B-57

LOW ALTITUDE BOMBING SYSTEM TEST FLIGHTS

John W. Harris

In November, 1955, I was a B-57 pilot in the 71st Squadron of the 38th Bomb Wing stationed in Laon, France. I was notified to report to Col. B. B. Taylor in Wing Ops. with my Navigator, 2/Lt. Louis F. ("Rock") Miserocchi.

When I arrived, Col. Taylor handed me a thin, blue cardboard bound, folder. He said it was the Eglin AFB report on Low Altitude Bombing System (LABS) for the B-57. We were to study the folder and leave it with him, because it was classified. We had been selected by him to go to Wheelus, AB at Tripoli, Libya along with Maj. Craig L. Jackson, one other officer, and two enlisted maintenance people. Rock and I were to do all the flying. The purpose of the trip was to find a system with which to get the Wing combat ready in nuclear weapons delivery. The Eglin report was admittedly very limited in scope and testing. We were to try it and see if it could be used.

The Eglin report required level flight at 1000 feet AGL [above ground level] at 425 knots and using the gun sight depressed at a given angle. When passing the target with the gun sight, a 3.5 G [gravity reading] pull-up was initiated and bomb released at the start of gyro tumble (attitude gyro precession), approximately vertical. We found immediately that the gun sight ran all over the desert in the turbulence because of the low angle setting. Maj. Jackson suggested trying pretty much the same approach but as close to the ground as possible and pulling up at a time determined from an initial point using a stop watch. This was a "manual" means of accomplishing the same thing as the LABS computer. We knew we'd never get those. Miserocchi got busy and figured a drop time/point past a prominent IP. First bomb was 4000 feet off because Rock had made a simple mistake in mathematics! For all our test drops, including the 4000 ft error, we averaged 825 ft. CEP (circular error of probability)!

The information we gathered was used to make the wing combat ready. When we finished our short session of test drops, the wing arrived at Wheelus for briefing on what we had learned and flying started immediately. About one-fourth of the pilots had asked for, and been given, a training flight in aerobatics to be ready for the Immelman type maneuver required in LABS bomb delivery. This was done prior to arrival at Wheelus. No major problems were encountered in getting the wing combat ready. There were a few incidents. One pilot flew with his fuel panel set incorrectly and flamed out both engines while belly to the ground at 425 knots with c.g. (center of gravity) out of limits aft.

He pulled up, reset the fuel panel, and got instant re-lights. Two pilots looped out of the bomb drop when they became too interested in where the bomb would hit, and escaped with only a fright. Several base flight aircraft overflew the range to watch the "bombers" do Immelmans. One F-86H made several attempts to fly wing on a B-57 throughout the maneuver. He was only able to stay in until about vertical and the difference in turn rates took over.

It's difficult to give enough credit to the others for what they accomplished in such a short time. Lt. Miserrochi, though the least experienced, made my job a breeze. He questioned everything, came up with data that we could only guess at, analyzed and presented finished products that the rest of us couldn't argue with. (He also made his own range charts for the B-57 that were better than those in the book). In flight, if I spoke, he wrote it down. He had the foresight to check out a GI stop watch before we left the States and bring it with him to Wheelus. The wing became combat ready with two stop watches! There just weren't any around the theater and had to be hurriedly ordered.

Major Jackson provided support for us. He got us what we needed. He picked the brains of the 48th Fighter Bomber [Wing] people and got information to base our work on. He spent some miserable time in the spotting towers, and helped when we needed it. (He still owes me a case of Scotch from when we bet on the first bomb score on the next flight. Of course, they were Rock's calculations that did it!)

The two maintenance people provided perfect maintenance support. (Once they removed the attitude indicator and rushed it to the shop to get some much needed attitude angle measurements done, then reinstalled it without causing any delay in our flights. We tried low angle toss, too, and it worked quite well, although not quite as accurate. Wing said let's stick to the Immelmann and keep it simple, so that was the way it was. With this kind of help, I fondly recall one of the best flying times of my life.

B-57

Low Altitude Bombing System Tests

The Official Report - November 1955

by then Capt. John Harris
Colonel, USAF (RET)

The following is an exact copy of the draft final report. This report has lain in my dresser drawer for more than forty years.

THE NOTES, (Accompanied by spotting tower's target markings)
Brackets [ ]indicate editor's notations.

Arrived Wheelus [Air Base] 25 November 1955 in B57-B #52-1564 for the purpose of making preliminary drops by LABS method with three pound practice bomb from T-1 rack. Aircraft was not equipped with any LABS gyro or computer. Drops were to be made in accordance with material furnished by Eglin [AFB], or any method found to be more suitable. Contacts were made with OIC [Officer in Charge] Special Weapons 48th Fighter Bomber Wing who were TDY [temporary duty] at Wheelus at this time. Valuable information was volunteered by this organization. It was their opinion that an extreme low level approach was more suitable than the 1000 ft. approach recommended by Eglin, however no computer and no bombing tables were available to us for this mission. There was no optimism evident from them as to the outcome of this experimental project. It was decided that two possible choices were open to us. First, to drop from 1000 ft. absolute altitude using the gun sight depressed to 5.7 degrees to establish pull up point and release point determined by attitude gyro tumble, as per Eglin report. Second, to use time and distance measurement with a stop-watch from an initial point a known distance from the target. The approach to target to be made at extreme low level.

On the 27th of November, a dry run mission was flown over the Tarhuna LABS target for orientation and practice approaches using Eglin method. Altimeter error was found to be negligible at 420 knots 1500 ft above sea level when measured with S-4 SHORAN [Short Range Navigation] equipment over the ocean. However, later it was decided that considerable altimeter error did exist (300-500 ft) when figures were checked as to pullup distances from target.

The first live mission was flown 28 November . Eight drops were affected using the Eglin system. The first three drops were made with no wind correction applied, and hits were 2500, 2300, and 1800 ft long at 12 o'clock. The first indication of gyro tumble was used as release point. In an effort to bring bombs onto target, pilot applied correction to release point, that is, 135 degrees of precession or tumble instead of the first indication of tumble. The next bombs were scored at 700 ft. 9 o'clock, 1150' at 7 o'clock , 1200' at 05:30 o'clock, 900' at 07:30 o'clock, and a SHACK [bull's eye]. Indicated air speed was approximately 425 knots and g's recorded in pull-up at 3.5., indicated altitude averaged 1520' plus or minus 20 ft. Target elevation was 504 ft. Average distance short of target for pull-up 4450 ft. as measured by stopwatch from IP 13,194 ft. from target. Actual time of fall of bomb release to impact, was found to be 38 seconds. Time from start of pull-up to impact was found to be 51 seconds. No check was made on escape distance.

This system was found to give satisfactory results. However, considerable difficulty was encountered trying to maintain altitude, air speed, and track exactly for desired results. [The] Eglin report called for 98% power to be applied a few seconds before pull-up causing [the] pilot to neglect flight instruments at a very critical time during the approach. Mathematical calculations showed that any error in altitude or attitude induced large errors in range. (Altitude error gives incorrect distance from target and attitude error of pitch gives incorrect errors in angles of deflection and incidence, thus another error in range (navigator talk)). It is anticipated that rough air would cause even greater errors.
The next mission was flown two hours later the same day. Time-distance measurement with a stop watch from a known point was used to determine pull-up point of 4590 feet short of target. A high speed pass was made from IP [Initial Point] to target (13,194 ft) at 425 IAS [indicated airspeed] to determine ground speed. Stop watch time was 18.8 sec. Ground speed 416 knots or 701.6 feet per sec. It was computed that twelve seconds from IP established the pull-up point, later figured to be 4590 ft. from target. The first bomb was dropped considerably short due to a four second error in timing. The next scores [in feet and clock position]were as follows: 600-10:30, 700 at 8:00, 425 at 9:00, 825 at 5:00, 475 at 8:30, 900 at 6:30. Indicated true altitude for runs was 900 feet plus or minus 50 ft. Actual altitude was 50-100 feet AGL [above ground level] as observed by [the] pilot and range control officers. Altitude at time of release was 5200' indicated and over the top at 6000 ft. Actual time of fall was 37.5 sec. Time from pull-up to impact was 51 seconds. One escape was practiced in full and escape distance was over 3 1/2 miles and range officer stated that the aircraft was out of sight to him at time of impact.
It was determined from hits observed that proper pull-up point should be 4590 feet from target. Later after some 200 drops by the wing, this figure proved to be very near to correct.
It appeared that the altimeter read about 300 feet too high on the aircraft. Power was stabilized at 98% about 3 sec. before pull-up as per the Eglin report. The release point was determined as before at 135 degrees of tumble of the attitude indicator.
Minor variations of altitude and attitude did not appear to be critical in this and later flights where time was used to for distance measurement.
Two other missions were flown the following day expending 13 more bombs for a greatly improved average C.E. [circular error]of 607 feet. The same system was used with one major exception. Power was advanced to 100% (to the stops) about three seconds prior to pull-up. No effect was noticed on hits. This took less time and effort and pilot was not distracted as much at this critical time. The gun sight was used for azimuth control, depressed to 3 degrees. Time from I.P. to pull-up was worked out to the nearest tenth of a second. A.T.F. [actual time of fall] averaged 37.6 seconds. Wind corrections were guessed for the last 13 drops, but a reasonably accurate system using forecast winds was developed. Speed runs from I.P. to target were made at the beginning of each mission, however this would not be necessary since forecast winds would be close enough to compute approach velocity.
It has been established that the aircraft has passed vertical, or at about 100 degrees, at time of release. Delayed releases (in pitch rotation) caused bombs to land short. Early releases hit long.

The minimum altitude approach using a timed pull-up point comparable to system used by LABS computer was favored. It was felt that this would be more practical for obvious reasons of aircraft and crew safety over enemy territory. (End of report)

I found in my dresser drawer, folded together with the hand written notes, two sheets showing the spotting pattern from the towers, along with notations of bomb scores. One shows 6 bombs for an average of 512 feet, and the other shows seven bombs for an average of 710 feet. I think these are the scores for the last two test missions flown on the 29 November 1955.

For the career oriented flying officer, this should have been good "meat" for the upcoming OER [Officer Efficiency Report]. It wasn't mentioned in mine. About two years later, in the squadron commander's endorsement, he commented that I had "greatly enhanced the ability of the wing to complete it's wartime mission, in testing and establishing bombing techniques." I can't remember if I gave Miserocchi appropriate credit, but I hope I did. Anyway, it was a lot of fun!

Note: All the bombing information and calculations came from Lt. Miserocchi. He seemed to remember everything they taught him at Mather AFB. Without his able assistance, the tests would have been far less professional. Much more would have been guesswork. He and one other officer were the only ones to bother checking out a stop watch from supply before departing the States. Everyone else kidded him about it. We couldn't have done the job without it. The two stop watches were hurriedly carried from one aircraft as it landed, to one waiting for takeoff, so every flight had a stop watch!

Lt. Col. Louis F. Miserrochi eventually retired from the Air Force and settled in Austin, Texas. He died of liver cancer in April 1994.