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Chapter 3

Commemoration of the Late US Senator and Astronaut John H. Glenn^{*}

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Abstract

John H. Glenn gained his first real hands-on flight experience as a pilot in World War II during which he flew fifty-nine combat missions. He would go on to fly sixty-three more combat missions during the Korean War. Before the end of his military service, Glenn was accepted to the US Naval Test Pilot School. As a test pilot, he broke the record for the fastest transcontinental flight from Los Angeles to New York. In 1959, after undergoing extensive physical and psychological tests as part of the recruiting process for NASA astronauts, he was selec-

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ted as one of the Mercury Seven-the first class of American astronauts. In 1962, John Glenn made history as the first American to orbit the Earth. This achievement instantly established his place as a role model to countless children in America and around the world. With his experience and passion for the promotion of science and technology, he was elected to the US Senate in 1974. Here, he was able to use his influence to initiate bills for important issues such as renewable energy and programs to help stimulate youth interest in science. While a serving US Senator late in his political career, John Glenn made his second trip into space, flying aboard the Space Shuttle Discovery for mission STS-95 in 1998. As one of the first humans to orbit our planet, John Glenn used his unique experiences to help enrich the lives of as many people as he could, through the promotion of education and shaping of public policy. In 2012, Glenn received the Presidential Medal of Freedom, the highest civilian honor in the US, for his contributions to the progress of space exploration and public policy as a senator. This chapter is a biographical commemoration of Glenn's life of distinguished service to his country and to the world, compiled to celebrate his memory and accomplishments.

I. Glenn's Childhood and Education (1921–1942)

John Herschel Glenn Jr. was born on Monday, July 18, 1921, in the small town of Cambridge, Ohio. He was born to John Herschel and Clara Sproat Glenn who both had grown up in Cambridge and whose families had deep ties to Ohio. John Glenn Sr., after being discharged from the Army in 1919, worked for a plumbing business while Clara worked as a schoolteacher. In 1923, the Glenns moved to New Concord, Ohio, where Mr. Glenn opened his own plumbing business. Here, the young John Glenn would grow up with his adopted sister Jean, who was born a few years later than him. From a young age, John Glenn was destined for an aviation career. As a child, he would play "airplane" in his backyard and would spend hours building airplanes by nailing old wooden boards together. He would later start building model planes with his cousin which were usually fighter planes from WWI. Even as a young boy, Glenn was heavily interested in airplanes and flight.

During high school, Glenn participated in many extracurricular activities. In just his freshman year, he was elected to student council and became a reporter for the school newspaper, *Maroon and White Newslite*. Glenn also had a deep interest in music and joined the school's orchestra and the town marching band, playing the trumpet. In addition, he enjoyed playing sports, including basketball, tennis, and football. In his sophomore year, he was again elected to student

council and continued his participation in extracurriculars. During his junior year in 1937, he was elected as class president, joined the glee club, and made the varsity teams in basketball and football. In his last year of high school, Glenn would become the only school athlete to win a varsity letter in three sports: tennis, basketball, and football.

It was also during his high school years that Glenn knew the girl he was going to marry. Her name was Anna Castor, but the nickname "Annie" stuck. Glenn had known Annie since they were young as they would be playmates while their parents would have dinner together every month as part of the "Twice-Five Club." This social club consisted of multiple New Concord couples [1]. As they grew up and started school, the two would naturally pair off. Throughout high school, dates with Annie would take up a noticeable part of Glenn's schedule.



Figure 3–1: John and Annie as young teenagers.

Also during high school, Glenn's interest in civics and politics started, an interest he credited to his civics teacher, Mr. Harford Steele. Mr. Steele showed John Glenn that someone could make a difference in the world and exercise their beliefs and cause positive change. These were lessons that John Glenn never forgot.

In the fall of 1939, John Glenn enrolled in Muskingum College as a chemical engineering major. He became the third generation of his family to study at the 125-year-old college. Annie was already part of the Muskingum student body studying as a music major. Glenn played on the freshman football team and earned a bid on the varsity team his sophomore year. During his sophomore year, Glenn made the decision to sign up for the civilian pilot training program at the New Philadelphia Airport in Tuscarawas County, which was his first step in starting an aviation career. This decision left his parents a little disappointed, however, since they had hopes that he would follow in his father's footsteps and head the family plumbing business. In addition, they did not think that flying was a very safe business at the time. After many objections and much persuasion from Paul Martin, the program's training instructor, they finally decided to allow John to continue the program.

II. Marine Pilot to Test Pilot (1942–1959)

Roughly three months into Glenn's junior year at Muskingum, the Japanese attacked Pearl Harbor. Shortly after, and as a licensed pilot, he appeared before the Naval Cadet Selection Board and was enlisted into the US Naval Reserve V-5 Program as a seaman second class. Glenn was assigned to Naval Aviation Preflight School in Iowa City, Iowa, in May 1942. After completing that course, Glenn was then sent to complete primary flight training at the Naval Reserve Air Base in Olathe, Kansas. Finally, Glenn was sent to the Naval Air Training Center in Corpus Christi, Texas, and on March 31, 1943, Glenn received a commission as a second lieutenant in the US Marine Corps accompanied with golden wings as a naval aviator.

Before John had to report to the Marine Corps Air Station at Cherry Hill, North Carolina, he had to take care of some important business first. Not yet a week after he received his wings, John Glenn returned to New Concord and was married to Annie Castor on Tuesday, April 6, 1943, in the United Presbyterian Church. After their honeymoon, Glenn reported to the air station and was assigned to Training Squadron 8. Soon after, Glenn was on the move, heading to Kearney Mesa in San Diego, and then on to the Marine Corps Air Station in El Centro in southern California. Here, Glenn would practice gunnery runs in the desert with his squadron, eager to be called for a mission.

In January 1944, Glenn's team, Marine Observation Squadron 155 (VMO-155), finally got word to move out. They would eventually sail out of San Diego, in February, to Honolulu in four ships with Glenn, now a first lieutenant, on the SS *Santa Monica*. To their disappointment, VMO-155 would learn that they were to be stationed on Midway Island as a Marine base defensive wing. Once their relief squadron arrived in the beginning of May, VMO-155 left for Honolulu, Hawaii, where they would check out the new planes, Corsairs, before they set sail to their final destination in the Marshall Islands.

Finally, they set sail for the Marshall Islands on June 28 and arrived into Majuro Harbor on July 3. A few days later, Glenn's squadron got their first combat assignment where they would be providing flak suppression for dive-bombers at Taroa, part of the Maloelap Atoll, by keeping antiaircraft fire down. During this mission, Glenn served as the leader of one of the divisions consisting of four planes. Unfortunately it was during this mission that Glenn experienced the loss of war for the first time. During the mission, Monty Goodman, one of Glenn's good friends and wingman for the mission, was shot down and crashed into the ocean. After two hours of searching and low on fuel, Glenn and his squadron finally had to return to base. In Glenn's words, "I had lost one of my closest friends, and war had suddenly become very, very personal" [1].

For the rest of their stay, the squadron would fly missions almost daily. Around the time of November 1, Glenn's squadron received orders to move to the Kwajalein Atoll some 275 miles northwest. For one of their assignments, a bombing run on the Jaluit Atoll, Glenn led the strike since their executive had not arrived yet. When Glenn was climbing after having dived and dropped two-thousand-pound bombs, he was hit by a 20-millimeter explosive shell. Glenn recalls that it looked as if somebody had taken out "a chunk the size of a man's head out of the left wing's leading edge" [1].

When the rest of the squadron joined the camp, Glenn moved to Kwajalein Island, which was mostly barren after devastating fighting in February. By the time John Glenn left Kwajalein six weeks later, he had fifty-nine missions under his belt and had been awarded two Distinguished Flying Crosses and ten Air Medals.

After being processed in San Francisco, John made a quick visit to see Annie where they had discussed starting a family. When Glenn's leave ended, he was ordered to Cherry Point, North Carolina, where he was then assigned to the Naval Air Test Center at Patuxent River, Maryland. There, Glenn and a number of other seasoned pilots would put new fighter planes through their expected hours of service life as fast as they possibly could. This was due to aircraft development having been accelerated by the war. By the time the war ended in Europe, Annie was pregnant. In July, John had been promoted to captain, but was still waiting to hear back on whether he would be offered a regular commission in the Marines as he was only officially in the reserves. Finally, word came that John's commission had gone through, and he and Annie decided that John would join the Marines.

While in Cherry Point, it was getting closer and closer to Annie's due date. Finally on the morning of December 13, 1945, John and Annie drove fifty miles in the pouring rain to Camp LeJeune, since there was no military hospital at Cherry Point. Later that morning their son, John David, was born. The Glenn family would not be in North Carolina much longer.

Due to fighter production having slowed with the end of the war, there were fewer planes to fly and fewer people to service and maintain them. This led to Glenn's second transfer to El Toro, California, in March 1946. Here, there was a good demand for Glenn's squadron to perform flyovers and air demonstrations at air shows because of the reputation that the Corsairs had mustered during the war. Although El Toro was a fun place to live, especially since this was John and Annie's first time there during peace, John felt that he wasn't learning anything

new as a pilot. Soon though, the Marines were looking for volunteers to head to China for duty.

There were rumors that this tour would be short, most likely lasting just six months at the most but they would be given credit for a full year's tour. After being home for almost a year, with Annie being five months pregnant, and Dave still a baby, John thought it made sense to take this short tour with the assumption that he would be back before their second child was born.

John Glenn arrived in the Chinese capital, Beijing, then known as Peiping, in December 1946. He was stationed at Nan Yuan Field as the VMF-218 squadron acting operations officer. John's squadron was tasked with supporting General George C. Marshall's negotiations with the Nationalist Chinese and the Communists led by Mao Tse-Tung. While in China, Glenn would go out on North China patrol. John's squadron's reports would let intelligence know where the Communist forces were operating. During the winter of 1946–1947, General George C. Marshall's peace talks were unable to persuade the Communists of negotiating with the Nationalists and his teams pulled out of China. Once the peace teams were evacuated safely, Glenn's squadron was starting to make the move to their next temporary home, Guam. It was during this move that John got a phone call with the news that Annie had successfully delivered their second child, Carolyn Ann, also known as Lyn.

At this time, Glenn was part of the flight echelon between Tsingtao (now Qingdao), the Yellow Sea, and Shanghai. A few days later, Glenn and his squadron arrived in Okinawa, Japan. As months passed, Glenn realized that the rumor of a short tour was miscalculated. Already eighteen months into his overseas tour, Glenn started to question when he would be ordered home so he had Annie and the kids come to Guam. The Glenn family moved into a Quonset hut that had been previously built. Glenn received orders home only three months after his family had arrived. After two weeks of traveling via the Military Sea Transport Service, they finally arrived to the coast of California. Here, John was assigned to Corpus Christi, Texas, as a flight instructor. After about three months, Glenn was assigned to Cabaniss Field in the air training center complex. His first duty was in the Instructors Advanced Training Unit (IATU). He would be tested on his ability to fly and teach flying. After graduating in six weeks the IATU asked him to be an instructor of the instructors in the course from which he had just graduated. Then in a program he initiated where instructors are exchanged between the Air Force and Navy to see how training methods differed, Glenn volunteered to go through the three-month Air Force course in Williams, Arizona, about twenty miles east of Phoenix. This is where Glenn would fly his first jets. He would train in P-30s and T-33s.

While fighting was going on in China and Korea, Glenn applied to the Naval School of All-Weather Flight once he returned to Corpus Christi. After yet another three-month course, Glenn climbed another step up the aviation ladder. Again, he was asked to stay as an instructor. Glenn would end up training two groups of students for their respective three-month courses heading back to Corpus Christi where he would stay until the late spring of 1951.

Glenn had been ordered to Quantico to go through the six-month course at the Amphibious Warfare School. During this course he studied coordinated warfare and how to use boats, planes, troops, and guns to win a battle. Once Glenn was done with the Amphibious Warfare School, he hoped that he would be assigned to a fighter squadron. However in December 1951, he was assigned to the general staff of Marine Corps Schools in the operations section and stationed at the base, Guadalcanal. After almost a year of Glenn writing monthly letters to his boss, Colonel Thompson, asking for assignment to Korea, the Marine Corps finally decided it was his time to go in October 1952.

On February 3, 1953, John reported to K-3, a Marine base on Korea's southeastern coast. Glenn was assigned to the fighter squadron, VMF-311. One of his fellow pilots in VMF-311 happened to be the American baseball star, Ted Williams. Glenn was a big fan of Williams and said that "he gave flying the same perfectionist's attention he gave to his hitting" [2]. Glenn flew his first combat mission, a reconnaissance flight along the main line of resistance, on February 26. John's squadron would fly frequently, starting in the morning, and would usually provide aerial support for troops below. A few weeks would go by before he would have his first close call as a pilot.

During a bombing run, Glenn had glimpsed the flashes of antiaircraft fire nearby and kept note of the position. After pulling out of a bombing dive, he decided to head toward the gun instead of heading back to the rendezvous point. Glenn was on a mission to get rid of this antiaircraft fire. He flew fast and low at the gun, firing at it and watched it get torn apart, however, as he pulled up to keeping from crashing into it, he felt something hit his plane. His plane nosed over and he had to struggle to fight the plane and keep it from going toward a rice paddy. After a lot of exertion on the stick, Glenn was able to somehow pull up at a speed close to five hundred miles per hour. Once he avoided more antiaircraft fire, John flew back to K-3, keeping constant pressure on the stick so that the nose wouldn't pitch down since the elevator had been shot. Once he safely returned to the base, Glenn examined his plane and saw that a there was a hole in the Panther's tail big enough to fit his head and shoulders through. This wasn't the last time Glenn would return to base with battle damage scattered across his plane. Later he would come back with a two-foot hole in one of his wings. As a result, the squadron started calling him "Old Magnet Ass."



Figure 3–2: Glenn standing next to a hole in his tail caused by antiaircraft fire.

Glenn's passion for having the chance to fly air-to-air combat led him to apply for exchange duty with the Air Force. Finally after completing sixty-three missions with VMF-311, his application was approved. John Glenn would finally get an opportunity to fly against the Soviet MiGs as an F-86 pilot. Glenn was assigned to the 25th Fighter Interceptor Squadron (FIS) at K-13, located at Suwon, which was south of Seoul. His squadron was responsible for setting up an aerial screen at the border between North Korea and China and intercept any MiGs that were trying to interfere with ground troops. Glenn's first few checkout missions were uneventful but he adjusted to the Air Force's routines well.

As the summer began, Glenn still hadn't found a MiG. He apparently started to moan a lot about this because one day he came to his plane with "MiG Mad Marine" painted on it. After John began leading two- and four-plane flights, he finally spotted his first MiG. He saw the plane out in front of them around fifty miles inside the North Korean border. He began to chase it but lost it in the clouds but saw another one behind the first. Glenn kept after the plane at about seven hundred miles per hour and finally caught up with him forty miles inside Manchuria. As the MiG slowed down trying to enter a Chinese airfield ahead, Glenn was able to get hits on the plane with his .50-caliber machine guns and the MiG crashed into a fireball.

By the end of the war, Glenn would fly twenty-seven Sabre missions with the Air Force and shoot down three MiGs in air-to-air combat. After the truce, Glenn continued his tour into December. He spent Christmas at K-13, showing kids from an orphanage they supported in P'ohang the planes and letting them play pilot. Glenn finally returned to Annie and the kids in January and celebrated a belated Christmas together.

Toward the end of the Korean War, Annie and John had begun talking about what career path John would take once he returned. John decided that test pilot school would be the best choice for him. While in Korea, he had applied to the school at the Naval Air Test Center (NATC) at Patuxent River. By this time, John had received four Distinguished Flying Crosses and eighteen Air Medals.

It wasn't long before Glenn was accepted and he reported to the center at the end of January 1954. After an intense six months filled with extensive academic work and performing practice runs in familiar airplanes, Glenn graduated in July 1954. Glenn was first assigned to do armament testing. His first project plane was the FJ3 flown by the Navy. It was essentially an F-86 Sabre, which he had already flown in Korea, with a tail-hook used for aircraft carrier service. His test flying of the FJ3 revealed a major flaw. Panels around the nose were weakened from extended gunfire. This would cause the panels to flex more than expected and as a result rivets would pop out and go down the air duct into the engine. This was not anticipated in the drawing room and showed just how dangerous being a test pilot could be.

Another problem arose that almost ended John's life. Glenn was preparing to run a high-altitude firing sequence at forty-five thousand feet. As he fired the cannons in the test area, his canopy seal blew. In addition the oxygen regulator went out. This wasn't very frightening to John as he had had to use the emergency backup many times before. This time, however, the emergency backup also failed. Glenn's eyesight started deteriorating with black patches floating in his vision, the symptoms of oxygen deprivation. With only a few seconds of vision left, Glenn reached for the "little green apple." This was a green-painted, wooden ball attached to a wire cable that would trigger a small bottle in his parachute pack that contained about ten minutes of oxygen. He found the green ball and pulled the wire. The black patches started to recede and his lungs filled with oxygen. His vision returned to him seconds later and he pulled out of the dive into which he had placed the plane. Glenn kept the green apple as a "souvenir of survival."

Glenn then became the project officer for the armament testing of the Chance Vought F7U Cutlass. During these trials, Glenn would encounter multiple problems with the Cutlass. These included engine flame out and engine failures due to metal falling off the wings and into the inlet duct. He also dealt with problems involving the twenty-millimeter cannons on a new plane, Chance Vought's F8U Crusader. Glenn also had to keep his head on a swivel as a test pilot.

In November 1956, after almost two years at Patuxent River, Glenn was transferred to the Fighter Design Branch in Washington, DC, as a project officer. Here, Glenn's main task was managing the development of the Crusader. Glenn would sort out change proposals gathered from the test program and would decide which were mandatory because of safety or combat and which would just be a luxury. Glenn also had many talks with Pratt & Whitney which manufactured the Crusader's J-57 engines. Although the engine had a good record, Glenn sat in discussions involving whether or not it had logged enough hours at combat power to guarantee no relevant flaws were found. This gave John an idea. Why not kill two birds with one stone and test the Crusader at the right power while also trying to break the Air Force's transcontinental speed record? Realizing that the Crusader flew faster than a bullet's muzzle velocity, he would name it "Project Bullet." After trying to convince the Navy and Pentagon from the end of 1956 to the spring of 1957 that Project Bullet could not only break the speed record but provide a perfect testing environment for the Crusader (sustained max power, max altitude, and max Mach-number long distance flight), the admirals and generals finally gave it the okay.

The historic flight was scheduled for July 16, 1957, just two days before Glenn's thirty-sixth birthday. Once July approached, logistics were being confirmed and finalized. It was planned that Glenn would make three refueling stops during the 2,445-mile flight. The flight would take Glenn from Los Alamitos Naval Air Station in California to Floyd Bennett Field in Long Island, New York. Finally on the morning of July 16 at 6:04 Pacific Time, Glenn took off in a F8U-1P, the reconnaissance version of the Crusader. Glenn soon climbed to thirty thousand feet where he eventually held a speed of Mach 1.25, which slowly accelerated even more to Mach 1.48 as he climbed to fifty thousand feet. Main-taining an average supersonic speed of 723 miles per hour, his flight lasted 3 hours, 23 minutes, and 8.4 seconds, breaking the previous record by 21 minutes. John was greeted by Annie and kids, along with Rear Admiral Thurston B. Clark, who was the commander of the Naval Air Test Center. Glenn also received his fifth Distinguished Flying Cross.

On October 4, 1957, the Soviet Union successfully launched the first artificial satellite, *Sputnik*. With the Soviets having beaten the United States in getting a satellite into orbit, the US view of technological superiority to the Soviets had drastically changed. Glenn soon heard rumors that the National Advisory Committee on Aeronautics (NACA) was coming up with a plan to put a man in space. Then there was word in late January or early February that the NACA Research Center at Langley Air Force Base was looking for test pilots to do some part-time studies on parameters for piloting spacecraft. John went to his boss, Navy Captain Joe Smith, and asked for the assignment to Langley, which he was granted.

The job at Langley was Glenn's first introduction into orbital mechanics. After a few days, Glenn was then asked to travel to the Naval Air Development Center in Pennsylvania to ride on the centrifuge they had there. Here he would be tested at up to eight times the force of gravity. Glenn was then sent, temporarily, to the McDonnell Aircraft plant in St. Louis where a manned capsule design was being worked on. Glenn would aid in talks about how it was to be configured. Later toward the end of July, Eisenhower signed the National Aeronautics and Space Act officially making the National Aeronautics and Space Administration (NASA) the successor to NACA.

The first project of this civilian-run program would be to put a man in space and then safely return him to earth. In October, NASA officially started with a budget of \$100 million. By the end of 1958, NASA had dwindled its field of possible astronauts to military test pilots because the agency believed "people who had worked under the most arduous and adverse high-speed flight conditions provided the best point of departure into what would be an entirely new realm of flight" [2].

On December 17, 1958, NASA announced that its manned space program would be called Project Mercury. In early 1959, Glenn received Top Secret papers having him report to a briefing at the Pentagon. Here, two NASA officials, Abe Silverstein and George Low, would tell John and the other test pilots that were summoned that their program needed volunteers. These men would be astronauts and would help with testing that would eventually send them into suborbital and orbital flight. Of course, John Glenn volunteered without hesitation.

III. The Mercury Seven (1959–1964)

After going over what this opportunity meant with Annie and the kids, Glenn continued with the selection process. NASA ended up with an initial batch of eighty potential astronauts after screening the records of 508 test pilots. The process continued with several screenings. John would meet with Charles Donlan, who was in charge of the astronaut selection. As the process continued, Glenn came very close to not making the cut. Along with all of the military and pilot requirements from NASA, there was a degree requirement. Glenn had never officially received his degree in chemical engineering from Muskingum College after he decided to join the Navy following Pearl Harbor. Although he had gone through many courses throughout his military career in addition to the three years at Muskingum, he had been deselected because he had no official degree.

Fortunately for Glenn and unbeknownst to him, Jake Dill, who knew of Glenn's background, showed NASA all of John's combat and academic records and convinced them to keep his name on the list. Glenn had made it to the last thirty-two. Soon a letter arrived at Glenn's home asking him to report, if he was still interested, to the Lovelace Clinic in Albuquerque, New Mexico.

Here, Glenn and his counterparts would be put through extensive medical examinations of all sorts. Dr. Lovelace, who founded the clinic, and his team took samples of all kinds, poked and prodded, and measured everything they could. Once they concluded their testing, Glenn and the others received orders to head on to Wright-Patterson and the Wright Air Development Center's Aero-medical Laboratories. Here Glenn and the other test pilots were subjected to stresses that scientists and engineers expected them to endure while in flight. Some of these included sitting in heat chambers, an isolation chamber, and an altitude chamber. Not only were there tests to measure the potential astronauts' physical prowess but their mental processes, too. Since extremely little was known about how the human body reacted in space at the time, the scientists and doctors wanted to make sure they were the "perfect" specimens made up of the "right stuff."

Each candidate spoke with psychologists and took Rorschach tests. After the tests concluded, Glenn returned to Washington, DC. Only two weeks later, Glenn received a call from Charles Donlan, asking him if he was still interested in the program. After Glenn said yes, Donlan replied, "Well, congratulations. You've made it" [2]. This great news just so happened to come on April 6, 1959, John and Annie's sixteenth wedding anniversary.

Glenn and the other newly selected astronauts met for the first time on April 8, 1959, at Langley Air Force Base. The rest of the astronauts included three from the Navy and three from the Air Force, with Glenn being the lone Marine. After the initial NASA press conference, introducing the world to the "Mercury Seven," Glenn and the other astronauts were bombarded with attention from the media.

The Mercury Seven finally started working toward the end of April at Langley. In May, they began a training regimen designed by Bob Voas, a Navy lieutenant and clinical psychologist. Although there wasn't a specified exercise regimen for the astronauts, each had their different ways of meeting the suggested four hours of unsupervised exercise each week. For Glenn, running became his morning routine. He liked it because he could do it anywhere and didn't need any equipment or another person. John measured a two-mile route in his car and would run it every morning. Around three weeks into their training, the astronauts were gathered for the first missile launch on May 18.





The vehicle they would watch launch was the Atlas D. It was originally an intercontinental ballistic missile (ICBM) that was converted to hold a capsule on the top. The rocket slowly rose off the platform but after a minute it failed in a massive explosion. This failure was sobering for the astronauts as they watched debris fall from the sky. The engineers could only tell them that they were analyzing photos and telemetry data. A mere ten days later, on May 28, NASA launched Able, a rhesus monkey, and Baker, a South American squirrel monkey, atop an Army Jupiter missile from Cape Canaveral.

The launch was successful and took the two monkeys to an altitude of three hundred miles. With the return of the monkeys alive and intact, it proved that humans could reach space and return safely. A few days after the monkeys' flight, the astronauts reported to Wright-Patterson for centrifuge training. Here they would simulate acceleration, deceleration, and zero gravity. Later, on December 4, months after the Soviets successfully launched *Luna 2*, another monkey named Sam was launched by NASA to an altitude of fifty-five miles and safely recovered.

In addition to the testing, each astronaut was assigned a specific area of responsibility. Glenn, since he had flown many different types of aircraft, was assigned cockpit layout and instrumentation, spacecraft controls, and simulation. For the duration of the training, the astronauts would normally travel together unless their area of expertise called for them to meet with contractors and subcontractors. The most important training however, in Glenn's eyes, was that relating to the Mercury spacecraft and systems. Each astronaut needed to know every detail of the spacecraft because their lives depended on how well they knew the spacecraft. After taking inputs from the astronauts, who would be performing maneuvers and checking attitude, a major design change was initiated. In the beginning, there was no window in the capsule, albeit for a small porthole that was almost impossible to use during flight due to its location. The astronauts saw this as a serious problem. They didn't want to lose the ability to make correcting attitude adjustments in the absence of visual cues. In addition, one of them would be the first to escape Earth's atmosphere and there



would be no way to look down at the planet and describe the magnificent view that nobody had seen before. There were limitations on the capsule though, which resulted in an initial design with no window. Including a window and its support would add more weight, which was critical to the design. NASA promised the astronauts a window if the weight problem caused from its addition could be fixed and eventually, Max Faget, the capsule's designer, got a new design the goahead which incorporated a window.

Figure 3–4: Mercury Seven astronauts in their pressure suits.

Around February 1960, almost a year after they started, the astronauts began training for attitude control. They trained in the Multi-Axis Space Training Inertial Facility (MASTIF) at the NASA Lewis Research Center in Cleveland, Ohio. It had three gimbals for each axis of attitude: roll, yaw, and pitch. The astronauts would strap in and programmers would start the machine spinning with the astronauts having to correct it with stick triggered compressed air bottles which simulated the same thrust-to-weight ratio of the Mercury capsule. They started by only correcting one axis and eventually moved on to having to deal with all three, at thirty revolutions per minute.

In the midst of all of the physical training, there was also intense academic work. Some of the courses they studied included astrophysics, trajectories and orbital mechanics, basics of propulsion, and astronomy. The last was important because it involved being able to use constellations to help orient the capsule if the automatic attitude control system failed. In the second year of Project Mercury, the astronauts spent a lot of time at Cape Canaveral, which was chosen as the Project Mercury launch site. The astronauts would continue with scuba training to try and simulate the zero gravity environment as best as they could. They

also went through desert survival training in July at Stead Air Force Base, outside Reno, Nevada, and then proceeded to sea survival training in Pensacola, Florida.

Toward the end of July, the astronauts learned that NASA would launch a final version of the Atlas missile that would propel the first orbital flight. On July 29, the Mercury-Atlas 1 (MA-1) was launched. The launch itself went without a hitch but later telemetry was lost and debris was seen falling into the Atlantic. An investigation revealed that the rocket had structurally failed when it went through a region of high dynamic pressure, at an altitude of thirty-two thousand feet. Glenn didn't know what to think as they were much closer to manned flights and this was now the second explosion he had witnessed [2]. This failure was well-publicized and NASA was criticized even more. Fortunately, there was some good news that followed when the satellite *Echo* was launched successfully in August via a hundred-foot diameter Mylar balloon.

During the fall, NASA was throwing new simulations at the astronauts that better suited actual flight. The astronauts took turns going through the Air Lubricated Free Attitude (ALFA) trainer. This trainer was more realistic in that it had the same weight to thrust ratio as the real capsule, and also had a screen imitating the porthole and periscope. Eventually, by the fall of 1960, the astronauts were training on procedure simulators that were replicas of the cockpit and by late 1960 they were training in the spacecraft itself. Later in the year, NASA was set to launch Mercury-Redstone 1 (MR-1). This would test the Mercury capsule atop a Redstone rocket, which would be used for the suborbital flights. During the launch, on November 21, the Redstone rocket fired but cut off when the rocket was about four inches off the ground. The capsule's escape tower subsequently fired but instead of taking the capsule with it, it took just the tower four thousand feet up. With yet another failure, NASA faced even heavier scrutiny. As a result, the astronauts worked even harder so that the president didn't have an excuse to cut or delay the manned space program. Soon talk of who would make the first flight came up with the astronauts. On January 19, Mr. Gilruth gathered the astronauts and said that NASA would announce the first three astronauts to make flights. The first three would be Al Shepard, Gus Grissom, and John Glenn.

With the first three astronauts selected, there were still test flights needed to make sure that safe manned flight could be achieved. On January 31, NASA launched a chimpanzee named Ham on a Mercury Redstone rocket. The flight reached an altitude of 157 miles and landed 418 miles downrange. Although the flight had not gone completely to plan (it went forty-two miles higher than expected due to a malfunctioning control valve and the capsule hit harder than expected in the ocean) the life support systems showed no problems and Ham was in good health after he was recovered.

It was decided that there should be one more Redstone test before they would send up a human. This additional test happened on March 24, and was successful, to the relief of the astronauts. The next time there would be a launch, a man would be onboard. Glenn soon learned that he would be Shepard's backup and started preparing for this flight as if he would be the one to fly. On May 5, 1961, after a weather-related postponement of his first launch, Alan Shepard became the first American in space. During his suborbital flight, he reached an altitude of 115 miles and safely splashed down. This came at a critical time since the Soviets had recently sent Yuri Gagarin into space. After this triumph, the nation was hungry for more.

On May 25, President Kennedy made his famous remarks of wanting to land a man on the moon before the end of the decade. As for the second suborbital flight, Glenn had assumed that since he had been named backup for Shepard, then he would be chosen to fly. However to his disappointment, Gus Grissom was chosen and he was named backup a second time. A couple of months later on July 19, Gus Grissom was launched for a second suborbital flight that went without hitch until splashdown. The capsule hatch blew off prematurely and water started coming in. Grissom was able to get out but the capsule was lost upon recovery. Later in August, the Soviets put a cosmonaut in a seventeen orbit flight lasting twenty-five hours. Upon hearing this, and having had two very successful suborbital flights, NASA decided that the next flight would send an astronaut into orbit. Now it was Glenn's turn.

While getting as much information about zero gravity from Shepard and Grissom's sub-orbital flights to prepare for orbital flight, NASA made multiple test flights. A flight on September 13, 1961, carried a dummy astronaut into a single orbit and splashed down into the Atlantic. The next flight, on November 29, sent a chimp named Enos into two orbits. This flight was also successful and showed that a chimp was able to perform tasks like pulling a lever in zero gravity.

To Glenn's great delight, at the post-flight press conference of Enos's flight, the world learned that John Glenn would be piloting the next orbital flight with Scott Carpenter as his backup. Following the announcement, and while NASA was figuring out a launch date, Glenn set out on continuting the astronaut tradition of naming their capsule. Before him, Alan Shepard had named his *Freedom 7*, while Gus Grissom named his *Liberty Bell 7*. The rule was that each would end in "7," paying tribute to the team of astronauts. After getting his children, Dave and Lyn, involved with the naming process, they selected *Friendship 7*. NASA finally decided that, after trying to find a date to launch before Christ-

mas, they would wait until after the holidays. January 16, 1962, would be the tentative date for Glenn's launch.

Once it had been announced that Glenn would make the orbital flight, there was a wave of reporters and photographers seeking Glenn's attention. He also started to receive huge amounts of fan mail and autograph requests from all across the country. Once Glenn returned to the Cape following a nice holiday with his family, he continued his usual morning runs, going from two miles to five miles now. He made sure to keep a healthy diet with the help of Bea Finkelstein, a dietician. In addition, he made sure to isolate himself as best he could. Glenn did not want to risk contracting some sort of sickness that would cause him to be scrubbed from the flight.

Once the January 16 date approached, it was postponed to January 23 due to technical problems [1]. Once again as the launch date approached, it was delayed to January 27, and then again because of weather. Although each delay was a little disappointing, Glenn knew that the right day would come and just continued to make sure that he was as prepared as he could be. More delays happened, mostly due to bad weather at the launch site or where the capsule was expected to splash down. Nearly a month later, John Glenn would finally get his time to shine.

On the morning of February 20, 1962, Glenn woke up at 1:30 A.M. and started looking over flight procedures. Bill Douglas, the physician of the astronauts, came in and gave Glenn a quick checkup with the stethoscope and cleared him for the launch. He also gave John Glenn the info that the weather was "fifty-fifty" and that Scott Carpenter had checked the capsule and it was ready to go. Douglas then started attaching biosensors to Glenn, while his pressure suit was laid out. Once Glenn was finished putting on the suit, he was given a pressure check. Glenn put his helmet on and walked to the van that would take him to the launch site. Soon Glenn was at Launch Pad 14 and out of the van. He made his way to the white room where he would be helped into his *Friendship 7* capsule.

Eventually it was time for Glenn to enter the capsule and he wriggled himself into the capsule feet first with the help of technicians. He sat in the capsule when the original launch time passed due to a weather delay. Then he and the technicians discovered that a microphone bracket in his helmet had broken, so they took even more time until that was fixed. Finally everything was checked and deemed fine and the hatch door was bolted into place.

To add further delay, a bolt was sheared in the process of placing the hatch, so another forty minutes passed until that was fixed and the hatch was again placed into position. Fortunately the weather started to clear up and the countdown continued again. Glenn checked his microphone by communicating with NASA's control center, and was able to have a brief private conversation with Annie and their children. Glenn told them he was strapped in and ready to go and that everything looked great. With thirty-five minutes left in the countdown, the liquid oxygen was topped off and the NASA crew started the check downs. "Go's were heard through the communications loop, and minutes turned into seconds. The countdown finally reached zero at 9:47 A.M.



Figure 3-5: Glenn being helped into his Friendship 7 capsule.

Slowly, the Atlas began to thunder upward, as it used every last bit of its 367,000 pounds of thrust to lift the 125-ton rocket off the ground. Once the forty-two inch diameter umbilical cord was detached from the rocket and the mission elapsed-time clock started, Glenn could hardly believe he was finally flying [2]. As the rocket gained higher altitude, it headed slightly to the east, and out over



the Atlantic Ocean. Glenn started to feel the gravity forces building up. Around forty-eight seconds into the flight, Glenn felt the vibrations increase as he reached the point of maximum aerodynamic stress. After several seconds, Glenn was past this period of high aerodynamic stress and the vibrations started to smooth out. At just over two minutes into the launch, the booster engines cut off and fell away. Soon the rocket pitched forward so the escape tower could properly jettison.

Figure 3-6: MA-6 lifting off from Cape Canaveral.

By this time, the gravity forces dropped to just over one gravity after being propelled by the sustainer engine and two vernier engines. The Atlas started to make small course corrections with the two Vernier engines until the rocket reached a top speed of 17,545 miles per hour. Glenn checked dials and readings making sure everything was still going smoothly. He reported that everything was in good shape and then got the notice that the sustainer engine cut off (SECO) would happen in twenty seconds. Five minutes into the flight, Glenn hit orbital speed and zero gravity ensued.

One of the first things he reported to ground control was that the "view is tremendous!" [2]. Glenn received the go ahead for at least seven orbits. The mis-

sion had planned for three orbits but if needed he could go seven orbits. Throughout his flight, Glenn was scheduled to do many experiments and make certain observations within the capsule. Some of these included taking his blood pressure, finding constellations, spotting designated lights on the ground, eating to see how weightlessness affected swallowing, and taking pictures.

His experiment time was cut short however after he found that the automatic stabilization control system (ASCS) was failing shortly after going into the second orbit. As a result he had to switch to the manual fly-by-wire control system to correct the attitude. Since he could no longer rely on the ASCS to help correct attitude, he was forced to keep a close eye on attitude in case he needed to fix it manually.



Figure 3–7: Hand controller used by Glenn to manually control the attitude of the capsule.

After going through the next orbit, making as many observations and performing as many experiments as he could, NASA ground control kept asking Glenn if he had the landing bag switch in the off position. Unbeknownst to Glenn, NASA ground control had received a signal that the landing bag had been deployed. This was critical because the way the capsule was designed, once the capsule was at a designated low altitude, the landing bag would deploy, thereby jettisoning the heat shield. The landing bag would then help cushion the capsule as it splashed down. With this signal, there was a chance that the landing bag had been deployed and the heat shield was no longer held to the capsule. Glenn was asked if he was a go for the last orbit, to which he confirmed with a "yes."

Once it neared the time when Glenn would adjust the attitude for re-entry, ground control asked Glenn to leave the retro pack on. Glenn now had suspicions that NASA thought the heat shield might be loose but no one would explicitly tell Glenn about it. Being held in the dark about this was one thing that Glenn later helped fix when he gave his input on how information should pass between ground control and pilot. He believed that the pilot should be told everything that would affect how he or she would fly the spacecraft and later this policy was enacted.

Once Glenn was at the appropriate orbital position, he used the fly-by-wire system to orient the capsule for re-entry. Soon Glenn and Friendship 7 were hurtling back to Earth. He lost communication, which was expected, as the air around the capsule started to ionize from the heat of re-entry. Glenn heard a thump as the retro pack gave way, and he saw a piece of metal fly past the window. He also saw an orange glow build up around the spacecraft. Soon, Glenn started to feel gravity forces build up as the craft decelerated. Within a few minutes, Glenn regained communication with ground control and prepared for the rest of the descent. At twelve miles altitude, the spacecraft had slowed to nearly subsonic speed and the gravity forces began to lessen again. At fifty-five thousand feet, the capsule had used up all of its attitude control fuel and was oscillating wildly. At twenty-eight thousand feet, the drogue parachute deployed and stabilized the capsule. Glenn opened snorkels to let air into the cabin and at ten thousand feet the main chute came out in what Glenn described as a "beautiful sight." He then flipped the landing bag deploy switch and all the panels glowed green. The capsule splashed down with a solid thump. Glenn shed his harness and prepared for an emergency escape if needed.

Glenn had landed about six miles from the USS *Noa*. After several minutes, the destroyer was lifting *Friendship* 7 out of the water and onto the deck. Glenn's flight lasted a total of four hours and fifty-six minutes and he had seen a total of three sunset and sunrises. After showering and putting on fresh clothes, Glenn received a phone call from President Kennedy congratulating him. He then called Annie and the kids and enjoyed hearing their voices [2].

Afterwards, Glenn debriefed and went through postflight medical examinations. On February 23, Vice President Johnson accompanied Glenn back to Patrick Air Force Base in Florida. He was welcomed by Annie and the kids and a large crowd. This crowd was only a small portion of the people waiting to congratulate John Glenn on his flight. He was received as an American hero. Glenn's drive back to Cape Canaveral turned into a parade. Thousands of people lined the streets to cheer Glenn. Shortly after he arrived at the Cape, President Kennedy landed aboard Air Force One. Glenn toured the NASA facilities with the president and talked about his flight. Later Glenn would receive NASA's Distinguished Service Medal. After all of the welcome-back ceremonies and news conferences, John Glenn and his family took a much needed secluded weekend trip to the naval base at Key West.



Figure 3–8: Glenn speaking with President Kennedy about his orbital flight.

Glenn soon got word that President Kennedy had invited him to address a joint session of Congress after they had a celebratory parade for him in Washington, DC. The day of the parade, February 26, was rainy and cold. There was a brief reception at the White House before everyone piled into open cars for the parade. The bad weather didn't stop thousands from gathering along the parade route to the Capitol.

Once they finally reached the Capitol, Glenn prepared for his speech. He was well aware this was a very rare opportunity usually reserved for heads of state and royalty. Glenn was introduced to a roaring round of applause. In his speech, Glenn made sure to address the things that were important to him, including the benefits of exploration and scientific inquiry, and how Congress should continue to support NASA's agenda.

Glenn's schedule remained busy as he attended more celebratory parades following the one in Washington. On March 1, another cold day, Glenn participated in a parade in New York City and on March 3, he returned home to New Concord, Ohio. By this time, Glenn was now getting special trucks full of letters from all of the country. John and Annie tried to answer as many as they could but eventually NASA took over with a dedicated mail room at their headquarters. During this time, many columnists praised Glenn's speeches and brought forth thoughts on his potential as a politician. There was enough chatter that Glenn had to clearly state his intention to stay out of politics at the moment and do all he could to support NASA and the astronaut corps.

A couple of months later on May 3, the Committee on Space Research of the International Council of Scientific Unions traveled to Washington for the International Space Symposium. Glenn was set to present a paper on his flight along with Gherman Titov, a Soviet cosmonaut. While in Washington, Glenn and Titov spoke a little about their flights and training regimens.

During the summer of 1962 and while NASA was moving groups to the new Manned Spacecraft Center in Houston, Glenn started to enjoy a new friendship with Robert "Bobby" Kennedy, US attorney general and brother of the president. Glenn and his family were invited to the Kennedy's Hickory Hill home many times. Glenn recalled having a "deep level of compatibility" and being very comfortable with Bobby [2].

While Glenn was enjoying his new friendship and getting his family ready to move to Houston, NASA kept making progress on the Project Mercury flights. Wally Schirra made a six-orbit flight on October 3 that lasted nine hours. Shortly thereafter, a new class of nine astronauts joined the group in Houston. In preparation for NASA's next manned space program, Project Gemini, Glenn and the rest of the astronauts were sent to Panama for jungle survival training. It was here that Glenn was paired with an astronaut named Neil Armstrong. Glenn enjoyed Neil's sly sense of humor [2].

Later, in May 1963, Glenn was aboard the ship *Coastal Sentry* near Japan for Gordon Cooper's twenty-two orbit flight in the *Faith 7*. That summer Bobby Kennedy invited Glenn to dinner to talk about Glenn running for the Senate in Ohio. He pointed out that the older incumbent, Stephen Young, was up for reelection and as President Kennedy was also, Bobby thought that Glenn would be a strong voice of support for his agenda and could help the important swing state of Ohio re-elect Kennedy. While Glenn was very flattered, and had not ruled out politics after many rumors of him running surfaced, he thought it wasn't the right time. Glenn still hoped to receive another flight assignment.

Unfortunately, that flight assignment never came. Glenn began to get frustrated [2] and asked Bob Gilruth when he might expect another assignment, and was told that they didn't want to send him up yet. Glenn would later learn that President Kennedy thought he was too much of a national asset to risk going up for a second flight. After receiving no indication of getting another flight, and compounded by the assassination of President Kennedy, Glenn sat down with Annie to figure out what Glenn's future would look like [2].

After talking it over, Glenn thought that it was time to enter politics. Glenn notified Bob Gilruth that he wanted to be relieved of his assignment as an astronaut and also informed the Marine Corps that he intend to resign his commission. Then, on January 17, 1964, John Glenn announced that he would challenge Young for the Democratic nomination for Senate from Ohio.

IV. Political Career (1964–1999)

The process of Glenn starting his first attempt at a political career was not as easygoing as he would have hoped. Although NASA had relieved him of being an astronaut, he was still technically a Marine because his retirement papers were going through "a molasses-slow bureaucracy" as Glenn put it [2]. This was important because due to the Hatch Act, Glenn could not engage in political activity until he was officially retired from service. A few NASA employees, whom Glenn had grown close to through Project Mercury, followed him to work on his campaign. Glenn and his team were new to politics and didn't have very many funds available.

Unfortunately only about a month into his campaign, Glenn was forced to withdraw- While staying in an apartment in Columbus, Ohio, Glenn was in an accident that ended in his head being cut badly. He was hospitalized and later found out he had received a concussion. Glenn, suffering from nausea and dizziness, was in no shape to run for office and was forced to drop out. He was released from the hospital about two months later. During his recovery John and Annie had the time to go through the roughly 350,000 letters that they had received over a six-month period. Once summer had come, Glenn had healed enough that he could walk normally again. In July, he sent a letter reminding the Marine Corps about his intention to retire. Since he was in a political hiatus and he was also no longer an astronaut, Glenn was looking for a job where he could actually learn about business and not just be an endorsement [2]. This led him to accept an offer to serve as the vice president for Corporate Development at Royal Crown (a US softdrink manufacturer) in October 1964.

By this time, Glenn had also completely recovered from his accident, and was ready to take the medical exam that would make him eligible for retirement from the Marine Corps. At the end of October, he returned to the Pensacola Naval Air Station and went through multiple tests that he had done years before. He also made a last request to take a short jet refresher course that was offered. While Glenn was back to flying jets for several days, President Johnson proposed a plan to promote Glenn to full colonel. He later received the promotion at the White House after President Johnson's election victory.

Finally on January 1, 1965, John Glenn retired from the Marine Corps after twenty-three years of service. As Glenn continued his duties at Royal Crown, he also continued to make public appearances for NASA, as well as the Boy Scouts. In addition Glenn was named to the editorial board of World Book Year Book. Over time, Glenn's responsibilities at Royal Crown started to increase. He was named the president of Royal Crown International, which allowed him to gain experience initiating international business deals. Unfortunately during his tenure as a Royal Crown officer, Glenn endured personal misfortune, along with the misfortunes endured by rest of the country.

The first came in late 1966 when Glenn's father passed away after battling cancer. The second came early in 1967 with the *Apollo 1* fire that took the lives of Gus Grissom, Ed White, and Roger Chaffee. The third was the assassination of the Dr. Martin Luther King Jr. The last came on June 4, 1968, the night of the California presidential primary. At this time, John and Annie had joined Bobby Kennedy's campaign for re-election as senator from New York.

They were at the Ambassador Hotel in Los Angeles, where Bobby was to give his victory speech after winning the California primary election. John and Annie had already retired to their room and were watching his speech on television when they witnessed the chaos that ensued after Kennedy was shot at close range. Glenn rushed downstairs in time to follow Bobby Kennedy to the hospital. Later Glenn and Annie received a call bearing the devastating news that Bobby had passed away after being in a coma.

In the wake of his friend's assassination, there was news that Stephen Young announced he was retiring in 1970 at the end of his second term as US senator from Ohio. Glenn followed this announcement with his own, saying that he would run for the Democratic nomination to replace him. Shortly afterward, Young's former campaign manager, Howard Metzenbaum, announced his own candidacy. Unfortunately for Glenn, Metzenbaum was better funded and had close ties to the state Democratic Party. Glenn would lose the primary by fewer than thirteen thousand votes. Glenn tried a third time for a Senate seat during the 1974 election. Although Metzenbaum was backed by the Democratic Party and the unions, he came into trouble regarding money. When it became known that Metzenbaum was paying less in taxes than Glenn, even though he had a bigger income, people started to take notice. Glenn also received a radio endorsement from Jackie Kennedy, the late president's widow, and was leading in the polls against Metzenbaum. Glenn would win the primary election and then go on to win the general election in November, carrying every county in Ohio, the first senator from Ohio to do so.

After Menzenbaum resigned his post, John Glenn was sworn-in as US senator on December 24, 1974. As he toured the Senate chamber for the first time, Glenn reflected on what Mr. Steele had instilled in his initial desire of public service. Shortly after becoming a jet-propelled senator, Glenn asked to be assigned to the Government Operations and Foreign Relations Committees. He chose the former because it oversaw the organization of government and had a history of cleaning out the "dirtiness" of government. Glenn chose the latter because he believed it was a road to helping create peace. Right out of the gate, Glenn got his wish of being on the Government Operations Committee but had to wait for an opening on Foreign Relations. During his first year as senator, Glenn learned about his position, maintained good attendance, and was able to help add floor amendments to energy, civil rights, and foreign policy legislation [2]. Glenn was then invited to travel with Mike Mansfield, who was planning a trip to China. Although he was still waiting to get a seat on the Foreign Relations committee, Glenn thought his would be a great opportunity to renew interest and gain experience.

Annie joined John as they traveled to China between September and October 1976. The purpose of the trip was to find out info about China including medicine, legal systems, and agriculture [2]. When Glenn returned from his trip, he finally received his assignment to the Foreign Relations Committee while moving from the Committee on Energy and Environment. In addition he was also made the chair of the Subcommittee on East Asian and Pacific Affairs. Glenn also asked to be on one more interesting committee. After seeing his mother and father almost have their entire retirement savings wiped out while battling cancer, Glenn wanted to use his own experience to improve the future of others fitting in the older demographic. As a result, he asked for a seat on the Special Committee on Aging. Later, in July 1978, President Carter asked Glenn to head the US delegation for the ceremony for the independence of the Solomon Islands. Here, Glenn would swap gifts with the tribal leader, Marija.

One of the biggest things that John Glenn felt he worked on dealt with nuclear non-proliferation [2]. At the time, five nations had acknowledged having nuclear weapons (the US, the Soviet Union, Great Britain, France, and China)

and all Glenn could think about was a nuclear holocaust [2]. Glenn took leadership initiative seeking an international agreement on limiting the number of nuclear weapons between countries. Glenn's views differed from that of President Carter's regarding the safeguards of the Strategic Arms Limitation Treaty (SALT), which was being negotiated with the Soviet Union. Glenn did not believe we should take part in a treaty that the US couldn't verify. Two radar posts located in northern Iran that could verify the Soviets' compliance were no longer available to the United States.

The SALT was eventually signed in June but was never approved by the Senate. In 1980, John Glenn was re-elected in a landslide. Halfway though his second term, on April 21, 1983, Glenn announced his candidacy for the Democratic nomination for president of the United States. His main rival was Walter Mondale, a Democrat from the state of Minnesota and former vice president in the Jimmy Carter administration. July polls had placed them almost dead even, and John felt good as he had raised a little more in campaign funds than Mondale [2]. By January 1984, Glenn had offices open in forty-two of the fifty states. After trying to allocate his campaign resources, Glenn focused on the southern US states of Alabama, Georgia, and Florida while overlooking the important state of Iowa in the US Midwest. Glenn soon learned that this was a costly mistake. Glenn ended up finishing fifth in the Iowa caucus, which is the first major milestone in the selection of a US president, and would later be defeated in the New Hampshire primary election, the first primary election in the course of a US presidential election cycle. Unable to overcome these defeats, Glenn announced his withdrawal on March 16, 1984.

Although disappointed about having to withdraw, Glenn got right back to work in helping the citizens of Ohio as senator. Still part of the Government Operations Committee, which was now called Government Affairs, Glenn listened to the concerns of the citizens of Fernald, a small town just outside Cincinnati, Ohio. Fernald Residents for Environmental Safety and Health (FRESH) claimed that the managers of the nuclear plant there neglected safety procedures and were putting workers and the townspeople at risk. Glenn didn't know how accurate these claims were so he requested an investigation from the General Accounting Office (GAO), which was responsible for looking into areas of government that concerned Congress. Two hearings were conducted by Glenn and other committee staff members producing a long list of evidence supporting FRESH's claims. The GAO investigation led to a Centers for Disease Control and Prevention (CDC) epidemiological study. The investigation led to other plants that were even worse than the one in Fernald. Initial cost estimates to fix the processes ranged from \$8 to \$12 billion [2]. Later it would be estimated that it would take a whopping \$300 billion and twenty-five years to clean up the problems, assuming that technology existed to do so [2]. As a final phase, Glenn introduced legislation that would create the Defense Nuclear Facility Safety Board, which would provide oversight of the correction process that involved the federal government as well as state and local governments.

In 1986, Glenn was re-elected for his third term. Shortly after, Glenn became the chair of the Governmental Affairs Committee. Glenn used his new role as chair to help bring about more efficiency within government, such as requiring departments to outline their annual plans. To Glenn's surprise, he found that departments weren't required to audit their funds [2]. Glenn ended up sponsoring legislation that would require the heads of agencies to report their funds and goal outlines to their own departments and the appropriate committees. Glenn also aided in new inventory controls for the Pentagon and other agencies that were more efficient than their predecessors [2]. Glenn was also now a part of the Armed Services Committee which he moved to in 1985 from the Foreign Relations Committee. Here, he thought his military experience would help lead to fewer weapons procurement [2].

In 1992, Glenn was getting ready for yet another reelection campaign. This one would not be as easy as the last two. At the time, no senator from Ohio had been elected for four terms and Glenn still had some campaign debts remaining from 1984. This year was also a presidential election year and Bill Clinton was running as the Democratic nominee for president. Glenn used this opportunity to unify the Democratic campaigns in Ohio and had posters showing a full Democratic ticket: Clinton-Gore (Al Gore being the vice presidential running mate for Bill Clinton), and Glenn for re-election to the Senate. On election night, Clinton won the presidency and Glenn won by a healthy margin over Mike DeWine.

During his years in the Senate, Glenn was unsurprisingly a constant defender of NASA's budget [2]. By now, NASA had long-concluded the Apollo Moon flights and had begun the Space Shuttle program. As Glenn was preparing in early 1995 to debate NASA's budget, he reviewed some materials, which included *Space Physiology and Medicine*, written by three NASA doctors. While reading this, Glenn noticed that there were more than fifty types of physical changes that happened to astronauts while in orbit. Some of these included bone loss, disturbed sleep patterns, cardiovascular changes, and many more. At this time, Glenn was seventy-three years old and still a member of the Special Committee on Aging. Glenn realized that many of these changes were very similar to changes the elderly experience while on the ground. Glenn thought that with the Shuttle program, there was a great opportunity to see how an older individual would react to the environment of low-Earth orbit. Glenn had many questions that he wanted to answer. Naturally, since Glenn never made another flight as a Mercury astronaut, he was still anxious to go back up, and he thought that he could be the one to make the trip [2].

Once again, Glenn was on the initiative. He researched what was already known and talked with multiple doctors from the National Institute on Aging to see if his questions were worth investigating. While this was ongoing, John had talks with Annie to see whether or not he should seek another term. After discussing concerns, John and Annie announced on February 20, 1997, that Glenn would retire from the Senate at the end of his fourth term. By the time Glenn neared the end of his last term he had accomplished many of his goals as a senator. These included limiting the spread of nuclear weapons [2]. Glenn played a key role in the Glenn/Symington Act of 1978 and the Nuclear Proliferation Control Act of 1992. He had also worked on the Taiwan Relations Act and authored the Congressional Accountability Act. After being in contact with Dan Goldin, NASA's Administrator at the time, Glenn finally convinced him to let him fly on the Space Shuttle in order to conduct science on aging. On January 15, 1998, Glenn was interrupted in a meeting by a phone call from Dan Goldin saying that NASA would have a press conference announcing John Glenn's return to space.

The next day, NASA announced that John Glenn would join the crew of the mission STS-95 flying on Space Shuttle Discovery. Glenn met his fellow crewmates in early February. A day later, Glenn was introduced as the oldest member of the astronaut corps. He was designated as Payload Specialist Number Two. Glenn quickly noticed the differences since his time in Project Mercury [2]. All the desks now had computers, and the astronauts were much more diverse, with most of them not being fighter or test pilots. Glenn commuted back and forth between Houston and Washington as he trained to make sure he was in shape and to get used to the layout of the Space Shuttle. He also took classroom sessions that went over all of the experiments that were to take place during the mission. One of these experiments would be Glenn himself, as he would be tested against a younger astronaut to see how space affected an older person. Launch day finally came on October 29, 1998. Glenn awoke, ate breakfast, and started putting his suit on, a task which lasted forty-five minutes. Once his suit was checked, he joined the other astronauts as they headed for the van that would take them to the launch pad. After the roughly six-mile ride to the launch pad, Glenn and the rest of the astronauts made their way up to the shuttle's flight deck.

After two-and-a-half hours of getting situated in the shuttle, the countdown clock reached T-minus twenty minutes. The clock continued counting down and

stopped for two built-in holds. When the clock reached six seconds to launch, the three main engines ignited. Glenn soon found himself in a familiar situation as he felt the gravity forces build on his chest. After eight minutes, the shuttle reached orbit.

> Figure 3–9: Glenn getting his helmet fitted for his Space Shuttle flight.



As soon as they could, the astronauts got to work. Glenn got used to floating weightless, a new sensation for him, as he was packed tightly in a chair during his Mercury flight. During the mission, Glenn performed many experiments, most of which included taking measurements and samples from himself. By the time the shuttle landed, Glenn had flown at an altitude of three hundred miles, making 134 orbits of the Earth, and traveling 3.6 million miles. Glenn was welcomed back by Annie and the kids after landing. Glenn was as happy as he could be, having performed the science he was interested in and being able to go back to space one last time [2]. A few months later, after undergoing follow-up medical examinations and preparing for his transition out of office, Glenn retired from the Senate on January 3, 1999.

V. Retirement (1999–2016)

Now retired from public service, John Glenn found new ways of engaging in his community and inspiring others. Through a partnership with The Ohio State University, the John Glenn Institute of Public Service and Public Policy (which is now the John Glenn College of Public Affairs) was established. Glenn's goal was to provide a place that would inspire citizenship and where young students and professionals could develop leadership. In addition, Muskingum College and the Center of Science and Industry (COSI) in Columbus had a special arrangement with the newly formed institute. Annie would stay alongside John as they became trustees of Muskingum College as well. Glenn would continue to serve his community and help inspire students of all ages for almost seventeen years during his retirement. In 2012, Glenn received the Medal of Freedom from President Barack Obama, given to those who have made "espe-



cially meritorious contributions to the security or national interests of the United States, to world peace, or to cultural or other significant public or private endeavors."

John Herschel Glenn Jr. passed away at the age of 95 at the Ohio State Wexner Medical Center on December 8, 2016. He was laid to rest on April 6, 2017, at Arlington National Cemetery. He is survived by his wife Annie, and their two children David and Carolyn.

Figure 3–10: Glenn receiving the Medal of Freedom from President Barack Obama.

John Glenn was a very modest man his entire life. He was always quick to give other people credit and felt blessed to have been given the opportunities that he had. From his parents, he learned about hard work, effort, and being honest, and he continued to honor their teachings in all that he did. John Glenn was a brave man who was very passionate about citizenship and service to his country through the US Marine Corps. That continued when he became a test pilot, and eventually when he was a part of NASA's Project Mercury. He also took his role as an American hero seriously and aimed to be the best role model he could. Glenn continued with this role as he became involved with public service as a senator. Glenn was honest, fair, and highly motivated when serving for his home state of Ohio. He listened to his community and strived to improve the lives of his citizens any way he could. Glenn was instrumental in paving the way for legislation involving many things, from restrictions on nuclear proliferation to improvements in government efficiency. John H. Glenn was the epitome of how one should serve people selflessly. He was truly made of the "right stuff."

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References

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