

Milestones in Aerospace History at Edwards AFB

Compiled by Air Force Flight Test Center History Office

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During the past six decades, Edwards Air Force Base, Calif., has arguably been the scene of more major milestones in flight than any other location in the world. The following list briefly summarizes just some of the significant milestones which have taken place at Muroc Field or Edwards AFB, or which involved Edwards-based test pilots or technical personnel since the 1940s:

Oct. 1, 1942 - As Bell test pilot Bob Stanley was completing the final series of high-speed taxi tests with the XP-59A Airacomet, the craft's wheels lifted off from the surface of Rogers Dry Lake and, for the first time, an American turbojet-powered airplane became airborne. The "official" first flight of the airplane actually occurred the next day when all of the program officials were on hand to witness it.

Dec. 15, 1943 - Bell test pilot Jack Woolams established an unofficial U.S. altitude record when he climbed to 47,600 feet in a YP-59A Airacomet.

Jan. 8, 1944 - First flight of the Lockheed XP-80, the first American aircraft to exceed 500 mph in level flight and the concept-demonstrator for the nation's first operational jet aircraft--the P-80 (later F-80) Shooting Star. The F-80, which was the first American aircraft capable of speeds approaching 600 mph, went on to record the first all-jet aerial victory in history when it downed a MIG-15 in Korea on Nov. 7, 1950.

June 19, 1947 - The world's absolute speed record was returned to the United States for the first time in 24 years, as Col. Albert Boyd (then Chief of the Flight Test Division at Wright Field, Ohio) piloted a highly modified Lockheed P-80R to an average speed of 623.608 mph as he flew less than 100 feet above a speed course laid out on Rogers Dry Lake. This was the first of 12 absolute world speed records that would be accomplished at Muroc/Edwards or by base test pilots over the next 18 years.

Aug. 20, 1947 - Navy Commander Turner Caldwell established a new official world absolute speed record as he piloted the Douglas D-558-I Skystreak to an average speed of 640.743 mph during four passes over the speed course at Muroc.

Aug. 25, 1947 - Marine test pilot Maj. Marion Carl broke Caldwell's five-day old record, as he flew the Skystreak to an average speed of 650.796 mph over the same course.

Oct. 14, 1947 - Air Force Capt Charles E. "Chuck" Yeager piloted the rocket-powered Bell X-1 to a speed of Mach 1.06 (approximately 700 mph at 42,000 feet) and thereby became the first man to penetrate the so-called "sound barrier." Though few people could comprehend its full implications at the time, Yeager's supersonic flight that morning marked the first step in a chain of events that would ultimately vault man beyond the atmosphere and into space.

Sept. 15, 1948 - Air Force test pilot Maj. Richard L. "Dick" Johnson extended the official world absolute speed record to 670.981 mph as he piloted a North American F-86A Sabre during four low-level passes over the lake bed.

Jan. 5, 1949 - Capt Chuck Yeager completed the first—and, to this date, only—ground takeoff of an experimental rocket plane in the Bell X-1 as he lifted off from Rogers Dry Lake and climbed to an altitude of 23,000 feet before exhausting his propellants approximately 100 seconds after engine ignition.

Aug. 8, 1949 - Air Force Maj. Frank K. "Pete" Everest piloted the Bell X-1 to a peak altitude of 71,902 feet. This was an unofficial world record and the highest altitude achieved by the first generation of X-1 research aircraft (all speed and altitude records for the rocket planes were cited as "unofficial" because the airplanes were air launched).

June 1, 1951 - Air Force aeromedical researcher Maj. John P. Stapp was strapped into a rocket sled which was poised on a 2,000-foot deceleration track at North Base. Moments later, 4,000 pounds of rocket thrust blasted him down the track and into the braking system (from 88.6 mph to a full stop in 18 feet). For a brief instant, he endured 48 "g's," with a rate of onset of approximately 500 "g's" per second. In other words, his body had absorbed an impact of more than four tons. Prior to Stapp's sled experiments, conventional medical wisdom had maintained that the human body could probably survive no more than 17-18 instantaneous g's.

July 27, 1951 - With company test pilot Jean "Skip" Ziegler at the controls, the Bell X-5 became the first variable-geometry aircraft in history to "swing" -- or sweep forward or back -- its wings while in flight.

Aug. 7, 1951 - Douglas test pilot Bill Bridgeman piloted the rocket-powered D-558-II Skyrocket to a record speed of Mach 1.88 (1,180 mph) at an altitude of 66,000 feet.

Aug. 15, 1951 - Bill Bridgeman piloted the Skyrocket to a new altitude record of 74,494 feet.

Nov. 19, 1952 - Air Force Flight Test Center test pilot Capt J. Slade Nash set a new official world absolute speed record as he piloted an F-86D to an average speed of 698.511 mph over a speed course laid out adjacent to the Salton Sea in southern California's Imperial Valley.

May 18, 1953 - With Maj. Chuck Yeager flying chase, famed aviatrix Jacqueline Cochran became the first woman to exceed the speed of sound flying a Canadian-built (Canadair) F-86 Sabre. That same day, she established a new women's absolute speed record of 652.337 mph over a low-level course at Edwards.

May 25, 1953 - The prototype North American YF-100A Super Sabre became the first aircraft in history to fly supersonic on its maiden flight. Though earlier fighter-type airplanes had attained supersonic speeds in dives, the Super Sabre was America's first true supersonic fighter.

Aug. 21, 1953 - Marine test pilot Lt. Col. Marion Carl piloted the D-558-II Skyrocket to a new unofficial altitude record of 83,235 feet, the peak altitude achieved by this airplane.

Oct. 29, 1953 - AFFTC test pilot Lt. Col. Frank K. "Pete" Everest established a new official world absolute speed record as he piloted the YF-100A to an average speed of 755.149 mph during four runs over a new 9.3-mile speed course laid out at the Salton Sea. This record, which approached the speed of sound (0.96 Mach) at sea level, was the last world absolute speed record to be achieved at low altitude (within 330 feet of the ground).

Nov. 20, 1953 - NACA test pilot A. Scott Crossfield piloted the Douglas Skyrocket to a speed of 1,291 mph (Mach 2.005) in a dive at an altitude of 62,000 feet and thereby became the first man to fly at twice the speed of sound.

Dec. 12, 1953 - Maj. Chuck Yeager shattered Scott Crossfield's recent record in the D-558-II when he piloted the Bell X-1A (second generation of the X-1 series of rocket aircraft) to a speed of Mach 2.44 (1,650 mph) in level flight at an altitude of 74,700 feet. It was on this flight that Yeager first encountered inertia coupling (then called "high-speed instability") as, shortly after attaining top speed, the craft tumbled violently out of control. Even though the X-1A was literally tumbling about all three of its axes simultaneously as he plummeted downward for more than 40,000 feet, Yeager somehow managed to recover to level flight and bring the craft in for a safe deadstick landing on Rogers Dry Lake.

Aug. 26, 1954 - AFFTC test pilot Maj. Arthur "Kit" Murray piloted the Bell X-1A to a new altitude record of 90,440 feet and thereby reportedly became the first man to actually see the curvature of the earth.

Aug. 20, 1955 - AFFTC test pilot Col. Horace Hanes established a new official world absolute speed record as he piloted an F-100C to an average speed of 822.266 mph during four runs over a new Antelope Valley speed course at an altitude of 41,000 feet. This was the first world absolute speed record to be achieved at high altitude.

Sept. 7, 1956 - AFFTC test pilot Capt. Iven C. Kincheloe became the first man to fly above 100,000 feet, as he piloted the rocket-powered Bell X-2 to a peak altitude of 126,200 feet. Though newspaper reporters were incorrect when they hailed him as "the first of the spacemen," he had, indeed, flown above 99 percent of the earth's atmosphere.

Sept. 27, 1956 - AFFTC test pilot Capt. Mel Apt became the first man to exceed Mach 3, as he piloted the rocket-powered Bell X-2 to a top speed of 2,094 mph (Mach 3.2 at 65,000 feet). Unfortunately, the craft tumbled violently out of control (a victim of the same inertia coupling that had almost claimed Yeager's life in the X-1A) while Apt was still above Mach 3 and he was unable to recover it. He was killed in the ensuing crash.

April 11, 1957 - The Ryan X-13 Vertijet, an experimental testbed designed to prove that vertical takeoff and landing, or VTOL, flight could be achieved on jet thrust alone, became the first jet aircraft in history to takeoff vertically, transition to conventional level flight, and then transition back to the vertical for landing.

Dec. 12, 1957 - Air Force Maj. Adrian Drew established a new official world absolute speed record when he piloted a McDonnell F-101A Voodoo to an average speed of 1,207.60 mph at Edwards.

May 16, 1958 - AFFTC test pilot Capt. Walter Irwin set a new official world absolute speed record when he piloted a Lockheed F-104A Starfighter to an average speed of 1,404.09 mph.

Dec. 14, 1959 - With AFFTC test pilot Maj. Joe Jordan at the controls, a Lockheed F-104C became the first jet-powered (i.e., air-breathing) aircraft to climb above 100,000 feet as it soared to a peak altitude of 103,389 feet high above Edwards AFB.

Dec. 15, 1959 - AFFTC test pilot Maj. Joseph Rogers set a new official world absolute speed record at Edwards when he piloted a Convair F-106A Delta Dart to an average speed of 1,525.065 mph.

Feb. 10, 1961 - Rocketdyne engineers at the Rocket Propulsion Laboratory atop Leuhman Ridge at Edwards AFB conducted the first captive firing of the whole F-1 Saturn rocket engine. The Saturn engine would be the launch vehicle for Project Apollo, the missions to the moon. The F-1 prototype engine was capable of producing 1.55 million pounds of thrust within a few seconds of firing.

March 7, 1961 - AFFTC test pilot Maj. Robert M. "Bob" White became the first man to exceed Mach 4, as he piloted the rocket-powered (57,000-pound thrust XLR99) North American X-15 to a speed of 2,905 mph (Mach 4.43).

June 23, 1961 - Major White became the first man to exceed Mach 5, as he piloted the X-15 to a speed of 3,603 mph (Mach 5.27).

Aug. 24, 1961 - Jacqueline Cochran claimed a new official world absolute speed record for women when she piloted a Northrop T-38 Talon to a speed of 844.202 mph.

Oct. 11, 1961 - Maj. Bob White became the first man to fly an airplane above 200,000 feet as he piloted the X-15 to an altitude of 217,000 feet.

Oct. 12, 1961 - Jacqueline Cochran established a new official altitude record for women as she climbed to 56,071 feet in a T-38 Talon.

Nov. 9, 1961 - Maj. Bob White became the first man to exceed Mach 6, as he piloted the X-15 to a speed of 4,094 mph (Mach 6.04).

Nov. 22, 1961 – U.S. Marine Corps pilot Lt. Col. R.B. Robinson established a new official world absolute speed record at Edwards when he piloted a McDonnell F4H-1 (original designation of the F-4 Phantom II) to an average speed of 1,606.505 mph.

July 17, 1962 - Maj. Bob White became the first man to fly an airplane above 300,000 feet—and the first to fly an airplane in near space (above 50 miles)—when he piloted the X-15 to an altitude of 314,750 feet. He was the first of eight X-15 test pilots at Edwards who would earn their astronaut's wings by flying an airplane in space.

Sept. 18, 1962 - Long-time Edwards test pilot Maj. Fitzhugh L. “Fitz” Fulton piloted a Convair B-58 Hustler, carrying an 11,023-pound payload, to an altitude record of 85,360.84 feet, a record for this category which still stands.

May 14, 1963 – The Northrop X-21A recorded a significant aeronautical milestone by achieving laminar airflow control over its wings with a measurable reduction in parasitic (friction) drag for the first time.

Aug. 22, 1963 - NASA test pilot Joe Walker piloted the X-15 to its peak altitude, 354,200 feet (67 miles above the earth's surface).

May 11, 1964 - Jacqueline Cochran established a new official world's absolute speed record for women when she piloted a Lockheed F-104G Starfighter to an average speed of 1,429.3 mph.

May 1, 1965 - The exotic Lockheed YF-12A (a stablemate of the SR-71 Blackbird) set no less than seven official world absolute speed and altitude records on a single day at Edwards without, in any way, taxing its full -- and classified -- potential. Among the records, were an absolute top speed of 2,070 mph and a sustained altitude of 80,257 feet with AFFTC test pilot Col. Robert L. “Fox” Stephens at the controls.

Oct. 14, 1965 – With North American's Al White and copilot Col. Joe Cotton at the controls, the No. 1 XB-70 Valkyrie accelerated to a speed of Mach 3.02 at 70,000 feet (approximately 2,000 mph) and thereby achieved the design speed for the mammoth, 500,000-pound prototype long-range bomber for the first time. In doing so, it became the first (and, so far, only) bomber-type aircraft to ever come even close to triple-sonic speeds.

Oct. 3, 1967 - AFFTC test pilot Maj. William J. "Pete" Knight piloted the modified X-15A-2 to a speed of Mach 6.7 (4,520 mph) and thereby recorded the top speed achieved in the X-15 program. The speed attained on this flight remains, to this day, the fastest that anyone has ever flown in an airplane.

Aug. 16, 1969 – Civilian racing pilot Darryl Greenamyer established a world absolute speed record for piston-engine aircraft of 482.462 mph while flying a modified Grumman F8F-2 Bearcat over a measured course at Edwards AFB. In doing so, he broke a record that had been on the books since April of 1936 when German test pilot Fritz Wendel flew the Messerschmitt Me-209V-1 to a speed of 469.224 mph.

Oct. 1, 1969 – A C-5 Galaxy lifted off the main Edwards runway at a total weight of 790,100 pounds (395 tons), establishing an unofficial world record for weight.

Feb. 18, 1970 - AFFTC test pilot Maj. Pete Hoag piloted the rocket-powered Northrop HL-10 lifting body to a speed of Mach 1.86 (at 67,310 feet), the highest speed attained by any of the experimental lifting body designs throughout the multi-phase test program. The lifting body aircraft were designed and tested to determine whether or not these wingless body shapes could make precision landings, after powerless, high-speed gliding descents from high altitudes. They pioneered many of the approach and landing techniques which were later employed by the Space Shuttles at the end of their orbital flights.

Feb. 27, 1970 - NASA test pilot Bill Dana piloted the rocket-powered Northrop HL-10 to an altitude of 90,303 feet, from which it made a successful, powerless descent to a deadstick landing on Rogers Dry Lake. The altitude attained during this flight was the highest recorded throughout the entire lifting body test program.

Oct. 27, 1970 – After flying the X-24A lifting body to its peak altitude of 71,400 feet, NASA research pilot John Manke completed the first simulated space shuttle-type approach and landing with a vehicle that was roughly similar in subsonic performance and handling qualities.

March 9, 1971 - Flying an extensively modified F-8, NASA test pilot Tom McMurtry completed the first flight of an airplane configured with a supercritical wing. Flattened on the upper surface and tapering downward at the trailing edge, the thin wing was shaped to modify shock-wave formation and associated boundary-layer separation, thereby delaying the typically sharp increase in drag that occurred as an aircraft approached the speed of sound. The successful results from this program would lead to the incorporation of fuel-saving/range-extending supercritical wings on a number of future transport designs.

Dec. 14, 1971 – A television-guided AGM-65 Maverick missile was launched from a Teledyne Ryan BQM-34A remotely piloted vehicle, or RPV, against an obsolete radar control van (serving as simulated a surface-to-air missile launch site) on the Edwards Flight Test Range and scored a direct hit—reportedly the first launch of a guided weapon from an RPV ever to score a direct hit.

May 25, 1972 - Flying the highly modified F-8 Digital Fly-by-Wire research airplane, NASA test pilot Gary Krier completed the first flight of an aircraft which was completely dependent upon an electronic flight control system.

Aug. 5, 1975 - NASA test pilot John Manke brought the rocket-powered X-24B lifting body in for a near-perfect landing on Edwards' main concrete runway after an unpowered descent from 57,050 feet. This was the first time a landing, within the limited confines of a conventional concrete runway, had been attempted and (along with a subsequent flight by Maj. Michael Love) it demonstrated that these unconventional lifting body shapes could, indeed, make precision runway landings, attaining touchdown accuracies of plus-or-minus 500 feet.

July 27, 1976 - Air Force Capt Eldon Joersz established a new official world absolute speed record when he piloted a Lockheed SR-71A to an average speed of 2,193.64 mph at Edwards.

Aug. 12, 1977 - The Space Shuttle Enterprise (the first, non-orbiting craft which was built to complete unpowered approach and landing [ALT] tests to confirm the design's low-speed controllability and airworthiness) was launched from the back of a 747 carrier aircraft at 24,100 feet and successfully completed a five minute 21 second descent to a landing and roll out on Rogers Dry Lake. This (along with four subsequent ALT tests) demonstrated the soundness of the shuttle design and confirmed the approach and landing techniques that would subsequently be employed by shuttle astronauts returning from orbital space missions.

July 11, 1979 - AFFTC test pilot Lt. Col. N.K. "Ken" Dyson completed the final flight of the highly classified Lockheed Have Blue low-observables concept demonstrator flight test program. Over the previous year, he had completed more than 50 flights during which the airplane had convincingly demonstrated its very low observability against a wide array of the most sophisticated air- and ground-based air defense systems. The successful conduct of these tests led immediately to the development of the F-117A Nighthawk in the early 80s and the "stealth" revolution was underway in earnest.

April 14, 1981 - The Space Shuttle Columbia landed safely on Rogers Dry Lake following its first orbital mission. This marked the first time in history that an orbital vehicle had left the earth under rocket power and returned on the wings of an aircraft.

Nov. 14, 1981 - The Space Shuttle Columbia touched down on Rogers Dry Lake following its second orbital spaceflight mission. During the re-entry through landing phase, Shuttle commander Col. Joe Engle had manually flown the profile—performing 29 flight test maneuvers—from Mach 25 through landing roll out. This was the first and, so far, only time that a winged aerospace vehicle has been manually flown from orbit through landing. With this flight, the central concept of the shuttle test program had been clearly demonstrated; the era of reusable spacecraft had dawned.

July 4, 1982 - For the first time, the Space Shuttle Columbia landed on the main concrete runway at Edwards at the end of its fourth orbital spaceflight. This marked a major milestone in the shuttle program because it demonstrated that vehicles could be safely recovered on conventional runways such as the one at the Kennedy Space Center in Florida.

July 29, 1983 - With AFFTC test pilot Col. Michael D. Hall at the controls, the McDonnell Douglas F-15 Eagle passed 10,000 hours of accident-free flight testing time. This was the first time in the history of fighter development that such a milestone had been achieved.

Sept. 5, 1983 - Space Shuttle Challenger (STS-8) landed at Edwards at 12:40 a.m. for the first night landing of a space vehicle.

Dec. 14, 1984 - Veteran Grumman test pilot Chuck Sewell lifted the wheels of the No. 1 X-29A off the main runway and, for the first time in over a decade, an experimental--"X-series"--test program got underway at Edwards. As Sewell pulled up from the runway that morning, it also marked the first time in history that an aircraft had taken to the air on blade-thin, forward-swept wings made of composite materials.

Sept. 13, 1985 - AFFTC test pilot Maj. Wilbert D. "Doug" Pearson pulled into a near-supersonic, 65-degree climb in a highly modified F-15 which had been aptly nicknamed the Celestial Eagle. Flying an extraordinarily precise profile, he climbed through 38,000 feet and launched a 17-foot long, three-stage missile toward Satellite P78-1 orbiting 340 miles overhead. In a feat which must be compared to "finding a needle in a haystack," the fighter-launched anti-satellite missile scored a direct hit. It was a first in history and a technological display which may never again be duplicated.

Dec. 13, 1985 - The No. 1 Grumman X-29A became the first forward-sweptwing aircraft in history to exceed the speed of sound in level flight when NASA's Steve Ishmael flew it to a speed of Mach 1.03 (690 mph) at 40,000 feet altitude.

Dec. 23, 1986 - With Dick Rutan at the controls (and Jeanna Yeager serving as co-pilot), nine days, three minutes and 44 seconds after taking off from Edwards, the experimental Voyager aircraft touched down on Rogers Dry Lake after completing the first-ever non-stop, unrefueled flight around the world.

Dec. 18, 1989 - The first "self-repairing" flight control system was demonstrated on NASAs F-15 HIDEAC (Highly Integrated Digital Electronic Control) research aircraft with test pilot Jim Smolka at the controls. The system identified control surface failures or damage and then automatically repositioned other control surfaces to allow the pilot to continue the mission or land the aircraft safely.

Nov. 3, 1990 - With Lockheed test pilot Dave Ferguson at the controls, the YF-22A Advanced Technology Fighter, or ATF, prototype, configured with General Electric YF120 prototype turbofans, became the first fighter aircraft in history to achieve sustained supersonic flight without employing afterburner. The aircraft attained a "supercruise" speed of Mach 1.58 at 40,000 feet.

April 21, 1993 - Employing a computerized propulsion control system to turn, climb and descend in the F-15 HIDEAC research aircraft, NASA test pilot Gordon Fullerton

completed the first fully successful approach and landing ever to be accomplished without using flight controls.

April 29, 1993 - Employing thrust vectoring, the X-31 executed a minimum-radius 180-degree turn--the "Herbst Maneuver"--while flying at more than 70-degrees angle of attack, well beyond the limits of any previous aircraft in history.

Aug. 29, 1995 - Using a computerized propulsion control system similar to that employed on the F-15 HIDECA aircraft, NASA test pilot Gordon Fullerton completed the first-ever fully successful landing of a widebody transport using only engine power for control as he landed a McDonnell Douglas MD-11 on the main Edwards runway.

Sept. 11, 1995 - The AeroVironment Pathfinder, an all-wing, remotely piloted, solar-power aircraft achieved a new record altitude for solar-powered aircraft as it climbed to 50,567 feet while being controlled from a ground station at the NASA-Dryden Flight Research Facility at Edwards. The previous record had been 14,000 feet.

Aug. 25, 1999 - Lockheed Martin test pilot Jon Beesley was at the controls of the No. 2 F-22 Raptor when, for the first time, the pre-production fighter aircraft flew at 60-degrees angle-of-attack and demonstrated post-stall controlled flight with thrust vectoring.

July 20, 2000 - The X-35B, Lockheed Martin's short takeoff and vertical landing, or STOVL, concept demonstrator in the Joint Strike Fighter competition achieved a milestone when it completed what the company called a "Mission X" flight profile—a short takeoff, level supersonic dash, and vertical landing all in one flight. Piloted by U.S. Marine Corps test pilot Maj. Art Tomassetti, the mission included a short takeoff at 80 knots, followed by conversion from the STOVL mode to conventional flight, a climb to 25,000 feet and acceleration to Mach 1.05, conversion back to the STOVL mode and deceleration to a hover 150 feet above ground level, followed by a vertical landing. The company reported that this was the first time in history that such a flight profile had been successfully accomplished.

April 22-23, 2001 - The No. 5 Northrop Grumman RQ-4A Global Hawk successfully completed a record non-stop trans-Pacific flight from Edwards AFB, Calif., to the Royal Australian Air Force Base at Edinburgh, Australia. Renamed "Southern Cross II" in honor of the first manned trans-Pacific flight by Sir Charles Kingsford-Smith and his crew in 1928, the vehicle completed the mission in 23 hours and 23 minutes and, reported Northrop Grumman, was the first UAV to cross the Pacific Ocean.

Oct. 11, 2001 - The F-15 Combined Test Force at the AFFTC achieved a major milestone when Lt. Col. Bill Thornton landed his Eagle on the main Edwards runway. With the landing, the CTF had surpassed a remarkable 40,000 flight hours without incurring a single serious mishap (Class A or B mishap) since the onset of the F-15 program more than 29 years earlier. No other fighter-type aircraft had ever come close to this extraordinary safety record.

June 7, 2002 – An RQ-1 Predator UAV launched an Inserted Detector Expendable for Reconnaissance (FINDER) mini-UAV while in flight at 10,000 feet over the Edwards Flight Test Range. The FINDER successfully completed a 25-minute preprogrammed mission before a flight technician took control and landed it on Rogers Dry Lake. This was the first time that an operational UAV demonstrated the capability to carry and successfully launch another such craft.

Sept. 10, 2003 – A B-2 test crew from the AFFTC successfully released a full load of 80 independently targeted, Global Positioning System-guided 500-pound GBU-38 Joint Direct Attack Munitions, or JDAMs, against 80 different targets in a single pass over the Utah Test and Training Range and thereby achieved a milestone in the development of precision-guided weapons capabilities as all 80 JDAMs scored either direct hits or impacted within lethal range of their targets.

March 20, 2004 – An X-45A Joint Unmanned Combat Aerial System or J-UCAS, performed the first-ever weapons release from the internal bay of a high-speed, stealthy unmanned aircraft when it released an inert unguided small smart bomb from an altitude of 35,000 feet and at a speed of 495 mph over the Edwards Flight Test Range. The inert weapon impacted within inches of its target, a truck parked on the range.

March 27, 2004 – The supersonic-combustion ramjet (scramjet)-powered X-43A unmanned hypersonic research aircraft (HYPER-X) attained a speed of Mach 7 during its first successful flight. It not only became the first scramjet-powered vehicle to achieve free flight, it also set a speed record (approximately 5,000 mph and 95,000 feet altitude) and thereby easily surpassed all previous records for aerospace vehicles powered air-breathing engines.

Aug. 1, 2004 – A pair of X-45A UCAVs became the first unmanned air vehicles ever to be autonomously flown in formation throughout their pre-programmed mission while being monitored by only a signal system operator. This represented a major step in the development of multi-ship UAV combat capabilities.

Nov. 16, 2004 – In the final flight of the program, the X-43A Hyper-X attained a speed of Mach 9.6 (approximately 6,500 mph) at 110,000 feet altitude for nearly 12 seconds and thereby far surpassed its own record (set on March 27, 2004) for a vehicle powered by an air-breathing propulsion system.

Feb. 20, 2006 – No. 3 pre-production RQ-4 Global Hawk unmanned aerial vehicle advanced concept technology demonstrator aircraft returned to Edwards AFB after extended deployments overseas that totaled more than four years of operations in support of the Global War on Terror. Despite the fact that it was still undergoing testing at the Air Force Flight Test Center, it was deployed after the terrorist attacks on Sept. 11, 2001, to fly in support of Operation Enduring Freedom. All told, it acquired tens of thousands of high-resolution target images while logging 4,245 flying hours in all-weather conditions during 191 combat missions in support of Operations Enduring Freedom and Iraqi Freedom.

Aug. 30, 2006 – In a joint Defense Advanced Research Projects Agency and NASA Dryden Flight Research Center effort, a significant milestone was achieved when the first-ever fully autonomous airborne refueling operation was successfully completed by a tanker and an F/A-18 modified to operate as an unmanned air vehicle, or UAV. Though safety pilots were aboard the F/A-18, they kept their hands off all controls as the airplane successfully hooked up with the tanker’s probe-and-drogue receptacle.

July 24, 2007 – The YAL-1 Airborne Laser or ABL demonstrator aircraft, a highly modified Boeing 747-400F, successfully demonstrated an engagement sequence for the first time when its infrared sensors acquired an instrumented target board on the Air Force’s NKC-135E aircraft, the system tracked it with a Target Illuminator Laser, employed its Beacon Illuminator Laser to compensate for atmospheric disturbances, and fired its Surrogate High-Energy Laser at the target board to simulate a missile shutdown. The event was a milestone in preparation for the eventual firing of the ABL system’s high-powered chemical oxygen-iodine laser against an in-flight ballistic missile projected for 2009.

Aug. 8, 2007 – In a signing ceremony at Edwards AFB, Secretary of the Air Force Michael W. Wynne announced the completion of the service’s certification of the Fischer-Tropsch synthetic fuel blend for use in all B-52H aircraft. Certification testing had commenced at Edwards on Sept. 19, 2006 when a B-52H was flown with two engines running on a half-and-half blend of standard JP-8 jet fuel and Fischer-Tropsch synthetic fuel and the six remaining engines on JP-8 fuel. The demonstration had been completed three months later, on Dec. 19, 2006, when the bomber was flown with all eight engines running on the Fischer-Tropsch/JP-8 blend. Calling it a “great day for the United States Air Force...and another milestone for the Flight Test Center,” Secretary Wynne described the certification process as “the tip of the spear for national energy independence” and he announced that all Air Force aircraft would be certified to fly on a domestically-produced synthetic fuel blend by 2011.

Note: Many photos depicting these events are located in the photo gallery, at <http://www.af.mil/photos/index.asp?galleryID=5537>