AMMO Chiefs Association (ACA)

"Shell and Flame"

Issue Number: XIV *September 2007*

We are the Ammo Chiefs Association, a not-for-profit, fraternal organization dedicated to the promotion of camaraderie among retired and active duty **USAF AMMO Chiefs**. Our members work diligently 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 also 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.

Board of Directors

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Vice-President
Vacant

Secretary
Fred O'Hern

Treasurer
Joe Dominguez

Chief-at-Arms
Mike Curran

Director-at-Large One
Rich Pennington
Director-at-Large Two
Tom Cox
Director-at-Large Three
John Cecere
Director-at-Large Four
Rick Bussell

Association News

From your President:

AMMO Chiefs:
Thanks for your overwhelming responses in voting on our revised ACA Constitution. We had a total of 77 votes with 69 votes for acceptance of the Constitution as revised and 8 opposed. This culminates more than a year's effort. Thanks to all who participated and all of those who helped draft this Constitution.

The next major event on our ACA Calendar is Election of ACA Officers for 2008. According to our newly adopted Constitution, the following offices are up for election:
Vice President
Secretary
Director-at-Large Three, and
Director-At-Large Four.

This is the normal cycle for these offices. Members nominated and elected to fill these slots will serve a two year term.

Our Constitution also makes a provision that those who fill a post prematurely vacated will stand for election during the next election cycle. With the number of resignations we've had on the Board this past year, the following positions are also subject to election:
President,
Treasurer,
Director-at-Large One and
Director-at-Large Two.
Members elected to these positions will serve the remainder of the term for these offices or one year. The only office not up for election this election cycle is the office of Chief-at-Arms.
We will be accepting nomination for these positions beginning October 1st through October 25th.

The Election Committee along with the ACA Secretary will assure all those nominated meet our Constitutional requirements and will then announce candidates and the offices for which they are running no later than November 1st. Members will then have until November 25th to cast their vote. On or about December 1st, we will announce the winners of the election. Those elected will assume the offices to which they have been elected on January 1st, 2008.

So be thinking about who you would like to lead the ACA!!

Fellow AMMO Chiefs and ACA Members.

AMMO HUAH!!

A couple of things about AMMO troops and AMMO Chiefs in particular, that certainly are true is one we tend to be opinionated and two we feel damn strongly about being AMMO. This past week we witnessed an outpouring of our feeling about AMMO and our traditions and culture that evokes emotions quite like those when I hear the National Anthem or taps played. All I gotta say is I am damn proud to be associated with this fine bunch.
And as Chief Al mercer probably still says; "having said all that," I have to say we are also a damned opinionated bunch and fell very strongly about opinions we hold. Despite all of that we've managed to find compromise and put together a Constitution you are now voting on. The results of voting on that measure will not be completed till the end of this month so stay tuned. At this time I would like to recognize a couple of people who gave a lot of their free time to work this project: Chief Yvonne Watts, Chief John Cecere, Chief Frank Waterman, Chief Marl Gossett, and Chief Fred O'Hern who formed the first Constitution Review Committee to begin this effort last August. This committee formulated a draft that was presented to the new ACA Board that took office in January 2007. That Board then reviewed the draft and found many things over which to argue. After more than 4 weeks of debate we decided to go back to the existing Constitution and build from there. That was the beginning of the Constitution now being voted on. After the Board had done their work our President at the time, John Matthews, realized we had not given the members a chance to review or comment on this new draft. So he established another review committee and sought inputs from our members. This time we had a larger cast involved and particularly sought out the input of our various Chapters. Again, Yvonne Watts and Frank waterman gave of their time as did Rich Pennington, Rick Bussell, Mark Gossett, and Joe D'Arco. If I have left someone's name out my apologies ahead of time. I assure you it is not intentional. I thank each of you for the time and attention you gave to this effort. Oh yeah, let me not forget those on our Board fo Directors; Darrell Beasley, Mike Curran, Mark Gossett, Johnny Long, Rick Bussell, Fred O'Hern, John Cecere, Joe Dominguez, Rich Pennington, Tom Cox, and John Rivard. This includes all of the names through the various personnel transitions we've made. Again, thanks to all.

Having completed that task the Board began considering other issues which required our attention and resolved a few of the most pressing.

a. Decided on Ft Walton beach, Florida as the location for the ACA Reunion 2008. We've contacted Danny Bridges and the ACA Emerald Coast Chapter asking them to host the event. Our reunions at Ft Walton Beach have always been great affairs and would expect no less of this one. Look forward to seeing all of you there.

b. We also approved putting out a call for nominations for Shell and Flame Award recipients and nomination for Honorary membership in the Association which we will celebrate at the Reunion.

c. The Board approved accepting nominations for our officer positions up for election beginning in October 2007. Elections will then begin on November 1st and results will be announced around the beginning of December. Those elected will then assume office on January 1, 2008. Just about the entire Board will be up for election. More details will come out about that during September.

d. We will once again pursue gaining tax exemption status for the ACA.

AMMO Chiefs and members, AMMO is alive and well. Chief Scott Heisterkamp certainly got our juices flowing and made us all proud to be AMMO. I really appreciated the outpouring and depth of feeling we share.

The Board still has more on our plate to work on and we will put out an agenda for our next meeting for some time in September. If you have any issues you'd like us to address we want to hear from you. Send us an email to ACA_BOD@ammochiefs.com and we'll give it due deliberation.

In the mean time; "Keep your powder dry and the AMMO flame burning brightly."

Sincerely,

Rich McVey
ACA President

Secretary's Section

Over the last couple of months I have been engaging in the main purpose of the ACA, i.e., socializing with AMMO. In July while visiting England I stopped off and spent an afternoon with SMSgt. Mike Eisenberg at RAF Welford. Mike graciously took time out to provide me with a personally escorted tour of Welford and an update on the changes occurring at Welford. At RAF Lakenheath, SMSgt. Dick Whitten (one of my Upper Heyford troops from the 1980s) hosted me at a luncheon with the AMMO NCO leadership, a tour of the AMMO areas, and a couple of AMMO imbibing sessions (thanks to Dick's lovely lady I didn't have to drive). Touring the facilities I remember at Lakenheath from my tenure there in the 1970s and chatting with the troops brought back many fond memories. As a former AMMO Chief for Spangdahlem it was interesting meeting a crew of deployed Spangdahlem AMMO troops. While there I was pleased to recognize SrA Kinslow in the Missile Shop with an ACA coin for his quick thinking in handling an explosive incident in the missile bay a few days before I got there. Although Chief Torelli was on leave I can assure him the AMMO NCOs and troops are a credit to his leadership.

Over the weekend of August 17th, Mike Curran and I took off for Fort Walton Beach where we spent several days consuming copious quantities of an amber liquid with the

guys at the ACA Emerald Coast Chapter. The golf tournament sponsored by the ECC in conjunction with the 33rd AMMO Welfare Fund was a tremendous success, particularly the 19th hole. It was great escaping the "old folks home" down here in central Florida and being around a group of AMMO Chiefs and their ladies. Thanks to John and Doris Greer, Danny and Janice Bridges, Tom Zima, Chuck Kuzma, Darrell and Ronnie Beasley, Don and Grace Hamilton, and Mark Madamba.

Fred O'Hern
Regular AMMO Chief
IYA AMMO YAS

Around the Bomb dump…..

A Request from Luke AFB, Arizona

My name is Rob Lunde and I'm a Munitions Scheduler at Luke AFB, Arizona. We here at Luke are in the process of building an "AMMO Heritage Room" out of an old dilapidated AFK office. We completely gutted the room, installed new ceramic tile, a new ceiling, oak paneled the walls, built a door using oak BDU-33 slats, collected all sorts of AMMO memorabilia and pictures ranging from the Civil War to current day ops overseas for display on the walls and in display cases, and put in a top of the line smart board with projector. Basically, anything and everything AMMO. This room also doubles as our Flight Conference room. I've attached a couple of photos, some before, some in progress; it really is something to see. The reason I'm writing is I need a little help collecting some information. I want to pay due respect to all of Luke's AMMO Chiefs from past to present. I would like to ask if you could poll your membership to see if any of your fellow Chiefs were actual Stripe wearing, Large and in charge Chiefs here at Luke AFB's Bomb Dump. If this is something you could help me out with, I assure you I will do these Chiefs justice. I would need the name, dates of assignment, and if possible, who their predecessor and replacement was.
what I had in mind was putting up a Shadow box, dark Blue background, Chief Master Sergeant power Stripes centered on the board, piss pots of course, and the names of all of Luke's AMMO Chiefs and dates of assignment, Listed in chronological order, on those new style satin finished name tags. This shadow board would take a place of Honor in our Heritage Room for all to see. I've tried to do searches on my own, however, have had little success. If your membership would be interested, they could e-mail me directly and I would do the rest, if they happen to have a couple of photos of themselves from "back when" they could attach them to the e-mail as well and I'd see that they got framed and hung on our walls. Thank you for your time. IYAAYAS. – AMMO – Nuff Said!!

If you're interested, please e-mail Robert.Lunde@LUKE.AF.MIL, or call him at (623) 856-6040.

Luke's Heritage Room

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!

7235th AMMO Supply Squadron
Camp Darby Reunion

We are nearing the 2nd 7235th Ammo Supply Squadron reunion. The reunion will be held at the Grand Plaza Hotel, Branson, Missouri – http://www.bransongrandplaza.com.

The hotel is located just off of Highway 76 Main Street that runs through the heart of Branson's entertainment district.

The dates of the reunion are **October 26-28**. We are planning on gathering formally on Friday evening in the hotel bar. We will have a cash bar and appetizers. We will have meeting space available during the entire time we are there. There will also be a breakfast buffet available as part of the room fare. We will also plan to have a formal gathering on Saturday evening. Meals will be on your own.

Room rates for two nights are single - $229; two people - $248; three people - $282; four people - $316. For reservations, call Becky Jewsbury, Branson Tourism Center – 1-800-268-4014 or e-mail Becky at becky@bransontourismcenter.com.

Branson Missouri is located approximately 30-40 minutes south of Springfield, Missouri on U.S. Highway 65. If you are flying, you can fly into the Springfield/Branson Regional Airport. If you are looking for cheaper fares and do not mind driving, Tulsa, Oklahoma is your best bet although by the time you rent a car, you may not have saved any money.

To date, 33 people are coming including **Wesley Nails**, **Ron Novy**, and **Joe Brien** who were not at the last reunion. Also, **John Mucci**, who has been battling cancer, will be there along with his son and daughter and their families.

There are excellent golf courses in the area and also some good entertainment. You can check the Branson Missouri website for more information.

Hope to see you there in October. If you need anything, feel free to call me evenings at 417-877-9002.

Keith Hartner.

News from Our AMMO Schoolhouse

Chief Sheffield provided the following information from the AMMO Schoolhouse.

The Schoolhouse is programmed to have 725 Non-Prior Service (NPS) students attend the 3-level course in FY07. The following are the Distinguished and Top Graduates for the months of July & August 07:

Distinguished Graduates

July Graduates

Name	Rank	GPA
Barnard, Justin 5 MXS, Minot AFB, ND	A1C	97
Nelson, Eric A 3 EMS, Elmendorf AFB, AK	A1C	95
Karl, Marcus 509 MXS, Whiteman AFB, MO	A1C	96
Roybal, Ryan 3 EMS, Elmendorf AFB, AK	A1C	96
Stome, Jason 366 EMS, Mt. Home AFB, ID	A1C	95

Distinguished Graduates

August Graduates

Name	Rank	GPA
Reichling, Brent 131 FW, ANG	A1C	96
Lewis, Joshua 122 MXS, Ft. Wayne, IN	A1C	95
Aleweidat, Adam 7 MUNS Dyess AFB, TX	A1C	97
Hammons, Erin 2 MUNS Barksdale AFB, LA	AB	95
Miner, John 5 MUNS Minot AFB, ND	A1C	95
Smith, Danny 442 MXS, Whiteman AFB, MO	SSgt	96

Top Graduates

Name	Rank	GPA
Wilson, Heath, A 138FW, Tulsa ANG, OK 26 Jul 07	SrA	98
Corcoran, Blake A 124 FW, Gowen Field ANG, Boise, ID 15 Aug 07	A1C	99
Franken, Donald, P. 131 MXS, St. Louis ANG, MO. 23 Aug 07	SrA	97

Chapter News

Wasatch Front Chapter. We had a mini-ACA membership rally that resulted in three Chiefs paying their 2007 dues. We haven't had a social ormeeting since May due to my working this government proposal but we should meet the end of September (date is still TBD). We communicated the need for civilian leave donations and prayers for a retired AMMO Chief's adult son assigned here at Hill AFB. The son is doing better and the AMMO Chief (who is geographically separated) was very appreciative of us offering assistance during his time of need. This was a good display of the AMMO Family taking care of each other. AND, we take full ownership of Scott Heisterkamp and his response to the IYAAYAS bashers here at Hill AFB. I'm sure by now that this eloquently worded response from Scott defending opur traditional AMMO phrase has no doubt circled the globe several times by now. This was a well-timed AMMO morale spike given the loss of several active duty AMMO troops and dependents over the course of the last five months.

Joe D'Arco
President.

Virginia Chapter. The ACAVC General Membership meeting was held July 14, 2007 and hosted by Mike Robertson, at his home in Dumfries, VA. Mike and Myong Robertson hosted a spread of food and beverages for the group. Our heartfelt thanks go out for their hospitality.
Our meeting focused on the proposed new Chapter coin design, the awards program and ACA matters. Also during the meeting, Bill McCullough passed out the ACA cards received from Fred O'Hern and solicited updated personnel information on the sign in roster.
Chief Stu Johnson will PCS in September to the desert for a year. If a local member departs to the desert for a year on a remote tour, we will still consider them part of our Chapter and support them accordingly.

In an effort to recognized some of our junior AMMO troops in the Mid-Atlantic region, we will ask each flight (Langley, Pope, Seymour-Johnson, Andrews) to submit a short package to us on their outstanding Airman (E-4 and below) between 1 Oct and 15 Nov. We will review the packages at our December meeting and make the award presentation before Christmas. We anticipate giving them a coin, a $50.00 award, and a certificate. The next full meeting will be December 8: Bill McCullough residence. Holiday social to follow.

Rich Pennington
ACAVC President

Midwest Chapter. Chief Don Myers has been elected to the Vice-President's position in the Chapter. Don will take over that position on 1 January 2008. Chapter Officers on 1 January 2008 will be Mark Gossett – President, Don Myers, VP and Bob Trout as Secretary/Treasurer. The next Chapter meeting is scheduled for 9 Dec 07 and is

being hosted by a Chapter's Honorary member, Jeff Hulme. Contact Mark Gossett at (937) 258-6747 for more information.

"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

Chief Bob Reinhardt's wife Norma passed away in August. Please drop him a card of condolence to:

Bob Reinhardt
11 Friar Tuck Rd
Niceville, FL 32578

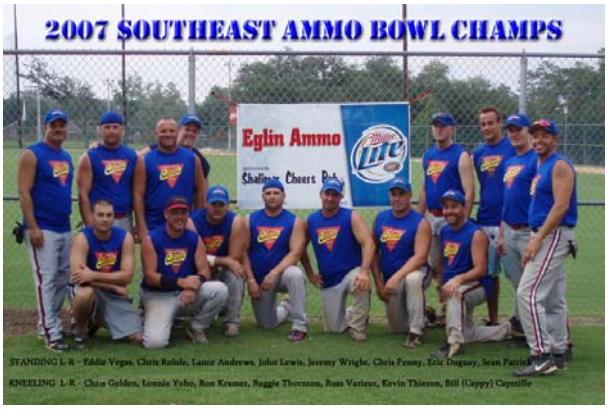
If you know of an AMMO Chief who can use a "Ray of Sunshine", please let us know.

AMMO Bowl Softball

The AMMO boyz of summer have completed another year of fast action softball. Here's a listing of this years' AMMO Bowl softball tournaments and winners:

Southeastern AMMO Bowl - 12 teams
20-22 Jul Niceville, FL.
The following AMMO teams placed:
First Place – Eglin
Second Place – Seymour-Johnson (Shady J)
Third Place – Tyndall
Fourth Place – Hurlburt Field
Fifth Place - Barksdale

Western AMMO Bowl - 14 teams
4-5 Aug Tucson, AZ
(No Results available)



Central AMMO Bowl – Sheppard AFB, Wichita Falls held their first annual Central AMMO Bowl this past Labor Day. The turnout was low, with only four combined teams but the feedback from the festivities was nothing but extremely positive. All particpants played in a guaranteed six game tournament with the first day being a four game round robin. First seed went to Cannon with Ellsworth and Sheppard respectively coing in behind. The player's pool gathered folks from Lackland, Dyess, Hurlburt Field and Little Rock ANG; we liked to call them Dy-Lack-Rockfield. With a "Wild Turkey" becoming the official mascot, the tournament kicked off with the posting of the colors from Sheppard's color guard and the first pitch coming from the 363th TRS Commander, Lt. Col. Ventriglia.

On the second day, Cannon took the lead and didn't look back taking first place in the double elimination bracket playing Sheppard first beating the sidewinders. Ellsworth came in second with Sheppard and Dy-Lack-Rockfield placing third and fourth.

Other honors included a homerun derby which was won by Spencer (last name unknown) who played for the DLR team. He took home and extra $90 bucks and a trophy. Tournament MVP was Wes Cummings from Cannon. Wes was voted in by the tournament officials by way of tournament play and sportsmanship. Congratulations to Cannon, Spencer and Wes for taking home the extra bling.

With the positive responses coming in from all teams who participated Sheppard is planning on hosting another Central AMMO Bowl for next year. Event planner SSgt. Casey Hearn was quoted as saying "Everything went very smooth and according to plan. We just wanted to make a good showing and make sure everyone had a great time. This is about keeping it real in AMMO and keeping the camaraderie and brotherhood of AMMO alive." If you are interested in participating in next years Central AMMO Bowl, contact event director TSgt. Rich Enderlein or SSgt. Casey Hearn at Sheppard.af.mil.

First Place
Cannon AMMO Team

Central AMMO Bowl
Sheppard AFB, Texas
Sep 07

Here's A Good News Story!!

As you may or may not be aware, we've been carrying Ray Wilson in the "Ray of Sunshine" column for a heart problem he's had for several months. You've responded with your kindness, sending cards and letters of encouragement for Ray to get better. Ray sent an email to Jerry Modlin recently with the following information he'd like to share.

Jerry:

"I'm doing great! My doc told me that there was no damage to the heart muscle and I have no restrictions."

My wife and I pinned 2LT bars on our son on May 12th. I had to get a new set of blues. I tried on the old blues, but if I had moved the wrong way, a button would have come off and killed someone. Ha! Ha!"

Everything went well and he's at Maxwell for Air & Space Basic Course until July 13th. Then he's off to Edwards AFB. I told him to hook up with a sharp Senior or Chief and they would take care of him."

As you can see, Ray also got to give his son the first salute!! We wish both of them our very AMMO best!!

Trinket Shoppe News

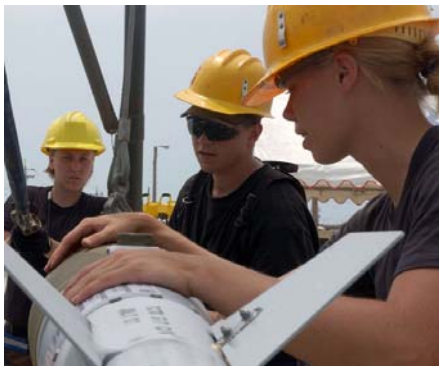
Mike Curran is the Manager of the Trinket Shoppe. Many items are still available for ordering through the ACA web site at ammochiefs.com. Click on the Trinket Shoppe tab to place an order. Mike will contact you to make arrangements for sending in the funds required for your purchase.

AMMO News From Around the Air Force

Airmen hold munitions exercise at Kunsan

By Staff Sgt. Alice Moore
8th Fighter Wing Public Affairs

7/12/2007 – KUNSAN AIR BASE, South Korea (AFPN) – Airmen from across the Air Force are participating in the annual Combat Ammunition Production Exercise July 10 through 13 here.



CAPEX is a three-day non-rated Exercise that provides Pacific Air Forces and Air Combat Command Units with training in mass-Munitions assembly in support of Aircraft sortie generation.

More than 200 Airmen participated
And they came from a variety of bases including Mountain Home Air Force Base, Idaho; Elmendorf AFB, Alaska; Aviano Air Base, Italy, Kadena AB, Japan; Osan AB, South Korea and the 8th Fighter Wing here.

"(The exercise is) designed to determine if munitions planning is adequate to support wartime operations plans," said Senior Master Sgt. Harold Whisler, 8th Maintenance Squadron production section superintendent.

Sergeant Whisler also said the exercise ensures Airmen practice and implement the basics of munitions support to air combat operations, which include munitions breakout, production and delivery skills.

The exercise consists of 24-hour operations in order to provide training under day and night conditions.

Participants say the exercise provides valuable training they wouldn't have otherwise received.

"Where I currently work I don't typically work with the munitions that I'm working with here," said Airman 1st Class Russell Fenimore, 18th Munitions Squadron trailer maintenance crew chief. "This is the first chance I've gotten to be able to work with big and small bombs in order to break them down. I'm definitely learning something new."

Airman Fenimore also said the CAPEX provided a means to fine tune skills.

“Practice makes perfect,” he said.

The CAPEX also provided additional benefits.

“This is a good networking opportunity and it’s great to see old froends as well as make new friends,” Airman Fenimore said. “You also have fun.”

Sergeant Whisler said the CAPEX continues to be the best tool available for all levels of command within the logistics community to evaluate munitions combat readiness, training requirements and Combat Munitions Plan adequacy.

“All participants walk away with a better understanding and greater appreciation of what it takes to initiate and sustain combat munitions efforts within the Pacific Theater,” he said.

AMMO Weapons File

Joint Direct Attack Munition (JDAM)

GBU-31: Mk84 bomb fitted with JDAM tail kit

Joint Direct Attack Munition (JDAM)	
Mission:	Close air support, interdiction, offensive counter air, suppression of enemy air defense, naval anti-surface warfare, amphibious strike
Length:	9 ft 11 in–12 ft 8 in (3.0–3.9 m)
Wingspan:	1 ft 7 in–2 ft 1 in (483–635 mm)
Range:	Up to 15 nm
Tech Order	11K31-2-7

The **Joint Direct Attack Munition (JDAM)** is a low-cost guidance kit that converts existing unguided gravity bombs, or "dumb bombs", into accurate, all-weather "smart" munitions. JDAM equipped bombs are guided to their target by an integrated inertial guidance system coupled with a Global Positioning System (GPS) receiver for enhanced accuracy, giving them a published range of up to 15 nautical miles from the release point. JDAM is a joint United States Air Force and United States Navy program. It is in service with the U.S. Air Force, U.S. Navy and the U.S. Marine Corps.

Overview

The JDAM is not a stand alone weapon system; rather it is a "bolt-on" upgrade for unguided gravity bombs that is installed in the field by AMMO troops. JDAM equipped bombs range in size from 500 lbs to 2000 lbs. The kit is compatible with the entire *Mk-80-Series* of general purpose bombs, as well as the corresponding **BLU** penetrator warheads. JDAM consists of a tail section with integrated aerodynamic control surfaces, a stabilizing strake kit, and a combined inertial guidance system and GPS guidance control unit. JDAM enables accurate delivery against high priority fixed and relocatable targets from both fighter and bomber aircraft.

History & Development

Desert Storm highlighted a shortfall in air-to-surface weapon capability. Limited visibility of the ground caused by smoke, fog, dust and cloud cover limited the employment of precision guided munitions. Unguided weapon accuracy was also degraded when delivered from medium and high altitudes. Research and development of an "adverse weather precision guided munition" began in 1992. The first JDAMs were delivered in 1997 with operational testing conducted in 1998 and 1999. More than 450 JDAMs were dropped during testing, recording an unprecedented 95 percent system reliability while achieving a 9.6 meter accuracy rate. JDAM performance has been demonstrated in operationally representative tests including drops through clouds, rain and snow. These tests included a B-2 Spirit releasing 16 JDAMs on a single pass against multiple targets in two separate target areas.

JDAM and the B-2 made their combat debuts during Operation Allied Force. The B-2s, flying 30-hour, nonstop, roundtrip flights from Whiteman Air Force Base, Missouri, delivered more than 600 JDAMs during Allied Force. Military sources say that "During Operation Allied Force, March 29 through June 9, 1999, B-2s launched 651 JDAMs with 96 percent reliability and hit 87 percent of intended targets..." Growth of the JDAM family of weapons expanded to the 500 pound Mark 82 bomb version, which began development in late 1999. Also, the Navy is currently studying the effects of adding enhancements such as improved GPS accuracy as well as a precision seeker for terminal guidance for use against moving targets and additional warheads.

On September 10, 2003, a B-2 Spirit bomber successfully released eighty (80) inert 500 pound JDAM munitions on a single sortie, demonstrating a saturation precision attack capability not thought possible in the early days of smart weapons.

JDAMs loaded under the left wing of a F-16 Fighting Falcon
with a LITENING II Targeting Pod visible beneath the fuselage

Operational Use

Guidance is facilitated through a tail control system and a GPS-aided inertial navigation system (INS). The navigation system is initialized by transfer alignment from the aircraft that provides position and velocity vectors from the aircraft systems. Once released from the aircraft, the JDAM autonomously navigates to the designated target coordinates. Target coordinates can be loaded into the aircraft before takeoff, manually altered by the aircrew in flight prior to weapon release, or entered by data link from onboard targeting equipment, such as the LITENING II Targeting Pod. In its most accurate mode, the JDAM system will provide a weapon Circular Error Probable (CEP) of 13 meters or less (some Boeing sources report less than 10 meters CEP) when a GPS signal is available. If the GPS signal is jammed or lost, the JDAM can still achieve a 30 meter CEP or less for free flight times up to 100 seconds.

JDAM can be launched from very-low to very-high altitudes in a dive, toss-and-loft, or in straight-and-level flight, with an on-axis or off-axis delivery. JDAM enables multiple weapons to be directed against single or multiple targets on a single pass. The JDAM system permits variable fuzing, from air-burst through contact- and penetration-fuzing, making it a versatile guidance system. Fuzing must be set prior to takeoff, as the aircrew have no way to adjust this in flight.

Upgrades

U.S. military experience during Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) highlighted the need for an even more accurate delivery of bombs. The Laser JDAM (LJDAM) adds a laser seeker to the nose of a JDAM equipped bomb, allowing for highly precise terminal guidance, allowing for a CEP of 3 meters, with the ability to strike a moving target. During FY2004, the Boeing and the U.S. Air Force began testing of the laser guidance capability for JDAM. These tests demonstrated that the system is capable of targeting and destroying moving targets. The weapon retains the ability to operate on GPS/INS alone, if laser guidance is unavailable, with the same accuracy of the earlier JDAM.

Integration - JDAM is currently compatible with:

- AV-8B Harrier II
- B-1B Lancer
- B-2A Spirit
- B-52H Stratofortress
- F-117 Nighthawk
- F-14A/B/D Tomcat
- F-15E Strike Eagle
- F-16C/D Fighting Falcon
- F/A-18C/D Hornet
- F/A-18E/F Super Hornet

- F-22 Raptor
- F-35 Lightning II

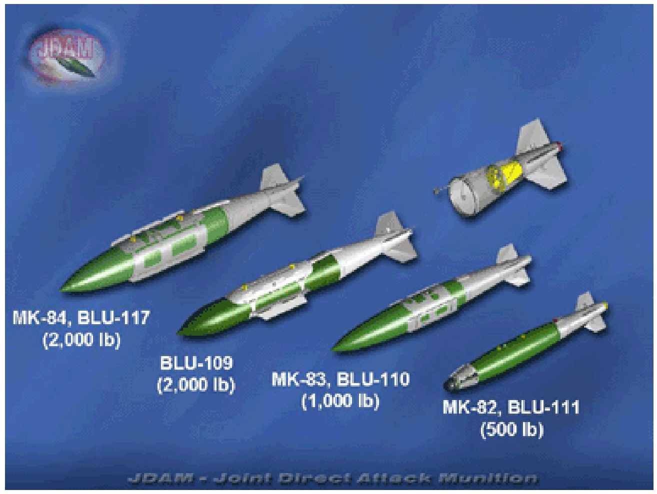
JDAMs loaded onto a Multiple Ejector Rack under the wing of a B-52H Stratofortress

Follow-on integration efforts are currently underway or planned to evaluate compatibility with:

- A-10 "Warthog"
- MQ-9 Reaper

General characteristics

- Primary function: Guided air-to-surface weapon
- Contractor: Boeing
- Length: (JDAM w/warhead) **GBU-31** (v) 1/B: 152.7 in; **GBU-31** (v) 3/B: 148.6 in; **GBU-32** (v) 1/B: 119.5 in
- Launch weight: (JDAM w/warhead) **GBU-31** (v) 1/B: 2,036 lb; **GBU-31** (v) 3/B: 2,115 lb; **GBU-32** (v) 1/B: 1,013 lb
- Wingspan: **GBU-31**: 25 in; **GBU-32**: 19.6 in
- Range: Up to ~15 miles
- Ceiling: 45,000 ft
- Guidance system: GPS/INS
- Unit cost: Approximately $21,000 per tail kit (FY 01 dollars)
- Date deployed: 1999.
- Inventory: The tail kit is in min-rate production. Projected inventory is approximately 240,000.
- Technical Order: 11K31-2-7



USAF rendering of JDAM kits fitted to Mk 84, BLU-109, Mk 83, and Mk 82 iron bombs.

Variants

- GBU-31(V)1/B (USAF) Mk-84
- GBU-31(V)2/B (USN/USMC) Mk-84
- GBU-31(V)3/B (USAF) BLU-109
- GBU-31(V)4/B (USN/USMC) BLU-109
- GBU-32(V)1/B (USAF) Mk-83
- GBU-32(V)2/B (USN/USMC) Mk-83
- GBU-35(V)1/B (USN/USMC) BLU-110
- GBU-38/B (USAF) Mk-82,(USN/USMC)Mk-82 and BLU-111

Source: Wikipedia, the free encyclopedia

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The JDAM Revolution

By Peter Grier

Precise, versatile, and relatively cheap, the Joint Direct Attack Munition today is a mainstay Air Force weapon system. Twenty years ago, it was something else entirely; a science project that was running out of time.

The Air Force Armament Laboratory has been studying a possible new inertial guidance system for bombs since the early 1980s. The USAF scientists had produced some demos – add-on tail kits that looked much like JDAM does now – and scored good results in test drops.

But it was still the years of the Cold War. Air Force tactics still emphasized low-level penetration of Soviet-developed air defenses. Service leaders were not looking for a high-altitude, all-weather, near-precision guided weapon.

“There was not a whole lot of interest in it, frankly,” remembers Louis Cerrato, chief engineer of the JDAM Squadron at Eglin AFB, Fla. , who has worked on the weapon since its earliest days.

Then, in the space of a few years, the world changed.

The capability and availability of Global Positioning System data exploded, making GPS a reliable and constant source of bombing coordinates. The 1991 Gulf War showed that flying high was the best way to fight post-Cold War adversaries. Operation Desert Storm also showed the Air Force that it needed more than just laser guidance alone, as bad weather or sand and dust storms could foil laser designators.

The new inertial guidance weapon was chosen as an acquisition reform pilot program, giving it flexibility and independence. The program that eventually became the JDAM was rushed into development and production.

The Joint Direct Attack Munition is a combination of “dumb” bomb and a set of add-ons, a low-cost guidance kit that converts free-falling bombs into guided weapons. The kit’s major parts are a tail section, which contains an inertial navigation system and Global Positioning System equipment, and body strakes that provide extra stability and lift.

Desert Storm was the crucial turning point in JDAM’s fortunes, even though the Air Force had been working on the idea for years.

Of the approximately 250,000 munitions dropped by US aircraft in the first Gulf War, some 210,000 were “dumb” iron bombs. The lack of accuracy of these unguided gravity bombs proved a problem. In the first two weeks of fighting, results fell far below projected rates – in part because of poor weather but also because of poor aim.

A postwar analysis showed that unguided munitions fell only within about 200 feet of their intended targets, on the average.

Laser guided weapons were far more effective. They accounted for 75 percent of the destruction wrought by US attacks. But laser guided bombs were expensive and could be used only in good weather. Not all US airplanes could carry them.

Clearly, the US needed a low-cost precision alternative. In May 1991, Gen. Merrill A. McPeak, then Air Force Chief of Staff, wrote a memo stating “a requirement for an all-weather precision guided munition.”

That was where JDAM came in. In 1992, a demonstration strike using a 1,000 pound bomb steered by inertial guidance and GPS data was a complete success. Initial development contracts were awarded in 1994.

Eleven 2,000 pound JDAMs fall from a B-2, which actually can carry 16. The Stealth bomber can carry up to 80 of the 500-pound variety. (Northrop Grumman photo).

An Acquisition Success

Cost was a big issue, as the flush years of the Reagan-era defense buildup were long gone. McPeak insisted that the Air Force would not buy this new weapon if its cost rose one penny beyond the $40,000 per-unit estimate of the JDAM program manager.

But the new program had one big thing going for it; Congress had selected it to be a test of acquisition reform. This allowed JDAM managers to waive some costly and burdensome regulations for the competing contractors.

Companies would not have to hand over extensive pricing data demanded on most other contracts, for instance. They could use some off-the-shelf parts, instead of relying only on military-specification components.

Eventually, the initial seven competitors were whittled down to two; Martin Marietta (subsequently merged into Lockheed Martin) and McDonnell Douglas (later absorbed by Boeing). The technology was fairly simple, so this battle would be won by the firm that could produce JDAM kits at the lowest price.

McDonnell Douglas decided, in essence, to act as if it had already won. “They spent their time actually doing the design for manufacture,” Said Cerrato.

The St. Louis-based firm brought in JDAM suppliers and promised them long-term contracts in return for low costs. Over 18 months, estimated unit cost was cut in half.

In September 1995, the Air Force tapped McDonnell Douglas as its JDAM producer. The final unit cost was $18,000 – less than half the $40,000 ceiling set by McPeak. (As of January, Boeing had delivered 145,000 JDAM tail kits to the US military. The current production rate is around 3,000 per month.)

In March 1999, NATO launched Operation Allied Force in the Balkans. Its goal was to force Yugoslav President Slobodan Milosevic to halt his attack on ethnic Albanians in the province of Kosovo.

For the Air Force, operations in this foggy corner of Europe were difficult. During the first two months of combat, the weather was so poor that airplanes could mount strikes against fielded forces only about one-quarter of the time. Many fixed-structure targets were in urban areas, where collateral damage was a big concern. USAF needed an all-weather, precision guided weapon.

At this point, JDAM production was just starting. There had also been rocky patches along the way – flimsy tail fins had to be redesigned, for instance. Some Air Force officials were concerned that JDAM's fiberglass shipping and storage crates were too fragile.

The GBU-31 JDAM consists of a bomb body, taken from inventory, a tail kit guidance section, and a set of strakes that help it maintain a precise aim angle. The near-precision weapon has changed the calculus of air attack. (USAF photo by SSgt. Jessica Kochman)

B-2s Over Kosovo

The B-52 and F/A-18 were to be the first airplanes to carry JDAMs. But Pentagon officials decided that the B-2, then going through operational test to develop non-nuclear capabilities, would be the best choice. The B-2 stealth bomber, based at Whiteman AFB, Mo., was designed to deliver nuclear weapons against heavily defended targets in the Soviet Union, and it needed a non-nuclear weapons enhancement. JDAM was the answer.

"All these things came together at the right time," said Cerrato. "We had some test [JDAM kits] here at Eglin, and they actually said, 'No, no, you've got to send them to Whiteman."

At Whiteman, 2,000-pound JDAMs were loaded into the stealth bombers, 16 at a time. Then the B-2s flew combat missions to Kosovo and back – a 30-hour round trip. These missions destroyed high-value targets such as an oil refinery wedged in among civilian buildings, but JDAMs were used in other ways as well, ways that the program office had not anticipated.

For instance, one mission took out the Zezeljev Bridge, which spanned the Danube River at Novi Sad.

“We didn’t expect [the weapon] to be used against bridges,” said Cerrato, but “the pinpoint accuracy amazed all of us.”

After-action reports showed that 98-percent of the 652 JDAMs used in the campaign hit their targets.

Accuracy can’t make up for bad intelligence data. During OAF, B-2s severely damaged the Chinese Embassy in Belgrade, hitting it with five JDAMs. The bombs had been steered to coordinates that mission planners mistakenly thought located an arms agency.

Still, JDAMs proved so useful that they were rapidly used up. During the Balkans air war, “they used almost the whole first lot,” said Cerrato.

This is a test JDAM about to ruin the hulk of an A-6 Intruder. JDAM operates by inertial measurement, coupled with updates from the Global Positioning System. The result is a bomb that routinely hits within 10 feet of the aim point. (AP/USAF photo)

Going “Winchester”

In the middle of the conflict, Gen. Richard E. Hawley, head of Air Combat Command at the time, went so far as to warn that it was “really touch and go as to whether we will go Winchester [run out of] on JDAMs before we get the next delivery.”

As Allied Force drew toward a successful close, Pentagon officials announced that JDAM production would soon be tripled.

The Air Force continues to refine JDAM kits. The bombs are more accurate that than they used to be, in part because GPS signals are more accurate and in part because GPS receivers have improved.

“It is really [the accuracy of] the source of the target coordinate that is the limiting factor now,” said Cerrato.

Antijam capability has been added. Saddam Hussein actually deployed jammers intended to disrupt the system, though they ended up being of little use.

US forces expended some 6,500 JDAMs during Operation Iraqi Freedom, hitting a wide variety of targets. For instance, in fierce fighting against insurgents for control of Fallujah and Ramadi, Marine F/A-18s made extensive use of a variant of the 500-pound JDAM that minimizes collateral damage. The Marines hit buildings, barriers, and even roadblocks with JDAMs.

Earlier, in Afghanistan, loitering US aircraft stocked with JDAMs proved highly effective in attacking the Taliban ground forces that chose to stand and fight rather than melt away into the bleak landscape.

In fact, JDAMs were in such demand in Afghanistan that, by mid-December 2001, following nine weeks of air strikes, the US Air Force had dropped 5,000 of them, using up half the inventory. Boeing's facility in St. Charles, Mo., had to go to three shifts to build JDAM stocks.

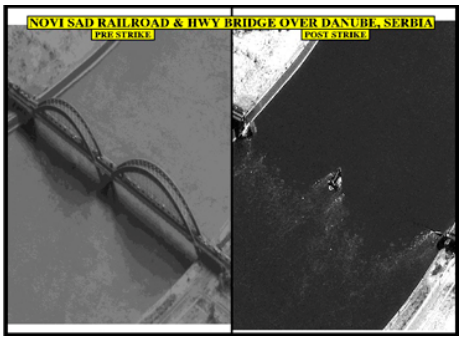
The rest is history. The Air Force has now used nearly 20,000 JDAMs, which are prized for their cost-effectiveness. Virtually all US warplanes can carry them.

Currently, the guidance kit is available in variants that fit everything from 2,000-pound Mk-84 down to the 500-pound Mk-82. The new 250-pound Small Diameter Bomb itself draws on JDAM concepts for its guidance system.

A JDAM can be launched as much as 15 miles distant from its target, in any weather. Once released, the inertial navigation system takes over, autonomously steering the bomb toward pre-entered coordinates. Location information beamed down from GPS satellites updates and corrects the course of the weapon.

By itself, the INS system can steer a JDAM within 100 feet of a target at least half the time. With the help of GPS, this circular error probable is reduced to about 40 feet, and the weapons often land a single bomb-length away from their target.

JDAMs can be launched from high or low altitude. They can be released from a dive or level flight or be tossed from a climbing aircraft. Future versions of the weapon might have wings, for extended range. The addition of wings would extend JDAM range by 300 to 400 percent, adds Cerrato.



JDAMs were widely used during Operation Allied Force in 1999. These images illustrate how a single aircraft with JDAMs dropped a span over the Danube River. (NATO photo)

More Firsts

JDAM keeps scoring firsts. For instance, last May a B-1B for the first time dropped a JDAM in combat, hitting a Taliban compound near Kandahar, Afghanistan, with a 500-pound GBU-38. Carrier-based Marine AV-8B Harriers employed JDAMs for their first time that same month.

Another GBU-38 was one of the two bombs dropped on a mujahedeen safe house near Baquba, Iraq, on June 7, 2006 killing the notorious leader of al Qaeda in Iraq, Abu Musab al-Zarqawi.

JDAM and other near-precision and precision weapons are more valuable than ever, now that the chief adversaries of the United States are terrorists, say Air Force officials. As in the Zarqawi strike, air weapons can destroy their safe houses without destroying their surrounding neighborhoods.

“The incredible precision of the munitions we’ve developed helps to ensure collateral damage is kept to a minimum,” said Maj. Gen. Jeffrey R. Riemer, commander of the Air Armament Center at Eglin, after Zarqawi’s death.

One upgrade that might loom in the weapon’s future is the addition of a laser. The JDAM Squadron at Eglin is working with the Navy on laser seeker technology. Boeing is funding some of the work.

Lasers would make JDAM a multimode weapon. US aircraft now often fly patrols without knowing what their eventual targets might be, making such flexibility a virtue.

Laser-capable JDAMs would mean that aircraft could carry one kind of munitions. Lasers would let JDAMs track moving targets, as well as targets for which the US does not have exact coordinates.

The JDAM Squadron is also considering the addition of a data link; this would allow the weapon’s course to be updated by data from E-8 Joint Surveillance Target Attack Radar System aircraft.

The newly operational Small Diameter Bomb, which is also GPS guided, has wings. It can penetrate 13 feet of concrete from a distance of ~70 miles.

In May 2006, an F-22A performed the highest and fastest delivery of a JDAM ever. The test featured the release of a 1,000-pound weapon dropped from 50,000 feet, with the airplane traveling at Mach 1.5.

The transition from bomb bay to supersonic air stream is “quite a dramatic one,” noted the JDAM chief engineer, and it took a lot of effort to get the dynamics right.

The F-22 weapon system will be crucial to the Air Force for years to come, and it will expand JDAM production even further.

Current plans call for a buy of at least 230,000 JDAMs and the 250-pound Small Diameter Bomb (SDB) promises even more flexibility in a less-destructive package.

“We’ve produced many more than we originally anticipated,” Cerrato said. “That’s very unusual in this business.”

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