

survived in comparison.

We had a WSO (Weapons Systems Officer). The light grey guys hate the idea of having company in the cockpit. That was life for us. Personally I found that when I worked with a good WSO I could fight better than by myself. I think I would have been a better pilot if forced to do it all by myself but when you put me with a WSO, we as a crew were better than I ever could have been with me by myself. Plus a huge advantage here, when I screwed up and was called into the boss's office to be screamed at it hurt less as he was screaming at two of us instead of me alone. Misery loves company.



USAF

Ground crews prepare to attach a CFT to an F-15E.

The F-15E had a fantastic advance know as Synthetic Aperture Radar (SAR). Basically a bunch of nerdy skinny guys with coke bottle eyeglasses and pocket protectors found that if they had the radar sweep back and forth a couple of times and then analyzed all of the pictures, checked them twice to see if we were naughty or nice, and then took the cube root of the square of the phase of the moon, that they could give us a picture of the ground that looked like it was taken from a satellite. It was incredible. Fences looked like fences. Buildings were square instead of blobs. Radar scope interpretation became much-much easier and bombing accuracy became much better.

To use the Synthetic Aperture Radar we had to move sideways to the target for a couple of sweeps. The greater the angle off the nose the area was we wanted to look at the faster the picture and the more accurate the radar picture was. This totally changed our target area behavior. In the F-111 you flew straight at the target as the WSO used the radar to find it. In the Strike Eagle we would fly at an angle to the target and turn direct

This was not that big of a deal really. We had to maneuver anyway to get minimum safe distance between each striking aircraft so we just integrated the need to map the target into our plan to attack from different directions at different times.

We would run in low. The F-15E could fly TFR down to 100 feet though I only used 200 feet to my eternal regret. Woulda-coulda-shoulda gone down to 100 feet at night just to say I did it. The lowest I ever flew at night in the F-111 was 500 feet, though I flew at 200 feet when flying under visual flight rules (VFR) conditions all the time.

Anyway, run in low then turn off when inside around 20 miles or so. This gave us our best resolution on the radar and I think the numbers were something like we could see objects as separate if they were a bit less than 10 feet apart. So, if you have two cars five feet apart they show up as one blob. If they were 15 feet apart they would show up as two blobs.

If the radar did not have enough grazing angle to see the target the WSO would direct us to climb. Once he had the picture we would turn target direct and drop back down to our attack altitude that was dictated by the bomb fuse combination that we were carrying.



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F-15E's massive holographic HUD with LANTIRN nav pod FLIR imagery projected onto it at night.

### Putting the Strike Eagle's arsenal to work during Desert Storm

The standard for the start of the war was the MK-20 Rockeye [cluster bomb](#) which if I remember right had a timer fuse on it. A certain time after being dropped the MK-339 timer fuse would fire. The bomb would spin after release from the fins popping out at the back at an angle. When the fuse fired, the case split open, and the bomblets inside spread out due

The bombs were dual purpose. If they hit something hard they would form a shape charge of plasma and burn through armor. If they hit something soft they would go off like a hand grenade and generate shrapnel. I loved Rockeye, great stuff, carried it the first few nights of the war and took out several Scud missiles with it.

By the end of the war we were primarily dropping CBU-87s, bigger at 1,000lbs than the 750lb Rockeye. That was nice because it had more bomblets. It was not nice because we could not carry 12 of them on the CFT's, 6 per side, and carry wing-tanks as well, the top three bombs on each side were too close to the tanks. Thus we either carried less, six to be exact, or we carried less gas, a center line tank instead of up to 3 tanks, 2 on the wing plus the centerline tank.

The CBU-87 had a radar proximity fuse. As a result if I released it on or above the minimum altitude I got the exact same dispersion of the bomblets. This came into play after the second night of the war when we started dropping from what we used to consider the stratosphere, the mid-teens to high twenties (thousands of feet). We could still cover a huge area on the desert with a carpet of white fire. These were the best dumb bombs we used for the vast majority of targets we attacked during Desert Storm.

[Laser Guided Bombs](#) (LGBs) are visual flight rules only weapons. The laser is attenuated by visible moisture. Sometime you could use a ground laser beneath a cloud deck, the aircraft could drop the bomb ballistically and the guy on the ground would guide it in by illuminating the target with his laser.

At the start of the war we had Paveway II LGBs in 500lb (GBU-12) and 2000lb (GBU-10) configurations. It didn't matter to the aircrew which he carried as they were identical in employment. We did not start using them until a bit into Desert Storm as we only had [nine LANTIRN targeting pods](#) for 48 aircraft. We were up to 24 pods by the end of the war. Because of this, we always used them from medium altitude in one of two ways.

**HOW A SMALL-TOWN GIRL ENDED UP IN THE COCKPIT OF AN A-10 WARTHOG**

By Frank Crebas, Rich Cooper and Tyler Rogoway  
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**WHAT IT WAS LIKE FLYING AND FIGHTING THE F-16N VIPER, TOPGUN'S LEGENDARY HOTROD**

By Paul Nickell And Tyler Rogoway  
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**HOW TO LAND A FIGHTER ON AN AIRCRAFT CARRIER ON A STORMY NIGHT**

By LCDR Joe "Smokin" Ruzicka  
Posted in [THE WAR ZONE](#)



If the aircraft was lasing (painting a target with a laser) for itself, it would

tactic though, where we would not turn the laser back on after release until 15 seconds or so to impact. This was to keep the bomb falling ballistically. If you had the laser on full time then as soon as the laser was seen by the seeker it would point straight at the target and cause the bomb to come in at a slightly shallower angle than it would with a delayed laser operation. Steeper meant faster and more energy to maneuver to steer to the laser spot. I have actually seen slow motion footage of bombs hitting short with the bomb at a very nose-high angle of attack as the seeker struggled to keep on target and the bomb got too slow.

By cranking sideways the laser spot would remain on the same side of the target as the bomb, usually. Even when you are lasing the target at almost 90 degrees you would usually have enough laser “splattering” for the bomb to see it. Round oil storage tanks could be tough though. Also, you could end up lasing the side of a building the bomb couldn't see so it took a bit of artistry to know the right run-in angle and crank-off angle.

The other advantage of cranking-off was avoiding the very disorienting roll of the seeker head as it passes through the vertical. Not only that, but since the LANTIRN targeting pod had the seeker head on the front of the pod's body, the ability to see to the rear was extremely limited. I have seen a lot of targeting pod video from the war and several times you can see where the laser stops prior to bomb impact due to this. With good crew coordination the pilot could quickly turn back toward the target and roll back out allowing the pod's laser to stay on target.

Another tactic we used was buddy lasing. In this case the poor wingman (always me as I was a wingman the entire war) who had no targeting pod would drop the bomb ballistically so that his flight lead could have all the fun and be the hero in taking the target out. I kind of felt like the sparring partner for the heavyweight fighter. I did a lot of work with little satisfaction. I know, yes I would like some crackers and cheese to go with my whine.

The flight lead would fly several miles behind the wingman and be able to fly straight towards the target the entire time. This actually gives the bomb the absolute best laser spot as it is more in line with the flight path of the bomb the entire time.

So how big is the laser spot? We had some footage taken out at the Utah test range that actually filmed our LANTIRN targeting laser on the target as we dropped bombs. If I remember right it was a 2 story target building. The laser spot covered most of the entire building when the bombs hit! We were several miles away and it showed how even lasers diverge over distance. The seeker on the bomb tracks the center of the spot so even though it was a big spot we still got good guidance with it.

coverhead in the desert of Kuwait with five 2,000lb bombs. We could see the shock-wave as they blew up, even on the darkest night.



USAF

Strike Eagles pushing it up at dusk.

### We own the night

We used the FLIR (forward-looking Infrared) in the LANTIRN Navigation pod to fly formation at night. Thus in a two ship or more we would fly a train with each wingman being two to four miles behind the aircraft in front. This allowed the radars to be in scan mode rather than remaining locked on to the aircraft in front of it.

I think most flight leads preferred to fly in black-hot on their HUD. I preferred white hot as it was easier to see the aircraft as a white dot than a black dot for me. Our leads tended to criticize us but most of us just shrugged and continued to do what we wanted to as it was our choice and we were the ones who would be embarrassed if we didn't stay in position. Remember the wingman's creed – "two, joker, bingo, mayday, and Lead you're on Fire." Other than that shut up and color. Be in position and do what you're trained to do. That way the formation is strong. A weak wingman is worthless.

At that time we had no data-link. Big weakness. All targets passed to the Strike Eagle after takeoff were done verbally. We worked with E-8 [JSTARS](#) a lot. They had a SAR radar like ours but theirs could take detailed pictures from much greater ranges. They would then try to talk us onto targets.

They would give us the coordinates, oh yeah also no GPS in the F-15E back then, so coordinates could be up to a half mile or more off. They would then verbally describe the targets they were seeing. "A group of six tanks in a crescent moon oriented towards the northwest." Sadly many