

# ARCHIVED REPORT

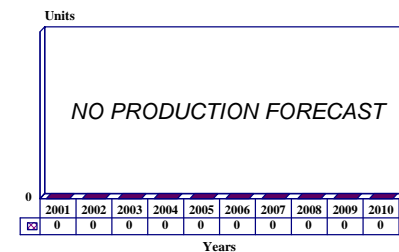
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## VVG-2 - Archived 03/2002

### Outlook

- Low-rate production for spares and replacement parts
- Barring any unexpected future activity, this report will be archived next year (2002)

10 Year Unit Production Forecast  
2001 - 2010



### Orientation

**Description.** The VVG-2 is a tank laser rangefinder.

**Sponsor**

US Army  
Armament Munitions & Chemical Command  
Rock Island, Illinois (IL) 61299-6000  
USA  
Tel: +1 309 782 5111

**Contractors**

Litton Industries Inc (formerly Varo Optical Systems)  
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: [www.littoncorp.com](http://www.littoncorp.com)  
E-mail: [info@littoncorp.com](mailto:info@littoncorp.com)  
(Current production)

**Status.** In service. Some production likely for spares and replacement parts.

**Total Produced.** Through 2000, an estimated 8022 systems were produced.

**Application.** M60A3 and M48H series tanks.

**Price Range.** Based on a 1985 contract, the unit price is estimated at US\$43,000 in dollars unadjusted for inflation.

### Technical Data

**Characteristics**

	<u>Metric</u>	<u>US</u>
Weight:	40.9 kg	90.2 lb
Dimensions:	40.6 cm x 101.6 cm x 27.9 cm	16 in x 40 in x 11 in
Operating range:	200 to 5,0000 m	

Range resolution:	2 targets at 20 m separation
Range accuracy:	±10 m
<u>Transmitter</u>	
Beam angle:	0.75 mrad max
Wavelength:	694.3 μm
Peak power:	1.0 MW min
<u>Receiver</u>	
Field:	0.75 mrad max
Aperture:	2.0 in min
<u>Laser Power</u>	
Voltage:	18 to 30 V DC
Current:	3 amp normal 12 amp (max) during 4-second charge
<u>Telescope</u>	
Field of view:	10° at 6x magnification 5° at 12x magnification

**Design Features.** The VVG-2 tank laser rangefinder is part of a fire control system that includes an M21 ballistic computer, a sensor net, and (on some vehicles) a thermal imaging system such as the VSG-2 Tank Thermal Sight (TTS). The VVG-2 replaced the M17 optical range finder and M13 mechanical computer.

The VVG-2 is part of the commander's station. Its optical system is equipped with a low-magnification viewing mode for lasing and gunlaying.

**Operational Characteristics.** The VVG-2 laser determines range by calculating the rate at which the light is reflected from a target. This information is used to compute the correct azimuth and elevation firing commands for the tank turret and main gun. If desired, this range can be automatically fed into the computer. Other data are fed into the computer, both automatically and manually, depending on the type of sensors with which the tank is fitted.

## Variants/Upgrades

**Laser Improvement.** Kollsman upgraded the VVG-2 laser rangefinder, changing the laser modules to a GSV-5 neodymium yttrium aluminum garnet (NdYAG) laser, in place of the older ruby rangefinder modules. This modification improved the unit's ranging capabilities in poor weather and otherwise low-visibility

conditions, at a cost of between US\$24,000 and US\$31,000 per vehicle.

A carbon dioxide laser rangefinder upgrade was also investigated but has not found its way into the United States inventory.

## Program Review

**Background.** Hughes Aircraft Company's Electro-Optical and Data Systems Group (now Raytheon Company) began work on the VVG-2 in 1972 for use on the improved M60A3. Hughes had previously developed the VVG-1 rangefinder for the M60A2 tank.

Hughes was initially the sole contractor for the VVG-2, but the Army Audit Agency was critical of the lack of

competition. As a result, Kollsman Instrument was brought into the program under the leader-follower approach. In 1985, Optic Electronic of Dallas, Texas, began supplying the VVG-2 as well, having built the system for Egypt and Saudi Arabia under the Pentagon's Foreign Military Sales (FMS) program. Optic Electronic became Varo Optical Systems, which was acquired by Litton in 1996.

## Funding

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Due to the obsolescent status of the M60A3 in US Army inventory, US funding is no longer required.

## Recent Contracts

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The following is the last publicized contract to specifically mention the VVG-2:

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Texas Instruments	6.5	Aug 1992 – FFP contract for M48H spare parts included 28 VVG-2s for the government of Taiwan. (DAAA09-92-C-0684)

## Timetable

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<u>Year</u>	<u>Major Development</u>
1972	Development of VVG-2 begun
1979	US Army M60A1-to-A3 tank conversion program initiated
1981	First conversion completed
1985	M60 production completed
1990s	Low-level spares and FMS production of the VVG-2 continues

## Worldwide Distribution

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Little information is disclosed regarding sales of the VVG-2 rangefinder. The following countries possess M60A3s (and, in the case of Taiwan, M48H Brave Tigers), and are assumed to be customers of the VVG-2: **Austria, Bahrain, Bosnia/Herzegovina, Egypt, Greece, Israel, Jordan, Morocco, Oman, Portugal, Saudi Arabia, Spain, Sudan, Taiwan** (confirmed), **Thailand, Tunisia, Turkey, United Nations**, and the **United States** (confirmed).

## Forecast Rationale

Litton Industries' VVG-2 tank laser rangefinder was developed in the 1970s for M60A3 and M48H series tanks of the US Army. Since then, many countries have procured the VVG-2 based on the wide distribution of M60A3 tanks. At present, production appears to have stopped for most, if not all, domestic and foreign military sales (FMS) orders. Since a Taiwanese order in 1992 for 28 VVG-2 systems, there have been no new known contract awards made public.

As indicated in the ten-year outlook below, the end of production for the system is very likely at hand. The prospect of any additional export sales and whatever negligible production there might be for spares and replacement parts would be too speculative to list in this forecast. Having enjoyed a long production life which saw the procurement of several thousand units, it appears that the VVG-2 has reached the end of its tether. Barring any future unexpected activity, this report will be archived in 2002.

## Ten-Year Outlook

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### ESTIMATED CALENDAR YEAR PRODUCTION

Designation	Application	Thru 00	<u>High Confidence Level</u>				<u>Good Confidence Level</u>			<u>Speculative</u>			Total 01-10	
			01	02	03	04	05	06	07	08	09	10		
VVG-2	Prior Prod'n:	8022	0	0	0	0	0	0	0	0	0	0	0	0