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1. Gemini Raises the Bar

With silent, lifting mind I've trod,
the high untrespassed sanctity of space.

John Gillespie Magee

By the end of July 1961 Gus Grissom knew that, barring unforeseen circumstances, he would not fly again in the Mercury program. One of America's original *Mercury 7* astronauts, Grissom had just commanded his country's second manned space mission. The flight went well until the very end, when the hatch of *Liberty Bell 7* unexpectedly blew off, and the spacecraft was lost to the ocean.

In his autobiography, *Schirra's Space*, fellow Mercury astronaut Wally Schirra recalled that Grissom now felt he had something to prove. "He was angry about being blamed for his spacecraft having sunk, and he was fighting to come back out of the pack. Gus was a tiger. He wanted the first Gemini flight, and by God he got it." Gemini, the two-person spacecraft that would follow the solo Mercury missions, was a good place for Grissom to focus. With his astronaut colleagues all waiting their turn to fly, Grissom was now at the back of the line.

"When Gus finished his Mercury flight, he knew he was out of the loop because we had to go through the seven," Schirra reflected. "And he looked at it and said, 'My God, we are not going to have that many flights. I'm going up to St. Louis and play with Gemini.' So it was essentially his spacecraft. He practically had it to himself." Grissom subsequently began working closely with the engineers at McDonnell's St. Louis plant, offering the advice of a flown astronaut as they designed the two-man spacecraft. It was an opportunity they had not been given with the smaller Mercury

craft, apart from some suggested modifications, and Grissom threw himself into the task with his usual determination and expertise. “Since we had to fly the beast,” he said prior to the flight, “we want one that will do the best possible job.” On the whole, the engineers were pleased to have Grissom’s input.

On the twentieth anniversary of the attack on Pearl Harbor, Dr. Robert Gilruth had revealed plans for the development of a two-person spacecraft. Just a month later, Alex P. Nagy from NASA headquarters in Washington gave an eminently appropriate name to the project: Gemini.

Nagy’s suggested title quickly caught on, and it stuck. In an astrological sense, Gemini was named after a constellation that includes the twin stars of Castor and Pollux, and it is a sign of the zodiac controlled by Mercury. Within its spheres of influence are the qualities of adaptability and mobility—two major objectives of Project Gemini. A circumspet Gus Grissom would later write that “those of us who had become involved with Gemini were beginning to suspect that we’d got, not twins, but a tiger by the tail.”

Gemini was seen as a necessary bridge between the pioneering Mercury flights, which primitively tested the adaptability of humans to spaceflight, and the Apollo program, which was designed to send astronauts to the moon and return them to the Earth. Grissom would also draw his own automotive analogy. “Gemini’s a Corvette,” he reflected. “Mercury was a Volkswagen.”

The Gemini astronauts would in effect open the doorway to a moon landing—an event not measured then in decades, but in a mere handful of years. They would not only conduct long-duration missions as a necessary precursor to the lunar voyages, but also experiment with the complex techniques of rendezvous and conducting docking maneuvers in Earth orbit. Over Gemini’s twenty-month duration there would be twenty available seats going into orbit. As one Gemini astronaut would describe the program and its list of challenging objectives, it was “test pilot heaven.”

Externally, the two-person Gemini vehicle was very similar to the Mercury spacecraft. However, it weighed almost twice as much, and being a foot wider and longer created an overall increase in size of some 20 percent. The most dramatic difference in the spacecraft itself was an increase of 50 percent in its interior volume, which would permit two astronauts to occupy it for flights of up to two weeks’ duration.

In every sense it was a pilot's spacecraft. Although 220 dials, switches, and levers surrounded the two astronauts, all of them were within easy reach, while strategically placed mirrors allowed them to view and operate other controls located behind them. The astronauts could also exit the craft while in orbit through two hinged hatches. It was all part of the planning process: the Titan boosters that would carry the three-ton spacecraft aloft used combustible fuel instead of the highly explosive propellant that had fed the Atlas rockets, which allowed designers to dispense with the heavy, rocket-propelled escape towers previously used in Mercury flights. "The weight saved could be put to good use in the spacecraft," Grissom observed in his book, *Gemini*. Having larger hatches was also critically important if a catastrophic situation developed on the launch pad or in early flight. Once a rapid evacuation had been decided upon the hatches would fly open in milliseconds, while ejection seats would simultaneously blast the two crew members out and away from their spacecraft.

Another feature of Gemini was the white, one-ton adapter section located at the rear of the spacecraft. Essentially a harmonizing collar between the craft and the Titan booster, the section also housed sixteen small rockets for orbital maneuvering, containers of oxygen, and batteries for electrical power. This adapter section, its job done, would be jettisoned just prior to reentry, exposing the spacecraft's retrorockets and heat shield.

In discussing developing plans for Project Gemini at a press conference, NASA's Director of Manned Space Flight, Dr. H. Brainerd Holmes, explained that the changes were important, "for they will allow us to put manned space flight on more of an operational basis, as opposed to the research and development effort that is involved in Project Mercury. They are the same changes that are generally found when we compare a first prototype aircraft with its later production version."

The Martin Company's Titan II had essentially been designed as a ballistic missile; in fact, it was the most powerful Cold War booster ever developed by the United States, capable of carrying an enormous warhead measured in tens of megatons of thermonuclear energy. This mighty booster's first stage would develop around 430,000 pounds of thrust—some 65,000 pounds more than the Atlases that would launch four American astronauts into orbit during Project Mercury—while the second stage would produce an additional 100,000 pounds of thrust.

Unlike the Atlas and other boosters of that era, the Titan II did not burn liquid oxygen or kerosene. Instead, it was powered by highly toxic hypergolic propellants: room-temperature fuels and oxidizers that spontaneously and violently ignited on contact with each other in the rocket's combustion chamber.

The one truly strange thing that happened to the Gemini craft and its interior fittings during their development was that they began to be fashioned around Gus Grissom—one of the smallest of the astronauts. Later, taller astronauts would have problems squeezing into the same space and using the same apparatus designed for Grissom's compact frame. He told *Life* magazine that "When the other [astronauts] started looking at the Gemini mock-up, it was pretty clear it was designed around me." In fact, this became so evident that the astronauts began to call the Gemini spacecraft "The Gusmobile."

Fellow astronaut John Young, who would be assigned to the first mission with Grissom, reflected the feeling of the others: "Gus really had a big hand in everything," he said, "from the way the cockpit was laid out to what instruments went where. It was his baby." Grissom demanded a lot of himself, especially as Gemini came with the accountability of command. "I was responsible for my own skin in my Mercury flight," he said at the time. "But now that I'm going up for my second flight and have John in that co-pilot's seat, I'm responsible for two. This will mean some of the decisions may come a little harder, but I've asked for the responsibility and I've got it."

In most of John Young's photos, past and present, he generally looks detached and unsmiling. Yet those who know him say that although the former navy pilot might seem aloof, he actually possesses a lively, very dry wit. Blink and you might miss it, but it is there. At various times he has been described as a loner, an adventurer, and a mechanical genius, with a curious dislike for the great outdoors.

"John is an amusing bundle of such contradictions," his first wife Barbara once commented. Fellow astronaut Michael Collins would also describe his colleague as "Mysterious. The epitome of the non-hero, with a country boy's 'aw shucks—t'ain't nothing' demeanor, which masks a delightful wit

and a keen engineer's mind." NASA managers, in their first technical meetings with the rookie astronaut, were regularly thrown by his demeanor. At first Young would sit in silence, absorbing the opinions being offered, and the others attending would assume he had nothing of importance to add. Then, toward the end of the meeting, Young would gently make a point so devastatingly precise that they would realize he was ahead of them all. He would have summarized all the key points and seen another that they had all missed. He was rarely underestimated twice.

Just a week shy of his thirty-second birthday and then a lieutenant commander in the U.S. Navy, Young was named as one of NASA's second group of astronauts. He had not been eligible for consideration in the first Mercury group, as he was still a student at test-pilot school. John Watts Young was born in San Francisco on 24 September 1930 to parents William Hugh and Wanda (née Howland). He was less than two years old when the family moved east—first to his father's birthplace of Cartersville, Georgia, where his younger brother, Hugh, was born in 1933. The future astronaut began his education at Cherokee Avenue School in 1935, and while his father looked for work he and his brother lived with their aunt, who remembered his childhood fascination with airplanes and model trains. She would later write of her nephew that "He has a brilliant mind with amazing concentration. John is a very reserved and private person completely absorbed and happy in his space work."

The following year his father found a new job in Orlando, Florida, but it would be some three years before the family moved there permanently, and into their own home. Young, now nine years old, and his brother were enrolled at Princeton Elementary School. Then, during World War II, his father served as a navy commander, flying patrols over the Pacific. Young's interest in aviation continued through his high school years, both at Memorial Junior High School and later at Orlando High. According to his father, he also "used to draw pictures of airplanes and rockets all the time." One of Young's former high school classmates recalls that "in the eleventh grade everybody had to make a talk on something. . . . John chose rockets."

Academically, he had little difficulty in high school, breezing through with straight As. Football proved a handy release from the strictures of study, and Young also became a promising track athlete. A member of

the National Honor Society, he graduated in 1948 and was awarded the faculty's highest senior class honor, the Guernsey Good Citizenship Cup. Young received an ROTC scholarship and enrolled at the Georgia Institute of Technology. He subsequently earned a magna cum laude degree in aeronautical engineering from the institute in 1952, finishing second in his class, and received a commission as an ensign in the U.S. Navy.

A temporary assignment as fire control officer aboard the Fletcher Class destroyer USS *Laws* followed, and even though he bore the fledgling rank of ensign Young seems to have made a lasting impression on people. One of those who served with him, Joseph LaMantia, recalls Young as being “the most respected officer on the ship.”

His next assignment was to attend basic flight training school in Pensacola, Florida, and in 1954 he won his wings. An advanced six-month flying course was followed by four years' duty on the carriers *Coral Sea* and *Forrestal*, flying TF-9D Cougars and F-8D Crusaders with the 103rd Fighter Squadron. During this exciting period Young married Barbara White of Savannah, Georgia, with whom he would eventually have two children—daughter Sandy, born in 1957, and a son, also named John, born two years later.

“John started out in the black-shoe Navy,” Grissom wrote with dry humor in his autobiography, using the term for navy personnel who were not naval aviators, “and I never let him forget his destroyer days. After switching to flying, he set a world time-to-climb record in 1953, during Project High Jump.” In fact, as a test pilot, Young set world “time-to-climb” records for both three thousand and twenty-five thousand feet in a navy F-4H-1 Phantom II fighter aircraft. Prior to his astronaut selection in 1962, he had accumulated an impressive record as a navy test pilot, instructor, and project evaluation officer, with around thirty-two hundred flying hours to his credit, including nearly twenty-seven hundred in jet airplanes. As Young told the *Washington Evening Star* newspaper in 1965, “I left the best job in the Navy to get the best job in the world.”

“John's not what you'd call the talkative type,” Grissom later recalled of his Gemini copilot, “but he's got a good solid sense of humor, which is a prerequisite in this space business. It's a bit unusual and takes you a while to catch on to, but he knows how to ease the strain. Without humor, you're in a bad way when the glitches come.” Neither Grissom nor Young were

known for wasting words, and as they continued their mission training they were regarded as well matched. As the first non-Mercury astronaut to get a confirmed prime crew assignment, Young seemed in fact to imitate his commander down to the tiniest detail. Both quietly absorbed themselves in the engineering details of the mission. When reporters tried to ask them questions about themselves, they would get a reply about machinery instead. It was the way the two astronauts wanted it. Neither man cared much for the publicity, and would rather have been quietly discussing the latest simulator run together than responding to reporters' questions.

In one aspect of the mission the crew seemed almost willfully intent on derailing NASA's publicity plans. Tradition demanded that the spacecraft receive a name, and this privilege fell to Grissom as commander of the vehicle. His first idea was to name it after an Indian tribe from the area in Indiana where he was born, and he and John agreed that the name Wapasha was appealing. Then someone suggested that the press would probably tongue in cheek call it the "Wabash Cannon Ball," after a popular rail-themed country song. At the time, Grissom's father was working for the Baltimore and Ohio Railroad, and he didn't want to impose that burden on him. "How would he explain that one to his pals on the B&O?" Grissom later reflected.

Then he had a devilish notion, inspired by the name of the popular Broadway show and movie *The Unsinkable Molly Brown*. Harking back to the loss of his Mercury spacecraft *Liberty Bell 7*, Grissom began to feel *Molly Brown* might be a perfect choice. Once again, John Young agreed, so their Gemini craft was named after the *Titanic* survivor portrayed in the musical. "Some of my bosses were amused," Grissom recalled, "some weren't." A couple of those who didn't like the name asked the unrepentant astronaut what his second choice might be, thinking he may have a better option. His second choice, he told them, was *Titanic*. "Nobody was amused, so *Molly Brown* it was."

In hindsight, Deke Slayton could hardly have selected a better crew for *Gemini 3*. It was essentially a "shakedown" flight, as pilots liked to call it, which called for the crew to exercise the spacecraft's orbital attitude and maneuvering system. This system was crucial to the planned rendezvous and docking flights that would later be attempted. Another of their vital tasks was to attempt a controlled reentry using an on-board computer. "In

comparison with some of the later missions,” Grissom once wrote, “ours was what John Young would describe as ‘a piece of cake.’ But John and I had practically lived with our spacecraft since the first rivet was put in it at the McDonnell plant. We had studied every one of its systems as each was installed, and sweated out the glitches along with the McDonnell engineers. So we had the vital ingredient of confidence going for us all the way.”

Originally, the first manned Gemini mission was scheduled for December 1964—America’s only manned flight planned for that year. Then the postponement of a critical test flight and the forces of nature brought about a lengthy delay. The second precursor flight, designated *Gemini 2* and scheduled for 6 October, involved launching an unmanned Gemini craft out over the Atlantic to demonstrate reentry techniques and recovery systems. On 17 August the Titan II booster being readied for the task was damaged by lightning as it stood on the launch pad. Later, as a precautionary measure, the second stage was removed and placed under shelter when Hurricane Cleo began advancing on the Cape. The first stage remained on the pad but was firmly battened down. After Cleo, another two hurricanes began moving in, so the first stage was also lifted from the pad and moved to a safe area. NASA’s associate administrator for manned spaceflight, Dr. George Mueller, announced that these factors had combined to eliminate the slim possibility of a manned launch that year, and he confirmed that the launch would take place no sooner than February or March.

The Titan II test flight eventually left the pad on 19 January, culminating in the recovery of the automatically piloted spacecraft by crews from the aircraft carrier *Lake Champlain* an hour and forty-four minutes after liftoff. The craft splashed down only twenty-four miles short of its intended target after a journey of 2,126 miles. A jubilant Gus Grissom said the almost-faultless trial had left a “clear road ahead” to the flight he and John Young would conduct just a few weeks later. At a news conference held in a giant assembly room of the Martin Company plant in Baltimore, Grissom was full of praise for the specific rocket that would carry them into space. “This Titan is the cleanest booster that has gone through all its tests—cleaner than any booster flown to date,” he said with conviction. “Very definitely, Titan is *go!*”

One aspect of their spacecraft that never really sat well with the crew was

the ejection system, intended to save them in the event of a booster catastrophe at launch or in early flight. As Young watched one test of the system, his hope turned to dismay when the hatch failed to open as planned. The ejection seat fired and plowed straight into the hatch. Such an event would have proved fatal, or, as Young dryly put it later, “One hell of a headache—but a short one!”

On 5 February, *Molly Brown* was slowly trundled out to Launch Complex 19 and carefully hoisted into position atop the ninety-foot Titan II launch vehicle. Three days later, in yet another positive move for the Gemini program, NASA announced that Mercury astronaut Gordon Cooper and rookie Charles “Pete” Conrad had been selected to fly the *Gemini 5* mission, then planned for September. With a provisional launch date of 23 March to work toward, the two *Gemini 3* astronauts stepped up their training. They worked well together. Young admired his commander's experience and dedication to the task at hand, while Grissom took a liking to his copilot's pragmatic enthusiasm, engineering skills, and wry humor. “Until we joined up for this flight,” Grissom said of him, “I didn't know John Young any better than any of the others in their group. They're all talented. In fact, when one of them comes up with a new answer for some problem, I think they are a lot smarter than our original group of seven. By launch time John and I will know each other pretty well. We take a note book with us into the flight simulator . . . and jot down all the problem areas. Then at night we sit down . . . and talk things over, deciding who does what.”

Nothing was going to prevent Gus Grissom from making this flight—not even a possible fracture in his arm. Within weeks of launch, he hit a door with his hand during a relaxed function in the Bahamas, and according to his wife, Betty, “apparently broke a bone in his left wrist.” Almost immediately the wrist began to swell up, and he had to strap it tightly with a plastic bandage. Somehow he managed to keep it a secret and worked privately on the wrist to bring the swelling down before launch date. He knew very well that if anyone found out it could easily have caused him, or both crew members, to be replaced. “Gus was never entirely sure the wrist was broken,” Betty Grissom later revealed in her book, *Starfall*, “because he did not consult a doctor, at NASA or anywhere.”

As launch day approached, the crew's training included a full seven-hour countdown simulation inside their spacecraft on the launch pad. The

test was deliberately halted just one minute before the theoretical liftoff. Even though several minor problems had emerged, officials declared the trial launch a success. Then, on 17 March, just six days before *Molly Brown* was due to fly, the Soviet Union dropped a sickening bombshell. *Voskhod 2* was launched into orbit, and cosmonaut Alexei Leonov made a historic spacewalk. The timing was clearly aimed at stealing NASA's thunder, and it gave the space agency quite a jolt. When asked the seemingly inescapable question about where this latest feat placed NASA in the space race, officials calmly reacted by talking about Gemini's elaborate and structured preparations, while politely downplaying what they claimed was a very obvious (and successful) instance of Soviet propaganda.

At 9:24 a.m. on 23 March 1965, after a minor delay, the Titan II's first stage erupted into life; NASA's first manned Gemini mission had begun. The launch was later said to have been so smooth and relatively free of noise that neither Grissom nor Young realized the Titan had left the pad until CapCom Gordon Cooper reported "Bolts and liftoff!" Then they noticed that the mission elapsed-time clock was running. Less than half a minute after launch the two astronauts once again heard Cooper's calm Oklahoma twang. "NASA never approved the name for the spacecraft," Cooper later recalled, "but I gave it my official approval by calling to Gus and John, 'You're on your way, *Molly Brown*.'" Grissom responded with an enthusiastic, "Yeah, man!"

Spectators on the ground watched as the Titan II rocket arced into a startlingly blue sky with a deep, thunderous roar. Witnesses to the launch were amazed that there was no fiery contrail as in earlier Atlas liftoffs due to the use of hypergolic fuel in the booster. Two minutes after liftoff, Flight Control reported, "everything looking well" as the Titan reached a speed of 3,000 miles an hour and the crew prepared for staging. "Staging is really something," John Young said of the event. "It's called 'fire in the hole' because you fire the second stage engine before you get rid of the first stage. [It] blew out everything and fire came all around the vehicle and you could see it. That was a surprise to me. But it is only momentary, and with the second stage firing you get right out of there."

As the second stage kicked in and the spent first stage dropped away, acceleration increased dramatically. Flight Director Chris Kraft gave the