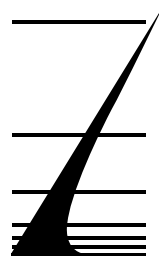


The Market for Fighter Aircraft

Product Code #F619

A Special Focused Market Segment Analysis by:



FORECAST INTERNATIONAL

Analysis 1

The Market for Fighter Aircraft 2011-2020

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PROGRAMS

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

Boeing F-15 Eagle
Boeing F/A-18E/F Super Hornet
Chengdu Aircraft FC-1
Chengdu Aircraft J-10
Dassault Rafale
Eurofighter Typhoon
Hindustan Aeronautics Light Combat Aircraft (LCA)
Korea Aerospace Industries T-50/A-50/FA-50
Lockheed F-16 Fighting Falcon
Lockheed Martin F-35 Joint Strike Fighter (JSF)
Lockheed Martin/Boeing F-22 Raptor
Mitsubishi F-2
RAC MiG MiG-29
Saab JAS 39 Gripen
Sukhoi Su-27/30/34/35 Series

Introduction

This analysis covers the market for fighter aircraft for the period 2011-2020 in terms of both units to be produced and the value of the market overall. The market for jet trainers, some of which are also used as attack aircraft, is covered in Analysis 3 of the *Military Aircraft Forecast* – "The Market for Military Fixed-Wing Trainer Aircraft."

The aircraft reviewed in preparing this analysis are listed below (the market outlook for each aircraft is covered in detail in individual reports in Tab A of the *Military Aircraft Forecast*):

Boeing F-15 Eagle
Boeing F/A-18E/F Super Hornet
Chengdu FC-1/JF-17
Chengdu J-10
Dassault Rafale

Eurofighter Typhoon
HAL Light Combat Aircraft/Tejas
Korea Aerospace Industries FA-50
Lockheed Martin/Boeing F-22 Raptor
Lockheed Martin F-16 Falcon
Lockheed Martin F-35/Joint Strike Fighter
Mitsubishi F-2
RAC MiG MiG-29
Saab JAS 39 Gripen
Sukhoi Su-27/30/35
Sukhoi T-50/PAK FA

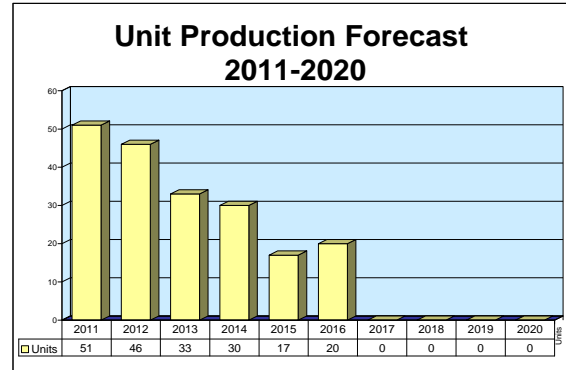
Note: Only those fighters that are currently in development and production are covered. The market for retrofits and upgrades to existing aircraft serving with air forces around the world is covered in Forecast International's *Airborne Retrofit & Modernization Forecast*.

* * *

Boeing F/A-18E/F Super Hornet

Outlook

- U.S. Navy's requirement increased from 494 to 515 F/A-18E/Fs; additional increase forecast to deal with expected fighter shortfall from 2015-2020
- Deliveries to Australia of 24 two-seat F/A-18Fs will wrap up in 2011
- EA-18G Growler electronic warfare variant in full production; final delivery scheduled for 2014



Orientation

Description. Twin-engine, single- and twin-seat, land- and sea-based, high-performance multirole fighter/attack aircraft.

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

Status. F/A-18E/F and EA-18G in production.

Total Produced. Approximately 432 F/A-18E/Fs produced through 2010, including seven flight test

aircraft. Boeing produced approximately 29 EA-18G Growlers through 2010, including two test aircraft. Approximately 1,457 F/A-18A/B/C/Ds Hornets were produced before production ended.

Application. Carrier- and land-based strike fighter/interceptor.

Price Range. F/A-18E/F recurring flyaway cost, \$60.3 million, EA-18G, \$72.1 million. Both in 2010 dollars.



Boeing F/A-18F Super Hornet

Source: U.S. Navy

Boeing F/A-18E/F Super Hornet

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
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Subcontractor

BAE Systems Electronic Solutions	http://www.baesystems.com/Businesses/EIS/Divisions/ElectronicSolutions/ , 65 Spit Brook Rd, Nashua, NH 03061-0868 United States, Tel: + 1 (603) 885-4321, Fax: + 1 (603) 885-2772 (ALQ-126 Deception ECM; Graphic Display System for Weapons Tactic Strainer)
Concorde Battery Corp	2009 San Bernardino Rd, West Covina, CA 91790 United States, Tel: + 1 (626) 813-1234, Fax: + 1 (626) 813-1235 (OEM Battery)
Curtiss-Wright Corp	http://www.curtisswright.com , 10 Waterview Blvd, 2nd Fl, Parsippany, NJ 07054 United States, Tel: + 1 (973) 541-3700, Fax: + 1 (973) 541-3699 (Canopy Actuator)
EADS CASA	http://www.eads.com , Avenida de Aragon, 404, Madrid, 28022 Spain, Tel: + 34 91 585 7000, Fax: + 34 91 585 7666 (Aft Fuselage Side Panel; Rudder; Speed Brakes; Flaps; Horizontal Tail Surfaces; Leading Edge Extensions)
ELDEC Power Conversion Division	16700 13th Ave W PO Box 1, Lynwood, WA 98037-8597 United States (Power Supply)
Eaton Aerospace - Hydraulic Systems Division	http://www.aerospace.eaton.com , 5353 Highland Dr, Jackson, MS 39206-3449 United States, Tel: + 1 (601) 981-2811, Fax: + 1 (601) 987-5255 (Vane-Type Fuel Pump)
Energy Container Corp (ECC)	2036 E Dyer Rd, Santa Ana, CA 92705 United States, Tel: + 1 (714) 250-9305, Fax: + 1 (714) 250-3123 (Radar & RECCE Pod Structure)
GE - Aviation	http://www.geae.com , 1000 Western Ave, Lynn, MA 01905-2655 United States, Tel: + 1 (617) 594-0100, Fax: + 1 (617) 594-4729 (F414-GE-400)
GE - Aviation Systems, Avionics	http://www.geaviationsystems.com , 14200 Roosevelt Blvd, Clearwater, FL 33762 United States, Tel: + 1 (727) 531-7781, Fax: + 1 (727) 538-7504 (Multipurpose Color Display)
GKN Aerospace Transparency Systems Inc	http://www.gkntransparencysystems.com , 12122 Western Ave, Garden Grove, CA 92641-2990 United States, Tel: + 1 (714) 893-7531, Fax: + 1 (714) 892-7635, Email: sales@tsus.aero.gknplc.com (Canopy)
Goodrich Landing Gear	http://www.lgd.goodrich.com , 8000 Marble Ave, Cleveland, OH 44105 United States, Tel: + 1 (216) 341-1700, Fax: + 1 (216) 429-4800 (Horizontal Stabilizer Control)
Hamilton Sundstrand	http://www.hamiltonsundstrand.com , 4747 Harrison Ave, PO Box 7002, Rockford, IL 61125-7002 United States, Tel: + 1 (815) 226-6000 (Main Engine Fuel Pump)
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 (Gun Bay Door)
Honeywell Aerospace	http://www51.honeywell.com/aero , 1944 E Sky Harbor Circle, Phoenix, AZ 85034 United States, Tel: + 1 (602) 231-1000, Fax: + 1 (602) 365-2075 (Gyroscope System)
Honeywell Aerospace, Engines, Systems & Services	http://www.honeywell.com , 111 S 34th St, Phoenix, AZ 85034-2892 United States, Tel: + 1 (602) 231-1000, Fax: + 1 (602) 231-5713 (GTCP 36-200 APU)
L-3 Communications - Electronic Systems Inc	http://www.l-3com.com/es/ , 25 Cityview Dr, Toronto, M9W 5A7 Ontario, Canada, Tel: + 1 (416) 249-1231, Fax: + 1 (416) 246-2001 (CRT Display)
Lockheed Martin Missiles & Fire Control - Orlando	http://www.lockheedmartin.com/mfc/ , 5600 Sand Lake Rd, MP 455, Orlando, FL 32819-8907 United States, Tel: + 1 (407) 356-2000, Fax: + 1 (407) 356-2080 (Laser Detector & Tracker; Strike Camera System; AAS-38A FLIR; Infrared Search and Track System)
Lockheed Martin Missiles & Fire Control - Orlando	http://www.lockheedmartin.com/mfc/ , 5600 Sand Lake Rd, MP 455, Orlando, FL 32819-8907 United States, Tel: + 1 (407) 356-2000, Fax: + 1 (407) 356-2080 (Laser Detector & Tracker)

Boeing F/A-18E/F Super Hornet

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 (Ejection Seats)
Meggitt Aircraft Braking Systems	http://www.meggitt-mabs.com , 1204 Massillon Rd, Akron, OH 44306-4186 United States, Tel: + 1 (330) 796-4400, Fax: + 1 (330) 796-9805 (Wheels & Brakes)
Moog Inc	http://www.moog.com , Jamison Rd, East Aurora, NY 14052 United States, Tel: + 1 (716) 652-2000, Fax: + 1 (716) 687-4457 (Spoiler Actuator)
Northrop Grumman Defensive Systems Division	http://www.es.northropgrumman.com , 600 Hicks Rd, Rolling Meadows, IL 60008-1098 United States, Tel: + 1 (847) 259-9600, Fax: + 1 (847) 870-5705, Email: contact_dsd@ngc.com (ALR-67 Radar Warning Receiver)
Parker Aerospace Electronic Systems Division	http://www.parker.com , 300 Marcus Blvd, PO Box 9400, Smithtown, NY 11788 United States, Tel: + 1 (631) 231-3737, Fax: + 1 (631) 434-8152, Email: esdmarket@parker.com (Integrated Fuel & Engine Display)
Raytheon Space & Airborne Systems	http://www.raytheon.com/businesses/rsas , 2000 E El Segundo Blvd, El Segundo, CA 90245 United States, Tel: + 1 (310) 647-1000, Fax: + 1 (310) 647-0734, Email: SAS_Comms_PA@raytheon.com (APG-79)
Rockwell Collins Aerospace & Electronics	http://www.rockwellcollins.com , 2701 Orchard Pkwy, San Jose, CA 95134 United States, Tel: + 1 (408) 432-3000, Fax: + 1 (408) 433-0553 (AVQ-28 Multipurpose Display)
Rockwell Collins Inc	http://www.rockwellcollins.com , 400 Collins Rd NE, Cedar Rapids, IA 52498-0001 United States, Tel: + 1 (319) 295-1000, Fax: + 1 (319) 295-5429 (ARN-118 TACAN)
SELEX Galileo	http://www.selexgalileo.com , 2 Crewe Rd N, Edinburgh, EH5 2XS Scotland, United Kingdom, Tel: + 44 131 332 2411, Fax: + 44 131 343 4011, Email: donna.mcgrory@selexgalileo.com (Combined Map & Electronic Display)
Thales Optronics Ltd	http://www.thalesgroup.com/Markets/Defence/Home/ , 1 Linthouse Rd, Glasgow, G51 4BZ United Kingdom, Tel: + 44 0 141 440 4000, Fax: + 44 0 141 440 4001, Email: supportline@fr.thalesgroup.com (Horizontal Situation Indicator)
Times Fiber Communications Inc	http://www.timesfiber.com , 358 Hall Ave, Wallingford, CT 06492-3555 United States, Tel: + 1 (800) 677-2288, Fax: + 1 (203) 265-8422 (Warning Receiver Interconnection System Hardware)

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

(F/A-18E/F)

Design Features. Mid-wing design, all-moving horizontal tail surfaces (stabilators), twin swept vertical stabilizers with single-piece rudders, and high-sink-rate tricycle landing gear with single-wheel main units and a twin-wheel nose unit. The wing's large leading-edge extensions/strakes blend into the forward fuselage near the windshield. Mid-span sawtooth with a leading edge helps maintain aileron effectiveness, and provides a high degree of maneuverability for dogfighting role.

About 12 percent of structural weight is of graphite composites, used in wing skin, flaps, ailerons, horizontal and vertical tails, and some access doors. About 55 percent of the airframe is aluminum, 14 percent is steel, and about 8 percent is titanium. The F/A-18 was the first U.S. fighter capable of supersonic speeds without the use of afterburners. This capability is limited to missions with no external fuel tanks or ordnance and using only air-to-air missiles.

Dimensions	Metric	U.S.
Length overall	18.31 m	60.1 ft
Height	4.88 m	16 ft
Wingspan	13.68 m	44.75 ft
Wing area, gross	46.45 sq m	500 sq ft

Boeing F/A-18E/F Super Hornet

	<u>Metric</u>	<u>U.S.</u>
Weight		
TOW	29,937 kg	66,000 lb
Fuel		
Internal	6,531 kg	14,400 lb
External	4,436 kg	9,780 lb
Max ext stores payload	8,051 kg	17,750 lb
Performance		
Max speed	Mach 1.8	Mach 1.8
Ceiling (F-18)	15,240+ m	50,000+ ft
Propulsion		
F/A-18E/F	(2) GE F414-GE-400 augmented turbofan engines rated approximately 97.84 kN (22,000 lbt).	
Crew		
F/A-18A/C/E, one; the F/A-18C/D/F fully combat-capable operational trainer versions seat two in tandem.		

Variants/Upgrades

F/A-18A. First single-seat model, produced from 1978 to 1985.

F/A-18B. First two-seat operational conversion unit. Produced between 1978 and 1985.

F/A-18C. Single-seat model delivered from 1986, with slightly greater range and takeoff weight. C/D first to receive ALQ-165 electronic countermeasures system and AMRAAM capability.

F/A-18D. Twin-seat version delivered from 1986.

F/A-18D Night Attack. Upgraded D, features new AAR-50 Thermal Imaging Navigation System, targeting forward-looking infrared system, laser tracker, moving map display, improved head-up display, and Cat's Eyes night vision goggles. Flew in 1988, delivered from 1989.

RF-18D. Standard two-seater fitted with Side-Looking Airborne Radar recon pod and Advanced Tactical Air Reconnaissance System. Eighty-three Ds equipped to replace USMC RF-4Bs.

F/A-18D Radar Upgrade. Approved for USMC in FY90. Equipped with upgraded APG-65 radar, designated APG-73. APG-73 has new data processors and receiver/exciter units. Radar has growth capability and can incorporate electronically steerable, active phased-array technology. A terrain-following capability was also introduced on this version. Upgrade completed in FY94; APG-73 also used on the F/A-18E/F.

F/A-18E/F. Development began in FY92. F/A-18E/F has center fuselage extension, 28 percent more internal fuel, 25 percent larger wing, 35 percent more powerful GE F404 engine (now designated F414), and more wing stations. Initial low-rate procurement began in FY97.

EA-18G. Electronic warfare variant based on the F/A-18F. This variant was designed to replace the Grumman EA-6B Prowler and is equipped with the ALQ-218, ALQ-99, and CSS-113 systems.

Program Review

Background. In 1975, the Navy chose the McDonnell Douglas/Northrop YF-18 for development as its Air Combat Fighter, a program nearly identical in mission requirements to USAF's F-16.

The YF-18, powered by GE F404 turbofans, was a major refinement of Northrop's YF-17. Full-scale development began in 1976, and the first aircraft flew in 1978. The first production aircraft flew in 1980.

As an escort fighter, the F/A-18 replaced the USN/USMC F-4 Phantom II, while for light attack missions, it supplanted Navy LTV A-7s. The Marine Corps also operates F/A-18Cs and Ds, the latter fitted with extensive night/adverse-weather fighting capability.

Boeing's McDonnell Douglas unit handled 70 percent of F/A-18 development and 60 percent of production, and Northrop assumed the lesser shares.

Boeing F/A-18E/F Super Hornet

The upgraded Block II Super Hornet debuted in 2005. The new standard replaced the existing mechanically scanning APG-73 radar with the active electronically scanned array (AESA) APG-79. Other improvements included a full Link 16 Multiple Information and Distribution System (MIDS), the ASQ-228 Advanced Targeting Forward-Looking Infrared (ATFLIR) pod, and the Joint Helmet Mounted Cueing System. The F model also included a new crew station that decoupled the rear seat's sensors and weapon systems from the pilot's, allowing the aircraft's crew to work independently of each other as needed. The first deployment of a Navy squadron equipped with the Block II Super Hornet took place in May 2008.

Navy Selects F/A-18F for Electronic Attack Mission

In 1995, McDonnell Douglas and Northrop agreed to develop an EW variant of the F/A-18F to replace the Grumman EA-6B Prowler. The variant requires no structural modifications and retains the air-to-air and air-to-ground capabilities of the E/F, but features a weight increase of about 1,700 pounds. The aircraft are fitted with podded wingtip-mounted wideband receiver arrays, a dorsal-mounted SATCOM/GPS antenna, and AESA radar. Two aircraft were used as prototypes for flight testing after conversion to the electronic attack configuration.

Boeing received the EA-18G System Development and Demonstration (SDD) phase contract in December 2003. The development program progressed on schedule, and Boeing delivered the first EA-18G Growler to the Navy in September 2006. It delivered the first production aircraft a year later in September 2007.

Unlike the aircraft used in flight testing, the production EA-18G was entirely assembled and tested on the same production line as the existing F/A-18E/F Super Hornet. The aircraft, dubbed G-1, joined the flight test program at the Naval Air Station, Patuxent River, Maryland, in 2007. The Growler was scheduled to complete flight testing in 2008 and achieve Initial Operational Capability in 2009. The Navy program of record calls for 85 EA-18G aircraft.

International Sales

McDonnell Douglas and Boeing have sold and delivered previous F/A-18 variants to the following countries: Canada (138 CF-18As), Australia (75 F-18As), Spain (72 EF-18s), Switzerland (34 F/A-18C/Ds), Kuwait (32 F/A-18C/Ds), Finland (64 F/A-18C/Ds), and Malaysia (eight F/A-18Ds). Australia became the first export customer for the F/A-18F in May 2007 when it ordered 24.

Bulgaria surfaced as the first serious international sales prospect for the E/F Super Hornet model in mid-2005. The former Warsaw Pact member nation sought availability and pricing information for 16 aircraft.

In another mid-2005 development, Boeing said it would offer the F/A-18E/F to India, which has been seeking to buy 126 new fighters under its Medium Multi-Role Combat Aircraft program. The number could rise to 200 fighters and be split between two manufacturers, but this will depend on the available funding. Other candidates include the Lockheed Martin F-16, the Dassault Rafale, the Eurofighter Typhoon, the RAC MiG MiG-35, and the Saab JAS 39 Gripen. The manufacturer selected for the requirement will deliver the initial 18 aircraft, and the remainder will be built under license in India. Technology transfer and industrial offsets are to be extensive.

Australia Becomes First Export Customer for E/F Model

In December 2006, Australian Defence Minister Brendan Nelson confirmed rumors that his country had asked Boeing for information on a potential purchase of 24 F/A-18F models to replace its F-111 strike aircraft, which are set to be retired between by 2012, leaving a gap in capability before JSF begins arriving in 2014. In February 2007, the Defense Security Cooperation Agency notified Congress of a possible sale, and in May 2007 the Australian Ministry of Defence announced that the \$3 billion contract had been signed. Press reports indicated that the aircraft would come out of planned production for the U.S. Navy to speed up delivery of the aircraft. Deliveries began in 2009 and are scheduled for completion by 2011.

Re-engine Potential for Any Super Hornet Export

The U.S. Navy has no official interest in re-engining its F/A-18E/Fs but has been approached by several manufacturers. Pratt & Whitney proposed its PW7000, combining the combustor, HP turbine, and compressor from the commercial PW6000 with a scaled LP turbine and fan from the JSF119. P&W said the PW7000 would offer a 31 percent range increase, boost acceleration by more than 25 percent, and extend mean time between overhauls out to 1,000 hours. GE proposes to increase the thrust of its F414 by 15 to 20 percent using swept three-dimensional blades, lower temperatures, and a new two-stage fan.

Boeing is developing an infrared search-and-track sensor that is mounted on the front of an external fuel tank. Using a center-mounted fuel tank for the installation allows the addition of a passiveIRST

Boeing F/A-18E/F Super Hornet

capability to the Super Hornet without requiring extensive modifications to the airframe. Boeing also working on an improved crew station centered on a new 9-inch x 11-inch display combined with a new, lower profile head-up display.

Related News

Raytheon Awarded \$52.25 Million for F/A-18 Super Hornet AESA Radars – The U.S. Department of Defense has awarded Raytheon a \$52.25 million contract modification for 19 APG-79 AESA radars to be retrofitted into F/A-18E/F aircraft, Lots 26-29. The APG-79 AESA radar, which will replace the APG-73 radar, will provide increased air-to-air detection and track range, increased air-to-ground targeting capabilities, longer launch range for standoff weapons, enhanced capability against advanced threats, and optimized use of the Super Hornet's weapons systems. The contract was awarded to Raytheon Space and Airborne Systems of El Segundo, California (U.S. Dept. of Defense, 11/10)

U.S. Navy Awards F/A-18 Support Work – The Boeing Co was awarded a \$21.6 million firm-fixed-price order against a previously awarded delivery order contract (N00383-06-D-001J) to provide integrated logistics support, in-service engineering, information systems, technical data, support equipment engineering, an automated maintenance environment, training/software integration support, provisioning and sustaining engineering in support of F/A-18 A-D, E/F, and EA-18G aircraft. Work was expected to be completed in December 2010. The Naval Air Systems Command, Patuxent River, Maryland, is the contracting activity. (U.S. DoD, 9/10)

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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
F/A-18E/F								
Proc. Cost	37	2,772.0	23	1,812.1	18	1,499.9	22	1,784.9
Adv. Proc. (current year)		46.5		42.5		51.3		2.3
Mods		485.0		464.3		559.9		536.1
RDT&E (PE#0204136N)		43.0		70.8		121.1		148.4
Total		3,346.5		2,389.7		2,232.2		2,471.7
EA-18G								
Proc. Cost	21	1,514.2	22	1,567.0	22	1,606.9	12	1,028.8
Adv. Proc. (current year)		50.8		46.7		20.5		55.1
RDT&E (PE#0604269N)		269.4		115.7		57.1		22.0
Total		1,834.4		1,729.4		1,684.5		1,105.9

Note: Procurement costs represent net P-1 costs taken from Fiscal Year Budget Item Justification sheets.

All \$ are in millions.

Contracts/Orders & Options

Contractor	Award (\$ millions)	Date/Description
Boeing	5,297	Sep 2010 – Multiyear (FY10-FY13) procurement of 124 aircraft, including 46 F/A-18E, 20 F/A-18F, and 58 EA-18G aircraft. Delivery to occur 2012-15.
Boeing	54.1	Dec 2009 – Contract for long-lead material and effort associated with full-rate production of Lot 35 F/A-18 and EA-18G aircraft.

Boeing F/A-18E/F Super Hornet

Contractor	Award (\$ millions)	Date/Description
General Electric	438	Mar 2009 – Contract modification covering 90 F414-GE-400 engines and device kits for U.S. Navy.
Boeing	1,319	Sep 2007 – Modification of previously awarded contract covering procurement of 24 F/A-18E/Fs for Australia under the Foreign Military Sales program.
General Electric	339	Sep 2007 – Modification to previously awarded contract that provided for FY07-FY08 full-rate production of 84 F-414-GE-400 engines and related parts and equipment.
Boeing	171	Sep 2007 – Modification of previously awarded contract covering procurement of three F/A-18Fs and one EA-18G for the U.S. Navy.
Boeing	9,600	Jan 2004 – Multiyear (FY05-FY09) procurement of 210 F/A-18E/Fs, plus design and development of EA-18G electronic attack variant.

Operator	Designation	Quantity	Phase
Australia Air Force	F/A-18F	12	On Order
United States Navy	F/A-18E/F	142 (MYP2 & MYP3)	On Order

Timetable

Month	Year	Major Development
Jan	1988	McDonnell Douglas and Navy begin study of advanced version of F/A-18 Hornet
May	1992	EMD Phase of F/A-18E/F program approved as Engineering Change Proposal rather than new aircraft program
Dec.	1992	EMD contract executed
Sep	1995	F/A-18E/F first flight
Apr.	1996	Authorization to procure LRIP long-lead items
Apr	1996	McDonnell Douglas and Northrop plan electronic warfare variant
Sept	1997	Start of LRIP production at Boeing
Mar	1998	LRIP II production funding approved
Jan	1999	First Super Hornet squadron, VFA-122, "stands up"
May	1999	Operational test and evaluation phase begins
Nov.	1999	Boeing selects Raytheon to develop APG-79 AESA radar for Super Hornet
Feb.	2000	Full-rate production begins
June	2000	Pentagon awards first 5-year multiyear procurement contract for 222 aircraft
Sep	2001	IOC
Dec	2003	Navy awards \$1 billion, 5-year SDD contract for EA-18G Growler
Apr	2005	Debut of Block II version of Super Hornet
Aug.	2006	First flight of EA-18G developmental aircraft, EA-1
Dec.	2007	IOC of Block II Super Hornet
Sep	2009	EA-18G reaches IOC

Worldwide Distribution/Inventories

(As of December 2010)

Operator	Designation	Quantity
Australia Air Force	F/A-18A	54
Australia Air Force	F/A-18B	17

Boeing F/A-18E/F Super Hornet

Operator	Designation	Quantity
Australia Air Force	F/A-18F	12
Canada CS	CF-18A	60
Canada CS	CF-18B	18
Finland Air Force	F/A-18C	56
Finland Air Force	F/A-18D	7
Kuwait Air Force	F/A-18C	26
Kuwait Air Force	F/A-18D	7
Malaysia Air Force	F/A-18D	8
NASA - National Aeronautics and Space Admin	F/A-18A	4
NASA - National Aeronautics and Space Admin	F/A-18B	2
Spain Air Force	EF-18A	55
Spain Air Force	EF-18B	12
Spain Air Force	F/A-18A	22
Switzerland Air Force	F/A-18C	26
Switzerland Air Force	F/A-18D	7
United States Marines	F/A-18A	28
United States Marines	F/A-18C	86
United States Marines	F/A-18D	95
United States Navy	EA-18G	10
United States Navy	F/A-18A	54
United States Navy	F/A-18B	16
United States Navy	F/A-18C	286
United States Navy	F/A-18D	47
United States Navy	F/A-18E	211
United States Navy	F/A-18F	222

Forecast Rationale

The U.S. Navy is the primary customer of the Boeing F/A-18E/F Super Hornet. The service acquired an average of about 40 aircraft per year over the past decade, and production is scheduled to end around the middle of the forecast period. The Navy is in the opening phase of acquiring the Lockheed Martin F-35C Lightning II to replace the existing F/A-18A/B/C/D Hornet fleet and the oldest portion of the Super Hornet fleet on carrier decks. The Navy's Hornet fleet is aging rapidly. Aircraft are being retired, and by 2015 the service will be retiring Hornets faster than it will be acquiring F-35Cs to replace them. The result will be a

shortfall in the number of fighters the Navy needs to equip all of its carrier air wings.

The Navy is taking a number of steps to address the expected shortfall. It is examining the potential of extending the service life of its Hornets from 8,000 to 10,000 hours. It is also considering buying more Super Hornets.

The Pentagon awarded a third multiyear procurement (MYP) contract in September 2010 covering FY10-FY13 procurement, including aircraft that Congress had approved as part of the FY10 budget. The

Boeing F/A-18E/F Super Hornet

new contract covers production of 124 aircraft between 2012 and 2015. The new deal followed the Navy's decision to increase its total program requirement from 494 aircraft to 515 aircraft in its budget planning documents for FY11.

In the past we have assumed that the Navy would add to its planned purchases of the Super Hornet as it dealt with the need to retire legacy Hornets. With this development in mind, our forecast assumes at least one extra year's worth of production in 2016, and the Navy may well buy even more aircraft if the F-35C suffers additional delays.

It is possible that the Obama administration will decide to simply reduce the size of the Navy's tactical aircraft requirement to eliminate the fighter gap. The administration threatened to veto additional funding for the Lockheed Martin F-22 in the FY10 budget on the grounds that the U.S. Air Force did not need more than 187 Raptors and that the F-35 program was the future. The administration may have a similar view of the Super Hornet program versus the F-35C.

The Navy is also acquiring the EA-18G Growler, an electronic warfare variant of the two-seat F/A-18F model. It is being built on the same production line as other Super Hornets. The Navy's original production target for the Growler was 90 aircraft. This requirement was later cut to 80, but, as we expected, the cuts were temporary. The Navy's FY09 budget raised the target to 85 units, and in its FY11 budget it raised the requirement to 114 aircraft. The first production Growler was delivered to the Navy in 2008, and production is expected to wrap up in 2014.

On the international market, the Super Hornet competes against its Boeing-made stable mate, the F-15E, along with Dassault's Rafale, the Eurofighter Typhoon and the Saab Gripen. It has also found itself in competition with the MiG-29/35 and Su-27/Su-30 in those markets that are open to buying from both Western and Russian makers. The Super Hornet has for years been viewed as a specialized carrier-based strike fighter that was not a good fit for customers using fighters in land-based operations, but recent improvements to the aircraft's sensors, cockpit, and defensive systems are designed to improve its position versus the competition.

The Block II Super Hornet's primary selling point versus other twin-engine fighters is its APG-79 AESA radar, which is reported to be able to spot stealthy cruise missiles and other small targets far enough away to allow them to be attacked and destroyed by defending fighters. AESA radars are in the works for competing European-made aircraft, but funding for these projects will be under pressure for the next few years as a wave

of budget austerity sweeps European governments. They aren't available "off-the-shelf" at the moment.

Australia ordered 24 two-seat F/A-18F models through the Pentagon's Foreign Military Sales program in September 2007. Boeing delivered the first three aircraft in 2009, and deliveries are expected to be completed in 2011.

The F/A-18E/F is a candidate for the Indian Air Force's Medium Multi-Role Combat Aircraft program, under which the service plans to acquire 126 or more multirole fighters. The Boeing fighter is competing for the deal against the MiG-35, Lockheed Martin's F-16, the Dassault Rafale, the Eurofighter Typhoon, and Saab's Gripen.

The F/A-18E/F is combat tested and has been used by the Navy in strike missions in Iraq and Afghanistan for years. The more difficult question to answer is to what extent political factors will determine the outcome of the MMRCA program. New Delhi wants to improve its relations with Washington, but memories of U.S. opposition to the country's nuclear program and fears about the prospect of a future embargo over a dispute in policy between the two nations likely remain alive among decision-makers. France and Russia have been reliable arms-trading partners with India over the years and may benefit from their existing relationships within the Indian defense procurement regime.

The government of Malaysia also remains a potential customer for the Super Hornet. The country is in the middle of acquiring Sukhoi Su-30MKMs under an existing contract, but it also maintains a fleet of eight F/A-18D Hornets it received in 1997, as well as 18 MiG-29s. Buying different fighters in small batches is an unusual approach because of the cost and inconvenience of managing separate maintenance and logistics systems for each type, but the practice does indicate that a Super Hornet purchase is not out of the question despite the country's recent acquisition of the twin-engine Su-30.

Brazil has put the Super Hornet on its shortlist for the country's FX-2 fighter competition. The Super Hornet is up against the Rafale and the Gripen, but it is a long shot. The Rafale has the edge in that competition because of growing defense industrial ties between Brazil and France.

The United Arab Emirates has emerged as a potential customer. French officials were surprised to learn in October 2010 that a potential sale of 60 Dassault Rafales to replace the UAE's fleet of Mirage 2000-9 jets was in jeopardy. France had expected to negotiate a sale to the emirates without competition, but media

Boeing F/A-18E/F Super Hornet

reports indicate that the UAE has approached Boeing about a potential Super Hornet sale. The reports indicate that the UAE is concerned that France expects it to spend EUR2 billion or more to fund upgrades to the Rafale to make it fit the UAE's needs, whereas the

Super Hornet is an off-the-shelf option that is already equipped with the technologies it desires. Enhancing relations with the U.S. government via arms purchases may also be more attractive than connecting with France.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program	High Confidence					Good Confidence			Speculative			Total
	Thru 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Boeing Defense, Space & Security												
EA-18 <> F414 -GE-400 <> United States <> Navy												
	36	21	22	13	24	0	0	0	0	0	0	80
F/A-18 E/F <> F414 -GE-400 <> United States <> Navy												
	437	18	24	20	6	17	20	0	0	0	0	105
F/A-18 F <> F414 -GE-400 <> Australia												
	12	12	0	0	0	0	0	0	0	0	0	12
Subtotal	485	51	46	33	30	17	20	0	0	0	0	197
Total	485	51	46	33	30	17	20	0	0	0	0	197

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