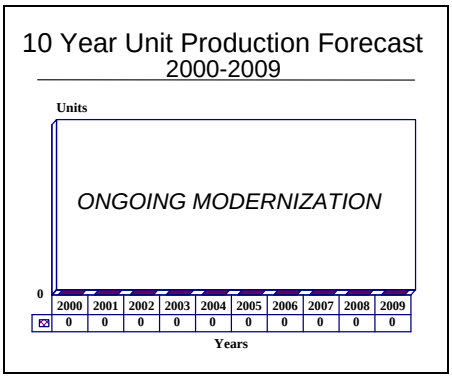
Boeing E-4 Advanced Airborne National Command Post (AABNCP) - Archived 6/2001

Outlook

- Modified Miniature Receiver Terminal upgrade begun
- Post-Cold War environment perceived as reducing need for E-4



Orientation

Description. Airborne Command Post. Airframe is similar to 747, with dorsal blister forward of wing and various other small dorsal antennas.

Sponsor. US Air Force, Aeronautical Systems Division.

Contractors. Boeing Aerospace Co, Kent, WA, USA.

Status. Operational since December 1974; E-4B since December 1979.

Total Produced. Four active in E-4B configuration.

Application. Command/Control/Communications (C^3) vehicle for key military personnel during a national emergency, specially outfitted for trans/post nuclear exchange operations.

Price Range. Total cost of converting three E-4A aircraft to the B configuration was approximately $417 million. Total E-4 acquisition cost, including procurement and modification, is estimated to be $1.2 billion.

Technical Data

Design Features. Cantilever low-wing monoplane, four underwing-mounted turbofan engines. Virtually identical externally to Boeing 747 commercial transport.

	Metric	US
Dimensions		
Length overall	70.66 m	231 ft
Height overall	19.33 m	63.5 ft
Wingspan	59.64 m	195.8 ft
Wing area, gross	511 sq m	5,500 sq ft

Weight

	Metric	US
Empty, approx.	189 kg	410,000 lb
Loaded, approx.	371.9 kg	820,000 lb

Performance

Max speed (at 9,144 m, 30,000 ft)	969 km/h	522.8 kt
Typical cruising speed	939 km/h	503.3 kt
Max range[(a)]	11,426 km	6,170 nm
Take-off distance, ISA	317 m	10,400 ft
Cruising ceiling	13,715 m	45,000 ft

Propulsion

E-4B (4) General Electric F103-102 turbofans rated 233.52 kN (52,500 lbst).

Crew

Up to 94 C^3I personnel on three decks, including flight crew.

[(a)]Max fuel, without in-flight refueling.

Variants/Upgrades

E-4A. Original version equipped with avionics from EC-135 aircraft. First two aircraft powered by JT9D engines, third by CF6-50E. Three built 1974-75.

E-4B. Fourth aircraft built, E-4A later upgraded to this standard. Extensive new avionics, electronics (especially radios), acoustic controls, nuclear thermal shielding, larger crew.

Program Review

Background. The Boeing E-4 was procured to replace the EC-135 command posts of the National Military Command System and the Strategic Air Command (SAC). The E-4, a part of the Advanced Airborne Command Post program, is designed to carry the President and other key military staff. The objective is to keep these leaders in touch with all (surviving) national assets through a network of communications vehicles and ground stations. The E-4 crew operates with the E-6 TACAMO ballistic missile submarine communications aircraft, E-3 sentry AWACS, various EC-135 command/control aircraft, military bases, and commercial telephone and radio networks (including making radio broadcasts itself on most all bands), and can quickly hook up to a ground communications network while on the ground.

The AABNCP E-4 has gone through several upgrades and changes. The original two E-4As were basically test aircraft, to which electronics from the EC-135 were added as an interim while advanced, custom-made systems were being developed. These aircraft were modified to be equipped with ICBM launch control equipment, but this requirement was dropped. The third and fourth aircraft joined the group with General Electric CF6-50E engines. All four aircraft now have the GE F103-102 (civil GE CF6-E2) engine for better fuel consumption and high and hot field performance than offered by the original JT9D engines. The fourth aircraft was delivered as an E-4B testbed with in-flight refueling capability and a modified electrical system. The C^3 equipment was then installed and tested.

The E-4Bs avionics suite was designed by a team of Electrospace Systems, Burroughs, Collins, Rockwell and RCA, all being coordinated by E-Systems and Boeing. The complete E-4B includes ASC-21 AFSATCOM and ASC-24 AFSATCOM UHF radios, super-high frequency communications equipment (whose aerials are housed in a dorsal blister), and dual Collins ARC-183 VLF/LF radio communications systems, which use trailing long wire (8 km, 5 miles long) and trailing short wire (1,200 m, 4,000 ft). Secure voice systems are provided by the KY-28, KY-3A and KY-75 crypto units. Digital data are transmitted by the ARA-60 secure digital data system. Multiple UHF radios are on board, as are high-frequency (HF) and single side-band (SSB) radios. An air conditioning system of 226.5 cubic meters (8,000 cu ft)/min cooling capacity is added to cool these and other systems.

These other systems include an APQ-122 search radar, a Carousel IV Inertial Navigation System, and SANS-7000A TACAN.

In 1990, the Department of Defense downgraded the E-4 status to ground alert, rather than keeping one aircraft airborne at all times. The reduced status allows for a specified number of sorties per week, which obviously saves fuel. This also reflected the lessening of tensions between the two superpowers and the more recent dissolution of the USSR.

The E-4 fleet is currently undergoing several modifications. The aircraft are being fitted with Traffic Alert & Collision Avoidance Systems (TCAS); NAVSTAR GPS receivers; new Flight Data Recorders; a Nuclear Planning and Execution System (NPES); and a Modified Miniature Receiver Terminal (MMRT).

Funding

The US Air Force maintains a line item in its procurement budget for E-4 modifications.

US FUNDING

	FY98		FY99		FY00		FY01(Req)	
	QTY	AMT	QTY	AMT	QTY	AMT	QTY	AMT
E-4 Mods		$12.7		11.0		15.0		31.6

All $ are in millions.

Recent Contracts

None noted.

Timetable

Month	Year	Major Development
May	1973	Interim electronics integration contract
Jun	1973	First flight of AACP-modified 747
	1973	Flight tests completed 1973
Jan	1974	E-4B development contract with Boeing signed
	FY73-FY74	Initial four aircraft funded for procurement
Dec	1974	First E-4A aircraft delivered
May	1975	DSARC review of E-4A cost escalation
Aug	1975	E-4B testbed delivered
Sep	1978	E-4B flight tests completed
Dec	1979	First E-4B delivered to Air Force
Jun	1980	E-4A to B modification contract awarded
Jan	1983	First E-4B roll out
Jul	1983	First E-4B delivered
Jan	1985	Last E-4B delivered

Worldwide Distribution

Country	Total	Variant	Ave. Age (Yrs)
USA	4	E-4B	25

Forecast Rationale

The major upcoming E-4 upgrade will be the Modified Miniature Receiver Terminal project, estimated at $38.7 million and planned for initiation in FY00. This unit is the same VLF/LF receiver fitted to the B-1B and B-52H bomber aircraft.

Additional E-4B modernization will take place over the life of this platform, but none of these planned or projected programs will involve a production re-start.

Ten-Year Outlook

No production of E-4B, or further 747 modification to E-4B configuration, is anticipated.

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