

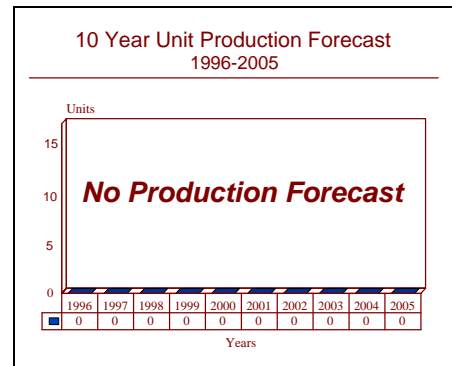
ARCHIVED REPORT

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ARC-171(V) - Archived 9/98

Outlook

- Production completed
- Has transitioned to spares support
- With availability of ARC-204 and ARC-210, future applications unlikely



Orientation

Description. Airborne Ultra High Frequency (UHF) radio.

Sponsor

US Air Force
Warner-Robins Air Logistics Center
215 Page Road Ste 106
Robins AFB, Georgia (GA) 31098-1662
USA
Tel: +1 912 926 2137

Contractors

Rockwell International Corp
Collins Avionics & Communications Division
350 Collins Road NE
Cedar Rapids, Iowa (IA) 52498
USA
Tel: +1 319 395 1000
Fax: +1 319 395 4777
(Prime: Development/Production)

Status. Out of production; spares support only.

Total Produced. An estimated 2,675 units were produced through the end of 1996.

Application. Strategic and special-purpose aircraft such as B-1, B-52, E-3, E-4, E-6, EC-130, EC-135, KC-10, and RC-135.

Price Range. Based on averaging of contracts dating from the mid- to late 1980s, the price of an ARC-171(V) was about US\$40,000.

Technical Data

Design Specifications. ARC-171 RT configurations range from 10 watts AM voice to 30/100 watts AM/ FM/ FSK/ECCM and satellite capabilities, with a MILSTAR configuration also available. The same chassis is used for all versions except for the full duplex. The desired version

is obtained through simple module/card substitution. The form factor is compatible with all existing UHF radios, thus allowing simple replacement when upgrading capability. It also results in reduced maintenance costs through improved reliability.

All configurations feature nuclear survivability and built-in test equipment. Each version offers self-contained cooling using an optional blower. Primary power is either 28-volt DC or 115-volt, 3-phase, 400 Hz, depending upon the power supply module selected. The ARC-171(V) provides 7,000 UHF channels in 25 kHz increments between 225.000 MHz and 339.975 MHz. A preset "guard" channel (243 MHz) is also included.

Operational Characteristics. The transceiver is controlled by means of a serial data stream and clock from the associated control unit. One control unit supplies control status data for AM-only radios. A second control unit is

available for use with radios having AM/FM/FSK/ECCM capabilities. Both control units allow operator control of built-in-test and use a nonvolatile solid-state memory with push-button channel storage. A third control unit is available for satellite communication terminals.

A digital frequency synthesizer generates injection frequencies for both transmit and receive functions and can change frequencies in less than one millisecond. The transceivers supply a 1 MHz reference output and can also use an external 1 MHz reference. The frequency reference is either TCXO or an oven-controlled standard.

Variants/Upgrades

Variants. The ARC-171(V) is produced in three basic models. The ARC-171(V)A is an AM-only transceiver. The "C" model is both AM and FM, while the "H" model has a full duplex capability, allowing simultaneous two-way conversations. The basic transmit and receive unit weighs only 35 lb (15.9 kg) and is a compatible replacement for ARC-27, ARC-34, ARC-51, ARC-89, and ARC-109 radios. The line-of-sight control panel, which includes frequency selection controls, weighs only 4 lb (1.81 kg).

HAVE QUICK. As part of the effort to increase the security of USAF radio communications, the ARC-171(V) was designated as part of a group of radios to receive HAVE QUICK I secure-voice, frequency-hopping modification kits. Developed by what was then Magnavox Government and Industrial Electronics Co, the HAVE QUICK I adapter set consisted of an external add-

on module that provided timed frequency changes. ARC-171(V) later received improved HAVE QUICK II capability, which is now carried under the Hughes Defense Communications division of Hughes Aircraft Co (HAVE QUICK I is no longer in production).

For the E-3 AWACS application, the set consists of two J-3850 electronics units, four C-9533A radio control sets and the ID-2391 indicator. The J-3850 electronics unit contains a very accurate Rubidium clock and is capable of controlling two ARC-171(V) radios. The ID-2391 indicator displays the status of the Rubidium oscillator which the system uses for time keeping and provides visual cues to the operator for priming and net selection. There were approximately 20 ARC-171(V)s on USAF E-3 series aircraft; however, four of the ARC-171s were to be replaced with a like number of HAVE QUICK A-Net radios, the ARC-204.

Program Review

Background. The ARC-171(V) was designated the Air Force Growth Radio (AFGR). Its goal was to provide versatile and flexible modular ultra-high-frequency (UHF) radios for a broad range of communications applications. The AFGR can be configured, due to its modular design, to provide clear and secured voice, tactical data and/or satellite communications.

The ARC-171(V) was designed to be compatible with current military satellite communications systems. About 1984, the USAF began to modify ARC-171(V) radios to enhance their AFSATCOM capabilities. The modification provided high-speed frequency synthesizer and control monitor circuits for the ARC-171 AFSATCOM transmitter/receiver. This modification was required to improve the operation of the radios in a jamming

environment, and to begin the transition to MILSTAR (see separate report) communications.

The program's emphasis later shifted toward retrofit upgrade kits for the A and H models. Estimated quantities produced are: 927 type A kits (one synthesizer module) and 581 type H kits (two synthesizer modules, one control monitor module and chassis re-wiring components). Full-scale development of the kits was completed in June 1987 and the design was to be implemented as the new ARC-171 baseline for ongoing production. First production deliveries were tentatively scheduled for May 1988 but slipped until mid-June 1988. Apparently Collins was on schedule with its production, but the Air Force was unable to accept the radios before June. Delivery was completed in FY90.

Funding

Not applicable, as production has ended.

Recent Contracts

No recent contracts were identified.

Timetable

	1973	Development began
	1976	Collins competitively won the first production award
	1981	Selected as UHF radio for B1-B
	1984	AFSATCOM Mod initiated on EC-135
Jun	1987	Collins completed upgrade development
Jun	1988	First deliveries of upgrade radio kits
	FY90	Completion of deliveries of upgrade kits
	1996	Production completed

Worldwide Distribution

The ARC-171(V) UHF radio has been the standard satellite communications system on **US Air Force** aircraft. The radios have been used on a variety of strategic aircraft in US Air Force inventory, as well as the **US Navy's** E-6A. The radios also equip those E-3A AWACS flown by **NATO, Saudi Arabia, France,** and the **UK**.

Forecast Rationale

The bulk of ARC-171(V) production was completed in the late 1980s, with Rockwell-Collins providing subsequent spares support. The E-4 National Airborne Command Post had its aging ARC-89s replaced with six ARC-171(V)s, starting in FY94; these were new production units.

In 1990, the USAF selected the Magnavox/Xetron ARC-204 UHF radio as part of the E-3 series AWACS HAVE QUICK A-Net modification program. The ARC-204 is an improved anti-jam HAVE QUICK II radio

that is compatible with existing HAVE QUICK equipment. Four ARC-204s replace a like number of ARC-171(V)s on AWACS aircraft. The upgrade was to be fitted to all NATO, French and British E-3 AWACS aircraft.

Due to these factors, plus the availability of the ARC-210 multi-band, multi-mode transceiver with embedded SATCOM/DAMA, VMF datalinks and COMSEC, the ARC-171 has now transitioned to spares support activity. Production is completed.

Ten-Year Outlook

No further production is forecast for the ARC-171(V). This report will be dropped next year.

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