

Project “Excelsior”



While serving on Project Excelsior USAF Captain Joseph W. Kittinger, Jr set records for highest balloon ascent, highest parachute jump, longest freefall, and fastest speed by a man through the atmosphere. As part of research into high altitude bailout, he made a series of three parachute jumps wearing a pressurized suit from a helium balloon with an open gondola. The first, from 76,400 feet (23,287 m) in November, 1959 was a near tragedy when an equipment malfunction caused him to lose consciousness, but the automatic parachute saved him (he went into a flat spin at a rotational velocity of 120 rpm, the G factor calculated at his extremities was over 22 times that of gravity, setting another record). Three weeks later he jumped again from 74,700 feet (22,769 m). On August 16, 1960 he jumped from the Excelsior III at 102,800 feet (31,300 m) and was in freefall for 4½ minutes. He reached a maximum speed of 614 mph (988 km/h) before opening his parachute at 18,000 feet (5,500 m). Test results from his experience taught the USAF much about high altitude endurance.



The “Predator”



The 11th Reconnaissance Squadron became the first Air Force unit to operate the Predator, or MQ-1, an unmanned aerial vehicle designed for aerial surveillance and reconnaissance. The Predator is a medium-altitude, long-endurance, remotely piloted aircraft. The MQ-1’s primary mission is interdiction and conducting armed reconnaissance against critical, perishable targets. The MQ-1 Predator is a system, not just an aircraft. The fully operational system consists of four air vehicles (with sensors), a ground control station (GCS), a Predator primary satellite link communication suite, and 55 people. It can serve in a reconnaissance role, and it can also be weaponized and can carry and use two missiles. The aircraft has been in use since 1995, and been in combat over Afghanistan, Bosnia, Kosovo, Iraq, and Yemen. Since its creation, the Air Force fleet of Predators has performed missions that were once executed by attack helicopters or ground troops such as scouting battlefields, tracking the enemy, and launching quick, precise strikes. The Predator program has saved the lives of countless U.S. soldiers while hitting targets that manned aircraft could not get close enough to reach.



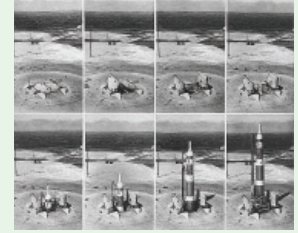
The “Minuteman”



The Minuteman was the world’s first solid-fueled Intercontinental Ballistic Missile (ICBM), and has been the mainstay of the Air Force’s ICBM force from its inception. Solid-fueled rockets have obvious advantages when compared to liquid-fueled ones. The most important advantage was being the long storage life of the motors and the lack of a time-consuming and potentially dangerous fueling process. Despite difficulties in the design process, progress was made, and by mid-1957, pre-development studies for a solid-fueled ICBM were firmly under way. In February 1958, the Minuteman program was officially approved, and three years later, on Feb 1, 1961, a Minuteman ICBM launched for the first time at Cape Canaveral in a major test. Under full guidance, the solid-fueled missile can travel 4,600 miles and hit the target area.



Titan I Missile



The U.S. Air Force successfully launched the first Titan I missile with a range of 5,500 nautical miles. The two-stage liquid-fueled missile was deployed in underground silos and was raised to the surface for launching. The Titan I burned RP-1 (Refined Petroleum 1, a highly refined form of kerosene similar to jet fuel) and LOX (liquid form of oxygen.) Testing of the missile was completed in 1960 and the missile was deployed in 1961. The missile utilized both radio and all-inertial guidance. The Titan was the first Inter-Continental Ballistic Missile, or ICBM, with two distinct stages of differing diameters. When the first stage had finished consuming its propellant, it dropped away, thereby decreasing the mass of the vehicle. That made for a more efficient missile, which resulted in increased range and enabled a larger payload. At a cost of \$1.5 million a piece, two versions of the U.S. Air Force’s Titan were deployed. The Titan I stood at the forefront of United States security during the Cuban Missile Crisis and was removed from service in 1965, in favor of the Titan 2.



Project “SCORE”



On December 18, 1958, the U.S. Air Force placed in orbit the first artificial communications satellite using the four-ton Atlas launcher. The entire rocket was placed into low orbit with the communications equipment integrated into the fairing pods of the missile. The low orbit limited life expectancy of the satellite to only two to three weeks, thus limiting opportunities for real-time relay between the two ground stations. Therefore, a store-and-forward mode was added by including a tape recorder, which also gave the satellite a worldwide broadcast capability and the world’s first satellite to broadcast voice. The next day, December 19, 1958 the satellite broadcasted a taped recording of President Dwight D. Eisenhower’s Christmas message. The SCORE satellite, an acronym for Signal Communication by Orbiting Relay Equipment. SCORE as a research endeavor was an experiment designed to test the feasibility of transmitting messages through the upper atmosphere from one ground station to one or more ground stations. The result of the project was unquestionably a major scientific breakthrough which proved that active communications satellites could provide a means of transmitting messages across the bandwidth from one point to any other on the planet Earth.



X-1 “Glamorous Glennis”



USAF Captain Charles E. Yeager at Muroc Air Base, California marked the first faster-than-sound flight, in a rocket-powered research plane, Bell XS-1 rocket ship. Captain Yeager was a decorated WWII pilot who remained with the Air Force after World War II as a test pilot. Captain Yeager broke the sound barrier on October 14, 1947, flying the experimental X-1 at Mach 1 and an altitude of 45,000 feet (13,700 miles). Captain Yeager’s flight recorded Mach 1.06. Yeager made another 21 flights in the X-1 after the first supersonic flight. None of them were routine. But perhaps the most significant would be his flight of January 5, 1949, the first ground launch. Firing all 4-rocket chambers simultaneously, the X-1 streaked off down the runway. After about 1500 feet, Yeager raised the nose at 200mph and the X-1 jumped into the air. The X-1 was accelerating so fast that when he flipped the gear handle up, the actuating rod snapped off and the wing flaps blew off. Only 80 seconds after ignition, the X-1 was at Mach 1.03 and 23,000 feet. Yeager set a time to climb record to 20,000 feet that would stand for some time. Capt. Yeager’s X-1 is on display at the Smithsonian Institution’s National Air and Space Museum.



F117 “Nighthawk”



On November 10, 1988 the U.S. Air Force revealed the F-117A Stealth fighter to the public for the first time. F-117A Nighthawk is the world’s first operational aircraft completely designed around stealth technology. Flown only by the U.S. Air Force it was manufactured using radar-absorbent materials and a radical new design. The F-117A can evade radar detection, securing its place as the aerospace “tip of the spear” and serving to blind the enemy by destroying command, control and radar early in any military campaign. About the size of an F-15C Eagle, the single-seat, twin-engine F-117A is powered by two non-afterburning General Electric F404 turbofan engines, and has quadruple-redundant fly-by-wire flight controls. In order to lower development costs, the avionics, fly-by-wire systems, and other parts were derived from the F-16 Fighting Falcon, F/A-18 Hornet, and F-15E Strike Eagle. Among the penalties for stealth are 30% lower engine power, a very low wing aspect ration, and a high sweep angle needed to deflect incoming radar waves to the sides.

