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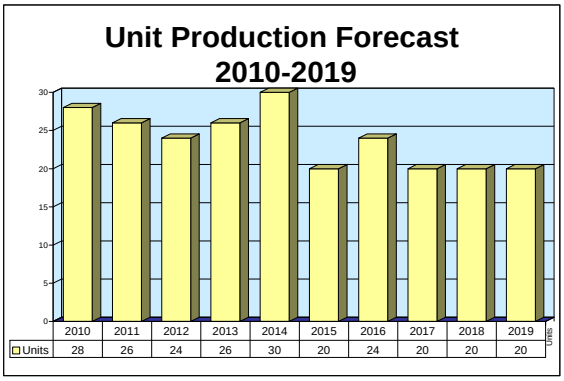
ADAD - Archived 3/2011

Outlook

- ADAD system is in wide use by a number of military organizations in Europe and has been under evaluation for additional applications
- Germany will continue to rely on ADAD for its Wiesel 2 tactical vehicle program
- Upgraded version of system should help prospects for ongoing production



Orientation

Description. Passive infrared Air Defense Alerting Device (ADAD) operating in the 8- to 12-micron band.

Status. In production and service.

Total Produced. An estimated 653 ADAD systems and derivatives are believed to have been delivered.

Application. ADAD is a passive system designed to work in cooperation with man-portable and vehicle-mounted air defense systems. The system can be deployed either as a freestanding sensor or as part of an integrated air defense system.

Price Range. The ADAD has an estimated unit price of $550,000.

Contractors

Prime

Thales	http://www.thalesgroup.com, 45, rue de Villiers, Neuilly-sur-Seine, 92526 France, Tel: + 33 1 57 77 80 00, Fax: + 33 1 57 77 86 59, Prime

Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series. For a detailed description, go to www.forecastinternational.com (see Products & Samples/Governments & Industries) or call + 1 (203) 426-0800.

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

ADAD

Technical Data

Characteristics	
Power requirement	300 W/28 V
Field of view	240+ degrees
Elevation	-7 to +17 degrees
Spectral view	8-12 μm
	3-5 μm (ARISE only)
Cooling	Split-cycle Stirling
Max detection range	
Fixed-wing aircraft	9 km
Helicopters	6 km

	Metric
Dimensions	
Scanner	230 mm x 900 mm
Processor	500 mm x 340 mm x 400 mm
Remote display unit	220 mm x 300 mm x 90 mm
Power requirements	300W/28V (typical)
Weight	<60 kg (not including power supply and tripod)

Design Features. ADAD consists of three main components: the rotating scanner infrared assembly (SIA), the electronic pack processor unit (EPPU), and the electronic pack remote display unit (EPRDU). The freestanding version also requires the use of a tripod and a small portable generator (300 W) in order to function. Recently, the EPRDU was replaced with newer models with an enhanced display system.

The SIA can detect airborne threats via the thermal signature given off by the skin surface of the threat. The scanner is designed to have a minimal number of moving parts and uses a continuously rotating mirror to scan its field of view. The infrared detector, cryogenic cooling system, and all electronics remain stationary. Infrared data are digitized and sent to the EPPU along with related boresight positional data. The SIA has built-in test equipment that automatically validates the entire assembly.

The EPPU receives the data from the scanner and examines it while automatically removing background signals (clutter) around potential targets. All verified targets are then prioritized and fed up to four EPRDUs via standard field telephone cabling. As an alternative, an output is available for direct interface to a weapon servo system.

The EPRDU is the man/machine interface between the ADAD and the weapons station. The system has two major functions: it displays prioritized target alerts and their bearings to the weapon operator, and it provides a means to enter tactical information into the ADAD system.

The EPRDU can display up to four targets simultaneously and in priority order according to pre-set, but flexible, rules that have been fed in and altered via a keyboard mounted with the display. The system is also relatively small and incorporates an inclinometer and magnetic compass to simplify set-up procedures.

The display uses light-emitting diodes configured in a clock-face circle to indicate the bearing of an approaching threat. The rate of flash is determined by the threat level as evaluated by the processing unit. An audio alarm provides additional warning for the operator. It is possible to insert safe sectors into the threat display, covering areas in which friendly aircraft are known to be operating.

Operational Characteristics. The ADAD system is designed to alert ground forces to the presence of low-flying threat aircraft by detecting their infrared signature.

The normal ADAD field configuration consists of four EPRDUs and a single SIA operating with each weapon's unit; each EPRDU covers a single sector. Data and tactical information are entered into the EPRDU via a basic alphanumeric keyboard. These data typically include primary and secondary arcs of responsibility, blind arcs, and weapons-restricted arcs. The SIA provides continuous passive coverage over a wide field of view; the elevation scan baseline is adjustable to compensate for terrain.

Deployment Configurations

Freestanding Version. This version can operate up to four EPRDUs, which can be deployed to 500 meters from the scanner processor. In this configuration, ADAD can be used with shoulder-launched weapons, lightweight multiple launchers, anti-aircraft guns, and vehicle-mounted weapons.

Vehicle Integration. ADAD can be integrated into a vehicle-mounted air defense configuration. The vehicle system can also be used to integrate external weapon platforms within 500 meters of the vehicle, similar to the freestanding version.

Variants/Upgrades

ADAD-ID. The ADAD-ID (Intrusion Detection) is an automatic intrusion detection system based on the standard ADAD, but is able to detect both ground and air threats. The system can still function as a weapons cueing sensor or can be used to alert other friendly units of the contact.

ARISE. The naval version of ADAD, designated ARISE (Area Reconfigurable Infrared Scanner Equipment), has undergone trials on a Royal Navy warship. This version incorporates a dual-band sensor to provide warning of inbound anti-ship missiles and aircraft by exploiting the kinetic heating of airframe surfaces. The ARISE program was intended to lead directly to the development of a deployable version of the system that might debut on the tri-nation Horizon air defense frigate.

ARISE 2000. Upgraded version of ARISE with improved sensor, EF2000.

Vehicle Mounted. This version is integrated with the Starstreak battlefield air defense system mounted on the Stormer armored personnel carrier. In this variant, the Starstreak's optical sight is slaved to the ADAD sensor to permit automatic slew-to-cue in order to acquire an oncoming threat.

Other Developments. ADAD technology is apparently being used in the MEOSS (Marine Electro-Optical Surveillance System) designed for patrol craft down to 10 meters in length.

Program Review

Background. Initial work was undertaken during the late 1980s, culminating in the unveiling of the prototype system at the 1988 British Army Equipment Exhibition. At that time, the ADAD system was expected to enter British Army service in 1989 or 1990, with the first units going to the British Army of the Rhine. It was decided, however, to rewrite the system software in Ada during 1989; this, in turn, delayed preproduction and service acceptance trials until 1990-1991.

In October 1991, Thorn-EMI and Texas Instruments (now Raytheon) signed a teaming agreement for a joint marketing strategy to identify and pursue additional ADAD customers. This included the promotion of ADAD as a potential U.S. Army ground-based sensor for the Forward Area Air Defense program. In the event of such a requirement, ADAD production would be undertaken in the U.S. to meet the contract. Pursuant to this agreement, ADAD was offered to the U.S. Army as an alternative to the much larger GE Aerospace Advanced Air Defense Electro-Optical Sensor system.

System Enters Service with British Army

Formal acceptance of the system was announced in July 1993, with the system entering service with the U.K. 47th Field Regiment, Royal Artillery. Procurement expenditures during 1992 and 1993 totaled $25 million. A total of 100 systems had been delivered by mid-1993 and an additional 200 by 1995.

Following a reportedly successful trial period with the U.K. Royal Navy, the ARISE system was returned to its manufacturers to improve its suitability for use in the naval environment. According to unofficial reports, this process did not involve any radical changes to the equipment, but did include minor changes to frequency-band coverage, along with packaging provisions more suited to the hostile maritime environment. There was also a program directed at integrating the ARISE system with the new Sampson multifunctional radar. This combined radar/electro-optical complex would equip British versions of the Anglo-Italian-French Project Horizon Common New Generation Frigate.

In October 1995 it was announced that ADAD had been selected to assist vehicle-mounted Stinger air defense units of Germany's Airmobile brigade. It was disclosed at the time that Pilkington Optronics had been awarded a contract from STN-Atlas Elektronik of Bremen to supply the ADAD as an element of the Leichtes Flugabwehrsystem (short-range air defense system). In this application, ADAD is mated with Stinger lightweight surface-to-air missiles on the Wiesel light-tracked vehicle. ADAD was selected on the basis of its ability to maintain electronic silence in the modern warfare environment.

The U.S. Marine Corps procured a single ADAD system for evaluation purposes in late 1997. It is believed that the unit came with both the tripod ground mount and provisions for mounting in a vehicle. The U.S. Army is

also known to have actively followed the USMC tests, which were believed to have been concluded by the end of 1999.

Important New Application Emerges

In early 1998, Pilkington Optronics (now Thales) teamed with Independent Product Support (IPS) of Switzerland to offer a passively controlled fire-control system designated Protector (for which ADAD was expected to be a major component). This variant consisted of upgraded Western- and Russian-design AA guns of various calibers. It was claimed that the Protector could greatly extend the life cycle of the guns and improve their operational capabilities.

Export contracts were awarded for a small quantity of ADAD units in April 1999 for the U.S. Army, Germany, Poland, and Thailand. The systems were shipped for evaluation purposes as a joint venture between Pilkington Optronics and Thomson-CSF.

In June 2000 it was reported that ADAD would be installed on Germany's Wiesel 2 vehicles. Approximately 136 vehicles were projected to be produced through 2011.

By the end of 2000, the ever-growing Thomson-CSF took over Pilkington Optronics and was subsequently renamed Thales.

Sometime around 2003 the ARISE system was upgraded by Thales to include an improved sensor head. This new variant, called ARISE 2000, is equipped with an EF2000 detector. In conjunction with this upgrade, it was reported that Thales and QinetiQ had signed a contract to develop an advanced naval infrared search-and-track technology demonstrator with the capability to detect future missile threats.

In 2004, ADAD was reportedly supplied to the U.S. for evaluation of its use in homeland security.

Information on an expanded version of ADAD was released in late 2006. This version reportedly features a new video sight display for improved situational awareness in air and ground applications.

Funding

The ADAD system was developed, and initial production funded, under a U.K. MoD contract awarded in September 1987. According to the Statement on the Defense Estimates 1992, Report and Proceedings of the Defense Committee, the ADAD program had a total cost of $170 million.

Contracts/Orders & Options

Contractor	Award ($ millions)	Date/Description
Pilkington/Thomson-CSF	N/A	Apr 1999 – Contract for small quantities of ADAD systems for evaluation purposes for the U.S. Army, Poland, Germany, and Thailand.

Timetable

Month	Year	Major Development
Sep	1987	Development and initial production contract
Oct		Thorn-EMI and Texas Instruments team to market ADAD in the U.S.
	1991	Thomson-CSF purchases 50 percent of Pilkington Optronics
	1992	ADAD enters service with British Army
Jul		ADAD demonstrated to U.S. Army
Oct	1995	Final ADAD/Starstreak system SP HVMs (self-propelled hypervelocity missiles) delivered
Oct	1995	ADAD selected for German Leichtes Flugabwehrsystem mobile air defense system
	1997	One ADAD procured for testing by USMC
Jun	1998	ADAD-derived Protector prototype demonstration and testing
	1999	U.S., Poland, and Thailand acquire ADAD for evaluation
	2000	Thomson-CSF completes takeover of Pilkington Optronics
Jun	2000	ADAD chosen for Germany's Wiesel vehicle
	2001	Thomson-CSF renamed Thales
	2002	New variant, ARISE 2000, introduced
	2004	Evaluation of ADAD in U.S. for homeland security purposes
	2011	Production of ADAD to be completed for Germany's Wiesel

Worldwide Distribution/Inventories

Germany. 75

U.K. A minimum of 391 ADAD systems known to be in service (135 vehicular units for the Starstreak SP HVM).

Poland, **Thailand**, the **U.S. Army**, and the **U.S. Marine Corps** are believed to have procured a small number of ADAD systems (fewer than three) for evaluation purposes.

Forecast Rationale

Thales' Air Defense Alerting Device (ADAD) is in wide use by the British and German armies. In Germany, the system is in production for the Wiesel 2 tactical vehicle. Further, it has been under evaluation by a number of nations, including Poland and Thailand as well as the U.S. The adaptability of the system and its variants to multiple land and sea applications should work in its favor.

The British Army has evaluated a version of the system for application to the upgrade of its vehicle-based Starstreak missile system. Thales has also upgraded the system to meet a changing threat environment and attract new customers. A new video sight display for the system recently was produced that would appear to offer greatly improved targeting capabilities.

Given that no significant new contracts have been made public in some years, the following 10-year forecast should be considered highly speculative.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION

Designation or Program	High Confidence					Good Confidence			Speculative			
	Thru 2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Thales												
ADAD <> Worldwide <> Multi-agencies												
	653	28	26	24	26	30	20	24	20	20	20	238
Total	653	28	26	24	26	30	20	24	20	20	20	238