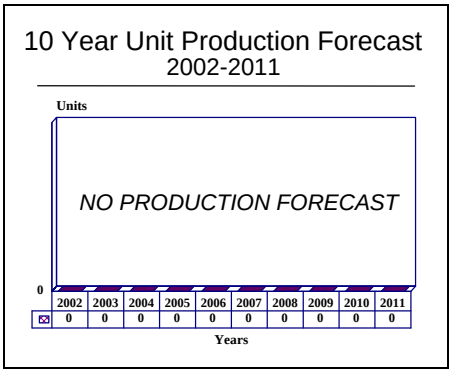
AGM-130 - Archived 3/2003

Outlook

- Production concluded
- No additional US Air Force orders for the AGM-130 anticipated
- South Korea could procure the AGM-130 via its competition to select a next generation fighter aircraft
- Tooling for the AGM-130 line has been moved to St. Charles
- Production of the AGM-130 could be resumed if new orders are placed



Orientation

Description. Air-to-ground stand-off missile.

Sponsor. The US Department of Defense through the USAF Aeronautical Systems Center (ASC) and the Development & Test Center, Eglin AFB, FL, USA.

Contractors. The AGM-130A was developed and produced by Rockwell International Corporation, Autonetics & Missile Systems Division, Duluth, GA, USA. Boeing purchased the defense interest of Rockwell International in August 1996.

Major Subcontractors. General Dynamics Electronics, Hercules Aerospace, Hughes Aircraft Company, Harris-Magnavox, and Honeywell Incorporated.

Status. Production has been concluded. The manufacture of the AGM-130A was approved by the USAF in 1990. Budget cuts reduced the anticipated procurement total to less than half of that originally planned.

Total Produced. Approximately 1,112 (with 41 AGM-130 RDT&E test models and 464 remanufactured units) are believed to have been produced through the end of 2001. The US Air Force received its first AGM-130A missiles in November 1992.

Application. The pinpoint destruction of highly defended hard targets and dispensing of various submunitions from a significant stand-off range.

Price Range. Boeing officials have mentioned a full-production unit price for the AGM-130 of $262,000. The USAF quoted a price of $746,078 in FY92/93.

Technical Data

	Metric AGM-130A	**Metric** AGM-130B	**US** AGM-130A	**US** AGM-130B
Dimensions				
Missile Length	392.58 cm	403.86 cm	12.88 ft	13.25 ft
Missile Diameter	45.72 cm	51.51 cm	1.51 ft	1.69 ft
Missile Weight	1,325.91 kg	1,163.64 kg	2,917 lb	2,560 lb
Wingspan	149.96 cm	149.96 cm	4.92 ft	4.92 ft
Performance				

	Metric	**Metric**	**US**	**US**
	AGM-130A	AGM-130B	AGM-130A	AGM-130B
Speed	High subsonic	High subsonic	High subsonic	High subsonic
Range	27.78 km	27.78 km	15.0 nm	15.0 nm

Figures for B version are maximum weight. The B model's weight can vary to as low as 1,022.72 kg (2,250 lb).

Propulsion. A WPU-5/B solid rocket motor manufactured by Hercules is used by the AGM-130A. A Williams International turbojet engine was offered to the United Kingdom as part of the company's bid for the CASOM requirement.

Control & Guidance. Electro-optic guidance with a command datalink, the same as the GBU-15 glide bomb. The GBU-15 datalink contractor is Raytheon, which also provides an imaging infrared (IIR) seeker. The control surfaces are pneumatically actuated. The system is used in conjunction with the Raytheon AXQ-14. Distance-measuring equipment is integral to the guidance system; Honeywell supplies the radar altimeter.

Harris' Government Aerospace Systems Division and Magnavox Advanced Products and Systems Company developed an Improved Data Link (IDL) to provide enhanced resistance to hostile electronic countermeasures. The previous datalink was not jam-resistant. The new datalink enables the AGM-130 to attack via remote control heavily defended targets that require pinpoint accuracy when conventional flyover tactics are not possible. The system incorporates command and control signals and advanced anti-jam technology and video communications from the missile to the launch platform.

Launcher Mode. The AGM-130 is expected to be rail-launched from underwing or centerline stations of F-4, F-15, F-111, A-10 and possibly F-16 aircraft. The missile has also been fit-checked on the Tornado. Plans to integrate the missile with the B-52 bomber have been dropped for the time being.

Warhead. The warhead for the AGM-130A is the standard unitary Mk 84 909.09 kilogram (2,000 lb) bomb; the new AGM-130C will use the BLU-109/B Targetbuster 2000 (I-2000) bomb. The US Air Force is also considering the development of a lightweight warhead system (1,000 lb).

AGM-130

Source: USAF

Variants/Upgrades

Boeing is actively developing two versions of the AGM-130: the AGM-130A and AGM-130C. The AGM-130A is the basic model based on the GBU-15 with the Mk 84 bomb. The AGM-130C is a follow-on based on the BLU-109/B penetrator bomb. The United States will integrate an imaging infrared seeker with the AGM-130A, as well as an inertial navigation system/Global Positioning System (INS/GPS). However, the focal plane array and INS/GPS upgrades are threatened due to declines in AGM-130 procurement. Production of both was to be under way before the end of 1995. Another version of the AGM-130, the AGM-130E, was a possible candidate for the United Kingdom's CASOM (Conventionally Armed Stand-Off Missile) requirement. The AGM-130 was to be equipped with a turbojet and other modifications.

Boeing decided not to bid for this contract. For more information on these other proposed AGM-130 versions, please see the pertinent entries in the **Program Review** section.

Program Review

Background. With the phenomenal success of the first PAVEWAY laser-guided bombs, the US Air Force wanted to explore the prospects of using electro-optic and other technologies to guide bombs to various heavily defended targets. Two programs, project PAVE STRIKE and the Defense Suppression Program, developed this technology starting in 1972.

Rockwell International Missile Systems Division (now Boeing) was selected in 1973 as the prime contractor. Both electro-optic and infrared guidance and control kits were developed for the Mk 84 909.09 kilogram (2,000 lb) bomb and the Mk 118 1,363.63 kilogram (3,000 lb) bomb. Further developments were in the datalink OA-8921/AXQ-14, the WCU-6A/B integrated control module, and the distance-measuring equipment. Operational testing was conducted in Southeast Asia and resulted in a full-scale development program. This program integrated the CBU-75 cluster bomb to the GBU-15 concept. Hughes Aircraft Company of Los Angeles, California, contributed the datalink technology, while the Armament Division of the US Air Force provided integration and other assistance. Through the 1970s, the GBU-15 concept was expanded and developed into an operational reality.

For some time, the program was referred to as HOBOS, for Homing Bomb System; later, the Air Force called the entire system the Modular Glide Bomb System. Most recently, the system has been designated the GBU-15(V), the V meaning variable configuration. The modular concept for this type of weapon is preferred by the US Air Force. The illustration below will aid in the understanding of this somewhat complicated system. The distance-measuring equipment can be used in conjunction with the electro-optic or infrared modules. The actual kit designations are as follows: KMU-353A/B Electro-optic, designated GBU-8; KMU-390/B Electro-optic, designated GBU-15(V)1/B; and KMU-359/B Infrared, designated GBU-15(V)2/B.

Each kit consists of the guidance section, a tail assembly with four fins with control surfaces and the batteries, a set of strakes and metal straps which integrate the assemblies.

AGM-130. Shortly after the introduction of the GBU-15, the US Air Force began exploring the possibility of a powered version of the glide bomb. At about the same time, a requirement for a Stand-off Attack Weapon was established by the US Air Force. This program was to develop a stand-off weapon for use against airfields. Various runway cratering, anti-aircraft, and area denial submunitions were to be delivered by this weapon. When the US Air Force changed its Stand-off Attack Weapon requirement to a unitary payload from a submunition payload, the idea of the powered GBU-15, designated AGM-130, was born.

Sequence of Operation. The AGM-130 is loaded on the aircraft in a manner similar to the loading of the AGM-65. The various guidance modules are fitted per mission requirement.

The weapon is equipped with either an electro-optic or imaging infrared seeker and datalink. The seeker provides the launch aircraft with a visual presentation of the target as seen from the weapon. During free flight, this presentation is transmitted by a datalink system to the aircraft cockpit monitor. The seeker either can be locked onto the target before or after launch for automatic weapon guidance, or it can be manually steered by the weapon system operator. Manual steering is performed through the two-way datalink.

A typical mission consists of one aircraft delivering a single weapon. For the primary mode of operation, indirect attack, the aircraft flies to a pre-briefed launch position. Survivability of aircraft and crew is enhanced by launching the weapon at a low altitude and significant stand-off range, thus avoiding detection by enemy air defenses. After the launch, the weapon flies through glide-powered glide phases toward the target area with mid-course guidance updates provided as necessary through the datalink. Upon termination of the powered flight phase, the rocket motor is ejected. As the target comes into view, the Weapon Systems Operator has dual flexibility in guiding the weapon via the datalink. For automatic terminal homing, the guidance tracker is locked on target but can be manually updated for precision bombing. When total manual guidance is used, the operator manually guides the weapon to the desired target aimpoint.

For those aircraft not equipped with a datalink pod, the weapon may be launched in the direct-attack mode. Here the weapon is locked onto the target before launch and flies autonomously to the desired aimpoint. For even greater operational effectiveness, multiple aircraft and weapon delivery tactics may be employed together with other types of munitions.

Missile Models. Boeing is proposing several variants of the AGM-130. The following descriptions should be taken tentatively since there have been a great deal of changes since the program was initiated. Some variants are believed to have been canceled, with new models receiving the canceled models' designations.

AGM-130A. This is the basic model based on the GBU-15 with the Mk 84 bomb. This was the first version of this missile to enter production and service with the US Air Force. This system was not available at the time of Operation Desert Storm (1990-1991). A full-rate production decision was made in late 1994.

AGM-130A IIR. The United States Air Force integrated a 256x256 focal plane array imaging infrared (IIR) seeker with the AGM-130A missile (referred to by some as the AGM-130B). This system enables the AGM-130 to lock onto a known (fixed) ground target and guide itself with greater precision. Integration of an IIR seeker with the AGM-130A was completed in 1994, with initial low-rate production following in 1995. A procurement contract for an initial batch of 214 missiles was issued in early 1996, but budget cuts continue to be a threat to this program.

AGM-130B. This version is based on the GBU-15 with the SUU-54 airfield attack submunitions dispenser carrying the Aerojet BLU-97/B Combined Effects Munition. The system carries a total of 15 boosted kinetic energy penetrators. Although canceled in February 1986, this version had strong backing in Tactical Air Command and could be resurrected in the future.

AGM-130C. The first AGM-130C to appear was the same as the AGM-130B but was equipped with the BLU-106/B Boosted Kinetic Energy Penetrator. Later, the US developed another AGM-130C, this one using an improved Targetbuster 2000 bomb (the BLU-109/B or I-2000) for better hard target penetration. This missile was also called the AGM-130D.

AGM-130E CASOM. This is the turbojet-powered version offered to the United Kingdom to meet its Conventionally Armed Stand-Off Missile (CASOM) requirement.

AGM-130 Follow-On. The US Air Force was working on a possible replacement for the AGM-130 as part of a inter-laboratory program known as Low-Cost Stand-off Weapon Technologies. This program was to develop and demonstrate key technologies that would reduce the cost of future guided stand-off weapons. The goal was to develop by the year 2000 medium-range stand-off weapon technologies for defeating a multitude of targets at one-third the cost of the AGM-130. Participants included Armament, Material, Aeropropulsion and Astronautics laboratories. No civilian defense contractor was selected.

Funding

The United States does not plan to procure additional AGM-130 missiles to replace those used against Iraqi and Serbian military targets.

Recent Contracts

In April 1997, Boeing North American, Incorporated, Duluth, Georgia, received a $31.3 million firm fixed-price contract to provide 72 AGM-130s built from government-furnished components. Work was completed by June 1999. Contract Number F08626-97-C-0110. In January 1997, Rockwell International, Duluth, Georgia, was awarded a $5.5 million face value increase to a firm fixed-price contract to provide for 12 autopilot processor cards applicable to the AGM-130 missiles and associated flight test support. Work was completed by December 1999. Contract Number F08626-95-C-0236 P00006

In December 1996, Hughes Aircraft Company, Los Angeles, California, was awarded an $8.9 million firm fixed-price contract to provide for 237 Weapon Datalinks for the AGM-130 air-to-ground missile. Work was completed by August 1998. Contract Number F08626-97-C-0015. In May 1996, Rockwell International received a pair of contracts worth $63.7 million. One award involved the delivery of 214 remanufactured AGM-130As equipped with an imaging infrared seeker and an inertial navigation system/Global Positioning System mid-course guidance capability. This contract was valued at $33.2 million. Contract Number F08626-95-C-0236. The second contract, worth $30.5 million, covered the procurement of 100 new AGM-130A missiles. Work on this contract was completed by November 1998. Contract Number F08626-95-C-0236 P00001

Timetable

Month	Year	Major Development
Mid	1960s	PAVEWAY concept developed
Jul	1972	GBU-15 concept initiated
Apr	1973	GBU-15 development begun
Sep	1978	DSARC 3 decision made
Sep	1980	Full-scale production begun
Jan	1982	First production deliveries begun
Sep	1984	Contract awarded for development of AGM-130
	1985-86	Prototypes fabricated, tested
Late	1988	Full development, test and evaluation phase commenced
Late	1989	Flight testing expected to be completed
	1990	Procurement funding re-instated
Mar	1990	Production approved
	1990-91	Initial low-rate production commenced
	1994[(a)]	Full-scale fabrication commenced
Mar	2000[(a)]	AGM-130 production completed

[(a)]estimated

Worldwide Distribution

There has been a lot of interest in the AGM-130 from various NATO alliance members though none have made a commitment to procure the system. Countries believed to have had a need for a system like the AGM-130 include the **Federal Republic of Germany**, **Egypt**, and **Israel**.

Australia had been considering the purchase of the AGM-130C (BLU-109/B version) to fill the Royal Australian Air Force's (RAAF) Air 5398 requirement for a new strike weapon. However, in mid-1996 the Israeli Popeye (the AGM-142A HAVE NAP in the US) was selected to fill this need.

Egypt has asked the United States to allow the export of the AGM-130 to outfit its F-16 fighters. **Turkey** had also shown an interest in the AGM-130 but decided to procure the HAVE NAP.

The **Philippines** has mentioned that it is interested in acquiring a 15 to 25 kilometer range stand-off missile. This missile would arm its new fighter aircraft, to be purchased in the relatively near future.

Korean Licensing. In June 1993, Boeing signed a Memorandum of Understanding with Goldstar Corporation of **South Korea** covering marketing and potential coproduction rights of the GBU-15 and AGM-130. Negotiations were to be finished around March 1994, nine months from the signing of the MoU. South Korea planned to make a final decision on AGM-130 procurement before the end of 1996 but delayed its decision until 1997. Eventually, Seoul announced that it had selected the AGM-130's main competitor, the AGM-142A HAVE NAP, to meet its stand-off needs.

User Country(s). The **United States Air Force** is the only operator of the AGM-130A.

Forecast Rationale

Operation Enduring Freedom will probably not result in new production contracts for the AGM-130, but could generate greater demand for this type of weapon system. Since the end of the air campaign to oust Serbian forces from Kosovo, interest in smart weapons has been increasing. However, purchases have lagged far behind those anticipated in the early aftermath of Operation Allied Force. Also, Operation Allied Force showed the need for new precision guided munitions, but it did not show which systems are no longer required.

According to sources, the US Air Force has no current plans to procure any additional AGM-130 missiles.

Instead, the Pentagon will meet its needs with the Joint Direct Attack Munition (JDAM), Joint Stand-Off Weapon (JSOW) and Joint Air-to-Surface Stand-off Missile (JASSM). Money that may have been spent on further AGM-130 production will go to fund the JASSM and other next-generation strike-missile programs.

With the US is reluctant to place any further AGM-130 orders, Boeing is looking overseas for potential customers. South Korea has been mentioned as a prime candidate to procure the AGM-130 via its selection of a next-generation strike fighter. The US is offering the F-15K to Seoul against competitors from Europe including: Sukhoi's Su-35, Dassault's Rafale and the Eurofighter Typhoon. The US armaments package reportedly includes licensed production of the AGM-130 by South Korea if the F-15 is selected. This fighter contract could be worth $4 billion and involve upwards of 200 aircraft.

Although the F-15K is considered the favorite for winning this competition, whether Seoul will want the AGM-130 is uncertain. Previously, South Korea was offered the AGM-130 but decided to procure an alternative strike missile system. Unless Boeing secures additional orders from somewhere, and the chances of this appear slim, the AGM-130 production line will remain closed.

Note: Deliveries of the AGM-130s with the mid-course upgrade package were made in late 1996. All previously fabricated and new-production missiles will be equipped with this upgrade package. Our AGM-130 production totals are split between the fabrication of all-new units and the remanufacture of the existing inventory. The first AGM-130A line represents initial US production. The second includes the remanufacture of the existing US inventory and new purchases and exports.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

			High Confidence Level				Good Confidence Level			Speculative			
Missile	**(Engine)**	**thru 01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**Total 02-11**
ROCKWELL INTERNATIONAL CORP.													
AGM-130A	WPU-5/B	648	0	0	0	0	0	0	0	0	0	0	0
AGM-130A	WPU-5/B	464	0	0	0	0	0	0	0	0	0	0	0
AGM-130B	UNSPECIFIED	0	0	0	0	0	0	0	0	0	0	0	0
AGM-130C	UNSPECIFIED	0	0	0	0	0	0	0	0	0	0	0	0
Total Production		1112	0	0	0	0	0	0	0	0	0	0	0