



USAF seeks weapons with less boom but more precision and flexibility.

Focused Lethality

By **Marc V. Schanz**, Associate Editor

The Air Force has embarked on a sizable conventional-weapon update in hopes of greatly expanding its power to generate specific—and greatly varied—battlespace effects.

Propelling the new weapon effort is the operational impact of a smaller and still-shrinking aircraft fleet. Weapons are now being designed to yield greater accuracies and offer much more flexibility in employment. Future aircraft, piloted and unmanned alike, will require portfolios of weaponry that can be smaller, but only if they can produce a wide variety of effects.

USAF's munitions arsenal faces "performance issues," Air Force Secretary Michael B. Donley told Congress in July, and the Air Force is committed to increasing the lethality of its

force "through advanced weapons." Donley added that the service now is developing "a new generation of scalable weapons with improved accuracy, standoff, penetration, and stealth."

These weapons have already begun to emerge and will continue to flow into the inventory over the next few years.

Weapons procurement plans may seem random to an outsider, but they have not been formed in a vacuum, argue planners at Air Combat Command, Langley AFB, Va. They note that the Air Force seeks a specific mix of new capabilities to complement older weapons that will remain in service a while longer.

Lt. Col. Andrew D. Spires, chief of ACC's weapons and tactics division (known as A3TW), is in charge of harmonizing the operational plans for

specific theaters with the capabilities needed to attack targets there.

"We just don't ... say, 'Hey, this is a great weapon; we're going to buy it,'" Spires said. "We need to have a weapon that is drilled down to a requirement."

The specific requirement could be deep-earth penetration, all-weather capability, or laser guided accuracy.

This is not a new process. Back in the early 1990s, the Chief of Staff, Gen. Merrill A. McPeak, was displeased that the Air Force's Paveway laser guided bombs could be rendered ineffective by rain, dust, and cloud cover. He ordered work to begin on an all-weather precision guided weapon.

McPeak's order was the genesis of the Joint Direct Attack Munition—a



“dumb” unguided iron bomb fitted with sophisticated, Global Positioning System-powered guidance hardware. The JDAM has become the go-to weapon for the Global War on Terror, and the same process has now given birth to several new capabilities with precise combat effects, said Spires.

Spires, recalling his deployment to the Middle East this year, said airmen there are expending an “extraordinary amount of effort” on the task of limit-

ing collateral damage, adding that “a lot of that drives the engineering on what we need in theater.”

Enter SDBs

This affects everything from the size of the warhead to the precision of the guidance systems used.

These efforts were key to the introduction of the Small Diameter Bomb, a near-precision, GPS-guided 250-pound warhead with a blast area significantly

Stills from a video sequence showing a Small Diameter Bomb penetrating a hardened shelter.

smaller than that of other weapons. From its first combat deployment in October 2006, the weapon has quickly become a mainstay for combat operations in both Iraq and Afghanistan.

An SDB variant, known as the Focused Lethality Munition, reduces collateral damage even further, according to Spires. That is because it features a composite-material casing to minimize fragments and a special multiphase fill designed by the Air Force Research Laboratory. The FLM arose from an urgent combat requirement. The first 50 were delivered to the Air Force in March.

A second increment of the SDB is in development and features the ability to hit moving targets in all weather conditions from standoff distances up to 46 miles. The Air Force plans a contract award by the end of 2009.

As unmanned aerial vehicles have increased their combat effectiveness,



USAF photo by TSgt. Erik Gudmundson

SSgt. Michael Jackson (l) and SSgt. Anthony Bagen, both munitions crew members with the 77th Expeditionary Fighter Squadron, prepare a JDAM to be loaded onto an F-16.



An F-16 fires an AGM-65H Maverick missile at a target at the Utah Test and Training Range. New Mavericks are being used against moving targets such as terrorists' trucks.

their weapons loads have evolved as well. The service's UAV fleet, dominated by the MQ-1 Predator and MQ-9 Reaper, is currently equipped with familiar, current generation weapons such as the AGM-114 Hellfire missile, GBU-12 Paveway II munition, and JDAM.

Old weapons are getting their own capability improvements. USAF's AGM-88 High-speed Anti-Radiation Missiles, known as HARMs, will be upgraded

with new navigational tools and will cause less collateral damage.

New Deployment Standards

ACC officials said that, as the Air Force expands its use of UAVs—especially the Reaper—capabilities will continue to advance. The MQ-9 should begin “Reaper Increment II” upgrades in 2011. In this period, weapons such as the SDB II will enter the Reaper's weapons arsenal.

Realities of modern warfare have also affected some older weapons such as cluster munitions. The BLU-108 submunition proved highly effective in the early days of Operation Iraqi Freedom, when it was used to great effect against Iraqi armored columns, but new policies limit its use. While reaffirming the military utility of cluster bombs, DOD has implemented a stricter standard for deployment.

In July, DOD released a new US cluster munitions policy which mandates that cluster weapons must have, by 2018, a functioning rate of at least 99 percent. This means that the weapon, after arming, must leave no more than one percent of its bomblets on the ground as unexploded ordnance.

For area attack, the Air Force's Sensor Fuzed Weapon Preplanned Product Improvement version (SFW P3I) now has entered the inventory. The weapon is more than 99 percent reliable and is the only area weapon currently meeting the criteria, said ACC.

The Air Force is now evaluating the best way to draw down and eventually demilitarize the remainder of its legacy cluster munitions.



This USAF F-15E, over Afghanistan, bristles with weaponry—a JDAM, laser guided bombs, and an AIM-120 Advanced Medium-Range Air-to-Air Missile.



Airmen at Dyess AFB, Tex., ready a Joint Air-to-Surface Standoff Missile (JASSM) to be loaded onto a B-1B.

ACC officials said they are closely analyzing the payload capacity of the F-22 and F-35; the internal weapons bays for the stealth fighters have limited space. Internal carriage allows F-35s and F-22s to keep a stealth profile in combat and evade air defenses. Smaller precision munitions, such as the Small Diameter Bomb, have been developed to meet these requirements.

Because of the cramped internal spaces in these fighters, planners also are pursuing the idea of weapons that can carry out air-to-air and air-to-ground functions. ACC's weapons planners indicate a focus in this area. The Joint Dual Role Air Dominance Missile (JDRADM) is envisioned as a single multirole missile for air and ground targets, and will meet the needs of a fifth generation fighter force structure around 2020.

Combat forces are clamoring for more flexible weapons to meet immediate needs. One result is the GBU-54, better known as the Laser JDAM. It was first employed in combat Aug. 12 by F-16s over Iraq in an attack against a moving enemy vehicle.

First identified as an urgent operational need in early 2007, Laser JDAM's development and testing was completed in fewer than 17 months. It is the service's newest 500-pound precision weapon, equipped with a special sensor combining GPS guidance with the pinpoint accuracy of laser targeting.

The Air Force has ordered 400 units and is deploying them across the combat fleet, Spires said.

He said the new weapon gives combat aircraft a capability similar to the EGBU-12 Paveway II laser guided bomb, with GPS augmentation to boot. The weapon is mountable on any aircraft that currently flies with JDAM. It allows a pilot in a combat situation to switch back and forth between satellite guidance and laser targeting—depending on the nature of the target.

Newer Mavericks

The Air Force has also moved to increase its portfolio of weapons useful against moving targets by acquiring a new variant of the old Maverick air-to-surface missile. The new missile, with an improved and newly manufactured laser seeker mated to a legacy Maverick body, is critical for precision strikes against high-speed, fleeting targets in urban areas.

ACC officials said they expect to buy 250 to 400 of the low-collateral-damage missiles beginning in 2010. USAF currently fields an older version of the laser Maverick on fighters such as the A-10C, which deployed to Iraq last year with about 50 vintage variants provided by the Navy.

The Air Force wants greater flexibility in its future weapons. "You're probably going to see more combining of guidance capabilities [versus] com-

ing up with new guidance capabilities," Spires said.

Ten to 20 years from now, newer weapons will likely feature as many as four guidance systems, Spires predicted. These could include laser, radar, GPS, or inertial types, or some other breed of classified guidance technology.

Conventional standoff strike—attacking from beyond the range of enemy air defenses—is a capability that has not been in much demand since the early days of Operation Iraqi Freedom.

But strike plans, especially against well-defended targets and integrated air defenses, depend on standoff-range stealthy weapons.

The Joint Air-to-Surface Standoff Missile, a cruise missile that as recently as last year was on the verge of cancellation after a long string of test failures and cost overruns, is key to future war plans.

Lt. Col. Gregory McNew, commander of the 676th Armament Systems Squadron at Eglin AFB, Fla., and JASSM deputy program manager, said a good portion of the cost growth was linked to USAF's changes in the program. Old plans for 2,400 missiles were revised, more than doubling the projected buy to 4,900 rounds in two variants—JASSM and JASSM-Extended Range. JASSM-ER is capable of a 500-mile range, 300 more than the original.

Once seemingly a model for a low-cost weapons acquisition, JASSM's 2007 troubles spurred the Air Force and Lockheed Martin to give the program a complete scrub. Following the review, ground testing at Eglin certified the weapon's GPS capability and in February the program conducted 16 flight tests in four days at the White Sands Missile Range in New Mexico.

Fourteen of the 16 tests were successful.

Nearly 800 missiles had been delivered by August, according to program officials, and the baseline weapon is now operational on the F-16C/D fighters and B-52, B-1B, and B-2 bombers.

The extended range variant is to be delivered beginning in 2010. Integration efforts are proceeding for the F-15E and the F-35.

According to JASSM Program Director Alan Jackson, it remains to be seen if the F-35 will carry two or four of the stealth cruise missiles on external stations. ■