

Fifty years since the first manned spaceflight

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16 April 2011

April 12 marked the 50th anniversary of the first manned spaceflight, when Soviet cosmonaut Yuri Gagarin flew aboard the Vostok I spacecraft, orbiting the Earth and returning safely after a journey of 108 minutes.

Gagarin's mission came at the height of what became known as the "space race," the Cold War competition between the Soviet Union and the United States, touched off by the first great Soviet space success, the launching of Sputnik, the first orbiting satellite, in October 1957.

Sputnik was only one of many Soviet space "firsts," followed by the first launching of a living animal into orbit, the dog Laika; Gagarin, the first man; the first paired launches, with two spacecraft orbiting the Earth at the same time; the first two-man space mission; the first woman in space, Valentina Tereshkova; and the first space walk, by cosmonaut Alexei Leonov.

It was the early success of the Soviet space program that compelled US President John F. Kennedy to commit the resources of the richest and most powerful capitalist nation to a crash effort to put a man on the Moon within a decade. Kennedy made that pledge in a speech delivered a month after Gagarin's successful mission had made him a worldwide hero.

The Vostok I spacecraft in which Gagarin lifted off from the Soviet launch center of Star City, in Central Asia, was a tiny and technologically primitive device by later standards. The entire spacecraft weighed less than 10,000 pounds, shaped roughly in a cylinder 15 feet long, with a diameter of just over six feet. Gagarin was only five feet, two inches tall, and his small size was a key qualification for the flight.

The cosmonaut himself was purely a passenger on the flight, locked out of the controls, which were operated remotely from the ground. He later joked that he was not sure whether he had been the first man in space or the last dog.

There was an emergency key to unlock the controls, but the main concern was that Gagarin would be incapacitated by the gravitational stress of liftoff or weightlessness while in orbit. Would his heart continue to pump blood? Would his

eyes function properly, his internal organs, and his brain? Since no human being had ever travelled beyond the Earth's atmosphere, there were very real fears of the impact of the Sun's radiation, gamma rays, or other unforeseeable dangers, or even that he might go mad.

Not that the cosmonaut was unstable. On the contrary, he had been selected in part because of his extreme calmness and his outgoing, happy personality. A secret ballot of the 19 cosmonauts-in-training reportedly resulted in 17 votes for Gagarin to be the first man in space. One account relates that, 20 minutes before launch, as he lay strapped into the capsule about to be blasted into outer space, his pulse rate was a steady 64 beats a minute.

Just last week, a slew of Soviet-era documents from 1961 were declassified by the Russian authorities, including a letter that Gagarin drafted to be sent to his family in case the Vostok mission ended in tragedy. It demonstrates his coolness in the face of incredible dangers.

According to an excerpt published in *Novaya Gazeta*, he wrote: "I trust the hardware completely. It will not fail. But it can happen that a man trips at ground level and breaks his neck. Some accident may happen. If it does ... do not waste yourself with grief. Life is life, and nobody is safe from being run over by a car."

The 27-year-old former fighter pilot was in top physical condition, and had to be, since he endured gravitational pressures as high as 8G—in which a 150-pound man would feel more than half a ton of weight. Gagarin's face was visibly contorted during reentry, but he passed through the ordeal and was able to eject and parachute safely into a peasant's field near Saratov, in European Russia.

The spacecraft made a single orbit, passing eastward across Siberia, then diagonally across the entire expanse of the Pacific Ocean from northwest to southeast, crossing the continent of South America at its southernmost tip, then northeast across the Atlantic Ocean, Africa and the Middle East, before landing a few hundred miles west of its launch point.

There was one critical point where Soviet ground control feared they would lose the spacecraft. When the Vostok capsule re-entered the Earth's atmosphere, the cables

attaching the descent module to the service module failed to separate. The craft began shaking violently, but then the cables burned up in the extreme heat of reentry. The two pieces of Vostok broke apart as required, with the service module burning up and the descent module plunging toward the Earth, protected by its 400-kilogram heat shield. After Gagarin ejected during the final descent, both cosmonaut and Vostok made successful parachute landings.

Both Gagarin and his pioneering mission were the products of the complex and tragic history of the Soviet Union. Gagarin's parents lived on a collective farm in the village of Klushino in Smolensk Oblast, on the western border of European Russia. His father was a skilled worker, a carpenter, and his mother tended dairy cows. Gagarin was born March 9, 1934, towards the end of the ferocious Stalinist campaign of forced collectivization.

Smolensk was overrun and occupied by the Nazis in World War II, and the Gagarin family were evicted from their home by a German officer. They built a mud hut where they lived for nearly two years. Gagarin's two older siblings were deported to Nazi Germany as slave laborers in 1943, but survived and returned home after the destruction of the Third Reich.

In the decade that followed the war, Gagarin showed early interest in flying airplanes, enlisted in the air force, and was selected for flight school and then the cosmonaut program.

The father of the Soviet space program was chief rocket designer Sergei Korolyev, who survived six years in Stalinist concentration camps during the purges of the 1930s. Released to work on the Soviet missile program, his name was never made public due to security concerns, until after his death from cancer in 1966.

The Soviet missile program had forged well ahead of the American in the early 1950s, in part due to the pioneering work of the distinguished scientist and engineer Konstantin Tsiolkovsky (1857-1935), who developed the entire theoretical framework of modern jet and rocket propulsion while working as a mathematics teacher in a Tsarist-era school.

As early as 1903, Tsiolkovsky published *The Exploration of Cosmic Space by Means of Reaction Devices*, which calculated the speed required for a spacecraft to achieve earth orbit, and suggested that this could be achieved by a multi-stage rocket using liquid oxygen and liquid hydrogen as fuel, foreshadowing the actual development of space technology by more than half a century.

The practical realization of these theoretical conquests was only possible as a result of the enormous advances in the development of economic organization, industry and technology in backward Russia, provided by the 1917 October Revolution, the founding of the USSR and the

world's first attempt at the development of a planned economy.

The Stalinist bureaucracy usurped power from the working class, murdered an entire generation of revolutionaries in the purges, and ultimately destroyed the property relations established as a consequence of the October Revolution. But the fatal contradictions of subsequent Soviet development notwithstanding, the growth of industry and of the proletariat under the impetus of the October Revolution were what made possible both the military victory of the USSR over Nazi Germany and the post-war development of the Soviet economy, including the rapid technological progress in the early years of space exploration.

Gagarin's successful space mission typified the contradictions of Soviet life, at approximately the mid-point between the October Revolution and the final liquidation of the USSR by Stalinism in 1991.

As he prepared to make history as the first man to leave the Earth's atmosphere, he and Korolyev fell into discussion about the food supply for his return trip to Moscow. Korolyev told him there was tea, sausage, candy and jam, enough to tide him over. Gagarin told the rocket scientist, "The main thing is that there is sausage."

After the worldwide sensation produced by his historic spaceflight, Gagarin found himself effectively—at age 27—forbidden to pursue his chosen career. While given a place on backup lists for subsequent missions, he was never again allowed to go into space. The Moscow bureaucracy preferred to milk his celebrity for its own political benefit, and wished to avoid the risk of losing this national hero in a subsequent disaster. Such caution did not suffice, however. Seven years later, while Gagarin was on a routine training mission, his MiG fighter jet crashed and burned, killing him and his co-pilot. He was only 34 years old.



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