

# ARCHIVED REPORT

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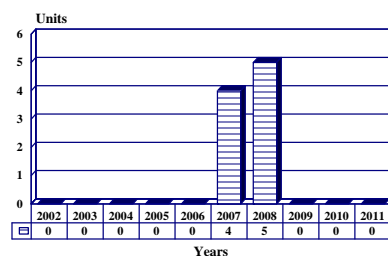
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## GAU-8/A and GAU-13/A - Archived 2/2003

### Outlook

- Production of the GAU-8/A Avenger cannon for the A-10 aircraft application has been completed. No additional production is forecast
- All forecast production is for the GPU-5/A podded version
- Graph to the right is for the GPU-5/A

10 Year Unit Production Forecast  
2002 - 2011



### Orientation

**Description.** Automatic cannon.

**Sponsor.** The development and procurement of these cannon have been sponsored by the United States Department of Defense through the United States Air Force. The procurement executive is the Armament Procurement Office located at Warner Robins Air Logistics Center, Warner Robins Air Force Base.

**Contractors.** These cannon were developed and manufactured by General Dynamics Armament Systems (formerly Lockheed Martin Armament Systems, and before that, General Electric, Armament Division), Burlington, Vermont, United States of America.

**Licensee.** None for the aircraft application. Societe d'Applications Generales d'Electricite & de Mecanique of Paris, France, has a license agreement to produce the basic cannon for its SAMOS close-in defense system, a naval program beyond the scope of this report.

**Status.** Components of the GAU-8/A remain in production on an as-needed basis for airborne applications. Production of the GAU-13/A for the GPU-5 pod unit remains open for further orders.

**Total Produced.** As of January 1, 2003, a total of 993 GAU-8/A and 336 GAU-13/A cannon had been manufactured.

**Application.** In the A-10 aircraft, the GAU-8/A, with its specialized depleted-uranium ammunition, is used to destroy tanks and other hard targets. The GAU-13/A is a four-barrel version of the GAU-8/A developed for aircraft pod mounts. Other applications, for both land- and sea-based platforms, are beyond the scope of this report.

**Price Range.** If production were to be resumed today, reliable sources put the unit price of the basic GAU-8 cannon for the A-10 at \$121,000 in Fiscal 2002 United States dollars. The unit price of the basic GAU-13/A cannon is \$114,000 in those same dollars.

### Technical Data

**Dimensions.** The following data are for the GAU-8/A cannon, as used in the A-10 aircraft. The GAU-13/A cannon, with four barrels, is similar except in weight, which is 153.8 kilograms (338.36 pounds), and length, which is 2.794 meters (9.17 feet).

	<u>SI units</u>	<u>US units</u>
Caliber	30 millimeters	1.18 inches
Number of barrels	7	7
Length	6.40 meters	20.99 feet
Weight	1,723 kilograms	3,790.61 pounds
Ammunition capacity	1,174 rounds	1,174 rounds

**Performance.** There are two selectable rates of fire: the low rate of 2,100 rounds per minute and the high rate of 4,200 rounds per minute. The range figure is the optimal range for armor perforation when fired from the A-10 aircraft. In 1986, the Air Force increased the barrel-life figure in the GPU-5/A pod to 30,000 rounds; the reliability figure here is expressed as the mean time between failures.

	<u>SI units</u>	<u>US units</u>
Muzzle velocity	1,066 meters per second	3,497.37 feet per second
Time to rate	0.55 seconds	0.55 seconds
Time to stop	0.5 seconds	0.5 seconds
Effective slant range	1,524 meters	5,000 feet
Barrel life (minimum)	20,000 rounds	20,000 rounds
Reliability	23,000 hours	23,000 hours

**Power.** Hydraulic. The GAU-8/A requires 57.44 kilowatts (77 horsepower) to operate. The GAU-13/A cannon in the GPU-5 pod installation is pneumatically driven.

## Variants/Upgrades

**Variants.** This is not applicable, as enhanced versions of these cannon are given new sub-designations.

**Modernization and Retrofit Overview.** This is an ongoing process with this type of weapon, with enhanced components made available to the users.

## Program Review

**Background.** The development of a new armament system for the new close-air-support aircraft desired by the United States Air Force was initiated by General Electric in the mid-1960s. The aircraft eventually selected, the Fairchild Republic A-10, was designed around the GAU-8/A armament system. General Electric named the system the Avenger. In 1993, the Aircraft Armament component of General Electric was acquired by Martin Marietta. Subsequently, Martin Marietta was acquired by the Lockheed Corporation and, more recently, General Dynamics assumed control of the program when it acquired the armaments business of Lockheed Martin.

The prime mission of the A-10 aircraft is close air support, specifically the destruction of tanks. Both the aircraft and the GAU-8/A cannon are optimized for this mission. Specialized ammunition was developed for the new cannon by Alliant Techsystems. The Armor Piercing Incendiary round employs a pyrophoric depleted-uranium penetrator, which enhances its anti-armor performance. High Explosive Incendiary and Target Practice rounds were also developed. All rounds employ plastic rotating bands at the projectile base to reduce barrel wear, and use aluminum cartridge

cases to reduce weight. The ammunition is produced on a competitive basis by Alliant Techsystems and General Dynamics Ordnance (formerly Primex Technologies). To date, slightly under 102 million rounds of this ammunition have been manufactured for the GAU-8/A and GAU-13/A.

### Description

GAU-8/A. The GAU-8/A was supplied as the main component of the complete cannon-based armament system for the A-10. The ammunition drum is protected against ballistic fragments and spalling. On the A-10, the hydraulic power to operate the cannon is supplied by the aircraft. The pilot selects the firing rate per mission need. The seven-barrel cannon operates on the Gatling system, with each barrel firing once per revolution. A reverse-clearing mechanism is used to clear the weapon. The ammunition-feed mechanism is the linkless type, and spent cartridge cases are returned to the ammunition storage drum.

The performance of the GAU-8/A has been described as nothing short of fantastic against modern armored vehicles. When compared with 20 millimeter projectiles fired the same distances from the target, the

GAU-8/A reduces flight time by approximately 20 percent. This reduces the aiming error margin inherent in firing airborne cannon at ground targets. On target impact, the 30 millimeter Armor Piercing Incendiary projectile used in the GAU-8/A and GAU-13/A has at least six times the kinetic energy of a similar 20 millimeter projectile. As of this writing, the only aircraft application for the GAU-8/A is the A-10. During the Persian Gulf War, the combination of the A-10 and the GAU-8/A received its baptism of fire and the weapon system more than lived up to expectations.

GAU-13/A. This four-barrel version of the GAU-8/A was developed to give aircraft other than the A-10 an armament system with similar anti-armor performance. The complete GAU-8/A armament system cannot be fitted to existing aircraft other than the A-10. The new armament system, designated GEPOD 30 by (then) General Electric and GAU-13/A by the Air Force, was developed in the 1970s and put into serial production in 1982. The cannon is fitted in pods that are mounted in fuselage centerline or underwing stations on various tactical aircraft. The pod is designated GPU-5.

Land Applications. Following the success of the M61 20 millimeter Gatling system in vehicle applications, the

contractor developed similar applications for the GAU-8/A and GAU-13/A. In 1983, General Electric received a \$1 million contract for integrating the GAU-8/A with the M113 armored vehicle, resulting in a mobile gun system that could defend air bases against both aircraft and air-to-surface missiles. Two program elements, numbers 63307F and 64617F, supported this effort.

During the time General Electric had the program, the firm developed its Modular Weapon System, which can be integrated with almost any existing (or proposed) tracked or wheeled vehicle. The system has since been redesignated Blazer and is available in four versions, one of which uses the GAU-13/A 30 millimeter cannon. The Blazer 30 turret integrates the GAU-13/A cannon and a launcher for four Blowpipe/Javelin missiles, and includes an option for the FIM-92 Stinger missile system. The fire control suite includes the Electronic Serge Dassault Rodeo search radar, GVS-5X laser rangefinder, identification friend or foe equipment, VSG-2 forward-looking infrared sensor, and digital fire control computer. General Dynamics Armament Systems continues to market this system.

## Funding

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Funding for the GAU-8/A and GAU-13/A has been broken out in the federal documents for some years.

## Recent Contracts

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The only recent contracts related to the GAU-8/A and GAU-13/A have been small ones for spare components such as barrels, barrel clamps, and feed mechanisms.

## Timetable

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This table relates to the naval applications for the GAU-8/A and GAU-13/A only in a general manner.

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1968	Concept definition formulated (GAU-8/A)
Fall	1970	Request for Proposals issued by Air Force
June	1971	Contract award to General Electric and Ford to develop 30 millimeter cannon for Air Force
	1972	General Electric/Ford prototypes tested at Eglin Air Force Base
August	1972	Development started on GAU-13/A
April	1973	Tests concluded
June	1973	Contracts awarded to General Electric for GAU-8/A manufacture
March	1974	First flight tests of GAU-8/A on A-10
February	1976	Production decision for GAU-8/A made
	1982	First production of GAU-13/A for GPU-5
October	1986	Production termination of GAU-8/A spares for A-10
Early	1993	Martin Marietta acquires General Electric Aircraft Armament
Late	1996	General Dynamics acquires Lockheed Martin Armament Systems
Early	2002	Production of GAU-8/A and GAU-13/A dormant, but GAU-8/A available for new orders

## Worldwide Distribution

**Export Potential.** The A-10 line has long been shut down, and no other aircraft application is expected to materialize for the GAU-8/A. The GAU-13/A cannon in the GPU-5 system could gather some additional sales in the export market, since it is the only system of its type and capability.

**Countries. United States** - GAU-8/A in the A-10, GAU-13/A on various tactical aircraft. The GAU-13/A in the GPU-5 podded installation has also been sold to several unidentified nations.

## Forecast Rationale

The serial production of both the GAU-8/A and GAU-13/A cannon is dormant, with a number of GPU-5 pods in storage ready for sale.

As the A-10 production line has been shut down for many years now and can no longer be restarted, no major new production of the completed GAU-8/A cannon for this application is forecast. For many years, all GAU-8/A production has been limited to components for spares and reserves; this should continue as long as the A-10 remains in service.

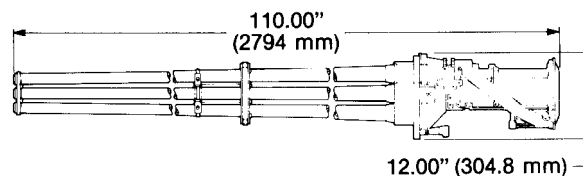
Production of the GPU-5/A gun-pod unit, mounting the GAU-13/A cannon for the United States Air Force, was completed with the delivery of the 299th pod in 1985. Again, only spare parts are being manufactured on an as-needed basis. However, the system is still available for domestic and export sales. Due to its unique capability, we forecast production for export sale of a few additional GAU-13/As in the GPU-5 pod in the latter years of the forecast period.

## Ten-Year Outlook

### ESTIMATED CALENDAR YEAR PRODUCTION

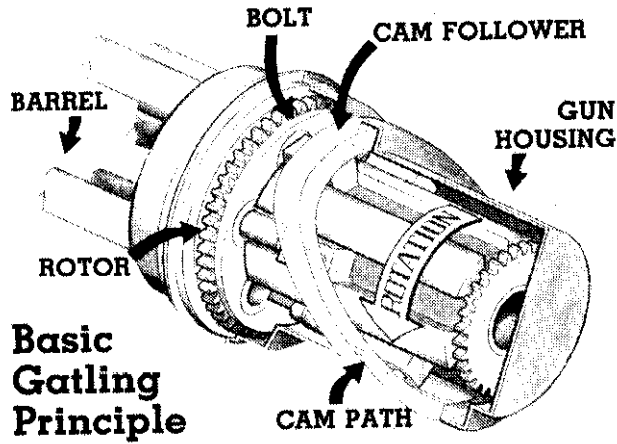
Ordnance	(Engine)	High Confidence Level				Good Confidence Level				Speculative			Total 02-11
		through 01	02	03	04	05	06	07	08	09	10	11	
GENERAL DYNAMICS/ARMAMENT SYSTEMS													
GAU-13/A (GPU-5) (a)	NO ENGINE	336	0	0	0	0	0	4	5	0	0	0	9
GAU-8/A (A-10) (b)	NO ENGINE	993	0	0	0	0	0	0	0	0	0	0	0
Total Production		1329	0	0	0	0	0	4	5	0	0	0	9

(a) All production is for service deliveries only.  
 (b) The production is for service deliveries only.



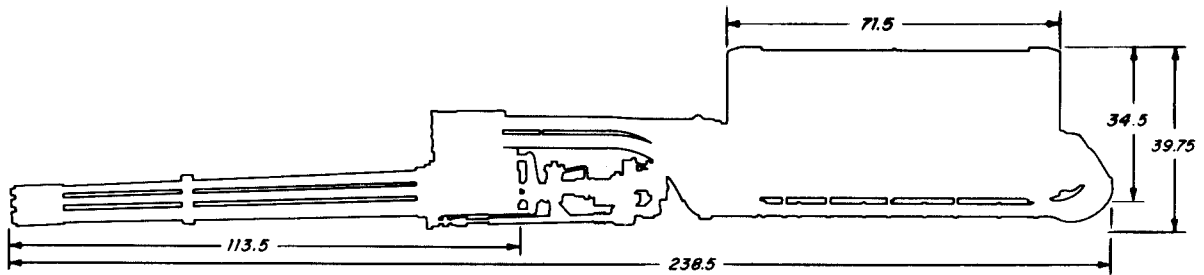
GAU-13/A

Source: General Dynamics Armament Systems



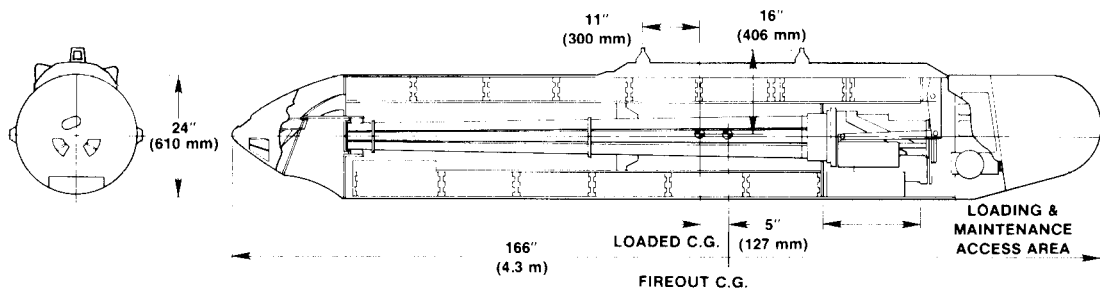
GATLING OPERATION

Source: General Dynamics Armament Systems



GAU-8/A INSTALLATION IN A-10

Source: General Dynamics Armament Systems



GPU-5/A POD

Source: General Dynamics Armament Systems