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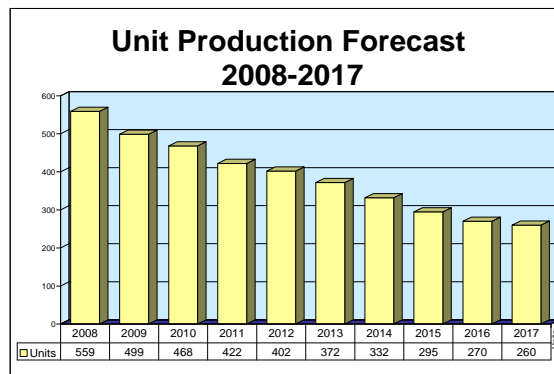
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APX-117/118(V)

Outlook

- The APX-117/118 has received contracts steadily since production began in 2001 and should continue to do so for many years
- The transponder equips a wide variety of fixed-wing and rotor-wing aircraft, as well as naval ships and submarines
- In September 2006, BAE Systems delivered the 2,000th Common Identification Friend or Foe Digital Transponder



Orientation

Description. The APX-117/118(V) airborne CXP supports both interrogating and responding operations in a single unit. It supports all IFF modes in use today and is upgradeable to next-generation IFF signals.

Sponsor

BAE Systems-North America
Advanced Systems
One Hazeltine Way
Greenlawn, NY 11740-1606
USA
Tel: + 1 (516) 261-7000
Fax: + 1 (516) 262-8002
Web site: <http://www.baesystems.com>

Status. Initial production for U.S. Navy and Army.

Application. The APX-117/118 equips a wide variety of fixed-wing aircraft, rotor-wing aircraft, and naval ships around the world.

Price Range. According to the latest contracts from the U.S. Department of Defense, the average price of a single APX-117/118 is \$45,000.

Contractors

Prime

**BAE Systems Electronics &
Integrated Solutions, Network
Systems**

<http://www.eis.na.baesystems.com>, 450 Pulaski Rd, Greenlawn, NY 11740-1606 United States, Tel: + 1 (631) 261-7000, Prime

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

APX-117/118(V)

Technical Data

	<u>Metric</u>	<u>U.S.</u>
Dimensions		
Weight	4.5 kg	9.8 lb
Size	13.65 x 13.65 x 21 cm	5.375 x 5.375 x 8.375 in
Characteristics		
Peak Power Out	500 W \pm 2W under all conditions	
Transmitter Frequency	1,090 MHz \pm 0.5 MHz	
Receive Frequency	1,030 MHz \pm 0.5 MHz	
Input Power	30W nominal, +18 to + 30 Vdc	
Modes	1, 2, 3/A, C, 4, and 5	
	Supports Mode S Level 3 and interface to TCAS II	
	Interface to TCAS II	
Crypto interface	Dual; supports external or embedded crypto (APX-118(V))	
Features	Mid-Air Collision Avoidance System (MCAS) capable	
	MIDS/JTIDS compatible	
	DoD AIMS 97-1000 compliant	
MTBF	4,000 hours per MIL-STD-781	
Maintainability	Front panel BIT activation	
	Side panel access to SRA fault indicators for rapid SRA fault detection and isolation	
	WRA status indicator for operational readiness verification	
Mounting	Airborne bay mounted	
	Airborne remote control unit	
	Shipboard versions	

Design Features. This system was derived from the APX-111/113(V) Combined IFF (Identification Friend or Foe) Interrogator Transponder and supports all IFF modes in use today or planned for the near term. It has designed-in growth potential for future modes (NATO STANAG 4193 Part 5). The CXP can be retrofitted into aircraft as a direct replacement for the APX-65(V), APX-72(V), APX-100(V), and APX-101(V).

Both the interrogator and transponder operate in Modes 1, 2, 3A, C, and 4. Additionally, the transponder provides Mode S level 1 and 2, with software growth to level 3. It was designed to accommodate Mode 5 when it is introduced.

All Combined Interrogator Transponder (CIT) signal processing is digital – performing ISLS, RSLS, GTC, diversity selection, de-fruiting, and degarbling, and using application-specific integrated circuits (ASICs). The all-digital signal processor was a significant improvement over older analog systems. It enhances signal extraction in heavy jamming and self-interference environments. The use of ASICs contributes to the system's reduced size and weight, and substantially increases reliability.

Both systems feature a fully compliant, dual-redundant MIL-STD-1553B data bus that operates in conjunction with a high-performance 32-bit microprocessor and coprocessor. It is programmed using Ada software and

is field-programmable via a 1553B data bus. This provides rapid on-site load and verification of the computer program.

The system uses a MIL-STD-1750 processor and 1553 data bus. The transmitter is fully self-contained, and the modular design makes maintenance easier. A statistical reply evaluator increases confidence in the returns processed.

The system was designed for future growth. In addition to having a transponder with Mode S capability, it was designed for growth to the Next-Generation IFF waveform. The design accommodates future growth through software upgrades rather than more expensive hardware replacements.

The NATO/Joint Mark XXI/XXIA Mode 5 capability is being developed to combine with Mode S. This cryptologically based identification technique will replace the National Security Agency–decertified Mode 4 Cooperative Identification system.

Operational Characteristics. The APX-117(V)/118(V) can interrogate other aircraft, as well as respond to identification queries. Transponders provide a set of established identification codes on request of IFF/SIF interrogators, providing specific information about the aircraft in question. The system incorporates the advanced features required in today's global military and civil air traffic control environments. It is designed

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to be upgradeable to meet future needs through software rather than hardware modifications.

The sophisticated Mk XII system is used to specifically identify military aircraft. Currently the system is the main method combat forces can distinguish friendly aircraft from foes. By using cryptologically based ID codes, identity can be established with better confidence. The system meets all international air traffic control requirements, as well as AIMS and STANAG standards.

The Mode S traffic control system provides air traffic controllers with precise location and identification of

aircraft within their flight paths. Existing Mk XII IFF systems, such as the APX-100(V) and APX-101(V), are not fully compatible with Mode S. Since military aircraft must be able to operate in established air traffic control (ATC) systems, the new systems are specifically designed to accommodate Mode S operation.

The system was also designed for better protection of overall operation in a hostile, combat environment. Electronic counter-countermeasures (ECCM) and crypto-coding are not needed on commercial IFF equipment. The upcoming Mode 5 will be crypto-based and replace the National Security Agency–decertified Mode 4 coding scheme.



APX-117/118(V) CXP

Source: BAE Systems

Variants/Upgrades

APX-117(V). Without embedded Mode 4 crypto.

APX-118(V). With embedded Mode 4 crypto.

Program Review

In late 1998, the Battelle Memorial Institute disseminated a Request for Information (RFI) to seek interested companies to produce a new IFF transponder. The system would have to be able to operate Mode S and have growth potential to (Mode 5) Advanced IFF for Air Force operations. The new system design would feature improved reliability and maintainability compared with existing systems. The optimistic estimate was for up to 6,000 aircraft installations.

In June 1999, the Naval Air Systems Command announced a planned set of pre-solicitation meetings with potential bidders of an anticipated Common IFF Digital Transponder Program (CXP). This followed RFI announcements in February and May.

In May 2000, BAE Systems was awarded a U.S. Navy contract for First Article Phase and four production options for the CXP. The first full-rate production contract was awarded in 2001.

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Replacement for APX-100

Beginning in 2002, the U.S. Army began replacing its APX-100s with the APX-118. Production continued in 2004, when the U.S. Navy ordered 1,100 APX-117s for its aircraft and ships. Additionally, BAE Systems was required to perform integration of the Air Traffic Management Radar Control Beacon Information Friend or Foe Mark XIIA System (AIMS) Mode 5 capability into the APX-118(V) and RT-1832 transponder sets.

Contract awards continued into 2006 with an award for 63 APX-117s, 293 APX-118s, and 100 APX-118 spares. The award, worth \$15.4 million, is expected to be completed in December 2007. The systems procured by this contract will equip naval and aerial platforms for

the United States Navy, Army, Special Forces, and Coast Guard. The systems will also be delivered to the governments of Germany, Norway, Japan, South Korea, Greece, and Chile as part of a Foreign Military Sales (FMS) program.

In September 2006, BAE Systems delivered the 2,000th CXP. The first contract was signed in 2001, and since then, contracts have reached \$140 million. The CXP is used by the U.S. military, as well as militaries around the world.

BAE Systems was awarded a number of contracts in 2007 for its APX-118. In total, the four contracts are worth \$60 million and cover 1,121 APX-118s along with system spares, maintenance, and other equipment.

Funding

U.S. FUNDING								
	FY06 QTY	FY06 AMT	FY07 QTY	FY07 AMT	FY08 QTY	FY08 AMT	FY09 QTY	FY09 AMT
Procurement (U.S. Navy)								
Identification Systems	-	33	-	31	-	37	-	36
	FY10 QTY	FY10 AMT	FY11 QTY	FY11 AMT	FY12 QTY	FY12 AMT	FY13 QTY	FY13 AMT
Procurement (U.S. Navy)								
Identification Systems	-	33	-	25	-	24	-	28

All \$ are in millions.

Source: FY08 U.S. budget documents

Note: Funding for identification systems covers all aspects of the procurement program, including the APX-117/118 CXP.

Contracts/Orders & Options

Contractor	Award (\$ millions)	Date/Description
BAE Systems	-	May 2000 – Contract for First Article Phase and four production options for the new Common IFF Digital Transponder Program (CXP) for the U.S. Navy and Army. First Article production required manufacture of production units, with full qualification testing, followed by four production options for over 1,900 units through FY04. (N00019-00-C-0298)
BAE Systems	14.2	Jan 2005 – FFP contract for APX-117(V) and APX-118(V) CIF digital transponder systems and associated equipment. This would include the manufacture, test, modification, and delivery of the system for use on shipboard and airborne weapons systems platforms, as well as production engineering and support, and continued support for Mode 5 development and integration. Completed by January 2006. (N00019-05-C-0027)
BAE Systems	6.1	Dec 2005 – Five-year FFP/IDIQ contract for APX-117/118(V) depot support and spares. (N00019-00-C-0298)

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<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
BAE Systems	5.1	Jan 2006 – Order against a previous FFP, ID/IQ contract for APX-117/118 CXP systems and associated equipment. This will include continued support of Mode 5 development and integration. Completed July 2007. (N00019-05-D-0027)
BAE Systems	19.9	Feb 2006 – Modification to a previously awarded FFP indefinite-delivery/indefinite-quantity contract (N00019-05-D-0027) to exercise an option for the procurement of up to 63 APX-117 and 293 APX-118 transponders. The program includes 100 APX-118 spares. Completed December 2007.
BAE Systems	7.2	Aug 2006 – Order against a previously issued contract for the APX-117 and APX-118 transponders for development, manufacture, test, modification, and delivery of Mode 5 kits. Completed December 2006.
BAE Systems	20.1	Mar 2007 – Mod to a previously awarded indefinite-delivery/indefinite-quantity contract (N00019-05-D-0027) to exercise an option for the procurement of 348 APX-118s and other equipment. Work will be completed by February 2009.
BAE Systems	6.5	Jul 2007 – Delivery order of Option Year 2 to a previously awarded indefinite-delivery/indefinite-quantity contract (N00019-05-D-0027) for the procurement of 105 APX-118s and other equipment. Work will be completed by June 2009.
BAE Systems	10.7	Sept 2007 – FFP modification to a previously awarded indefinite-delivery/indefinite-quantity contract (N00019-05-D-0027) for the procurement of 249 APX-118s and other equipment. Work will be completed by August 2009.
BAE Systems	21.6	Dec 2007 – Mod to a previously awarded indefinite-delivery/indefinite-quantity contract (N00019-05-D-0027) to exercise an option for the procurement of 419 APX-118s and other equipment. Work will be completed by September 2010.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Nov/Dec	1998	RFI for interested sources
Oct	1999	Sources Sought synopsis for CXP
Mar	2000	Selected by Navy and Army as next-generation Common Digital Transponder
	2001	First contract awarded
Dec	2003	Lot 1 procurement begins
Dec	2004	Lot 1 production complete
Sep	2006	2,000th production APX-117/118 delivered

Worldwide Distribution/Inventories

The CXP is operated in the **United States** by the Army, Navy, Special Forces, and Coast Guard. **Germany**, the **Netherlands**, **Norway**, **Japan**, **Saudi Arabia**, **South Korea**, **Greece**, and **Chile** also operate the system.

Forecast Rationale

Production Will Remain Strong

Prospects for the APX-118 remain good. The system has steadily generated contracts since production began in 2001 and should continue to do so for many years.

The U.S. government has issued contracts for the CXP for both its own forces and those of its allies through foreign military sales.

APX-117/118(V)

The APX-117/118 is the latest in a long line of BAE Systems' IFF transponders and builds on the company's past successes. Its APX-113 is still being produced and is mostly used on F-16s and F-15s. The APX-117/118, however, was designed as a replacement for the APX-111 on F/A-18s. It has since been chosen to equip a wide variety of fixed-wing and rotor-wing aircraft, as well as naval ships and submarines. The large number of platforms that the APX-117/118 equips ensures that production will continue.

New Contracts Leave Out APX-117

Contract awards for 2007 have left out orders for the APX-117. There have been no official statements

regarding the future of the APX-117, however, if this trend continues, production of the system will cease.

Over the next 10 years, expect BAE Systems to produce 390 APX-117s and 3,489 APX-118s, for a total of 3,879. They are two of the most advanced IFF systems on the market today, and contracts will continue to roll in from countries around the world. Production levels will be highest in 2008 and gradually decline from there. The United States is the primary customer of the systems; however, many other countries have received the APX-118 through foreign military sales.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program		High Confidence				Good Confidence			Speculative			
	Thru 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
BAE Systems Electronics & Integrated Solutions												
APX-117 <> Worldwide												
	332	44	43	41	41	38	37	38	37	36	35	390
APX-118 <> Worldwide Year 2008-APX-117 and APX-118 production is for aircraft and naval vessels for the U.S. Navy, Army, and Coast Guard. It also includes production for Saudi Arabia and the Netherlands.												
	2,195	515	456	427	381	364	335	294	258	234	225	3,489
Subtotal	2,527	559	499	468	422	402	372	332	295	270	260	3879
Total	2,527	559	499	468	422	402	372	332	295	270	260	3,879