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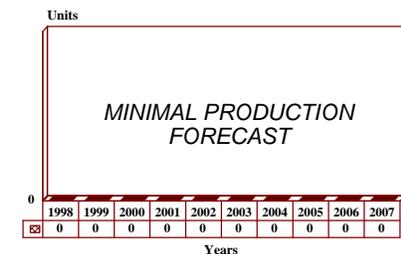
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ARN-118(V) TACAN - Archived 7/99

Outlook

- In widespread service, with over 30,000 units produced
- Demand has been low of late
- Production will be discontinued after 1999
- **Barring further activity, this report will be dropped next year, 1999**

10 Year Unit Production Forecast
1998-2007



Orientation

Description. Tactical airborne navigation system.

Sponsor

US Air Force
 Warner Robins Air Logistics Center
 Robins AFB, Georgia (GA)
 USA

Contractors

Rockwell International Corp
 Collins Avionics & Communications Division
 350 Collins Road NE
 Cedar Rapids, Iowa (IA)
 USA
 Tel: +1 319 295 5100
 Fax: +1 319 295 4777

Status. Production to conclude in 1999.

Total Produced. Through 1997, an estimated 30,440 units were produced.

Application. Most US Air Force, Coast Guard and Navy aircraft, as well as associated FMS and foreign-produced aircraft. (See Worldwide Distribution section below.)

Price Range. The unit price has been estimated at US\$15,000, but this is based on the initial (1976) production contract and does not take inflation – or any other factor that could have altered this figure through the years – into account. There have since been no contracts that have provided a specific dollar value and quantity to aid in making a determination of price.

Technical Data

	<u>Metric</u>	<u>US</u>
Dimensions		
Receiver/Transmitter:	19.1 cm W x 17.3 cm H x 31.8 cm D	7.5 in W x 6.8 in H x 12.5 in D
Adapter:	4.3 cm W x 17.3 cm H x 31.8 cm D	1.7 in W x 6.8 in H x 12.5 in D
Control:	12.7 cm W x 7.6 cm H x 8.1 cm D	5.0 in W x 3.0 in H x 3.2 in D

	<u>Metric</u>	<u>US</u>
Weight		
Receiver/Transmitter:	12.23 kg	27.0 lb
Adapter:	1.81 kg	4.0 lb
Control:	0.77 kg	1.7 lb
Shockmount:	0.68 kg	1.5 lb
Power Requirements:	115 V AC, 400 Hz, 125 watts	
Cooling:	Self-contained blower	

Design Specifications. The ARN-118(V) TACAN has had the distinction of being the most widely used military navigation system in service. It can provide an aircraft pilot with distance and bearing information with an operational range of 390 nm air-to-ground and 300 nm air-to-air. The system weighs about 34 pounds and is all solid-state except for a 100-watt power output which is provided by transmitter tubes. The ARN-118(V) consists of four elements: a basic transmitter/receiver unit, a cockpit control unit, a digital-to-analog adapter, and a shock-mounted platform with appropriate wiring. Mean time between failures (MTBF) is 2,000 hours – 1,200 hours over the factory warranty. Air-to-air ranging is up to five aircraft, with bearing accuracy of ± 1 degree, and absolute range accuracy of ± 1 nm.

The ARN-118(V) can directly replace the ARN-21, ARN-65, ARN-72, ARN-52V, and ASQ-19/88 through the use of an adapter unit and mounting base. The mounting base contains the wiring necessary to utilize existing aircraft cables and connectors. A new serial control tuning unit directly replaces the old control unit in retrofit applications. The serial control provides complete TACAN control functions, and it utilizes only eight control lines.

Since no structural modifications are required, older TACANs can be replaced usually in less than half an

hour. Existing aircraft displays are used and, as the adapter unit converts the digital output of the ARN-118(V) to analog signals, it is compatible with standard aircraft instruments.

Operational Characteristics. The ARN-118 incorporates protection against encountering a weak or incorrect signal, which can erroneously lock onto another 40-degree sector, resulting in a bearing error of 40 degrees or a multiple of 40 degrees. The ARN-118 provides a monitoring circuit to ensure that a 40-degree lock-on error cannot be displayed to the pilot. The pilot also receives warnings when there is co-channel interference caused by a garbled station identifier. False or incorrect lock-on due to mechanical misalignment of crystal selectors assemblies is eliminated since no moving parts are involved in the channeling process. Echo protection and built-in automatic self-test equipment are provided, as are channel acquisition of less than one second, one-second DME, and three-second bearing lock-on features.

Both X and Y channels are standard on the system and a self-contained automatic antenna switch makes it possible to plug the unit into aircraft that have either single or dual TACAN antenna installations.

Variants/Upgrades

ARN-153(V) TACAN. Collins offers the ARN-153(V) TACAN as a direct replacement of the ARN-118(V). The ARN-153(V) is a MIL-STD-1553-compatible, digital system that has about half the size and weight of the ARN-118(V), and will operate with any ARN-118(V) control for ease of retrofit. MTBF was anticipated to be 4,000 hours. This system has been selected for the US Air Force C-17 and B-2; Other activity has included the

Marine Corps' proposed AV-8B upgrade and some undisclosed Army helicopter applications.

MAGR. Collins also developed the Miniature Airborne GPS Receiver (MAGR) – a next-generation airborne navigation device – for the US Department of Defense. Initial low-rate production began in 1994.

Program Review

Background. Originally developed for the US Air Force in 1975, the ARN-118 was first tested aboard T-38 jet trainers, leading to the initial production contract (US\$14.7 million, for 1,000 units) in 1976. In 1978, after encountering many problems with its ARN-84 MICROTACAN, the US Navy began purchasing the ARN-118(V) for A-4M aircraft. In 1981, the system was sought as a replacement for the troubled navigation set on Navy's SH-2F and, after performing

exceedingly well, became a standard item on most US Navy aircraft. The last contract activity to be identified for the US comprised five awards between February 1991 and February 1992, for a total of US\$9.5 million.

International customers have also been a major source of sales through the years. The Mirage F-1 is but one platform that has been specifically identified for this system. According to Rockwell Collins, a total of over 30,000 ARN-118(V)s have been sold worldwide.

Funding

No further RDT&E funding is expected. Any residual procurement funding to be spent before the ARN-118(V) exits production will be contained within individual aircraft modernization procurement accounts; none is broken out in separate line items.

Recent Contracts

The most recent contract to be identified was the mid-1990s purchase of ARN-118(V)s as part of a US\$16 million avionics package for the upgrade of 25 CT-133 Silver Star combat training aircraft operated by Canada.

Timetable

<u>Year</u>	<u>Major Development</u>
1975	ARN-118(V) developed under US Air Force RDT&E
1976	Initial test trials aboard T-38 jet trainers; Air Force ordered first 1,000 production units for US\$14.7 million
1978	US Navy procured first 200 sets for A-4 aircraft
1981	Field reliability surpassed 800 hours; ARN-118(V) chosen to replace USN SH-2F aircraft navigation set
1994	Next-generation MAGR receiver entered low-rate production
1999	Last year for ARN-118(V) production

Worldwide Distribution

According to Rockwell Collins, the US Air Force and Navy have installed the ARN-118(V) aboard virtually every existing platform, except those facing imminent retirement. The following is a listing of US military aircraft that have used the ARN-118(V):

A-4	B-52	C-130	CH-53E	F-16	MB-32	T-38
A-7	C-5A	C-131	E-2C	F/A-18	OV-1	T-39
A-10	C-7A	C-135	F-4	F-111	OV-1	U-21
A-37	C-9A	C-141	F-5	FB-111	P-3C	UH-1F/P
AV-8B	C-12	CH-3	F-14	HH-1H	SH-3	UH-1N
B-1	C-123	CH-46	F-15	HU-25A	SH-60	VC-137

The ARN-118 has also been deployed aboard a number of foreign fighters and tanker aircraft. Users of the system have included **Algeria, Angola, Argentina, Australia, Bahrain, Belgium, Bolivia, Brazil, Cameroon, Canada, Chad, Chile, Denmark, Ecuador, Egypt, El Salvador, Ethiopia, France, Gabon, Germany, Ghana, Greece, Haiti, Honduras, Indonesia, Ivory Coast, Israel, Italy, Iran, Japan, Jordan, Kenya, Libya, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Niger, Nigeria, Norway, Oman, Pakistan, Peru, Philippines, Portugal, Saudi Arabia, Singapore, Somalia, South Korea, Spain, Sudan, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Arab Emirates, United Kingdom, Venezuela,** and the **Yemen Arab Republic**. **China** also acquired several sets of the ARN-118 for evaluation for its military navigation improvement program.

Forecast Rationale

Since the late 1970s, the ARN-118(V) has been the standard tactical air navigation system for most current-generation US military aircraft. It has been directly superseded, however, by the ARN-53(V) TACAN. That system, together with the MAGR receiver, can be installed within the avionics space allocated to the ARN-118(V) and provide a major increase in navigation capabilities. TACAN capability will likely be retained to serve as backup to the more advanced GPS system.

Rockwell Collins has announced that production of the ARN-118(V) will be discontinued after 1999. This decision was due a combination of factors, including age of design and low demand, which have contributed to an increasingly “nonprocurable” status of critical components. Remaining production will likely be geared toward filling existing orders. As open-source material has indicated little activity over the past few years, only minimal production is expected for the near term.

Ten-Year Outlook

No significant production is forecast; thus the chart has been omitted. **Barring further activity, this report will be dropped next year, 1999.**

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