AEW aircraft from Sweden's Saab is not reflected in the forecast tables within this analysis because we believe that the AEW system involved – Ericsson Microwave Systems' Erieye – is likely to be mounted on a used aircraft. Complete coverage of the production of the Erieye is available in Forecast International's *C^{4}I Forecast*.

The Platforms

The aircraft covers Western-built aircraft only. Russia and China both produce aircraft in special-purpose configurations for military use.

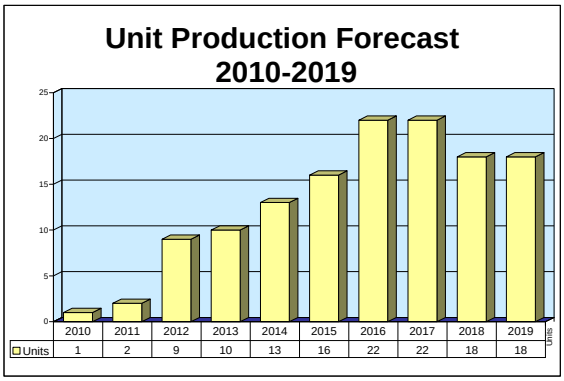
Aircraft programs covered by this analysis include:

Aircraft	Prime Contractor	Missions
Nimrod MRA4	BAE Systems	ASW
737 AEW&C	Boeing	AEW&C
KC-767	Boeing	Aerial refueling/transport
EA-18G	Boeing	Tactical jamming/EW
P-8A MMA	Boeing	MPA/ASW
A330 MRTT/KC-45A	EADS/Airbus	Aerial refueling/transport
P-1 (formerly P/X)	Kawasaki	MPA/ASW
KC-130J/HC-130J/MC-130J	Lockheed Martin	Tanker/SAR/special operations
E-2C/D Hawkeye	Northrop Grumman	AEW&C
US-2 (fka US-1A Kai)	ShinMaywa	Search and rescue/patrol

Boeing P-8A Poseidon

Outlook

- Replacement for U.S. Navy's P-3 Orion patrol aircraft fleet, based on Boeing's 737 civil airliner
- Navy requirement set at 117 aircraft; IOC planned for 2013
- Boeing sees demand for more than 100 additional aircraft as navies throughout the world recapitalize patrol aircraft fleets



Orientation

Description. Land-based maritime patrol/ASW aircraft.

Sponsor. U.S. Navy/Naval Air Systems Command, Washington, DC, USA.

Status. System Development and Demonstration.

Total Produced. Three test aircraft through August 2010.

Application. Long range, land-based ASW/maritime patrol and surface attack.

Price Range. Program unit cost listed as $229.5 million in FY11 Navy budget.

Contractors

Prime

Boeing Defense, Space & Security	http://www.boeing.com, PO Box 516, St Louis, MO 63166 United States, Tel: + 1 (314) 232-0232, Fax: + 1 (314) 777-1096, Prime

Subcontractor

Boeing Defense, Space & Security	http://www.boeing.com, PO Box 516, St Louis, MO 63166 United States, Tel: + 1 (314) 232-0232, Fax: + 1 (314) 777-1096 (Acoustic Processing System)
CAE Inc	http://www.cae.com, 8585 Côte de Liesse, Saint-Laurent, H4T 1G6 Quebec, Canada, Tel: + 1 (514) 341-6780, Fax: + 1 (514) 341-7699, Email: info@cae.com (Advanced Integrated Magnetic Anomaly Detection (MAD) System)
CFM International Inc	http://www.cfm56.com, Mail Drop Y7, PO Box 15514, Cincinnati, OH 45215 United States, Tel: + 1 (513) 552-3272, Fax: + 1 (513) 552-3329, Email: geae.csc@ae.ge.com (CFM56-7)
Fokker Elmo BV	http://www.fokker.com/elmo, PO Box 75, Aviolandalaan 33, Hoogerheide, NL-4630 AB Netherlands, Tel: + 31 164 617540 (Mission System Wiring Management)
GE - Aviation Systems, Avionics	http://www.geaviationsystems.com, 3290 Patterson Ave, Grand Rapids, MI 49512-1991 United States, Tel: + 1 (616) 241-7000, Fax: + 1 (616) 241-7533 (Flight Management System; Stores Management System)

Boeing P-8A Poseidon

General Ecology Inc	151 Sheree Blvd, Exton, PA 19341 United States, Tel: + 1 (610) 363-7900, Fax: + 1 (610) 363-0412, Email: info@generalecology.com (Versa Pure Drinking Water System)
Hindustan Aeronautics Ltd	http://www.hal-india.com, 15/1 Cubbon Rd, PO Box 5150, Bangalore, 560 001 India, Tel: + 91 802 286 5197, Fax: + 91 802 286 7140 (P-8I Weapons Bay Doors)
ITT Defense & Information Services	http://www.defense.itt.com, 1650 Tysons Blvd, Suite 1700, McLean, VA 22102 United States, Tel: + 1 (703) 790-6300, Fax: + 1 (703) 790-6360 (Pneumatic Ejector Bomb-Rack Units)
L-3 Communications - WESCAM	http://www.wescam.com, 649 N Service Rd W, Burlington, L7P 5B9 Ontario, Canada, Tel: + 1 (905) 633-4000, Fax: + 1 (905) 633-4100 (Digital Electro-Optical and Infrared Imagining Sensors)
Martin-Baker Aircraft Co Ltd	http://www.martin-baker.com, Higher Denham, UB9 5AJ Buckinghamshire, United Kingdom, Tel: + 44 1895 832214, Fax: + 44 1895 832587, Email: information@martin-baker.co.uk (Mission and Crew Rest Seats)
Northrop Grumman Corp	http://www.northropgrumman.com, 1840 Century Park E, Los Angeles, CA 90067-2199 United States, Tel: + 1 (310) 553-6262, Fax: + 1 (310) 201-3023, Email: onewebmaster@ngc.com (Self-Protection Suite; Electronic Support Measures; Night Hunter II EO/IR Sensor)
Parker Aerospace Stratoflex Products Division	http://www.parker.com, 220 Roberts Cut-Off Rd, Fort Worth, TX 76114 United States, Tel: + 1 (817) 738-6543, Fax: + 1 (817) 738-9920 (Hydraulic Hose)
Raytheon Co	http://www.raytheon.com, 870 Winter St, Waltham, MA 02451-1449 United States, Tel: + 1 (781) 522-3000, Fax: + 1 (781) 860-2520 (APY-10 Surveillance and Tracking Radar)
Spirit AeroSystems	http://www.spiritaero.com, 3801 S Oliver St, PO Box 780008, Wichita, KS 67278 United States, Tel: + 1 (316) 526-9000, Fax: + 1 (316) 526-1845, Email: communications@spiritaero.com (Fuselage)
Telephonics Corp	http://telephonics.com, 815 Broad Hollow Rd, Farmingdale, NY 11735 United States, Tel: + 1 (631) 755-7000, Fax: + 1 (631) 755-7200 (UPX-40 IFF Interrogator System)
Texas Instruments Inc	http://www.ti.com, 12500 TI Blvd, Dallas, TX 75243-4136 United States, Tel: + 1 (800) 336-5236 (APS-137 Maritime Surveillance Radar)

Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series. For a detailed description, go to www.forecastinternational.com (see Products & Samples/Governments & Industries) or call + 1 (203) 426-0800.

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Technical Data

(Preliminary)

Design Features. Derived from Boeing 737-800 commercial transport. Uses the 737-800 fuselage and the wing of the 737-900, with fuselage modified to hold an internal weapons bay. Raked wing extensions are used in place of commercial model's standard blended winglets to reduce icing at lower altitudes.

	Metric	**U.S.**
Dimensions		
Length	39.47 m	129.5 ft
Height overall	12.83 m	42.1 ft
Wingspan	37.64 m	123.6 ft
Weight		
Max takeoff weight	86,000 kg	189,200 lb
Weapons payload	5,670 kg	12,500 lb
Fuel capacity	42,681 liters	11,275 gal

	Metric	U.S.
Performance		
Max transit speed	907 kmph	490 kt
Cruise speed	824 kmph	445 kt
Service ceiling	12,500 m	41,000 ft
Range, four hours on station	2,222 km	1,200 nm
Mission radius	3,704 km	2,000 nm

Propulsion

(2) CFM56-7B turbofans, approximately 121 kN (27,300 lbst) each.

Program Review

Background. The U.S. Navy began studies of a successor to its Lockheed Martin P-3C Orion maritime patrol/anti-submarine warfare (ASW) aircraft during the late 1990s. Concept exploration studies began in 2000 as the Navy funded studies by both Boeing and Lockheed Martin. After circulating the initial draft, the Navy issued a final Request for Proposals in September 2003 that covered 251 aircraft. The figure has since been scaled down to 108 aircraft.

The Multimission Maritime Aircraft (MMA) competition ultimately came down to a face off between Lockheed Martin's Orion 21 (a much enhanced derivative of the P-3C) and a variant of Boeing's 737. The Navy ultimately selected the Boeing entry as the finalist in June 2004.

The Navy awarded Boeing the contract for the System Development and Demonstration (SDD) phase of the program on June 14, 2004, in what was estimated at the time to be a deal worth $3.9 billion. The SDD phase will result in the manufacture of seven test airframes in two stages. Three SDD Stage I flight test aircraft were procured in FY06 to support initial developmental and operational testing. A second batch of three SDD Stage II flight test aircraft will undergo DT/OT and initial operational test and evaluation (IOT&E) after being updated to the production configuration.

The P-8 program passed its Critical Design Review in June 2007. In 2008, the Navy discussed with Boeing the possibility of accelerating production of the aircraft to allow it to retire Navy P-3Cs at a faster rate. The Navy had determined that a sizable portion of the P-3C fleet is suffering from structural fatigue. Refurbishment of the affected aircraft is possible but will take money and time. The Navy saw an accelerated procurement of P-8As as the better option. This idea was later abandoned over concern that increasing the pace of development would threaten the program's ability to stay on schedule and within budget.

The manufacturer's SDD contract includes $314 million in early completion incentives as an inducement. The Navy was amenable to the accelerated schedule because its P-3C fleet is heavily tasked in current operations. Moving the P-8 into production more quickly would reduce the need to spend a substantial amount of funds on maintaining these aircraft as the service waits for their replacements to become available.

Production of the fuselage of the first development aircraft (designated "T-1") began at Spirit AeroSystems in Kansas in December 2007. The P-8 fuselages are built at Spirit and then are trucked to Boeing's facility in Renton, Washington, to be mated with the wing. Production of the aircraft is completed in Seattle by Boeing. The first flight of a T-1 occurred on April 25, 2009. This aircraft will be used for airworthiness testing. Two additional flight test aircraft, T-2 and T-3, will be assigned to test mission systems and weapons systems, respectively. First flight of a T-2 occurred on June 5, 2009. Three additional production-representative test aircraft, T4, T5, and T6, will be used in operational evaluations. The Navy planned to purchase 117 aircraft as of June 2009, an increase of nine aircraft over the prior 108-unit program target. The Navy approved the start of low-rate initial production in August 2010.

The Navy has scheduled Initial Operational Capability for 2013, and Increment 2 fleet introduction for 2015.

International Partners Sought

The Navy and Boeing held discussions with a number of potential overseas partners regarding participation in the program's development phase, with Australia, Canada and Italy viewed as prime prospects. None of these talks have borne fruit to date. Australia appears ready to order the aircraft, but it does not need to replace its fleet of AP-3s until 2018. In the meantime, the Australian government has signed a Memorandum

of Understanding with the U.S. Navy to help develop Spiral 1 enhancements to the P-8A design.

India Selects P-8A

In April 2006, Boeing offered to sell the Indian Navy eight P-8As in a deal that would include significant participation by Indian industry. Other candidates for the requirement included maritime patrol variants of the Airbus A319 and Ilyushin Il-38 and refurbished/ upgraded P-3Cs.

India selected the P-8 in 2007, and in January 2009 the Indian government signed a deal for a direct commercial sale of eight new P-8Is. Complicating the deal is a need for offsets and a requirement that Indian aerospace manufacturer Hindustan Aeronautics Ltd (HAL) take a share in production of the aircraft. Delivery of the aircraft would be required to be made within four years after signature of the contract, giving the parties wriggle room regarding the completion of a deal. The Indian Navy does not plan for its eight new aircraft to reach Initial Operational Capability before 2015.

The international market for the P-8 is expected to be significant, if not large. Boeing has said it foresees a market for about 100 P-8As to replace existing P-3 and other maritime patrol platforms.

Related News

Another Boeing P-8A Joins Flight Test Program – A Boeing P-8A Poseidon aircraft T3 successfully completed its first flight test in Seattle on July 29, 2010. T3 is the P-8A program's mission-system and weapon-certification aircraft. T3 joins the two P-8A test aircraft at Naval Air Station Patuxent River, Maryland, and will complete additional ground and flight tests. Airworthiness-test aircraft T1 entered flight testing in October 2009 and arrived at the Navy's Patuxent River facility in April 2010. T2, the primary mission-system test aircraft, arrived at Pax River in June 2010. (Boeing, 8/10)

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Funding

U.S. FUNDING

	FY08 QTY	FY08 AMT	FY09 QTY	FY09 AMT	FY10 QTY	FY10 AMT	FY11 (Req) QTY	FY11 (Req) AMT
P-8A					6	1,659.4	7	1,824.4
P-8A Advanced Procurement (CY)	-	-	-	110.2	-	138.0	-	166.2
RDT&E (PE#0605500N)	0	861.1	3	1,089.7	0	1,170.5	0	929.2
Total	**0**	**861.1**	**3**	**1,199.9**	**6**	**2,967.9**	**7**	**2,919.8**

All in $ millions.

Notes: "CY" is an abbreviation for "current year."
FY10 funding includes research funding for base aircraft and for the development of the Spiral One upgrade program.

Contracts/Orders & Options

Contractor	Award ($ millions)	Date/Description
Boeing	3,890	Jul 2004 – An initial SDD contract calling for production of five test and development aircraft, including three flight test vehicles and two static test airframes.
Boeing	278	Sep 2008 – Contract for production of two P-8As. The aircraft will include mission systems and be used during the operational evaluation phase of the MMA program.

Contractor	Award ($ millions)	Date/Description
Boeing	334.7	Jul 2009 – Contract for production of one P-8A and support activities. This aircraft is the final of three production-standard aircraft to be used in operational evaluations.
Boeing	2,100	Jan 2009 – Order from the Indian government for eight P-8I aircraft and associated equipment and services. The contract requires delivery of the first P-8I variant to take place within 48 months of contract signature. Deliveries are scheduled to run from 2013 through 2015. The Obama administration approved the direct commercial sale in Mar 2009.
Boeing	109	Apr 2009 – Advance acquisition contract for long-lead materials for the first LRIP batch of aircraft, along with production line slots in support of P-8A LRIP 2 aircraft.
Boeing	334.7	July 2009 – Contract modification covering one P-8A Stage II test aircraft with mission systems and funding the modification of three test aircraft to production-representative standard.
Boeing	136.6	Sep 2010 – Advance acquisition contract for long-lead materials for the second LRIP batch of aircraft.

Timetable

Month	Year	Major Development
	2000-01	Industry concept studies
	2001-02	Alternative solutions analyzed
Sep	2002	Component advanced development studies
Jun	2004	Boeing selected as finalist
	2004-2013	System Development/Demonstration
Apr	2009	First flight of P-8A
Aug	2010	Low-rate initial production approved
	2013	Planned IOC

Forecast Rationale

The U.S. Navy is developing the P-8A Poseidon to replace its fleet of elderly Lockheed P-3C Orion maritime patrol aircraft. The aircraft is not an all-new design, but rather is a heavily modified derivative of Boeing's 737 narrowbody airliner. The program appears to be on schedule and on budget, good news at a time when other high-visibility defense programs are burdened by news of cost spirals and development delays.

Boeing will build the P-8A production aircraft on a separate, ITAR-compliant line at the company's Renton facility rather than producing green aircraft on the civil 737 line and then converting them to military specifications. The Boeing-led team has built three Stage I flight test prototypes with FY06 funds. Two aircraft had been delivered through August 2010, and a third made its first flight in July 2010. Three Stage II production-representative test aircraft (designated T4, T5, and T6) were procured in FY09. These are scheduled for delivery in 2011-12 and will be used in operational evaluations.

The Navy began procurement of 117 production aircraft in FY10 and will buy its last P-8A in FY18. Deliveries are forecast to run through 2020.

The Navy procured six low-rate initial production (LRIP) aircraft in FY10 and requested funding to purchase seven LRIP 2 aircraft in its FY11 budget request. The Navy approved the start of low-rate production in August 2010 after a review by the Defense Acquisition Board.

All six LRIP 1 aircraft are scheduled for delivery in 2012, with the seven LRIP 2 aircraft scheduled for delivery in 2013. The Navy's production plan then calls for a LRIP 3 procurement of nine aircraft in FY12, with the first full-rate production buy happening in FY13, when the Navy plans to buy 13 aircraft. Procurement would then climb to 17 aircraft in 2014 and briefly cross

Boeing P-8A Poseidon

the 20-unit threshold in FY15. This procurement plan is, of course, subject to adjustment in future years.

On the export front, India has selected the P-8A to fill an eight-aircraft requirement. The Indian government and Boeing executed a $2.1 billion contract covering an India-specific P-8I variant in January 2009. The final design review of the new P-8I variant was completed in July 2010. Delivery of the aircraft is to begin in 2013 and run through 2015. Boeing has publicly noted that the additional orders will not have an impact on the U.S. Navy's delivery schedule. Raytheon is developing an international version of the APY-10 radar for the Indian purchase.

Australia is forecast to place an order for eight P-8s to replace its small fleet of AP-3Cs, which are due for retirement in 2018. A government defense white paper released in May 2009 listed a requirement for a total of eight new maritime patrol aircraft.

Japan has the largest P-3 fleet outside the U.S., but has chosen to develop its own aircraft, the P-1, as a replacement for these aging aircraft. The P-1 design is under development by Kawasaki (see "Kawasaki C-X/P-1" report in this tab). Unless the P-1 project encounters significant cost and/or technical problems, Japan is unlikely to buy new P-8s.

Overall, Boeing has said it sees demand for about 100 P-8As on the international market, primarily from current operators of P-3C types. The Kawasaki P-1 cannot be exported by Japan and so will not be able to compete with the Poseidon on the international market.

The primary competition for the P-8 will come mainly from refurbishment and upgrade programs for existing P-3Cs. Lockheed Martin offers a variety of solutions using existing aircraft. It completed extensive upgrades to the Royal New Zealand Air Force's fleet of P-3K Orions in the late 1990s, including the fitting of new wings and horizontal stabilizers. The program extended the life of the aircraft by an estimated 20 years. And it now offers the P-3 Aircraft Service Life Extension Program (ASLEP) that replaces the aircraft's outer wings, center-wing lower section, and horizontal stabilizers, among other components. The Royal Norwegian Air Force became the first customer for the ASLEP when it signed up for six upgrade kits, along with two conditional kits, in early 2007.

Canada needs to replace a fleet of CP-140 Auroras, the Aurora being a Canadian variant of Lockheed's P-3 Orion. These aircraft were originally to be retired around 2016, but a new upgrade program would extend their lives out to 2020. Should the program proceed, an order for the P-8A is unlikely to come until 2015 at the earliest.

About 15 countries now operate a combined total of more than 220 P-3s, but, given budgetary constraints and a reduced need for maritime patrol aircraft, many of these aircraft will likely be replaced by smaller platforms fitted with state-of-the-art mission systems. Also, a one-for-one replacement of these fleets will not be necessary. The P-8 is a faster aircraft than the P-3, enabling each plane to reach patrol areas more quickly – an improvement that Boeing believes will allow operators to reduce the size of their patrol aircraft fleets while maintaining the same level of patrol capability.

The P-8 is expected to have much higher availability rates than the P-3C because of its more modern systems. Boeing projects that the commonality of many P-8 systems with the 737 commercial transport will allow operators to use commercial vendors for maintenance and support, reducing the need to maintain a large complement of specialized maintainers – reducing parts costs and speeding up maintenance.

The U.S. Air Force was reported in February 2010 to be examining the P-8 as a potential replacement for the service's fleet of E-8 Joint Surveillance Targeting and Attack Radar System (JSTARS) aircraft. The P-8 is just one of many potential replacement platforms for this role, however.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program		**High Confidence**				**Good Confidence**			**Speculative**			
	Thru 2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**
Boeing Defense, Space & Security												
P-8 A <> CFM56 -7 <> Australia												
	0	0	0	0	0	0	0	4	4	0	0	8
P-8 A <> CFM56 -7 <> India <> Navy												
	0	0	0	2	3	3	0	0	0	0	0	8
P-8 A <> CFM56 -7 <> United States <> Navy												
	2	1	2	7	7	10	16	18	18	18	18	115
Subtotal	2	1	2	9	10	13	16	22	22	18	18	131
Total	2	1	2	9	10	13	16	22	22	18	18	131

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