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F-15E aircraft belonging to the 90th Fighter Squadron, the only Strike Eagle squadron re-equipped with F-22A Raptors in 2007. All photos: U.S. MoD

Boeing F-15E Strike Eagle (Part II)

The combat use of F-15E strike aircraft is not as spectacular as the use of the F-15A/B/C/D fighter versions, but from the perspective of warfare, the Strike Eagle made a significant contribution to the defeat of Iraq in 1991 and 2003, as well as twice forcing the Serbs into submission—in Bosnia in 1996 and in the New Yugoslavia in 1999. The F-15E effectively replaced the F-111 fighter-bombers, providing the capability to carry out powerful, deep strikes against important enemy targets.



F-15E belonging to the 492nd Squadron from the 48th Fighter Wing based at Lakenheath in the United Kingdom. Before re-equipping to the Strike Eagle, this unit was equipped with F-111F fighter-bombers. Plans to re-equip the entire wing were not realized, and one squadron (the 493rd) is equipped with F-15C fighters.

The F-15E entered service with the USAF in 1988, during the final period of the Cold War. The first unit to receive the new version was the 405th Tactical Training Wing at Luke Air Force Base in Arizona. In April 1988, the F-15Es were delivered to the 461st Tactical Fighter Training Squadron, and in February 1989, the first group of pilots completed their training on the Strike Eagle. The squadron was disbanded in 1994. In May 1989, a second squadron belonging to the 405th Wing—the 550th Tactical Fighter Training Squadron—was equipped with the F-15E. This unit was also disbanded along with the 405th Wing at the end of 1994, and the training of F-15E crews was taken over by the 333rd Fighter Squadron from the 4th Fighter Wing.

The first combat unit, and in fact the only one in the USAF to be fully equipped with strike F-15Es, was the 4th Tactical Fighter Wing from Seymour Johnson in North Carolina. In October 1989, the 336th Tactical Fighter Squadron of the wing achieved combat readiness on F-15E aircraft, which had been delivered to the unit a few months earlier. Subsequently, the re-equipment of the 334th and 335th Squadrons of the wing began, with both subunits achieving operational readiness in October 1990. The 4th TFW was a unit designated to reinforce any strategic direction—Europe or the Far East—in the event of war with the Eastern Bloc. In 1994, the wing was further strengthened by the addition of a newly formed squadron, the 333rd Fighter Squadron, which was a training unit, receiving aircraft, equipment, part of the staff, and tasks from the disbanded 550th Squadron at Luke in Arizona.

According to the plan drawn up during the Cold War, the F-15E was to be introduced into the armament of the 20th and 48th Tactical Fighter Wings. Both units were equipped with F-111 aircraft and were stationed in the United Kingdom. They were intended to operate in the European theater of war, conducting deep strikes on the communication routes of Warsaw Pact forces, on advancing second echelons of those forces, and their operational reserves. However, the end of the Cold War led to a change in these plans. The F-15E was introduced only into the armament of the 48th Tactical Fighter Wing at Lakenheath, and, in addition, one of the unit's squadrons was equipped with F-15C Eagles from the disbanded 36th Fighter Wing at Bitburg (the 493rd Fighter Squadron). The remaining 492nd and 494th Fighter Squadrons were equipped with strike F-15E

Strike Eagles. First, the 494th, and then the 492nd Squadrons began receiving F-15Es in February 1992, and by October 1993, both had achieved operational readiness on this type. Both mentioned wings, the 4th and 48th, still operate F-15E aircraft, having (respectively) four and two Strike Eagle squadrons. Slightly earlier, in May 1991, the newly formed 90th Fighter Squadron belonging to the 21st Fighter Wing at Elmendorf in Alaska was equipped with F-15Es. This squadron was to support ground forces in the defense of Alaska in the event of an attack. According to the Cold War organization, the entire 21st Wing, with two squadrons of F-15C/D fighters (the 43rd and 54th) and one squadron of strike F-15Es (the 90th), was subordinate to the Alaskan Air Command. After the end of the Cold War, the unit was assigned a new task

– Strengthening the forces defending South Korea, Japan, or Taiwan in the event of a North Korean or Chinese attack. As a result, the entire wing was transferred to the USAF Pacific Command (PACAF). At the same time, its number was changed to the 3rd Fighter Wing, in reference to the unit that was once stationed in the Philippines. Until 2006, the wing still included the 90th Fighter Squadron with F-15E aircraft and two fighter squadrons with F-15C/D (the 12th and 19th, renumbered from the 54th).

i 43.). However, at the end of 2006, the F-15Es from Alaska were transferred to the 366th Fighter Wing, and from August 2007, the 90th Squadron was equipped with F-22A Raptor aircraft. In this way, the 3rd Wing is no longer an operator of the F-15E.

In October 1991, an experimental expeditionary wing was formed at the 366th Fighter Wing, which was equipped with F-111D aircraft at Mountain Home in Idaho. This wing was to include fighter and fighter-bomber squadrons operating F-15C/D, F-16C/D, F-15E, as well as a bomber squadron with B-1B and an aerial refueling squadron with KC-135R. At the beginning of 1991, the wing had three tactical squadrons: the 389th Fighter Squadron with F-16C/D, the 390th Fighter Squadron with F-15C/D, and the 391st Fighter Squadron with F-15E, alongside the bomber and refueling squadrons. After a few years, it was decided to create more homogeneous expeditionary units, as there are usually several operating in a theater of war and there is no need to gather diverse subunits in one wing. Therefore, only tactical aircraft remained at Mountain Home. At the end of 2006, the 389th Fighter Squadron gave up its F-16s and in return received F-15Es from the 3rd Fighter Wing in Alaska. Currently, the 366th Fighter Wing operates

(similarly to the 48th Wing) two F-15E squadrons (389th and 391st) and one F-15C/D squadron (390th).

Currently, three USAF wings have a total of eight combat F-15E squadrons. In addition, the Strike Eagle is used in the independent 85th Test and Evaluation Squadron at Eglin Air Force Base in Florida (alongside other types) and in single examples in the 412th Test Wing at Edwards Air Force Base in California.

Desert Storm - First Blood When Iraq invaded Kuwait, the F-15E aircraft was just being introduced into service, and only the 336th Tactical Fighter Squadron of the 4th Wing was fully operational. As early as August 9, 1990, 24 F-15Es, mainly from this squadron, were redeployed to Oman, to Thumrait Air Base. The group was supplemented with aircraft and crews from the other two squadrons and from the wing headquarters. Not everyone was fully trained; some pilots completed their training already in the Persian Gulf region. Upon arrival, the aircraft began air defense alert duties, with at least two armed like F-15C fighters—with four Sparrow and four Sidewinder missiles—and others with Mk 20 Rockeye cluster bombs or GBU-12 laser-guided bombs. Their main task was the air defense of their home base. Meanwhile, the aircraft armed with bombs were to be used to support Saudi Arabian forces in the event of an Iraqi invasion of that country. In addition, the entire force was preparing to participate in the planned "Desert Storm" operation—the recapture of Kuwait from Iraq.

At Thumrait Air Base in Oman, the provisional command of the 4th Tactical Fighter Wing (4th TFW Provisional) was formed. The unit commander was Colonel Russell "Rusty" Bolts. The wing's personnel was supplemented before Christmas in December 1990 with crews who had just completed F-15E training at Luke Air Force Base in Arizona.

On September 30, 1990, the wing lost its first F-15E Strike Eagle (87-0203) during a training interception of two British Jaguars. The crew, consisting of Major Pete Hook and Captain Jim Poulet, was killed. The probable cause was spatial disorientation of the pilots, who lacked experience flying over the desert. The aircraft was replaced by another that arrived from the United States, and the 4th TFW (P) still had 24 F-15Es. In December 1990, the unit was redeployed from Oman to Al Kharj Air Base in Saudi Arabia, closer to the future combat zone.

The war began on January 17, 1991, just after midnight, with a massive

F-15E-47-MC Strike Eagle 89-0487/SJ (serial number 1134/E109) belonging to the 335th FS "Chefs", 4th Fighter Wing, Seymour Johnson, North Carolina. A GBU-10 bomb attack carried out by the crew of Capt. Tim Bennett and Capt. Dan Bakke resulted in the destruction of an Iraqi Mi-24 helicopter. During "Operation Iraqi Freedom" in 2003, the aircraft bore the "Lucky" emblem painted on its nose. Illustration: Robert Gretzyngier



The crowded Al Kharj base in Saudi Arabia, from which the Strike Eagles of the 4th Tactical Fighter Wing operated during Operation "Desert Storm".





F-15E over one of the Iraqi cities during the stabilization phase of Operation "Iraqi Freedom" in 2006. Under the aircraft are mounted GBU-12 Paveway III laser-guided bombs and the new Lockheed Martin Sniper-XR targeting pod. On the wings, next to the external fuel tanks, AIM-120 AMRAAM air-to-air missiles are visible.

The initial attack involved cruise missiles and F-117A aircraft in the first wave, followed by various types of tactical aircraft in subsequent waves. The main objective of the first night's attack was to target elements of Iraq's integrated air defense system. However, the F-15Es were directed towards different targets. The mission involved 21 aircraft from the wing, divided into four- and three-aircraft flights. All, except for one four-aircraft flight, were armed with twelve Mk20 Rockeye cluster bombs and two AIM-9M missiles for self-defense, while that particular four-aircraft group carried twelve standard Mk82 bombs weighing 227 kg each. All aircraft were equipped with fuel tanks along with Fast Packs and three additional tanks, all fully refueled, as their targets were quite distant. These targets were five fixed bases with Al Hussein and Al Abbas ballistic missile launchers.

– Iraqi variants of Scud missiles with extended range. Despite the strong defense of the targets by anti-aircraft guns and surface-to-air missile launchers, the F-15Es surprised the defenders by approaching the target at night at an altitude of about 100 meters. Only during the attack did they climb to an altitude of about 1,200–1,800 meters. During the egress from the attack, some pilots, under heavy anti-aircraft artillery fire, maneuvered sharply, reaching up to +7 g forces, even though the operational limit in this configuration was only +3 g! Nevertheless, all 21 F-15E aircraft returned to Al Kharj base after the first combat mission in their history.

On January 17, the wing conducted two more attacks on mobile Scud ballistic missile launchers identified by intelligence. Each sortie involved about a dozen aircraft. This time, however, the approach to the targets was carried out at high altitude, around 10,000 meters, and the bombing was performed during the pull-out from a dive, which occurred at about 5,000 meters, above the range of light anti-aircraft artillery and man-portable air-defense systems. Under these conditions, aiming was very difficult, despite attempts to use the television camera of the LANTIRN pod. While the night strike was relatively effective, both daytime missions ended in failure. Some of the designated targets were destroyed, but they turned out to be decoy launchers intended to lure American air strikes.

Hunting Scuds

Iraqi missile attacks on Israel could have effectively ended Operation "Desert Storm." They could have provoked Israel to join the war on the Coalition side, which would have meant the withdrawal of Arab states, without which further operations would have been impossible. Therefore, destroying ballistic missile launchers that could be fired at targets in Israel (and also in Saudi Arabia) was an extremely important task. Aircraft assigned to this mission included the A-10A and F-15E, which operated in pairs within designated zones for independent search and destruction of targets (so-called Kill Boxes). Every night, F-15Es set out to areas for independent search and engagement of ballistic missile launchers, supported by E-8A Joint STARS airborne ground surveillance and target designation aircraft, as well as groups of special forces soldiers on the ground.

These were not easy flights, because the F-15Es spent a very long time in the air at an altitude of 100-300 meters over foreign territory, and, in addition, opportunities to attack detected launchers were very rare. Already on the second night, from January 17 to 18, 1991, a group of F-15Es encountered a lone MiG-29. The Strike Eagle crew attempted to shoot down the opponent with an AIM-9M missile, but it missed the target. From that point on, the F-15Es carried 1-2 AIM-7M missiles on under-fuselage pylons (asymmetrically, on one side), which gave them a chance to detect and engage a potential opponent with radar earlier. However, the F-15Es did not shoot down any enemy fighters during the entire conflict.

F-15E losses in "Desert Storm" On the night of January 18 to 19, 1991, the first F-15E was shot down during Operation "Desert Storm." Sixteen F-15E Strike Eagles



A triumphant flyover of Kuwait by USAF aircraft after the end of Operation "Desert Storm." In the foreground is an F-16A from the 174th Tactical Fighter Wing of the New York Air National Guard, followed by two F-15Es from the 4th Tactical Fighter Wing, an F-15C from the 36th Tactical Fighter Wing, and another F-16.

were assigned the task of destroying a large liquid fuel depot near Basra. Basra is located only about 80 km north of the Kuwaiti border, but due to the occupation of that country by Iraqi forces, the allied strike group had to cross about 200 km of hostile territory. For the F-15E, this was an average penetration depth; these aircraft sometimes ventured as far as 600-700 km into Iraqi territory. However, the area around the ports of Umm Qasr and Basra was extremely heavily defended by numerous anti-aircraft missile battalions and countless gun batteries. At this stage of the conflict, Iraq's air defense had not yet been neutralized—there were also Iraqi fighters in the air. All participants in the mission recall it as the most difficult task they performed during "Desert Storm."

The F-15Es approached the target in loose pairs, carrying out attacks individually. The approach to the target was performed at an altitude of about 100 meters; after aligning with a selected reference point, the aircraft would perform a pop-up maneuver before the target, dropping bombs "from a toss" in a climbing flight. The onboard computer anticipated this method of bombing, and for surface targets such as the attacked fuel depot, it was effective. During this flight, the aircraft dropped Mk 82 bombs weighing 227 kg. However, the most difficult part was the egress from the attack. This involved banking the aircraft to an angle greater than 90°, that is, partially inverted, and performing a slanted, almost flat half-loop, which in its final phase transitioned into a descending turn. This turn had to be completed by transitioning to level flight at an altitude of 100 meters. At night, this was extremely difficult, as the entire maneuver had to be performed by instruments, and when approaching the ground, additionally using the navigation pod camera, which was not very effective over desert terrain lacking distinct infrared-contrasting objects. And all this under very heavy anti-aircraft fire! All crews carried out effective attacks, destroying the target, but during the withdrawal from the target, F-15E number 88-1689 with the crew consisting of Major Thomas F. Koritz and Major Donnie Holland struck the ground and exploded. The crew was killed, having reported no problems beforehand. To this day, it is not known whether this was the result of Iraqi fire or pilot error.

The second and last F-15E lost during Operation "Desert Storm" was lost on January 20, during an attack on detected Al Hussein ballistic missile launchers, which required a much longer preparation procedure than typical mobile Scuds. The launch area was defended by S-75M Volkhov batteries, and it was just such a missile that hit F-15E number 88-1692. The crew, consisting of Colonel David Eberly and Major Thomas E. Griffith Jr, ejected and for some time hid in the desert. However, since Colonel Eberly did not send the correct identification code (which could have indicated an ambush) and due to various organizational difficulties (jurisdictional disputes between USAF tactical commanders and special forces), a rescue mission was not launched. As a result, the F-15E crew was captured by the Iraqis after a few days and was released only in March 1991, after the end of Operation "Desert Storm."

Final phase of the operation

Both losses were recorded in the first week of the operation, when Iraq's air defense was still quite effective. In the later period, flights over Iraq became significantly safer. The search

The release of infrared flares by a group of four Strike Eagle aircraft belonging to the 494th Squadron of the 48th Fighter Wing stationed in the United Kingdom.



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F-15E-47-MC Strike Eagle number 89-0475/SJ (factory number 1122/E097) belonging to the 334th Fighter Squadron, "Fighting Eagles", 4th Fighter Wing, Seymour Johnson, North Carolina. Illustration by Robert Gretzyngier



Countering ballistic missile launchers remained an important task for the F-15E until the end of the conflict. Their operations contributed to a significant reduction in Iraq's ability to launch ballistic missiles—from five per day to just one per day (after January 26), and eventually to single attacks every few days (after February 10). Such a low launch rate could not affect the outcome of the conflict, so the F-15E accomplished its mission.

However, these aircraft also attacked other targets. Already on the night of January 18 to 19, a group of F-15Es penetrated deep into the heart of the country, striking an air defense command post in Balad, about 100 km north of Baghdad. That same night in the early morning, another group of F-15Es destroyed another command post of this type in Rasheed, just outside Baghdad, on the southeastern side of the city. At the beginning of February, F-15Es attacked selected Iraqi power plants, depriving the country of electricity. Iraq's industry was halted, but the most significant impact was the considerable difficulties in maintaining order in the cities. The police forces and secret services—the backbone of Saddam Hussein's regime—could not cope with this, especially in the Shia-dominated southern part of Iraq.

Starting from February 13, all Coalition air forces, including the F-15E, were deployed to destroy Iraqi forces in Kuwait and to attack the Republican Guard forces north of Kuwait. Iraqi troops had already been under fairly intense attack since January 25, but from February 13, they became the target of extremely concentrated, massive air strikes. The F-15Es mainly bombed Republican Guard forces, using both conventional and cluster bombs as well as GBU-12 (227 kg) laser-guided bombs dropped on individual tanks, and GBU-10 (908 kg) bombs against command posts and certain fortifications. Within a week, the backbone of the elite Republican Guard units was broken. At this point, the war was already lost for Iraq. Saddam Hussein requested a ceasefire and offered to withdraw his troops from Kuwait, but the Chairman of the Joint Chiefs of Staff, Gen. Colin Powell (US Army), became concerned that the war would be won by air power alone, without the involvement of ground forces. Therefore, Iraq was given conditions impossible to fulfill, such as the complete withdrawal of troops from Kuwait within 24 hours. In this way, from February 28 to March 2, a rapid ground assault took place, when Iraqi forces had already begun withdrawing from Kuwait. It was close to air power alone forcing Iraq into submission. The F-15E also played a part in this.

F-15E Strike Eagle aircraft over Afghanistan in 2007—visible are INS/GPS-guided JDAM bombs, two GBU-12 laser-guided bombs, and a Sniper-XR targeting pod.



The only shootdown

On February 14, 1991, the F-15E achieved its only air-to-air victory. And, as befits a fighter-bomber, the enemy helicopter was destroyed... with a laser-guided bomb.

On that day, the crew consisting of Capt. Richard T. Bennet and Capt. Dan B. Bakke was dispatched by an on-duty AWACS aircraft to support a group of special forces that had found themselves in serious trouble. The F-15E was armed with a GBU-10 laser-guided bomb (the other three had already been dropped), and the crew decided to place it as accurately as possible on the group of Iraqi troops engaged with their own special forces. However, when the F-15E arrived in the combat area, it turned out that the most dangerous opponents of the special forces were two Mi-24 helicopters. Without much hesitation and not wanting to waste time, the weapons systems officer locked onto one of the Mi-24s with the targeting pod camera, and the GBU-10 bomb was released within the attack envelope for a slow-moving target. Initially, the crew saw no effects and feared that their bomb had not detonated. However, moments later, the Mi-24 disappeared in a massive fireball. The special forces soon confirmed that the GBU-10 had exploded on the ground just in front of the low-flying Mi-24, which was caught in the center of the explosion. The F-15E then locked onto the second one with radar—



NF-15B ACTIVE. Photo: NASA

Supermaneuverable F-15 Eagle

In October 1984, the USAF decided to launch a research program aimed at demonstrating the possibility of shortening the takeoff and landing of tactical aircraft with minimal modification. The prototype F-15B (71-0290) was selected for testing. Two canard control surfaces (actually the horizontal stabilizers from the Hornet) were installed at the front of the aircraft fuselage. They had a strong dihedral angle of up to 20°, and were intended to be used as the main control surfaces, capable of moving symmetrically or asymmetrically. Installing additional control surfaces ahead of the aircraft's center of gravity allowed the airframe to withstand g+9 loads (normally, the F-15A/B were rated for g+7.33) without further structural reinforcement, as the loads were distributed across different parts of the airframe, rather than being concentrated at the wing spar attachment points. Another modification was the implementation of a new active control system, which managed both the control surfaces and the engine nozzles. The entire system was integrated into cockpits typical of the F-15E, with cathode-ray displays replacing traditional instruments.

The modified F-15B carried the official designation NF-15B, though it was also called the F-15B S/MTD (for Short Take-Off and Landing/Maneuvering Technology Demonstrator). Initially, the aircraft did not yet have the planned movable engine nozzles, which encountered significant design issues. It was therefore equipped with standard F100-PW-220 engines with conventional nozzles. In this configuration, the aircraft made its first flight on September 7, 1988. Testing of the control system and additional lifting surfaces continued until January 1989.

At the beginning of 1989, the final upgraded, rectangular F100-PW-220 engine nozzles developed by Pratt and Whitney were finally installed. They could move only in the vertical plane within a range of +20°. Shifting from one extreme position to the other took 0.5 seconds. At the same time, the nozzles could be switched to thrust reversal, which took 1.5 seconds (from full afterburner).

After another upgrade, the NF-15B, in its nearly final form, made its first flight on May 10, 1989. After initial factory tests, on June 19, 1989, the aircraft was transferred to Edwards. Ground tests conducted there again revealed problems with the nozzles, which were resolved at the beginning of 1990. Only then did full aerodynamic configuration testing begin, including engine nozzle deflections. The results obtained at Edwards were satisfactory: the aircraft took off with a full fuel load in a distance of 300 m, and landed on a 400 m runway segment. Its maneuverability (angular velocity in maneuvers) increased by nearly 60%.

On August 15, 1991, the tests ended in complete success. However, the Cold War had ended, and the entire program became purely experimental. The goal of the next modification, called the NF-15B ACTIVE (Advanced Control Technology for Integrator Vehicle), was to—Research on aerodynamic solutions and control systems prepared for the new ATF fighter, the future F-22A. In general, this was another modification of the NF-15B, in which the rectangular nozzles were replaced with round ones, mounted on special pivots, and their axis could be deflected by 20° in any direction. These nozzles were developed by Pratt and Whitney as part of the Pitch-Yaw Balance Beam Nozzles (PYBBN) program and were used in the F100-PW-229 engines installed on the NF-15B ACTIVE. At the same time, further changes were made to the digital active control system, mainly in its software. The program was led by Berwin Kock, while the chief designer of the ACTIVE configuration was Gerard Schkolnik.

In its new form, the NF-15B ACTIVE made its maiden flight on February 14, 1996. Initially, low-speed maneuvering tests were conducted, but on April 24, 1996, pilot Jim Smolka began a program of maneuvering tests at supersonic speeds using the deflectable nozzles. Thus, the aircraft became the first in the world to conduct engine nozzle deflections at supersonic speed. On October 31, 1996, the same pilot performed a series of maneuvers using the deflectable nozzles at a speed of Ma=1.95 at an altitude of about 15,000 m. At the same time, a series of maneuvers with angles of attack of about 30° were also performed at a speed of 360 km/h at an altitude of about 10,000 m.

In December, the test program was completed and the aircraft underwent another modernization. This time, the nozzle control system was fully integrated with the digital control system, so that thrust vectoring was used continuously during flight, just like all other control surfaces. The aircraft received special control system software written according to the Matrix-X concept, which automatically generated control codes from flight parameter charts that were read by the computer during the system programming preparation phase. The program was called Inner-Loop Thrust Vectoring (ILTV). The test pilot was once again Jim Smolka.

The NF-15B, in its final configuration for supermaneuverability research, made its maiden flight in November 1998. The program was conducted without much publicity for several months, after which further work was discontinued. The development of excellent medium-range missiles, helmet-mounted sights, and supermaneuverable guided air-to-air missiles of short range convinced designers that the maneuverability capabilities of modern fighter aircraft were no longer as significant as had been thought ten years earlier. The F-22A does have controlled thrust vectoring, but the resulting excellent agility of the aircraft will be used mainly for evasive maneuvers in case of missile attacks by anti-aircraft systems. Interestingly, although the Americans were pioneers in thrust vectoring and have achieved significant, spectacular successes in this field, in general opinion, achievements in this area are associated with... the Russians!



F-15E from the 335th Squadron of the 4th Fighter Wing during operations in Iraq (from airbases in Kuwait) in 2007. Under the aircraft is a Sniper-XR targeting pod, and under the wings are AIM-120 AMRAAM air-to-air missiles.

The second Mi-24 attempted to attack it with a Sidewinder missile, but a friendly special forces helicopter appeared nearby. Fearing a mistake, the F-15E aborted the attack, especially since the second Mi-24 began to withdraw from the battlefield. After careful analysis, conducted after the war, the crew was credited with the shootdown of the Mi-24.

Operations

In the new circumstances In the 1990s, the F-15E participated in low-intensity operations in the Balkans and the Persian Gulf. In the Balkans, Operation "Deny Flight" was conducted, during which the no-fly zone over Bosnia was enforced, while in the Persian Gulf, similar operations "Southern Watch" and "Northern Watch" enforced no-fly zones over southern and northern Iraq. In the Balkans, Operation "Deliberate Force" was also carried out, aimed at forcing the Bosnian Serbs to sign the peace agreement in Dayton. In the operation conducted from August 20 to mid-September 1995, the 492nd Fighter Squadron from the 48th Fighter Wing based at Lakenheath in the United Kingdom, temporarily deployed to Aviano in Italy, participated. F-15E aircraft entered action on September 5, 1995, dropping laser-guided bombs on Serbian ammunition depots around Sarajevo, and on September 9, for the first time, a GBU-15 thermal imaging guided bomb was dropped in combat conditions. Operation "Deliberate Force" ended successfully, and not a single F-15E was lost during its course.

Operation "Allied Force"

Operation "Allied Force," conducted in the spring of 1999 by NATO air forces, aimed to force the authorities of the Federal Republic of Yugoslavia to withdraw their troops from Kosovo and allow international peacekeeping forces into the province. It was believed that this would put an end to the wave of ethnic cleansing carried out by Serbs against the Albanian population in Kosovo.

Among the air forces assembled for the operation was also the 492nd Fighter Squadron from the 48th Fighter Wing at Lakenheath Air Base in the United Kingdom, reinforced by part of the 494th Fighter Squadron from the same unit, totaling 26 F-15E aircraft. On the day the operation began, March 24, 1999, all 26 F-15E Strike Eagles launched attacks on elements of the air defense system of the Federal Republic of Yugoslavia. They bombed the positions of anti-aircraft missile battalions with CBU-87 cluster bombs and also attacked fortified command posts of air defense sectors with special laser-guided GBU-28A/B bombs equipped with BLU-113 penetrating warheads, designed for destroying bunkers and underground installations. However, the attack on the underground hangar at Cristina Air Base was unsuccessful, as the GBU-28A/B bomb dropped from an F-15E did not penetrate the interior of the hangar.

Soon after the initial phase of operations, the F-15Es began attacks on Yugoslav forces in Kosovo. The crews of these aircraft for the first

F-15E from the 335th Fighter Squadron of the 4th Fighter Wing flying over Iraq in 2007. Under the aircraft is a typical mix of GBU-31 JDAM and GBU-12 Paveway III guided bombs, used during direct support missions for troops in their operations against terrorists.





F-15E from the 492nd Squadron of the 48th Fighter Wing at Bagram Air Base, Afghanistan, in 2007. Below – F-15E from the 391st Squadron of the 366th Fighter Wing at the same base, Afghanistan, 2007.



Initially, they carried out combat missions using night vision goggles in addition to standard targeting pods. Furthermore, after releasing their ordnance, the F-15Es remained in the target area and assumed the role of providing intermediate fighter cover for strike groups, armed with AMRAAM and Sidewinder missiles. Thus, two different missions were performed—engaging ground targets and maintaining readiness in the zone to counter aerial threats—within a single flight. This was the realization of the swing role concept, meaning two different tasks in one sortie, as opposed to multi-role, which refers to the ability of the same aircraft type to perform various tasks (in separate flights).

The greatest threat to American aircraft during Operation "Allied Force" was the mobile batteries of 2K12 Kub surface-to-air missile systems, which could not be eliminated. They appeared in various, unpredictable locations and opened fire by surprise. However, it turned out that the F-15E was equipped with an adequate self-defense system, effectively protecting it from being shot down by Kub missiles. Therefore, the Strike Eagles could operate freely at high altitudes, beyond the range of anti-aircraft artillery and man-portable air defense systems, as well as above the engagement zone of the highly dangerous 9K33 Osa missile systems. The experience of F-15E crews from Operation "Southern Watch" over Iraq, enforcing the no-fly zone, also proved helpful, as the aircraft had been repeatedly fired upon by Iraqi air defense systems.

Particularly heavily defended targets in May 1999 were attacked by F-15Es attacked using AGM-130C guided missiles, which are a variant of the GBU-15 guided bomb, equipped with propulsion for strikes from beyond the range of the target's air defense systems. The AGM-130C-9 version with a WGU-40/B TV guidance head and the AGM-130C-10 version with a WGU-42/B thermal imaging guidance head were used, both derived from AGM-65 Maverick missiles. Additionally, some AGM-130 missiles were equipped with an INS navigation system enhanced with a GPS receiver (used for approaching the target area); these versions were designated (respectively) AGM-130C-11 and AGM-130C-12. In order for the image from the missile's guidance head to be received onboard the F-15E, the aircraft had to carry AXQ-14 pods with a receiver for the image transmitted by the missile. AGM-130 missiles were used, among other things, to destroy bridges in the Belgrade area. During one of the attacks, an AGM-130 struck a bridge at the moment when a passenger train unexpectedly appeared on it, resulting in many civilian casualties. This attack received widespread coverage in the global media, condemning NATO's actions.

Ultimately, however, Operation "Allied Force" ended successfully in June 1999, when President Slobodan Milosevic agreed to the terms set by NATO. During the air campaign, the F-15E proved to be among the most effective strike aircraft, demonstrating the ability to attack ground targets day and night, in all weather conditions.

Operations "Enduring Freedom" and "Iraqi Freedom"

In response to the terrorist attack of September 11, 2001, the United States began its fight against the Taliban regime in Afghanistan. The operation, which continues to this day, is known as "Enduring Freedom." Throughout the campaign, air power has been used to support ground forces—initially only American, but today also from other NATO countries—though with the greatest intensity during the first few months of the war, when the Taliban regime was overthrown with the help of the Afghan opposition (Northern Alliance). Since the spring of 2002, the Taliban have gone underground and conduct guerrilla operations, but the critical phase of the operation was removing them from power over the entire country. The F-15E also played a role in reducing the brutal Taliban regime to an underground partisan-terrorist organization.

This time, the main role in the military operations at the end of 2001 was played by the 391st Fighter Squadron of the 366th Wing, transferred from Mountain Home in Idaho to Al Jaber Air Base in Kuwait. Eighteen F-15Es from the squadron were deployed to the area of operations. The unit entered action at the end of October 2001, conducting long flights around Iraq, through Pakistani airspace into Afghanistan, where they primarily supported their own special forces assisting the Northern Alliance in overthrowing the Taliban. Once again, AGM-130 missiles and GBU-15 guided bombs (variants with integrated

The INS/GPS system was used to carry out attacks on targets with fixed geographic coordinates, in case the laser seeker failed to acquire or lost the target during the attack. Additionally, the F-15E was armed with GBU-24 A/B guided bombs equipped with penetrating warheads for attacking caves where Taliban and Al Qaeda terrorists were hiding. By the end of 2001, F-15E aircraft had also dropped five GBU-28 penetrating bombs. Interestingly, the lack of VHF radios in the meter band made it difficult for F-15E aircraft to fly through airspace controlled by civilian air traffic agencies (such as the Persian Gulf and Pakistan), so F-15E pairs flying over targets were "linked" to F-16 pairs, which handled all radio communications.



The F-15E remains the primary strike aircraft type of the USAF, and the Strike Eagle continues to participate in combat operations in Afghanistan and Iraq.

In the initial stage of the operation, Afghan airfields were attacked, where a dozen or so outdated combat aircraft (mainly MiG-21s), which were already unfit for flight, were destroyed. Subsequently, the positions of S-75M Volkhov and S-125M Neva anti-aircraft battalions in the Mazar-i-Sharif and Bagram regions were eliminated. The latter were operational and posed a threat, but after their elimination, there were no other significant targets, especially since the Taliban had gone underground. From that moment, laborious attacks began in support of friendly troops and special forces, which were supported by NATO air forces (since 2002 stationed at bases in Afghanistan and at Manas Air Base in Kyrgyzstan (where the 336th Squadron from the 4th Fighter Wing on F-15E was also recently based).

The 336th Squadron from the 4th Fighter Wing on F-15E was also recently based there.

By early January 2002, F-15E aircraft from the 391st Fighter Squadron had carried out numerous sorties for direct support of ground forces, with night missions dominating for the first time. Night strikes against a well-concealed enemy, conducted in close proximity to friendly troops, were among the most challenging. A great help proved to be the JDAM bombs guided by INS/GPS, used for the first time on the F-15E—provided they functioned properly, although there were some issues at the initial stage of their use. For support missions, lightweight laser-guided GBU-12 bombs (227 kg) were also often used, as well as unguided Mk 82 bombs (also 227 kg) dropped in dive attacks, in the direction "away from friendly forces." In some cases, the best weapon turned out to be the onboard cannon, whose fire was sufficient to neutralize Afghan fighters' positions while minimizing the risk of friendly fire. During their operations in Afghanistan from late October 2001 to January 7, 2002, two crews from the 391st Fighter Squadron also completed the longest combat flight on tactical aircraft in history. The flight from Kuwait over Afghanistan and back took a total of 15 and a half hours, of which 9 hours both crews spent in the holding area over Afghanistan, ready to be called from the battlefield to support friendly forces.

In January 2002, further operations in Afghanistan were undertaken by crews from the 335th Fighter Squadron of the 4th FW, redeployed to Al Jaber Air Base. On March 2, 2002, a crew from this squadron used a new weapon for the first time—the GBU-24H/B Paveway III guided bomb with a BLU-118 thermobaric warhead, specially designed for attacking cave entrances. Although the first use was unsuccessful, as the bomb missed its target, in subsequent attacks it proved its usefulness. The explosion

An F-15E from the 335th Squadron of the 4th Fighter Wing takes off from a base in Kuwait for operations over Iraq, September 2006.



At the mouth of the cave, a thermobaric charge instantly burns up all the oxygen in the cave corridor, and in addition, the temperature rapidly increases over a large section of the corridor.

On March 4, 2002, two crews from the 335th Squadron—Major Chris Shorr and Lieutenant Colonel James Fairchild, as well as Captain Kirk Rieckhoff and Captain Chris Russell—participated in the clash known as the Battle of Roberts Ridge. During the combat mission, a Navy SEALS special forces unit fell into an ambush. Additionally, the Americans began to to fire at individual mortars hidden among the rocks. The F-15Es dropped several GBU-12 laser-guided bombs, but the Navy commandos were unfamiliar with the procedures for designating targets for the USAF, and the support was not very effective. Meanwhile, a special unit of the US Army moved to assist the SEALs, but their MH-47E Chinook helicopter was shot down by an anti-tank grenade launcher. Fortunately, everyone on board survived, and on the ground, a USAF sergeant, a qualified forward air controller, was present. He quickly directed the Strike Eagle to the correct targets, which were then hit with the remaining bombs and strafed with cannons. Ultimately, the American commandos managed to escape the ambush, with one killed and two wounded.

At the beginning of March 2003, the 334th Squadron also arrived in Qatar. The Fighter Squadron (4th FW), reinforced with crews from the 333rd and 391st Fighter Squadrons (from the 4th FW and 366th FW, respectively). Now, there were as many as 48 F-15E Strike Eagles in Qatar, the largest number of this type of aircraft used simultaneously in a single operation. Additionally, some aircraft were equipped with AN/AAQ-28 Litening II targeting pods, which were better suited for high-altitude operations than the outdated LANTIRN system. Already on March 19,

The "Medina" Division was deployed between Karbala and Baghdad, defending the southern approaches to the Iraqi capital. Soon, an engagement was to occur between the armored-mechanized units of this division and the American 3rd Infantry Division (mechanized), but before that, F-15Es destroyed almost the entire 10th Brigade of the division and severely damaged the 14th Brigade of the "Medina" Division. In parallel with the destruction of successive tanks and armored personnel carriers, F-15Es destroyed about 65 Iraqi combat aircraft

XR. Along with the new targeting pods, the aircraft were also adapted for the release of JDAM guided bombs. It was not until the first half of 2005 that JDAM bombs were used in combat for the first time by F-15E aircraft.

Summary

The F-15E remains the primary strike aircraft type of the USAF, and Strike Eagles continue to participate in combat operations in Afghanistan and Iraq. The intensity of these operations is not high, however

F-15E-47-MC Strike Eagle 89-0473/SJ (serial number 1120/E095) belonging to the 333rd FS "Lancers", 4th Fighter Wing, Seymour Johnson, North Carolina. Illustration by Robert Gretzyngier



An F-15E Strike Eagle from the 335th Fighter Squadron drops a 908 kg GBU-32 bomb during JDAM bomb trials. Older LANTIRN system pods are mounted under the aircraft.



In January 2003, another squadron of the 4th Fighter Wing – The 336th Fighter Squadron, reinforced with aircraft and crews from the 334th Squadron, was redeployed to Al Udeid Air Base in Qatar to participate in the next American-British operation—"Iraqi Freedom." A total of 26 F-15Es arrived in Qatar, and from February, they were personally commanded by the 4th FW commander, Brigadier General Eric J. Rosborg. These aircraft began flying over Iraq as early as the end of January 2003, theoretically as part of Operation "Southern Watch," but in reality, they were conducting intensive reconnaissance of Iraqi targets in the southern part of the country, using LANTIRN targeting pods.

In 2003, on the eve of the start of Operation "Iraqi Freedom," a group of four F-15Es penetrated deep into Iraqi territory, attacking S-60 anti-aircraft gun positions and Roland missile launchers deployed near the H-3 airfield. The guns were destroyed, but the Roland anti-aircraft vehicles managed to hide and survived. On March 20, 2003, F-15Es armed with AGM-130 missiles launched attacks on Iraqi fortified air defense command posts. In the following days, various Iraqi command posts and targets around Baghdad were attacked. However, as early as March 25, attacks began on the positions of the "Medina" mechanized division belonging to the Iraqi Republican Guard.

on the ground, in their bases. At the end of March 2003, the 335th Squadron systematically supported the special group Task Force "Tawny," which operated ahead of the main forces of the US Army's 3rd Infantry Division. Since the main opponents of the special forces turned out to be the Fedayeen and fanatic Iraqi militia fighters, the F-15Es again had to mainly use their cannons, as their targets were often small groups of fighters or even individual shooters!

In December 2004, the squadrons of the 4th Fighter Wing in Qatar were replaced by the 494th Fighter Squadron from the 48th Fighter Wing at Lakenheath. At the same time, the newly arrived F-15Es received their first Lockheed Sniper targeting pods.

In the event of another major conflict, the F-15E will once again form the backbone of the USAF's strike forces. It will be many years before the first F-22A Raptors achieve readiness to engage ground targets using a wide range of weaponry.

In the following years, the F-15E systematically increased its combat capabilities, mainly thanks to the integration of ever newer types of weaponry on the aircraft. The aircraft's equipment was modernized to a lesser extent, but this will soon change—the F-15E will receive upgraded AN/APG-63(V)3 radars, which, together with Sniper-XR pods, will become the aircraft's new "eyes."