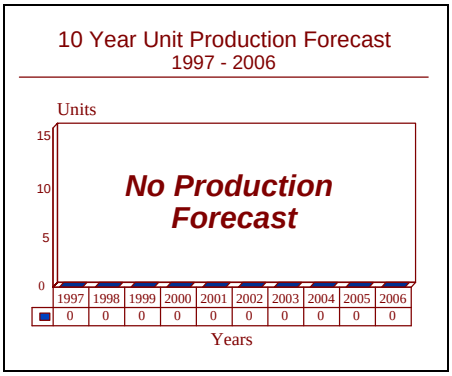
AAS-33A -Archived 11/98

Outlook

- Production run completed
- Remaining support will end when A-6Es are fully retired in 1998
- Report will be dropped next year, 1998



Orientation

Description. Detection and Ranging Set (DRS).

Sponsor
US Navy
Naval Air Systems Command
Jefferson Plaza Bldg. 1
Washington, DC 20361-0001
USA
Tel: +1 202 692 2260

Contractor
Hughes Electronics Corp
PO Box 80028
7200 Hughes Terrace
Los Angeles, California (CA) 90080-0028
USA
Tel: +1 310 568 7200

Status. Production complete; limited spares activity.

Total Produced. Total production is estimated at 324 units.

Application. Electro-optical sensor for the A-6E.

Price Range. Indeterminate from available documents.

Technical Data

Characteristics

Max Diameter (turret):	20 in (50.80 cm)
Weight (total system):	less than 500 lb (227 kg)

Design Specifications. The AAS-33A Detecting and Ranging Set (DRS) is the heart of the Target Recognition and Attack Multi-sensor (TRAM) update to the Navy's Grumman A-6E Intruder. The AAS-33A DRS consists of a forward-looking infrared (FLIR) receiver a laser designator-ranger and a laser receiver. These are housed in a stabilized turret located underneath the radome, in front of the nose landing gear wheel well. The rotating turret can provide a full 360 degrees of coverage for the entire attack run. Cued to the A-6E's

APQ-156 multi-mode radar, the flight crew can acquire long-range targets and then employ the AAS-33A's boresighted FLIR to track those targets. The first TRAM-equipped A-6E was delivered to the Navy in 1978 and the first carrier deployments began in 1980.

The Laser Receiver Transmitter (LRT) has been modified to add a removable crown to maximize the number of repairs that can be accomplished without removing the Turret Sensor Platform (TSP). The TSP package contains the FLIR, Laser Receiver Designator and Forward Air-Control Receiver. TSP removal exposes these sensors to excessive handling, cable damage, breakage and disassembly damage.

Operational Characteristics. The AAS-33A's FLIR can track targets at night by displaying the temperature differentials of objects within the target area. The continuous optical zoom capability of the FLIR allows the bombardier/navigator to bring the target image in for a close-up view for optimal recognition. During zoom the image remains intact despite a change in the field of view, with the picture of the target displayed on a CRT (cathode ray tube) screen in the cockpit. Temperature differential sensitivity is said to be so high that it is possible to tell how much oil remains in a storage tank.

During target acquisition, the bombardier/navigator must manually locate the target on his radar screen, and then designate it on a separate FLIR video screen and engage the laser ranging system to determine range and illuminate the target with a laser spot for delivery of laser-guided munitions. The AAS-33A's laser receiver is also used to locate targets illuminated by external laser designators. The turret is gyro-stabilized, so once the flight crew obtains and locks on target, the pilot can perform evasive maneuvers and still accurately guide weapons to impact.

Depressing the "attack" button on the console beside the radar/FLIR slew control handle engages the ballistic computer to calculate the proper release point to deliver laser-guided or conventional munitions. The bombardier/navigator continues to manually track the target with the cursors on the FLIR display. This provides the pilot with a video pathway on his CRT (cathode ray tube) vertical display indicator to maintain proper heading while updating target location information to the computer. At the same time the pilot must depress and hold the weapon release trigger on his control stick until the computer finally releases the munition.

Variants/Upgrades

DRS Upgrade. A new-start modification program was under way in 1992 to upgrade the AAS-33A by installing new assemblies to increase reliability and maintainability. The DRS Upgrade featured an improved detector assembly and signal/data processing converter.

The detector was the same type currently used in AAQ-16 Hughes Night Vision System in service with US Army SOF helicopters. This detector had demonstrated performance equal to, and in some visibility conditions, greater than, the existing DRS detector. The new detector also operated at a higher temperature than the existing unit, allowing Hughes to replace DRS's helium compressor cooling system for the detector with one that would simplify maintenance and also extend the mean time between failure (MTBF) of the system.

The new signal/data processing converter, which converted electronic signals from the detector into video signals for the cockpit display, reduced the number of required circuit cards from 23 to 12, which would also result in reduced maintenance. The new card set included six circuit cards derived from Hughes's Cobra Nite night targeting system for the AH-1S gunship.

Even though a contract for the upgrade was awarded in September 1992, it was canceled in 1993 after the Navy decided to phase the A-6 out of service by about FY98.

Program Review

Background. At the center of the A-6E Target Recognition and Attack Multi-Sensor (TRAM) system is the AAS-33A Detecting and Ranging Set (DRS), an integrated E-O sensor package that provides day/night adverse weather target acquisition capability coupled with highly accurate weapons delivery for the US Navy's A-6E Intruder. In addition to the AAS-33A, the other major subsystems of the A-6E TRAM are the APQ-156 multi-mode radar, ASQ-155 ballistic computer, the ASN-92 CAINS (Carrier Aircraft Inertial Navigation System), a solid-state weapons release system and new communication/navigation/identification (CNI) package.

IRVAT. While the AAS-33A is a highly accurate target acquisition/weapons delivery system, it does not

possess an automatic target tracking capability that would ease the bombardier/navigator's workload during the attack run to the target. During target acquisition, the bombardier/navigator must manually locate the target on his radar screen and then designate it on a separate FLIR video screen and engage the laser ranging system. Both displays are located on the instrument panel.

In FY85 Grumman awarded a US$8.5 million contract to Northrop's Electro-Mechanical Division to develop an automatic tracking feature for the A-6E TRAM. Designated as the Infrared Video Automatic Tracking (IRVAT) system, the upgrade would work in conjunction with the TRAM, computerizing and automating the tracking portion of the AAS-33A. Northrop delivered a total of 11 prototype IRVAT systems to Grumman for integration and flight testing.

Subsequently, an AAS-33A DRS Auto-Track was to have been part of a modification program designated as (OSIP 3-89) A-6E Block Upgrade II in FY88 documents. IRVAT was expected to fill that requirement. However, this mod program was never implemented.

Funding

No funding has been identified in current US government documents. From FY76 through FY88, Hughes received a total of US$672.8 million for procurement, engineering changes, and spares for the AAS-33A DRS. A total of 324 AAS-33(V) DRS systems were delivered to the Navy, with the last during FY88. About 200 existing A-6Es were converted to the TRAM standard, with about 120 new-production aircraft built to the TRAM configuration.

Recent Contracts

No contracts have been awarded since the following:

Contractor	Award ($ millions)	Date/Description
Hughes	47.3	Sept 1992 – Ceiling price order for 300 retrofit kits, plus technical documentation, in support of the AAS-33A system used on the A-6E aircraft. Originally to be completed in March 1996, but later canceled. (N00383-91-G-B501, 0063)

Timetable

1976	Contract awarded for 36 TRAM units worth US$21 million
1979	First units produced
1988	TRAM modifications completed; AAS-33(V) production completed
1990	Production scaled back to spares support
1992	DRS Upgrade initiated
1993	Upgrade canceled

Worldwide Distribution

The A-6E Intruder is deployed exclusively by medium attack squadrons of the US Navy and US Marine Corps. No other applications of the AAS-33 have been identified.

Forecast Rationale

Production of the AAS-33s is complete. With all modifications and upgrade programs for the A-6E canceled due to its full retirement from service by 1998, a market no longer exists for the electro-optical sensor.

Hughes will continue to support the existing AAS-33s until the A-6Es leave service. Aside from this, no further activity is expected in the AAS-33 program, and the report will be dropped next year.

Ten-Year Outlook

No production is forecast. THIS REPORT WILL BE DROPPED NEXT YEAR, 1998

* * * *