AMMO Chiefs Association (ACA)

"Shell and Flame"

Issue Number: XV *December 2007*

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We are the Ammo Chiefs Association, a not-for-profit; fraternal Association dedicated to the promotion of camaraderie among active duty and retired **USAF AMMO Chiefs**. Our members work throughout the year to raise funds for worthwhile charitable causes such as the Richard Gauvin Memorial Fund, the Enlisted Widows Foundation, and a Sunshine Committee to respond to members' time of distress. The ACA contributes to the morale of active duty AMMO troops at the Chapter level through recognition and sports programs. The ACA sponsors awards programs for the AMMO School House Outstanding Performer, and the AFCOMAC Outstanding Performer. ACA has contributed to cultural enterprises such as the RAF Welford AMMO Museum. **We are AMMO, and proud of it!** Please visit the AMMO Chiefs web page for more information at http://ammochiefs.com.

Association News

From your President:

ACA Members.

It has been another good year for the AMMO Chiefs Association. We've finished a re-write of our Constitution; we've incorporated in the state of Florida, selected the ACA Emerald Coast Chapter to hold our reunion in 2008, held ACA officer elections, and managed to conduct the vast majority of our business through virtual meetings and by email. Still in the works are efforts to gain tax exempt status for the ACA being worked by Fred O'Hern and Joe Dominguez. We are also reviewing what the ACA will offer in our trinket shop headed up by Mike Curran. Mike is also taking the lead along with Joe Dominguez and Mark Gossett to find quality certificates/charters for our Chapters and for various kinds of recognition certificates at a more affordable price than what we've paid in the past. We also have our annual ACA audit underway and are preparing our budget for the coming year. Lastly, we'll review and update the ACA Strategic Plan initiated by John Matthews to identify the goals we will pursue during the coming year.

During the year we've had a number of turnovers on the ACA Board. The year started out with John Greer stepping down for health reasons and Johnny Long, Mark Gossett and Darrell Beasley stepping down for personal reasons. Later in the year, John Matthews also stepped down for health reasons.

As many of us are finding out first hand, the golden years are not quite so golden. Despite these losses we can be thankful that we've had other members step up to fill the need. I would like to thank Fred O'Hern, Rich Bussell, John Rivard, Rich Pennington, and Tom Cox for volunteering to fill the various vacancies and helping move the ACA forward in a highly contentious atmosphere. I would also like to thank the many people who worked on committees and contributed to rewriting our Constitution. A rewrite was due and no matter how much we tried there was no way we could satisfy everyone in this one document. I particularly want to thank Yvonne Watts, Fred O'Hern, Frank Waterman, Johnny Long and John Cecere who served on the initial Constitution Review Committee and got this ball rolling.

Each of our chapters appears to be vibrant and involved in their areas. I particularly would like to recognize Joe D'Arco and the ACA Wasatch Front Chapter for the work they have done on Holiday Baskets for AMMO troops among the 5 bases associated with that chapter. Joe and the Chiefs of the chapter have collected $500.00 and bought DECA certificates to pass out to the 5 bases to help make the holidays just a little better for AMMO troops in need. This is a no red tape type of program. The Chapter gives the AMMO NCOIC at each of these 5 bases the DECA certificates to pass out as they see fit, no justifications to write, just get the job done. I am sure our other Chapters are equally involved. Joe has done a good job keeping us informed and I ask the other Chapters to also let us know what you are doing so that we can piggyback on your efforts and maybe make a contribution to your endeavors as well.

Lastly, I would like to thank you our members for your involvement in the ACA. We need your input and participation no matter if you are for or against a particular course of action. This is your Association and we listen and respond to your input. I would also like to recognize you for your participation in voting on our Constitution and our recent elections. In both instances we had better than 70 percent participation. Our members are involved. The AMMO Chiefs Association is alive and well!

On behalf of the ACA Board of Directors I wish all of you a Merry Christmas and Happy New Year.

Rich McVey
ACA President

Secretary's Section

Please provide me with an update of your address and contact details. You can do this in two ways; either drop me an email or snail mail, or use the Get in Touch-Update Contact Info Tabs on the web site http://ammochiefs.com.

All members were sent a new membership card this year. If you did not receive yours, please contact me and I will send you a replacement. Also, if you have not received your numbered Membership Coin, please let me know.

Fred O'Hern, Secretary
6046 SW 98th Loop
Ocala, FL 34476

ACASecretary@aol.com
or fohern@aol.com

Membership Report

At the end of 2007 the membership in the ACA stands at 142 broken down as follows; 52 Chief Life Members; 73 Chief Annual Members, Four Associate Life Members, Eight Associate Annual members, and Seven Honorary Members. Unfortunately, 32 members were dropped from the Membership Rolls in 2007 for non-payment of dues. If you are one of those who was dropped we would like to have you back. A member can be reinstated by paying the current years dues. All individuals were notified using their address on file that they were dropped from the rolls.

Annual Members are reminded that dues ($25.00) should be paid by January 31st, 2008. Due to the recent change to the Constitution a continuous members may apply all annual dues toward Life Membership, e.g., if you have paid dues annually for six consecutive years (6 x $25 = $15) you can become a Life Member by paying $100. This obviously has to be an individual calculation! If you are interested contact me and I will explain your contribution amount.
(probably should read: Continuous years of paying membership dues may apply toward Lifetime Membership. For example,…..)
Checks or queries to the above address.

Reunions

Danny Bridges and the members of the Emerald Coast Chapter have agreed to host our 5th reunion in the Fort Walton Beach area. Earlier this year Tom Zima took a survey of our members to determine where members wanted their next reunion, Fort Walton Beach won. Other areas considered were Branson, Missouri; a cruise; and several other locations. Fort Walton was the favorite.

Although at this point definite dates have not been established and much planning and work remain to be done this should give all of our members plenty of advance notice of our bi-annual get-together. Since our other reunions have been held in the month of October it would probably not be a stretch to suggest this next one will also be in October.

So start making your plans now and hope to see you there. Lets make this our biggest and best reunion ever!

40th Thule Air Base Anniversary

On January 21st, 1968, an American B-52 bomber crashed on Thule Air Base in Greenland. It has been 40 years since that tragic event and both the Danish and American soldiers and civilians who participated during the incident continue to remember and reflect on the ensuing events from this nuclear accident. The 430th Anniversary meeting for the Thule Union will commemorate the men who served their countries and risked their lives during that fated time.

The Thule Union would like to cordially invite the American Servicemen who gave their hands and their hearts during that special time in 1968 for their 40th Anniversary meeting, which will be held January 19-20, 2008. During this meeting, we will be orienting and updating invitees regarding the events that have transpired since the crash and about the ongoing case in Brussels, Belgium. This is a time for remembering, recollecting, and re-uniting with those bonded together as a result of the B-52 incident in 1968. Thank you for your participation.

The meeting will be held at Kolding PA|dagogseminarium, Dyrehavevej 116, 6000 Kolding, January 19th, 2008 at 12:00 pm. At 1:00 pm, presentations will be followed by discussions.

Dinner will be at 7:00 pm, with a cash bar, followed by coffee and entertainment. Breakfast will be at 9:30 am on January 20th.

Admission for the event is 200.00 D. Kr. (US $40.00). Reservations can be made for you at the Hotel Byparken, www.hotelbyparken.dk. Or you may procure reservations elsewhere, at your discretion. We look forward to your response.

Please contact for RSVP to: ib RenAc Clausen mail@ib-rene.dk, telephone: +45 40171088 or Lisa Clausen, USA at 904-377-7899.
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MORBACK Reunion 2008

Our next reunion is scheduled for a Friday-Saturday in September 2008 in Dayton, Ohio. The venue will probably be Hope Hotel and Conference Center, on the grounds of Wright-Patterson Air Force Base, home of the Air Force Museum.

I need to know very quickly from those of you seriously intending to attend if there is any weekend in that month in which you could not attend.

Fraternally yours,
Daniel E. "Moose" Parks
614 Evergreen Drive
Clarksville, IN 47129
812.280.9574

News from Our AMMO Schoolhouse

Chief Norman Sheffield provided the following information from the AMMO Schoolhouse at Sheppard AFB, Texas. Chief Sheffield is on his way to Aviano, reporting in January 2008.

Distinguished Graduates

September-October 2007 Graduates

Name	Rank	GPA
Pereira, Jerome,Q.A 18MUNS Kadena AB, JA	AB	95
Veldhouse, Ian, P. 31MXS Aviano AB, IT	AB	95
Milholland, Dustin, C 18MUNS Kadena AB, JA	A1C	95
Terrill, Quinton, B. 509MUNS Whiteman AFB, MO	A1C	95
Wassing, Nathaniel I. 3EMS Elmendorf AFB, AK	A1C	95

Distinguished Graduates

November 2007 Graduates

Name	Rank	GPA
Cline, Luke, A. 36MXS Andersen AFB, Guam	AB	96
Gore, Christopher, M. 36MXS Andersen AFB, Guam	AB	95
Weirich, Patrick, J. 442MXS, Whiteman AFB, MO	SSgt	95

Top Graduates

Name	Rank	GPA
Huddleston, Paul, D. Ft. Wayne ANG, IN	SSgt	97
Thompson, Alan, J. 132 MXMS Des Moines ANG, IA	SrA	97
Hatfield, Christopher L. 3 EMS Elmendorf AFB, AK	A1C	98
Cook, Anthony, P. 335 MXS Misawa AB, JA	AB	98
Livgren, Lance E. 36 MXS Andersen AFB, Guam	AB	98
Sawyer, Lonnie, J. 442 MXS Whiteman AFB, MO	SrA	97
Rogers, David L. 442 MXS Whiteman AFB, MO	A1C	98

Chapter News

Wasatch Front Chapter. Once again, the Wasatch Front Chapter is stepping up to help the younger AMMO troops in their area. The Chapter collected contributions from its members to purchase DECA Certificates (a.k.a. Holiday Baskets). This year, they collected $500 worth of certificates. Once they are obtained, the Chapter sends them to the Flight Chiefs to disperse to the neediest AMMO troop(s). The Flight Chief is in the best position to determine who could use the help and this is an excellent, no-hassle way for the Chapter to take care of the troops and their families. Each Flight Chief received one-$50 and two-$25 certificates. Most bases/units have some sort of holiday program in which to submit names of troops that may/may not fall above the funding line. Well, now the AMMO Flight Chiefs have the power to give and help as they see fit. Donated amounts dispersed to the five AMMO units will depend on how much is raised. Each envelope has a letter from the Chapter Chiefs which is slanted away from them giving charity, which turns some people off.

This is a low-maintenance way of the AMMO Chiefs continuing to take care of the AMMO force.

JOE D'ARCO
President.

Virginia Chapter. The ACAVC held it's meeting on 8 December 2007, hosted by Bill McCullough at his home. A social was held after the meeting and food and drink were furnished by Bill and Marilyn. Our heartfelt thanks go out for their hospitality. We set the budget for the coming year and established meetings dates for 2008. The ACAVC selected it's first Annual Award for junior AMMO troops in the Mid-Atlantic Region. The winner was A1C Kevin Johnson from Seymour Johnson AFB, NC. A Certificate of Appreciation, letter, ACAVC Coin, and check for $50 will be presented by Jack Miller to Kevin in the coming weeks. Our thanks to Mike Robertson for designing the certificate.

We will be working the Langley AFB AMMO area to provide $500 worth of gifts or critical need items to young airmen before Christmas. Last year this was a bg success story for our Chapter. We all feel good about helping our young AMMO troops throughout the year; however, during the holiday season many of them find themselves a little short in being able to provide a special gift or meal for their family and children.

We also welcomed our newest member, Chief Thomas McConnell, and his wife Teresa. Tom is active duty, working at HQ ACC/A8Z.

The following dates are for ACAVC meetings: 29 March, 28 June, October meeting will be held in conjunction with the ACA Reunion in Florida, and 6 December will close out the 2008 year.

We wish fellow AMMO Chiefs a Merry Christmas and Best Wishes and Good Health in 2008.

RICHARD PENNINGTON
ACAVC President

"Ray of Sunshine"

The following AMMO Chiefs are having health problems and could use a "Ray of Sunshine" from you, their AMMO Brethren, to help them through the tough times.

Bill Poe
220 Dominica Circle E.
Niceville, FL 32578-4085

Larry DiAmco
30427 Middle Creek Circle
Spanish Fort, AL 36527

If you know of an AMMO Chief who can use a "Ray of Sunshine", please let us know.

Another web site of interest may be: http://www.airforcechiefs.org/FallenChiefs.html.

ACA Web Page News

ACA has been having problems with its web site. The membership application and contact information forms were not working but have been updated and fixed. They are now connected and we do get and work off of that data. Please update your contact information is you've had any changes.

TTU-595 Paveway Tester Update

A new system used on Laser Guided Bombs (LGBs) was deployed to Military Ocean Terminal Sunny Point, NC (MOTSU) to test over 1,000 Paveway II Computer Control groups (CCGs) which were removed from an Air Force Afloat Prepositioned Fleet (APF) vessel.

The TTU-595 Laser Guided Bomb Tester ensures that a CCG is functioning properly prior to weapon deployment. It has the ability to test Paveway II and Paveway III Laser Guidance Units.

The TTU-595 greatly reduces the amount of time needed to test CCGs, when compared to the current test set, the TTU-373 C/E. With the TTU-595, a technician can set up, test and recap a CCG in about 4 minutes; compared to about 10 minutes for the TTU-373. "Compared to the length of time it took to test CCGs with the TTU-373 C/E Digital Test Set, the TTU-595 is much faster and simpler to operate" stated SSgt Joshua Mains, APF technician at MOTSU. "[The TTU-595] is so easy to operate," added SrA Paul Connell.

In all, APF technicians at MOTSU tested 1,032 CCGs from 5 Nov 07 to 15 Nov 07. By testing at MOTSU, the APF technicians were able to test the CCGs as they were removed from the ship, ensuring usable assets as soon as they arrived to the Operational Units.

The testing at MOTSU also benefited the 507 CBSS.GBLC program team by providing valuable feedback from the technicians that will be used to create a more user friendly test set prior to field deployment.

"The testing at MOTSU benefited every organization in the chain," stated Mark Kiedrowski, Program manager for the TTU-595 test set. "We (507 CBSS/GBLC) were able to get valuable information on the performance of the system while working with the professional APF technicians at MOTSU to efficiently test and release usable assets to the warfighter faster. It was a win-win situation for everyone."

The TTU-595 is scheduled to reach Initial Operation Capability (IOC) in 2008.

Mr. Mark Kiedrowski.

Squadron Leader Costick Accorded Honorary Membership

For those of us stationed in the United Kingdom in the late '70s and '80s, Squadron Leader E.H. "Ted" Costick was a familiar figure as he regularly visited USAF AMMO areas, units, and operations. Those working in storage in those days frequently called on him for advice with regard to that dreaded RAF Explosive Regulation AP110A-0102-1. Ted was the RAF's Liaison Officer for Armament at Headquarters Third Air Force from 1975-1983. For those not familiar with the UK; all AMMO/EOD operations and applications of explosive safety rules had to comply with RAF/UK-MOD guidance. Ted was the go-to and arbiter of all matters with regard to AMMO/EOD operations, facility siting and licensing, waivers, and applications of explosive safety rules in the UK.

It was through his efforts on USAF's behalf that 275 Hardened Aircraft Shelters; 1,500 AMMO Storage Structures; virtually all new construction/renovation of facilities at RAF Welford; the bed down of Ground Launched Cruise Missiles (GLCMs); and re-licensing (permitting a quantum increase in storage) of every storage facility in the UK was made possible. Ted always provided the most liberal interpretation of UK rules consistent with common sense approaches to explosive safety. His studied guidance made life much easier for AMMO Chiefs in the UK.

Sqn Ldr Costick enlisted in the RAF in 1945 as an Armorer; he rose to the rank of Flight Sgt (MSgt) took a commission and retired after 38 years service as Sqn Ldr (Major); all of his service was in Armament (both conventional and otherwise). In RAF terms this included EOD; his actual trade description was Chief Ammunition Technical Officer. He received the Queen's Gallantry medal (equivalent to the Silver Star) for bomb disposal duties in Cyprus and the British Empire medal (equivalent to the Legion of Merit) for his service as RAFLO-Arm. Interestingly his service included time spent in Baghdad.

As a result of his support of and contributions to AMMO, the ACA Board of Directors unanimously approved Sqn Ldr Costick's honorary membership. His membership coin was presented to him by Fred O'Hern in July. Ted was in British terms "over-the-moon" by being honored by a group equivalent to the RAF's "Hairy-Chested-Amorers".

Fred O'Hern
Secretary

AMMO News From Around the Air Force

Air Force releases B-52 munitions transfer investigation results

by Staff Sgt. Monique Randolph
Secretary of the Air Force Public Affairs

10/19/2007 - **WASHINGTON (AFPN)** -- A senior Air Force official released results of the command-directed investigation stemming from a weapons transfer incident that occurred Aug. 30 when cruise missiles were loaded onto a B-52 Stratofortress at Minot Air Force Base, N.D., and transported to Barksdale AFB, La.

The Barksdale-assigned B-52 was prepared to transport 12 cruise missiles to Louisiana as part of a tactical ferry mission; however, six of the 12 missiles were not properly prepared for transport, said Maj. Gen. Richard Newton III, assistant deputy chief of staff for operations, plans and requirements at the Pentagon.

General Newton attributed the loading and transport of the weapons to "a series of procedural breakdowns and human errors," stating that the six cruise missiles on that particular pylon "were not supposed to be moved."

"The extensive, six-week investigation found that this was an isolated event and the

weapons never left the custody of Airmen and were never unsecured," General Newton said. "However, this incident is unacceptable to the people of the United States and to the United States Air Force."

Following the incident, Gen. Ronald Keys, Air Combat Command commander, ordered an immediate investigation to be conducted by Maj. Gen. Douglas Raaberg, ACC director of Air and Space Operations. The investigation lasted six weeks.

Immediately following the incident, one ACC commander was relieved of command, and the 5th Bomb Wing at Minot was decertified from specific missions and suspended from performing tactical ferry operations.

Since the investigation, several other officers have received administrative action and were relieved of command. Additionally, the Air Force conducted a service-wide stockpile inventory to verify there were no additional discrepancies, and enhanced management directives regarding the storage, tracking and labeling of all weapons.

Secretary of the Air Force Michael W. Wynne also directed nuclear security inspections for nuclear-capable units with oversight from the Defense Threat Reduction Agency.

As a result of the investigation, Air Combat Command officials will recertify the tactical ferry program prior to reinitiating B-52 ferry operations, General Newton said.

"We are aggressively examining and implementing corrective measures to our weapons handling and transfer process," he said. "Corrective action will ensure our munitions are handled precisely and safely 100 percent of the time.

"This was a serious error caused by a breakdown of procedural discipline by our Airmen," General Newton added. "We're accountable and we reassure the American people that the Air Force standards they expect are being met."

Keep your eye on the 2008 DOD budget. The Senate is trying to increase the percentage of E-9s from 1% to 1.25% of the total force.
(Source: AF Sergeants magazine, November/December 2007)

Laser-Guided Maverick Missile Meets Urgent Air Force Need

by Staff Writers
Tucson AZ (SPX) Aug 17, 2007

Force in 1972.

Having published an urgent operational need for a close air support weapon to defeat high-speed moving targets with minimal collateral damage, the U.S. Air Force has expressed interest in re-establishing production of Raytheon Company's (NYSE: RTN) laser-guided Maverick. The laser-guided AGM-65E Maverick missile is an air-to-ground weapon that can meet the service's needs in the near-term.

The Air Force currently operates with television- and infrared-guided versions of Maverick. Until now, only the Navy and Marine Corps have employed the laser-guided version. The laser-guided Maverick has a combat-proven record of effectiveness and reliability against armored and moving surface targets in scenarios involving urban environments and during close air support missions.

"Maverick missiles constitute a key capability required for use in the modern battlespace," said Harry Schulte, Raytheon Missile Systems vice president of the Strike product line. "Maverick has proved itself over many years of service to be a very versatile weapon system, and the newest laser version will significantly enhance the Air Force's precision capability required to save lives in close combat and quick-reaction situations.

"To get that capability on Air Force aircraft in short order, the Navy has agreed to transfer some of its inventory of laser-guided Mavericks to the Air Force."

Maverick is a precision air-to-ground missile that has multiple warhead and seeker variants and is used against moving or stationary small or hard targets; armored vehicles; surface-to-air missile sites; and high-value targets such as ships, port facilities and communications centers. The missile has launch-and-leave capability that enables a pilot to fire it and immediately take evasive action or attack another target as the missile guides to the target.

First employed in Southeast Asia more than 30 years ago, Maverick is the most widely used precision-guided missile in the world. Maverick has been upgraded to meet evolving threats, playing a key role in recent conflicts. The weapon's seeker technology has improved significantly since the initial television-guided version was delivered to the Air Force in 1972. Increased capabilities were added with the introduction of scene magnification optics; modern charge-coupled-device television technology; and improved software, infrared and laser seekers.

AMMO Weapons File

AGM-65 MAVERICK Missiles

Mission

The AGM-65 Maverick is a tactical, air-to-surface guided missile designed for close air support, interdiction and defense suppression mission. It provides stand-off capability and high probability of strike against a wide range of tactical targets, including armor, air defenses, ships, transportation equipment and fuel storage facilities.

Features

The Maverick has a cylindrical body, and either a rounded glass nose for electro-optical imaging, or a zinc sulfide nose for imaging infrared. It has long-chord delta wings and tail control surfaces mounted close to the trailing edge of the wing of the aircraft using it. The warhead is in the missile's center section. A cone-shaped warhead, one of two types carried by the Maverick missile, is fired by a contact fuse in the nose. The other is a delayed-fuse penetrator, a heavyweight warhead that penetrates the target with its kinetic energy before firing. The latter is very effective against large, hard targets. The propulsion system for both types is a solid-rocket motor behind the warhead.

A-10, F-15E and F-16 aircraft carry Mavericks. Since as many as six Mavericks can be carried by an aircraft, usually in three round, under wing clusters, the pilot can engage several targets on one mission. The missile also has "launch-and-leave" capability that enables a pilot to fire it and immediately take evasive action or attack another target as the missile guides itself to the target. Mavericks can be launched from high altitudes to tree-top level and can hit targets ranging from a distance of a few thousand feet to 13 nautical miles at medium altitude.

Maverick A and B models have an electro-optical television guidance system. After the protective dome cover is automatically removed from the nose of the missile and its video circuitry activated, the scene viewed by the guidance system appears on a cockpit television screen. The pilot selects the target, centers cross hairs on it, locks on, then launches the missile.

Although the Maverick B is similar to the A model, the television guidance system has a screen magnification capability that enables the pilot to identify and lock on smaller and more distant targets.

The Maverick D has an imaging infrared guidance system, operated much like that of the A and B models, except that infrared video overcomes the daylight-only, adverse weather limitations of the other systems. The infrared Maverick D can track heat generated by a target and provide the pilot a pictorial display of the target during darkness and hazy or inclement weather.

The Maverick G model essentially has the same guidance system as the D, with some software modifications that track larger targets. The G model's major difference is its heavyweight penetrator warhead, while Maverick A, B and D models employ the shaped-charge warhead.

Background

The Air Force accepted the first AGM-65A Maverick in August 1972. A total of 25,750 A and B Mavericks have been purchased by the Air Force.

The Air Force took delivery of the first AGM-65D in October 1983, with initial operational capability in February 1986. Delivery of operational AGM-65G missiles took place in 1989.

AGM-65 missiles were employed by F-16s and A-10s in 1991 to attack armored targets in the Persian Gulf during Operation Desert Storm. Mavericks played a large part in the destruction of Iraq's significant military force.

General Characteristics

Primary Function: Air-to-surface guided missile

Contractors: Hughes Aircraft Co., Raytheon Co.

Power Plant: Thiokol TX-481 solid-propellant rocket motor

Launch Weight: AGM-65A/B, 462 pounds (207.90 kilograms); AGM-65D, 485 pounds (218.25 kilograms); AGM-65G, 670 pounds (301.50 kilograms)

Diameter: 1 foot (30.48 centimeters)

Wingspan: 2 feet, 4 inches (71.12 centimeters)

Aircraft: Used aboard A-10, F-15E and F-16

Guidance System: AGM-65A/B, electro-optical television; AGM-65D/G, imaging infrared

Warheads: AGM-65A/B/D, 125 pounds (56.25 kilograms), cone shaped; AGM-65G, 300 pounds (135 kilograms) delayed-fuse penetrator, heavyweight

Unit Cost: $17,000 to $110,000 depending on the Maverick variant

Date Deployed: August 1972

Inventory: Classified

Point of Contact

Air Combat Command, Public Affairs Office; 115 Thompson St., Suite 211; Langley AFB, Va. 23665-1987; DSN 574-5014 or (757) 764-5014.

Above Information Courtesy of United States Air Force

AGM-65

Raytheon (Hughes) AGM-65 *Maverick*

The **AGM-65** *Maverick* was the first general purpose fire-and-forget tactical air-to-ground missile in service with the U.S. Air Force. It was produced in very large numbers, and its later versions will remain in the U.S. inventory for some time in the future.

Development of the *Maverick* began in 1965, triggered by the bad performance of the AGM-12 *Bullpup* in South-East Asia. Rockwell and Hughes designed missiles for the **ZAGM-65A** *Maverick* requirement, and in 1968 Hughes was selected as prime contractor. The first unguided **XAGM-65A** prototype flew in September 1969, and in December that year the first guided launch resulted in a direct hit. In August 1972, the first production **AGM-65A** missiles were delivered to the USAF.

The AGM-65A is a relatively small missile powered by a Thiokol TX-481 (SR109-TC-1) dual-thrust solid-fueled rocket motor. It uses an electro-optical (TV) guidance system. The picture of a TV camera in the nose of the missile is displayed on a screen in the cockpit. When the pilot has selected a target, the TV image is "locked" in the missile's seeker logic, and the *Maverick* is fired. After launch, the AGM-65A homes on the target by constantly matching the TV camera image to the locked target image. The 57 kg (125 lb) WDU-20/B shaped-charge warhead is detonated by an impact fuze. The accuracy of the AGM-65A is reported as about 1.5 m (5 ft) CEP.

Photo: Hughes
AGM-65A

One drawback of the AGM-65A was the relatively small TV image presented to the pilot, requiring an unnecessarily close approach to the target. Therefore the **AGM-65B** was developed, which used scene-magnifying optics doubling the image resolution. This allowed the engagement of smaller or more distant targets. Development of the AGM-65B, a.k.a. "Scene-Magnification *Maverick*", began in 1975, and the missiles were delivered during the late 1970s. Production of the AGM-65A/B TV guided *Mavericks* ended in 1978 after more than 35,000 missiles had been built.

Photo: Phil Callihan
AGM-65B

The **AGM-65C** was to be a semi-active laser guided version for the U.S. Marine Corps. It was intended for close air support, and was equipped with a heavier 113 kg (250 lb) MK 19 blast-fragmentation warhead. Full-scale development began in 1978, but only a few AGM-65C missiles were built and the program was eventually cancelled because of high costs. The USMC's laser-guided *Maverick* requirement was later satisfied with the AGM-65E.

The **AGM-65D** "IIR *Maverick*" is a derivative of the AGM-65A and replaces the latter's TV guidance section with a WGU-10/B imaging infrared (IIR) seeker (the same seeker is also used in the GBU-15(V)2/B glide bomb and the AGM-84E *SLAM*). This seeker has almost twice the lock-on range of the AGM-65A, and allows effective use of the missile at night or in bad weather. Development of the AGM-65D began in 1977, and the first missiles were delivered to the USAF in October 1983, with IOC (Initial Operational Capability) achieved in February 1986. The AGM-65D was also the first variant to be produced with a new reduced-smoke Thiokol TX-633 (SR114-TC-1) motor (alternative motor was an Aerojet SR115-AJ-1) in the WPU-4/B propulsion section. The AGM-65D-2 is an upgraded version with a faster seeker for higher accuracy and moving target tracking.

AGM-65D

When the AGM-65C was cancelled, development of r the USMC switched to the **AGM-65E**, whose WGU-9/B laser g aper than the

AGM-65C's. The AGM-65E uses a heavy 136 kg (300 lb) WDU-24/B penetrating blast-fragmentation warhead, which is triggered by a FMU-135/B delayed impact fuze. It also features a reduced-smoke rocket motor in a WPU-8/B propulsion section, and entered USMC service in 1985. The **CATM-65E** is a captive-carry training version of the AGM-65E.

Photo: U.S. Navy

AGM-65E

The U.S. Navy's "IIR *Maverick*" is designated **AGM-65F**. It uses the IIR seeker of the AGM-65D in combination with the warhead and propulsion sections of the AGM-65E. It also features a SAD (Safing/Arming Device) for safer shipboard use. The AGM-65F has also a slightly different seeker software for optimum performance against surface ships. The **CATM-65F** captive-carry training version replaces the WGU-10/B guidance section with a WGU-13/B.

The **AGM-65G** is an improved "IIR *Maverick*" for the USAF. It is based on the AGM-65D, but uses the heavy warhead and fuze of the AGM-65E/F because it is especially designed for use against hardened tactical targets. The AGM-65G also has a new digital autopilot and improved tracking and target selection options. The new autopilot allows the operator to select a lower trajectory to prevent break of lock in clouds. The AGM-65G entered operational service with the USAF in 1989. The AGM-65G-2 is a -65G with the guidance software replaced by a modified version of the AGM-65F's software. Like the AGM-65D-2, the G-2 also has a faster seeker for higher accuracy and moving target tracking.

Photo: USAF

AGM-65G

Training variants of the USAF's AGM-65 missiles do not use ATM-65 designations as one would expect. Instead the training *Mavericks* are known semi-officially as **TGM-65** (TGM = "Training Guided Missile"), with variants being designated TGM-65A, TGM-

65B, TGM-65D and TGM-65F. Captive-carry (non-launching) training missiles ("CATM-65") received the designation **A/A37A-T9** by the USAF, and dummy (non-flying) missiles ("DATM-65") for ground handling training are designated **A/E37A-T60**. The latter are also used by the Navy, which sometimes calls them **DATM-65E/F**.

The *Maverick* was extensively used by the USAF in Operation Desert Storm (ODS). More than 5000 missiles of the AGM-65B/D/G variants were launched, mainly by A-10A aircraft. The hit rate was reported as between 80% and 90%. The USMC also fired a few AGM-65Es in ODS, with a reported hit rate of about 60%.

Photo: Raytheon
From front: **AGM-65D**, **AGM-65E**, **AGM-65B**, **AGM-65F**

The IIR seeker of the AGM-65D had some problems during Operation Desert Storm, because of thermal clutter in the excessive heat of the desert. Therefore, the USAF decided to field a *Maverick* with a modern TV-guidance section using a new CCD seeker. Raytheon developed a CCD seeker to replace the TV or IIR seekers of some existing AGM-65 missiles. The new CCD seeker will give remanufactured missiles higher reliability, higher lock-on range and better low-light performance. However, the CCD seeker is not suitable for night-time use.

The designation **AGM-65H** was assigned to AGM-65B/D missiles upgraded with the new CCD seeker. It was originally planned to convert many old AGM-65Bs and -65Ds to AGM-65H standard, but these plans were apparently cancelled in favor of the AGM-65K. The **AGM-65J** designation applies to U.S. Navy AGM-65F missiles rebuilt with the CCD seeker. As such it would be very similar to the USAF's AGM-65K. The AGM-65J was initially planned to enter service in December 2001, but I don't know whether this has actually happened, and how many AGM-65Fs have already been and/or are going to be converted to AGM-65J standard. The **AGM-65K** is an AGM-65G upgraded with the CCD seeker. At least 1200, but possibly up to 2500, AGM-65G rounds are planned for conversion to AGM-65K standard. The **CATM-65H** and **CATM-65K** are the captive-carry training versions of the AGM-65H/K.

Photo: DOD

AGM-65 (exact model unknown)

In the mid-to-late 1990s, Raytheon proposed a *Maverick* development called "Longhorn". This was to feature many significant improvements, including a data link (for optional lock-on after launch), additional turbojet sustainer propulsion (for increased range of up to 75 km (46 miles)), GPS/INS in-flight navigation, and mm-wave radar or IIR terminal seeker. However, the "Longhorn" was not developed. The designation **AGM-65L** is unofficially associated with a proposed *Maverick* development with a new tandem (boost/sustain) motor, stealth characteristics, a two-way data link, IIR guidance and automatic target acquisition technology.

Production of new-built AGM-65 missiles ended around 1999 after more than 75,000 missiles (including production for foreign customers) had been built. The main U.S. platforms for the AGM-65 are currently the USAF's A-10, F-16 and Navy's F/A-18 aircraft. The *Maverick* is fired either from single-rail LAU-117/A or triple-rail LAU-88/A launchers.

Specifications

Note: Data given by several sources show slight variations. Figures given below may therefore be inaccurate!

Data for AGM-65A/B/D/E/F/G:

	AGM-65A/B	AGM-65D	AGM-65E	AGM-65F/G
Length	2.49 m (98 in)			
Wingspan	71.9 cm (28.3 in)			
Diameter	30.5 cm (12 in)			
Weight	209 kg (462 lb)	220 kg (485 lb)	285 kg (630 lb)	304 kg (670 lb)
Speed	supersonic			
Range	~ 27 km (17 miles)			
Propulsion	Thiokol SR109-TC-1 solid-fuel rocket	Thiokol SR114-TC-1 (or Aerojet SR115-AJ-1) solid-fuel rocket		
Warhead	57 kg (125 lb) WDU-20/B shaped-charge		136 kg (300 lb) WDU-24/B penetrating blast-	

		fragmentation

Main Sources

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[3] Christopher Chant: "World Encyclopaedia of Modern Air Weapons", Patrick Stephens Ltd., 1988
[4] Hajime Ozu: "Missile 2000 - Reference Guide to World Missile Systems", Shinkigensha, 2000
[5] Bernard Blake (ed.): "Jane's Weapon Systems 1987-88", Jane's, 1988
[6] Raytheon Website

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