

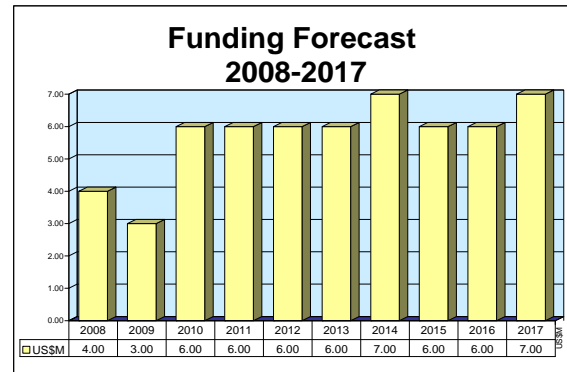
ARCHIVED REPORT

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Night Vision Systems Advanced Development - Archived 9/2009

Outlook

- Based on a projection of the U.S. defense budget for FY09, the program will likely receive \$57 million in funding over the next 10 years
- Development of new sensor capabilities for new generation of platforms – such as UAVs and the Future Combat System family of vehicles – to be a major part of the program’s focus.



Orientation

Description. The U.S. Army’s Night Vision Systems Advanced Development program focuses on the development of countermeasure and electro-optic sensors for individual soldiers and combat vehicles to meet stated U.S. Army deficiencies.

Sponsor

U.S. Army
Defense Communications-Electronics
Evaluation & Testing Activity Center
Fort Belvoir, VA
USA

Status. Continuing program with various ongoing advanced developments.

Total Produced. Because this is principally a research and development program, actual production is restricted to a few prototypes.

Application. Support for the advanced development of night vision and electro-optic devices and systems that are capable of engaging enemy targets at maximum ranges under degraded battlefield or weather conditions, as well as in countermeasure environments.

Price Range. Not applicable.

Technical Data

Characteristics. Efforts in this program include the development of third-generation, high-performance thermal imaging technology that will allow simultaneous operation in the mid- and long-wavelength infrared bands. Research into Sense Through the Wall technology seeks to improve survivability and lethality

of troops in urban environments by allowing them to detect motion through buildings and other man-made objects. Work is also performed on giving night vision sensors the ability to conduct Foliage Penetration, Aided Target Recognition (ATR), and Close Surveillance Support for 360° situational awareness for vehicles.

Night Vision Systems Advanced Development

Program Review

Background. Development of night vision technology and systems was given a big boost in the early 1990s, thanks largely to its successful role in the Persian Gulf War. Most of the early program efforts centered on development of the Multi-Sensor Target Acquisition System (MTAS), directed-energy weapons (lasers), and electro-optic sensors for individual soldiers.

Development of the MTAS Pathfinder Radar, a dual sensor system supporting extended range surveillance, acquisition, and engagement requirements of future armor systems, was completed in FY92 and successfully demonstrated. Another effort, the standardized advanced detector/dewar assemblies (SADA) program for the development of infrared systems for combat vehicles, was also implemented around this time.

By the following year, FY93, two SADA-compatible detector/dewar assemblies had been completed and transitioned to the Second Generation Tank Sight program for integration. It was during this transition that a special task force was put together to study the horizontal technology integration (HTI) second-generation forward-looking infrared (FLIR) effort.

In FY94, further advanced development of SADA continued with the development of the Tri-Service Standard High/Mid-to-High Dewar Assembly for Second Generation Infrared Sensors to meet future weapon systems requirements such as HTI. Another major effort included beginning development of an integrated helmet-mounted display program for the Mounted Warrior concept. (Mounted Warrior is the combat vehicle version of the Land Warrior soldier system program. Its design goal is to permit combat vehicle crewmen to view the vehicle's tactical displays while operating in an open hatch mode.)

The SADA project was completed by the end of FY95, at which time 25 units were delivered and integrated into ongoing development of second-generation infrared systems such as the Improved TOW Acquisition System (ITAS). Work on the helmet-mounted display made advances as the miniaturization of electronic components was implemented in the design. Also during that year, development began on the Advanced Second Generation FLIR (SGF) B-Kit, which featured aviation applications, a digital imagery interface card, and improved optical features. Support was provided for Stingray Task Force XXI Advanced Warfighting Experiment participation.

Accomplishments in the late 1990s included the development of the Interface Control Document and connectors for Automatic Target Recognition/Automatic Target Cueing (ATR/ATC) interface capability with SGF B-Kit. The sight level demonstration of improved FLIR capabilities was also initiated and completed, as was the development of HTI laser designs. Portions of the total program funding were also dedicated to work on the developing Prophet unmanned air vehicle program.

Program Benefits from Congressional Largesse

In an August 1999 Defense Authorization Conference Agreement, Congress authorized \$71 million (\$50 million more than the president's request) for night vision devices and improvements for the U.S. Army.

Program accomplishments in FY00 included a number of demonstration and validation milestones. Frontside illumination laser protection and advanced capabilities were developed for high-performance systems such as the HTI SGF. The Automatic Target Recognition/Automatic Target Cueing capabilities on the LRAS³ were also successfully demonstrated.

In 2001, program work continued with the analysis and evaluation of the potential for an uncooled FLIR B-Kit for the Objective Individual Combat Weapon and Objective Crew Served Weapon; the completion of the development of head-tracked Commander's Thermal Sensor; and the demonstration and evaluation of Enhanced Night Vision Goggle and enabling technologies.

Robotic sensor technology was integrated throughout 2002 to support the Objective Force concept for unattended ground sensors. UGS are designed to provide intelligence, surveillance, reconnaissance (ISR) and physical security for unattended ground applications.

The FY04/FY05 DoD budget, released in February 2003, included approximately \$54.1 million in RDT&E funding for the program. Most of this funding would go to work related to night vision signals intelligence (SIGINT) applications for UAVs.

Other program work begun in 2003 included the extending of uncooled focal plane array technology capabilities across multiple platforms. The goal of this work is to achieve greater interchangeability of parts at lower cost, weight, and volume.

Night Vision Systems Advanced Development

During 2005, some \$10 million was budgeted for the establishment of a Joint Unique Identification program. The FY08/09 DoD budget, released in February 2007, featured \$34.7 million to be spent from FY07-13.

Funding

U.S. FUNDING								
	FY08	FY08	FY09	FY09	FY010	FY10	FY11	FY11
	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>	(Req) <u>QTY</u>	(Req) <u>AMT</u>	(Req) <u>QTY</u>	(Req) <u>AMT</u>
RDT&E (U.S. Army)								
PE#0603774A								
Night Vision Systems								
Adv Dev: Project 131								
NVS Adv Dev	-	3.4	-	2.5	-	5.6	-	5.7
	FY12	FY12	FY13	FY13				
	(Req) <u>QTY</u>	(Req) <u>AMT</u>	(Req) <u>QTY</u>	(Req) <u>AMT</u>				
PE#0603774A								
Night Vision Systems								
Adv Dev: Project 131								
NVS Adv Dev	-	5.9	-	6.0				

All \$ are in millions.

Source: U.S. Department of Defense FY09 RDT&E Descriptive Summary

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	FY94	Mounted Warrior helmet-mounted display initiated
Dec	FY96	Time and materials contract for HTI second-generation FLIR completed
Sep	FY00	Fibertek's time and materials contract for services and support completed
Mar	FY01	EOIR and Fibertek's time and materials contract in support of NVESD completed
	FY01	Combat Vehicle sensor fusion demonstrated
	FY02	Evaluation of alternative thru-wall devices to support USAIC ORD development and develop thru-wall technology strategy
Feb	FY03	Time and materials contract in support of the HTI SGF program completed
	FY05	Work on Sense Through the Wall Stand-Off and Foliage Penetration technology
	2006	UAV advanced payload development, third-generation FLIR development, aided target recognition (ATR) development/transition
	2008-2017	Ongoing RDT&E

Worldwide Distribution/Inventories

Although this is a **U.S. Army**-directed effort, the Night Vision Systems Advanced Development program adheres to Tri-Service Reliance Agreements on Electro-Optics, with oversight and coordination provided by the Joint Directors of Laboratories.

Night Vision Systems Advanced Development

Forecast Rationale

The next 10 years should see steady, if relatively low annual levels of funding for the U.S. Army's Night Vision Systems Advanced Development RDT&E program. Under the FY09 defense budget, the Army plans to spend \$29.1 million on the program through 2013. Funding will continue after this date in large part to meet the demands of new platforms due to emerge in greater numbers in the next decade.

Coming out of the program will be sensors to help accomplish U.S. Army Advanced Unmanned Aerial Vehicle payload missions, and improved situational awareness with such capabilities as the Close Surveillance System. The Systems Advanced Development program in the years ahead will also look at improving route reconnaissance for road hazards, detection of threat soldiers carrying rocket-propelled grenades (RPGs), and identification of the current deadliest threat

in Iraq and Afghanistan, the improvised explosive device (IED).

Funding has also been provided for the development of systems to handle a variety of combat environments, any of which present unique surveillance challenges. Sense Through the Wall and Foliage Penetration technology continue to be two of the driving forces currently behind the perfection of night vision technology as it relates to the Advanced Development program.

Based entirely on a projection of the current defense budget, the next 10 years will likely see the U.S. Army spend approximately \$57 million on the Systems Advanced Development program. Viewed by itself, this may seem like a small amount, but this program is just one of several Night Vision programs seeking similar technology improvements.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR RDT&E FUNDING (in millions \$)												
Designation or Program	High Confidence					Good Confidence			Speculative			Total
	Thru 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
MFR Varies												
NIGHT VISION SYSTEMS ADVANCED DEVELOPMENT <=> United States <=> Army												
	116.87	4.00	3.00	6.00	6.00	6.00	6.00	7.00	6.00	6.00	7.00	57.00
Total	116.87	4.00	3.00	6.00	6.00	6.00	6.00	7.00	6.00	6.00	7.00	57.00