Air Force Materiel Command units at Eglin AFB, Fla., work together to make the best weapon systems even better.

Photography by Guy Aceto, Art Director, **and Paul Kennedy**

A Test of Precisio

Test-flying is not just about exploring the limits of new airplanes. The characteristics of each new weapon, too, must be carefully assessed before it is deployed in the field. This F-15E from Eglin, carrying a notional load of air-to-air missiles, prepares to release the "star" of this test: a brightly painted GBU-15 glide bomb fitted with a Global Positioning System guidance kit, which will give the TV-guided weapon an all-weather capability.

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Staff photo by Guy Aceto

Photos by Paul Kennedy

At left, Lt. Col. David Smith (left) and Maj. Vinnie Eovine, check over their aircraft and the weapon prior to the test. The GBU-15 made news during the 1991 Gulf War, when two of the weapons, released by F-111s, prevented an environmental catastrophe by destroying two pumping stations that were discharging oil into the Persian Gulf.

A proven weapon, the GBU-15 is nevertheless a fair-weather bomb. Low cloud cover, smoke, or haze could degrade the TV image received by the aircrew. The conflict in Kosovo underscored the urgent need for all-weather, precision strike capability—adding a GPS kit can bring the GBU-15 right to the doorstep of the target, regardless of atmospheric conditions.

The Precision Strike System Program Office and the 46th Test Wing had just 45 days to develop, test, and field the improved, GPS–guided GBU-15 for Operation Allied Force.

At right, the program's lead test engineer, Martin Hammond, and the F-15E's crew chief, SSgt. Alicia Camp, signal readiness for this test sortie, which featured one of the first drops of the new munition.

Staff photo by Guy Aceto

The 46th Test Wing handles the flying side of the development and test process. Its 39th Flight Test Squadron flies various models of the F-16 and A-10, while the 40th FTS flies nearly every version of the F-15. Both aircrews and ground crews have long experience in many variants of their airplanes—a key to understanding how aircraft and munitions will interact. At left, Col. Kevin P. Burns, 46th Operations Group commander, checks out the F-16 he'll fly as chase aircraft for that afternoon's test. The two squadrons cooperate extensively and often fly on the same test sorties. The squadrons merged after this test to form the combined 40th FTS—flying F-15, F-16, A-10, and C-130 aircraft and UH-1 helicopters.

Staff photos by Guy Aceto

In each test flight, a finely scripted "dance card" provides the precise agenda. More a checklist than a card, the script details timing, coordinates, and altitudes that must be attained to properly measure the system being evaluated. A chase F-16 gives the F-15E test subject a good once-over to make certain all is where it should be.

Fitted with the same kind of load it would have on a combat mission, the F-15E also carries a telemetry pod to record data while the bomb is in flight. Not every weapon tested gets the loud paint job, but, in this case, the bright markings on the munition help cameras and observers track it and will help those reviewing the test footage.

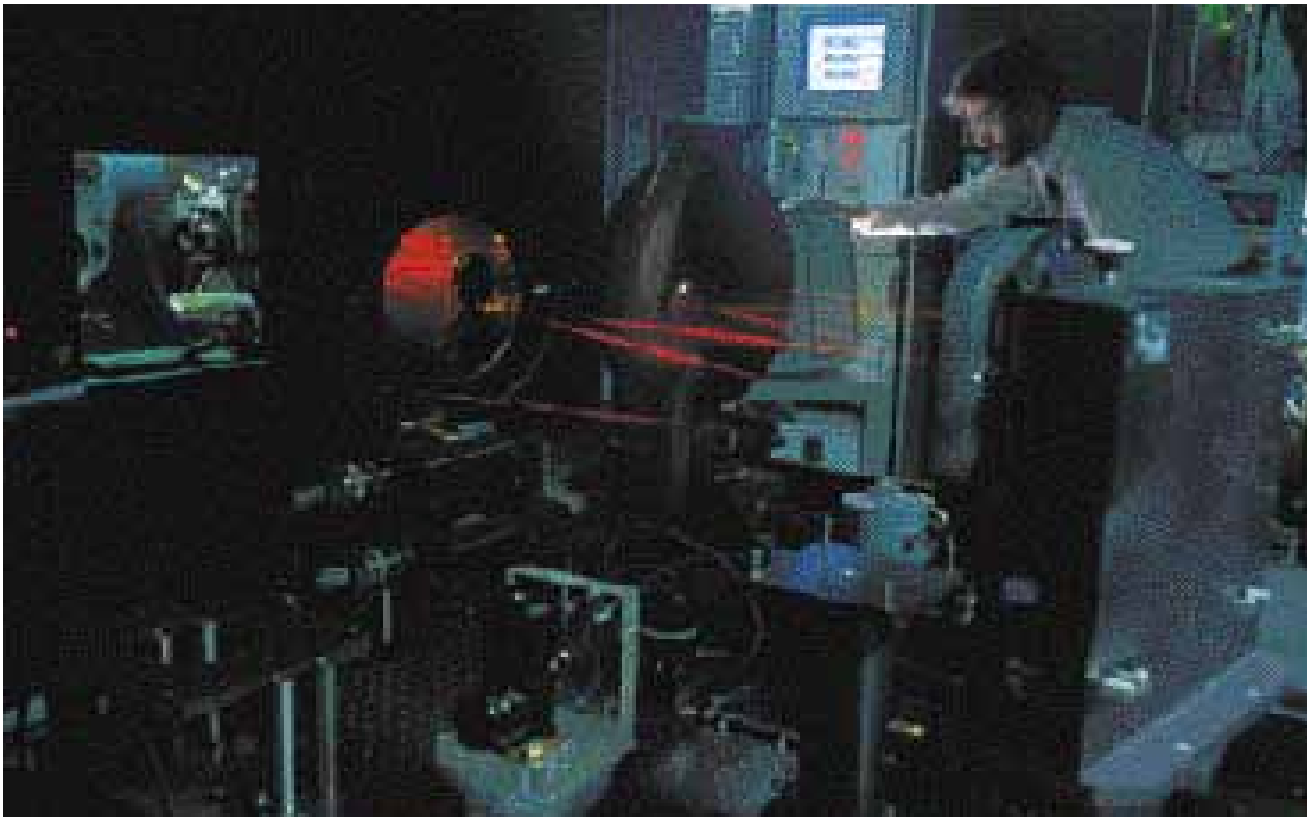
The chase aircraft reports that, after two preliminary passes, everything looks good. Keeping close watch on speed and altitude, the F-15E aircrew makes the drop (left).

Photos by Paul Kennedy

New weapons start out in the lab. The Munitions Directorate operates several facilities that examine munitions down to the molecular level. At left, a technician mixes the explosive brew that gives bombs their punch. Air Force research is on a drive to pack more boom into every bomb to make precision guided munitions smaller. Smaller bombs mean more can be carried, allowing more targets to be hit with the same effectiveness as their bigger ancestors.

And now, the loud part: At another area, technicians set up a test of the new multimodal warhead meant for the Low Cost Autonomous Attack System. This weapon can select the proper firing mode for the target—soft, medium, or hard—being attacked. At right, the test subject is arranged with sensors that won't survive the blast (below) but will yield valuable data.

The mother of invention: To test the imaging capability of a new sensor and seeker, engineers installed the system in a gyro-stabilized pod and flew it, along with a testing computer, on a UH-1 helicopter. Flying the system on the range against a variety of targets, they obtained useful data, which, when combined with other data from computer modeling and simulation, will form a detailed database for the new weapon.



Photos by Paul Kennedy

Laser radar seeker technology, used in LOCAAS, is the subject of the experiment shown above. Lasers can precisely measure the distance to a target and "paint" a detailed image to provide autonomous target recognition. Such technologies will be critical as USAF pursues uninhabited combat aerial vehicles in the future.

In the development and test mode of any new system, the first examples are usually handmade, as Ricardo Sayles is doing above. The systems are tweaked, and, once thoroughly wrung out and approved, put into production. Some 1,500 GBU-15s are to be modified with GPS in the next year.

Above, Carlotta Garrett uses a microscope to fine-tune the circuitry of a GPS–equipped GBU-15, while Honeywell technician Ken Bett (at left) carefully wraps the circuits in foil prior to the test to help keep them cool and help ensure the data obtained are accurate.

Photos by Paul Kennedy

A1C Richard Kleen (left) and SSgt. David Currie carefully position the weapon on an F-15E for the drop test. Everything must be right to ensure that a test subject is not accidentally lost. Below, a tech rep positions cameras that will record every instant, at every angle, of the release.

Company and program technicians at the side of the airplane conduct comprehensive checks and rechecks. A computer strapped to a cart becomes an impromptu mobile test set as technicians labor to ensure that the GBU is "talking" to the aircraft and that both are feeding data to the pods. With only 45 days to get the weapon into service, every flight was critical.

Back in the Central Control Facility, the test is scrutinized by experts monitoring every aspect of the release. Cameras are trained on the bomb, the launch airplane, and the target area. The bomb's own nose-mounted TV camera will record the flight to target from the best vantage point of all.

With a war on, the test group has a strong motivation to get this new system into the field without delay. Many members are combat veterans and know full well the benefits of the improvement they are making.

Staff photos by Guy Aceto

After releasing the weapon, the F-15E heads back to base. At right, high-speed cameras freeze the moment of payoff: right-on-target delivery of 2,000 pounds of high explosive. The GPS unit can guide the bomb to this pinpoint impact without the aircrew's active intervention.

New dogfight missiles, small laser-guided bombs, deep-penetration warheads, and autonomous munitions are all on the roster of upcoming tests at Eglin.

The first two lots of GPS–aided GBU-15s have entered the inventory and have been deployed overseas.

The crews, engineers, and technicians at the 46th Test Wing are determined that anything they test comes to the force with no hidden surprises or operational shortcomings, to work reliably and "as advertised." ■