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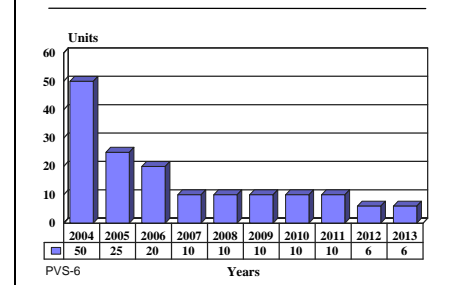
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PVS-6 (MELIOS) - Archived 2/2005

Outlook

- Production trending downward as newer systems capture bigger share of the market
- Most likely future production for replenishment only
- System widely distributed throughout U.S. Army

10 Year Unit Production Forecast
2004 - 2013



Orientation

Description. The PVS-6 is a handheld laser rangefinder also known as the Mini Eyesafe Laser Infrared Observation Set (MELIOS).

Sponsor

U.S. Army
Communications - Electronics Command
Ft. Monmouth, New Jersey (NJ) 07703-5000
USA
Tel: +1 201 532 2534

Research Development & Engineering Center

Building 312
Ft. Belvoir, Virginia (VA) 22060-5606
USA
Tel: +1 703 704 2238

Contractors

Northrop Grumman
Electronic Systems (Laser Systems)
(formerly Litton Laser Systems Division)
2787 South Orange Blossom Trail
Apopka, Florida (FL) 32703
USA
Tel: +1 407 295 4010
Fax: +1 407 297 4640
Web site: <http://www.littonlaser.com>

Status. In service and low-rate production.

Total Produced. Through 2003, an estimated 8,168 production units had been manufactured.

Application. Provides the individual soldier with laser rangefinding capability for target acquisition.

Price Range. Based on comparative systems, the cost of PVS-6 MELIOS is approximately US\$30,000.

Technical Data

	<u>Metric</u>	<u>U.S.</u>
Specifications		
Range	50 m to 9,995 m	189 ft to 32,783 ft
Range accuracy	+/-5 m	+/-16.4 ft
Unit weight	1.85 kg	4.08 lb
Laser type	Erbium: glass	
Wavelength	1.54 microns	
Pulse energy	16 mJ	
Pulse width	28 μ sec, nominal	
Optical magnification	7 power	
Field of view	7.0 degrees	

Design Features. The PVS-6, or Mini Eyesafe Laser Infrared Observation Set (MELIOS), consists of a rangefinder, tripod, battery, carrying case, shipping case, and lens cleaning kit. It is constructed in three modules to allow for low-level maintenance. At three and a half pounds, it is smaller and lighter than the GVS-5 it replaced. Furthermore, the PVS-6 MELIOS uses an erbium glass laser and operates at an eyesafe wavelength. Thus, it can be used in force-on-force training as well as in combat without concern for dangers to the eyesight of allied forces or civilians.

Operational Characteristics. The PVS-6 MELIOS provides the individual soldier with accurate target acquisition data for direct and indirect fire weapons systems. It is designed for ranges out to 10 kilometers with an accuracy of +/-5 meters. Operation in the eyesafe wavelength region permits maximum use by units in training and tactical exercises. The PVS-6 MELIOS was designed to increase first-round hit probabilities during battlefield engagements, expedite target acquisition, and provide accurate range data for ground-to-air defense.

Variants/Upgrades

Compass Capability. The Compass/Vertical Angle Measurement (C/VAM) module, attached at the top of the unit, indicates the azimuth and vertical angle to a target, and can operate either with PVS-6 MELIOS or independently of it.

ESL-200. This is the name given to PVS-6 MELIOS systems sold on the export market.

TAMER. The Technology Advanced Mini Eyesafe Ranger (TAMER) was developed by Motorola Space and Systems Technology Group as a single module integrated with a PVS-6 MELIOS rangefinder. The module comprises a GPS receiver, a video display, thumb-input devices, data ports, and software for

intelligence reports. During the initial concept-definition phase of the program, a field-retrofit kit added to PVS-6 MELIOS improved target location, relayed reports digitally through a SINCGARS radio interface, and presented data on an external medium-resolution display.

LIFES. The Laser (initiated) Identification For Enhanced Survivability (LIFES) is an Identification Friend or Foe (IFF) system that was configured to operate with PVS-6 MELIOS for successful field trials conducted in 1995 and 1996. The U.S. Army evaluated LIFES for the ground-to-ground role, while the U.S. Navy focused on air-to-surface evaluations.

Program Review

Background. Development of the PVS-6 MELIOS began in 1979 and continued through the 1980s, with the Hughes Electro-Optical and Data Systems Group (now Raytheon) and Optic-Electronic Corp (OEC) competing for the development/production contract. Hughes offered the neodymium yttrium aluminum garnet (NdYAG) laser with Raman-shifting for its PVS-6 MELIOS eyesafe laser rangefinder, while Optic-Electronic offered a design based on its ESL-100 handheld laser rangefinder.

In September 1988, Optic-Electronic was selected as prime contractor for full-scale engineering development, which included the delivery of 30 prototypes by September 1990. The company's PVS-6 MELIOS prototype used an erbium rod laser operating in the 1.54-micron range. In 1990, Optic-Electronic was acquired by IMO Industries Inc, and was combined with another acquisition, Varo, in 1991.

The PVS-6 MELIOS experienced delays during engineering development that focused on adding a compass capability to the handheld system. In 1991, Varo demonstrated its ability to resolve the technical difficulties of inserting the compass capability, and it was cleared as a preplanned product improvement. A US\$28 million modification contract for 1,500 PVS-6 MELIOS production systems was awarded in March 1992, but was quickly retracted. Testing of the Compass/Vertical Angle Measurement capability for PVS-6 MELIOS ran through FY94. In 1995, C/VAM capability was fully qualified and marketed as an add-on module.

The equipment is marketed internationally as the ESL-200. Two major export sales have been reported: Saudi Arabia received 677 units to equip LAV-25s and other members of the Light Armored Vehicle Family; and the Canadian Army received 186 units for its LAV-Recce program. In other activity, Varo developed an insert, accommodating three commercial 9-volt batteries, as an alternative to the Mil-Spec rechargeable nickel-cadmium units originally required.

The PVS-6 MELIOS product line changed hands again in 1996, when Litton acquired IMO Industries' electro-optical holdings.

With the introduction of Raytheon's PAS-13 in the late 1990s, the future of the PVS-6 MELIOS was thrown into doubt. The newer thermal weapon sight offers many advanced features, including an embedded Global Positioning System (GPS), remote real-time video, and a laser designator for precision strikes. To the detriment of the PVS-6, the PAS-13 also features a laser rangefinder.

An indication that there was still life in the system was the US\$1.2 million contract awarded by Litton to GroupTech in March 2000 to produce circuit card assemblies for at least 350 PVS-6 MELIOS units. This was followed in June by the system's notable inclusion in the U.S. Department of Defense's portion of the Eurosatory 2000 International Land Defense Equipment Exhibition in Paris, France.

In 2001, Northrop Grumman acquired Litton, and the PVS-6 once again changed hands. (It is now carried under the Laser Systems division of the Electronic Systems group.) Production for the system likely continued for the last of its known orders as well as for spares and replacements throughout 2003.

Funding

Funding specifically allocated to the PVS-6 MELIOS has not been identified.

Recent Contracts

<u>Contractor</u>	<u>Award (US\$ millions)</u>	<u>Date/Description</u>
Bren-Tronics	35.6	Sep 1995 – Indefinite delivery/FFP contract for military rechargeable batteries and battery chargers for use on SINCGARS radio, night vision sight, handheld radio, thermal weapon sight, and PVS-6 MELIOS systems. Completed September 1999. (DAAB07-95-D-G323)
GroupTech	1.2	Mar 2000 – Contract from Litton to build circuit card assemblies for PVS-6 MELIOS. Order includes manufacture of four different styles of circuit cards for approximately 350 lightweight, portable laser rangefinders.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Sep	1983	Competitive development awards to Hughes and OEC
Sep	1988	OEC selected for full-scale engineering development
Jun	1989	OEC informs Army of difficulty in integrating compass capability
Sep	1990	OEC completes delivery of 30 prototypes
	FY91	Engineering development completed

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	FY92	Low-rate production contract awarded
Mar	1992	Contract for 1,500 systems awarded, then retracted
2Q	FY94	C/VAM testing and In-Process Review (IPR) completed
	1995	C/VAM qualified and marketed with MELIOS
	1998	PVS-6 MELIOS forms part of the LRAS ³ (qv) demonstrator program
	2000	PVS-6 MELIOS promoted at defense exhibition in France
	2001	Northrop Grumman acquires Litton
	2004-2013	Moderate production continues

Worldwide Distribution

The system was developed for and is principally used by the U.S. Army. **Canada** and **Saudi Arabia** are the only identified export customers.

Forecast Rationale

Night vision systems continue to be among the leading sensors on the battlefield. Systems like the PVS-6 MELIOS (Mini Eyesafe Laser Infrared Observation Set) will always be in high demand. The truth, however, is that the system is a somewhat older type, and newer, far more advanced systems are coming on line in the years ahead. Advances in the quality of night vision imaging are even seeing the ability to produce color images. The PVS-6, a system developed in the early 1980s, finds its usefulness waning, especially in the U.S. At this point the best and only chance for future production may be the export market.

While no major contracts have been made public through open sources, recent contracts for ancillary items such as batteries and circuit cards would indicate that the system is still being relied upon, at least by the U.S. military. Suffice it to say that while it may not be

knocking down new doors, the PVS-6 is still a significant player with great usefulness in basic training maneuvers at an economical cost. PVS-6 is considered quite proficient at performing its task and has retained its appeal among military forces that merely need a decent, practical laser rangefinder.

With no firm information regarding future production, a modest forecast has to be made for the once formidable PVS-6 MELIOS system. A total estimated production run of well over 8,000 systems is by no means insignificant, but the reality of technological innovation dictates that the old must eventually be replaced by the new. While this report will be kept up to date if any new information arises to change the production outlook, it is more than likely that it will be archived in 2005.

Ten Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Designation	Application	<u>High Confidence Level</u>				<u>Good Confidence Level</u>				<u>Speculative</u>		Total 04-13	
		Thru 03	04	05	06	07	08	09	10	11	12		13
PVS-6 MELIOS	RANGEFINDER (US ARMY)	7305	50	25	20	10	10	10	10	10	6	6	157
PVS-6 MELIOS	Prior Prod'n:	863	0	0	0	0	0	0	0	0	0	0	0
Total Production		8168	50	25	20	10	10	10	10	10	6	6	157