

= United Airlines Flight 736 =

United Airlines Flight 736 was a daily U.S. transcontinental passenger flight operated by United Airlines that crashed on April 21, 1958, following a mid-air collision. The aircraft assigned to Flight 736, a Douglas DC-7 airliner carrying 47 persons, was flying at cruise altitude above Clark County, Nevada, en route to a stopover at Denver, Colorado, when it was struck by a United States Air Force fighter jet crewed by two pilots. The collision occurred at 8:30 a.m. in clear weather within a major commercial airway; both aircraft fell out of control from 21,000 feet (6,400 m) and crashed into unpopulated desert terrain southwest of Las Vegas, Nevada.

There were no survivors from either aircraft, and with 49 fatalities it remains the deadliest crash in the history of the Las Vegas Valley. Among the victims were a group of military personnel and civilian contractors involved with sensitive Department of Defense weapons systems. The loss of the group triggered new rules prohibiting similar groups engaged in critical projects from flying aboard the same aircraft.

The official investigation stated that cockpit visibility limitations played a role in the accident, but also faulted military and civilian aviation authorities for not taking measures to reduce well-known collision risks that had existed for over a year within the confines of airways, despite numerous complaints from airline crews. The loss of United Airlines Flight 736 was part of a series of 1950s mid-air collisions in American skies, including the well-publicized 1956 Grand Canyon mid-air collision, which helped usher in widespread improvements in air traffic control within the United States.

= Events leading to the accident =

Flight 736, a four-engine DC-7 propliner with registration N6328C, departed Los Angeles International Airport at 7:37 a.m. on a flight to New York City with stops in Denver, Kansas City and Washington, D.C. On board were 42 passengers and five crew members; Captain Duane M. Ward, 44, First Officer Arlin Edward Sommers, 36, Flight Engineer Charles E. Woods, 43, and Stewardesses Pauline Mary Murray, 22, and Yvonne Marie Peterson, 27. Of the passengers on the flight, seven were military personnel and 35 were civilians.

Soon after takeoff the airliner was directed into airway "Victor 8," on a route that took it east over Ontario, California, and then northeast toward Las Vegas. The crew flew the DC-7 under instrument flight rules, controlled by Civil Aeronautics Authority (CAA) ground stations, at an authorized altitude of 21,000 feet (6,400 m) toward the first stopover at Denver.

Approximately 8 minutes after the DC-7 had departed Los Angeles, a U.S. Air Force F-100F NA Super Sabre jet fighter, serial number 56-3755, took off from Nellis Air Force Base near Las Vegas at 7:45 a.m. on a training flight with two pilots on board. In the front seat of the tandem cockpit was flight instructor and safety pilot Capt. Thomas N. Coryell, 29, and behind him sat his student, 1st Lt. Gerald D. Moran, 24, who as part of his training would spend the flight under a hood that blocked his view outside the aircraft, but allowed him to see his instrument panel.

The instructor had two-way microphone communication with the student, and his duties were to instruct the student in the rear seat, monitor his performance and maintain a lookout for other aircraft. The F-100F had dual pilot control and the instructor could take over flying the jet at any time. The training flight involved a descent and approach to Nellis Air Force Base under simulated instrument meteorological conditions from an altitude of 28,000 feet (8,500 m). The descent was to be a "teardrop pattern," with the Las Vegas commercial radio station KRAM as the navigational fix, a process that was referred to as the "KRAM procedure." The prescribed descent angle for the KRAM procedure was about five degrees.

At 8:14 a.m. the United Airlines crew radioed a routine position report over the Mojave Desert to notify controllers that they expected to arrive over McCarran Field near Las Vegas at 8:31 a.m. Air Force pilot Moran radioed the control tower at Nellis Air Force Base at 8:28 a.m. to report that he would now begin a procedural "jet penetration" descent to 14,000 feet (4,300 m). As

the fighter descended , the airliner was approaching Las Vegas air space at about 312 knots ( 578 km / h ) on a heading of 23 degrees , flying straight @-@ and @-@ level within the confines of its designated airway . The CAA stations controlling the airliner were unaware of the fighter jet ; the Air Force controllers at Nellis Air Force Base directing the jet were unaware of the airliner .

= = Collision = =

At 8 : 30 a.m. , despite clear skies with excellent visibility of about 35 miles ( 56 km ) , the flight paths of the two aircraft intersected about 9 miles ( 14 km ) southwest of Las Vegas . The converging aircraft collided nearly head @-@ on at an altitude of 21 @,@ 000 feet ( 6 @,@ 400 m ) at an estimated closure speed of 665 knots ( 1 @,@ 232 km / h ) .

The descending Air Force jet , flying at 444 knots ( 822 km / h ) , had clipped the airliner 's right wing with its own right wing , immediately sending both aircraft out of control . At the moment of collision the F @-@ 100F was in a 90 degree bank to the left at a down angle of about 17 degrees . One eyewitness to the collision stated that about two seconds before the collision the wings of the F @-@ 100F " dipped " ; another eyewitness said the fighter " swooped down " just before the impact . The witness descriptions and the extreme 90 degree bank of the fighter jet ? far more than the 30 degrees outlined in the KRAM procedure ? suggest an unsuccessful " last second " evasive action on the part of the Air Force crew .

Moments after the two planes collided , the only mayday distress call radioed by the United Airlines crew was heard at 8 : 30 a.m. plus 20 seconds . The crippled airliner ? now missing about eight feet ( 2 @.@ 5 m ) of its right wing ? trailed black smoke and flames as it spiraled earthward , and crashed into a then @-@ empty patch of desert outside the town of Arden . The nearly vertical impact and subsequent explosion instantly killed everyone on board .

The fighter jet ? its right wing and right tailplane torn away by the collision ? left a trail of fragments as it arced downward , and crashed west of the small community of Sloan into a hilly area of uninhabited desert , several miles south of the DC @-@ 7 crash site . At least one of the Air Force pilots was still in the jet when it hit the ground , but contemporary news reports differ on whether the other pilot managed an unsuccessful ejection at too low an altitude to survive , or stayed with the jet all the way to the ground . Witnesses reported seeing a parachute drifting away from the falling F @-@ 100F , leading to the hope that a pilot had ejected , but when the parachute was located it was determined to be a drag parachute that is meant to be deployed on landing to help slow the fighter down .

= = Investigations = =

At the request of the local sheriff and United Airlines , the Federal Bureau of Investigation sent fingerprint experts to help identify the human remains . The Los Angeles Times reported that among the dead were 13 civilian and military managers , engineers and technicians assigned to the American ballistic missile program . Articles in the Las Vegas Review @-@ Journal commemorating the 40th and 50th anniversaries of the crash reported that the FBI search went beyond fingerprint matching for identification ; the agents were also looking for any surviving sensitive papers relating to national security that the group of military contractors had carried on board in handcuffed briefcases . The same reports also said the crash prompted the military and defense industry to adopt rules to keep groups of technical people involved in the same critical project from traveling together on the same plane .

The Civil Aeronautics Board ( CAB ) conducted an investigation and published a report on the accident . The CAB ruled out the weather conditions and the airworthiness of the two planes as factors in the collision . The report stated the probable cause was the high rate of near head @-@ on closure , and that at high altitude , there were human and cockpit limitations involved . Analysis of the approach angles concluded that a metal frame support on the F @-@ 100 's windscreen " interfered seriously " with detection of the DC @-@ 7 , and a supporting pillar on the DC @-@ 7 's windshield may have hindered sighting the fighter . The CAB accident report also cited a failure of

Nellis Air Force Base and the CAA to take measures to reduce a known collision exposure ; training exercises were allowed to be conducted for more than a year prior to the collision within the confines of several airways , even after numerous near @-@ misses with military jets had been reported by airline crews .

= = Legacy = =

The mid @-@ air collision involving United Airlines Flight 736 , and a second one a month later over Maryland , between a Capital Airlines airliner and another military jet , accelerated efforts in the United States to change the way air space was allocated to commercial and military flights .

On April 22 , 1958 , the day after United Airlines Flight 736 crashed , the CAB proposed an experiment in which it would set aside part of the air space from which would be barred all aircraft lacking specific clearance to enter it . All aircraft operating in the designated space would have to be equipped for instrument flight operations . According to the CAB there had been 159 mid @-@ air collisions in the years 1947 @-@ 1957 , and that in 1957 alone there were 971 near @-@ misses . The increased speed of aircraft and higher air traffic density made it harder to give pilots enough time to spot each other during flights . Therefore , the CAB said , " it is essential that positive control be extended to altitudes at 35 @,@ 000 feet and on additional routes as rapidly as practical . " At the time such control only existed between 17 @,@ 000 and 22 @,@ 000 feet on certain transcontinental airways .

In the wake of the two airliners lost in the April and May 1958 collisions , investigators from a House of Representatives committee ? concerned about the lack of coordination between civil and military air traffic controllers ? imposed a 60 @-@ day deadline on the CAB and the Air Force to establish new control procedures . The committee also said that eventually a single civil agency should be given the power to regulate all air space for all types of aircraft . Furthermore , the committee stated that military flying should be controlled in the vicinity of airways not only in instrument weather , but also in visual conditions .

Four months after 49 lives were lost in the worst aviation accident in the history of the Las Vegas region , the Federal Aviation Act of 1958 was signed into law . The act dissolved the CAA and created the Federal Aviation Agency ( FAA , later renamed Federal Aviation Administration ) . The FAA was given unprecedented and total authority over the control of American air space , including military activity , and as procedures and ATC facilities were modernized , airborne collisions gradually decreased in frequency . The Las Vegas Review @-@ Journal in a 50th anniversary article stated that the act " specifically referenced the crash of United 736 in ordering the creation of the FAA . "

The supersonic F @-@ 100 left a legacy of many crashes over its years of service ; nearly 25 percent were lost to accidents . In particular , 1958 was the most costly , with 47 F @-@ 100 pilots killed and 116 of the fighters destroyed , a loss rate averaging almost one every three days .

= = Legal aftermath = =

Following the collision at least 31 lawsuits seeking damages were brought against United Airlines , the U.S. Government , or both . On September 24 , 1958 , United Airlines filed for damages ? based on the Federal Tort Claims Act ? against the United States in the U.S. District Court for the District of Delaware . The airline alleged that the United States through its agents in the United States Air Force negligently operated the F @-@ 100F , and sought damages of US \$ 3 @,@ 576 @,@ 698 . The court found neither crew was negligent for a failure to see and avoid each other , but held the United States was liable because of other negligence . The case was settled on December 17 , 1962 , with the United States agreeing to pay the airline \$ 1 @.@ 45 million .

In another case , on January 8 , 1964 surviving relatives of two of the United Airlines crew were awarded a total of \$ 343 @,@ 200 from the government , with U.S. District Court Judge Hatfield Chilson finding the Air Force pilots did not use " ordinary care " in operation of the fighter jet , and should have yielded the right of way to the DC @-@ 7 airliner . Chilson also criticized the Air Force

for not coordinating instrument training flights with civilian instrument flight rules traffic , and for failing to schedule flights to minimize traffic congestion . The government appealed , and the relatives cross @-@ appealed to have their damage awards increased , but the earlier 1964 judgment was affirmed on September 30 , 1965 .

= = Nearby crash sites = =

The region where the United Airlines and Air Force aircraft went down has experienced other major airliner crashes . In 1942 movie star Carole Lombard and 21 others died in the mountainside crash of TWA Flight 3 , about 16 miles ( 26 km ) WSW of where United Airlines Flight 736 crashed . In 1964 , 29 people lost their lives when Bonanza Air Lines Flight 114 flew into a hilltop 5 miles ( 8 km ) SW of the United Airlines impact site ; the F @-@ 100F crashed in the same area of desert hills as the Bonanza Air Lines flight .

At both of those rugged , mountainous sites , salvage efforts removed the more accessible and valuable wreckage , but scattered and sometimes substantial portions of the TWA DC @-@ 3 and Bonanza Air Lines Fairchild F @-@ 27 were left behind , including the DC @-@ 3 's radial engines . The United Airlines DC @-@ 7 crash site , however , has been cleared of all but the smallest artifacts , and is threatened by development . In 1958 the site was at least a mile from the nearest paved road ; today the spot where the DC @-@ 7 hit is adjacent to a developed neighborhood near the intersection of Decatur Boulevard and Cactus Avenue . Five decades after the events of April 21 , 1958 , a small makeshift marker placed in the sandy soil was the only sign of the loss of United Airlines Flight 736 , but preliminary efforts were in motion to encourage public officials to build a permanent memorial to those who died .