

Author's Note: This article was written prior to the February 2022 Russian invasion of Ukraine. It is intended to highlight the early history of Ukrainian and Russian gliding, not to promote Russian nationalist propaganda. The author hopes that Russia will finally abide by its long-standing obligations to respect Ukrainian territorial integrity, and that someday we might all be able to visit historic Ukrainian gliding sites, like Koktebel in Crimea, in peace.

Vintage Gliders and the Space Race

What do vintage gliders have to do with the Space Race? Well, certainly many early (and current) NASA employees flew gliders. That would include astronauts who flew gliders as part of their training, or for fun, as well as scientists, researchers and leaders who engaged in the sport in the 1960s. NASA's predecessor organization, the NACA, showed some interest in early glider development, but there doesn't appear to be much of a connection between "vintage" gliders and the early U.S. space program. However, if you look at the other side of the Space Race, the story is quite different. Many of the engineering leaders of the early Soviet space program cut their professional teeth on designing, building and flying gliders in the 1920s. Foremost among them is Sergei Pavlovich Korolev, the legendary "Chief Designer" of the Soviet space program. Korolev is still not well known in the West, and he was not publicly identified as the Chief Designer in the Soviet Union until after his untimely death in January 1966. Soviet leaders claimed that they kept his identity secret because of fears that he might be assassinated or abducted by the West. In reality, they had a number of reasons to keep Korolev on a tight leash, but during his lifetime they did publicly laud the mysterious "Chief Designer" and even allowed Korolev to write articles for the Soviet press that appeared under the pseudonym Professor K. Sergeev.

All of this secrecy may seem a bit much to us, but Korolev was so valuable that Soviet Premier Khrushchev referred to him as his "magician." Following the second World War, Korolev emerged from prison to become the engineering leader of the USSR's ballistic missile program. After Soviet leader Stalin's death in 1953, Korolev took the huge gamble of convincing his new leaders to leap over several planned development cycles to build the world's first intercontinental range ballistic missile. The R-7 missile (known in the West as the SS-6 Sapwood) turned out to be a poor weapon. Only a handful of them were ever deployed. But the

R-7 was a remarkable space launch vehicle, and that was not an accident. In fact, the improved Soyuz variant of the R-7 is still in use today, launching both satellites and humans into space. It is, so far, the only launch vehicle that the Soviet Union/Russia has ever used to launch cosmonauts. More importantly at the time, the R-7 was the most powerful rocket in the world, and it retained that title until 1964. Korolev, and the team that he led, used the R-7 to score a string of space firsts for the Soviet Union that radically changed the world's view of his country. Starting with Sputnik in October 1957, Korolev was the mastermind and driving force behind the first animal in space, the first spacecraft to fly by the Moon, the first spacecraft to impact on the Moon, the first pictures of the far side of the Moon, the first probe launched to Venus, and the first human (Yuri Gagarin) to fly in space. In three and a half years Korolev and his team made the USSR the "winner" of the Space Race and this pushed President Kennedy into declaring a race to the Moon. The string of Soviet space spectaculars continued into 1965 when Project Gemini began to break records and the Soviet program faltered for a variety of reasons.

While Korolev could well be credited with starting the Space Race and changing the course of history, his story is a most unlikely one. Born 115 years ago, on 12 January 1907 in Zhitomir, Ukraine, then part of the Russian Empire, his parents' marriage broke up when he was three years old. While his mother, Maria Nikolaevna Koroleva, pursued her dream of higher education in Kyiv, young Sergei's grandparents raised him in the provincial town of Nezhin, Ukraine. There, on 4 June 1911, one of the first pilots in the Russian Empire, Sergei Isaevich Utochkin, brought his self-built biplane to town for a demonstration flight. Five-year-old Sergei Korolev saw the flight sitting on the shoulders of his grandfather, Nikolai Yakovlevich Moskalenko. He was (like so many of us) immediately hooked on aviation at



Sergei Pavlovich Korolev at Kapustin Yar missile test site in 1948. Author's collection.

an impressionable age. But his path to the sky, or even an education, was soon obstructed by war and revolution. When World War I broke out, his grandparents moved out of the path of the war and into Kyiv. Korolev began his intermittent education in Kyiv, but as the war was winding down in 1917 his mother completed her advanced education (in French and literature) and remarried. Korolev's new stepfather, Grigory Mikhailovich Balanin, had just been offered a job as chief engineer of a railway line based in Odessa, Ukraine. The family moved to a home near the waterfront there and Sergei restarted school in September 1917. But the Bolshevik revolution led to the closure of the schools just over a month later. During the civil war that followed, control over Ukraine passed back and forth between the "Red" Bolsheviks, the anti-communist "White" forces, and Ukrainian nationalists who were seeking their own independence. Complicating the situation further, the Western allies intervened in several places after the Bolshevik revolution. Odessa was occupied by a French-led force from December 1918 to April 1919. The Bolsheviks eventually consolidated control over Ukraine, but the situation was turbulent and living conditions were extremely difficult. Fortunately, young Sergei had educated parents who ensured that he was home-schooled until the education system settled down in around 1922. Meanwhile, Korolev had taken advantage of his freedom from a school schedule to spend much of his time watching at the fence of the military seaplane base near his home. Eventually, the staff there let him onto the base and put him to work. Like his counterparts at small airports around the U.S., Korolev soon found himself getting airplane rides in exchange for helping out around the airport.

After the Bolsheviks had consolidated control in the Soviet Union, they recognized that they would need an air force. Resources were extremely limited, so glider building and flying societies were encouraged around the country. Korolev and his stepfather joined one of these groups in 1923. The rest of Korolev's school studies suffered for a while as he threw himself into learning everything he could about glider design,

construction and operation. Fortunately, his stepfather was able to help Korolev translate a number of books on gliders from German and convince him to pay attention in school. Within a year, by the summer of 1924, 17-year-old Sergei Korolev was being paid to teach classes on glider design at several places in Odessa. That summer, he completed the plans for the first glider he designed – dubbed the K-5. (His numbering system for his designs defies explanation.) The plans for the K-5 were submitted to a national contest and were lost. But the citations he got for these plans were a prominent part of his application to the Kyiv Polytechnic Institute. Korolev began studies in the aeronautics department at Kyiv Polytechnic in the fall of 1924.

The Soviet effort to encourage glider development also included the All-Union Glider Tests (Russian acronym: VPI) that started in late 1923. These events were held in Koktebel, at the time a small resort town on the Black Sea coast of the Crimean Peninsula. With hills rising from the shoreline to over 250 meters (820 feet) and a prevailing onshore breeze, flying conditions at Koktebel were excellent for early gliders. The town became so closely associated with these activities that



Top: Pilots pose in front of the AVF-20 glider during the 4th All-Union Glider Tests in 1927. This photo hung in Korolev's home office in the 1960s. Korolev is third from the left. Bottom: The Koktebel in flight, October 1929. Natalia Sergeevna Koroleva photos.





The glider *Koktebel*. Sergei Lyushin (L), Sergei Korolev (seated in the cockpit), and test pilot Konstantin Artseulov (R). Natalia Sergeevna Koroleva photo.

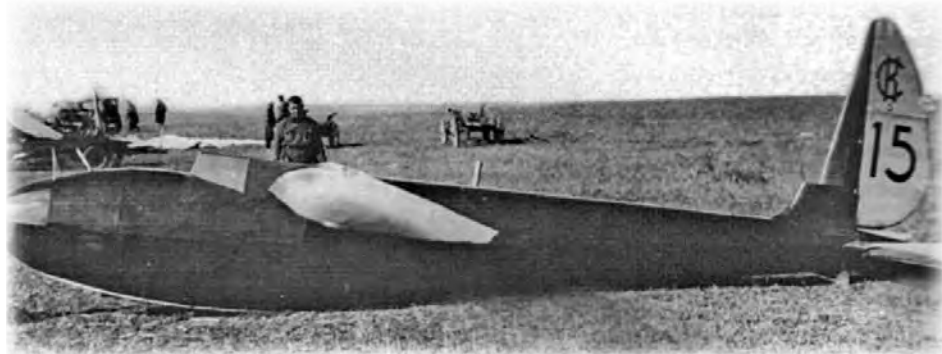
Soviet leaders renamed it Planerskoye (Russian for glider); the name was returned to Koktebel after the collapse of the Soviet Union. The VPIs were more than simply contests, because they involved evaluation of newly-designed gliders, test flights, and training of glider pilots. Korolev knew that Kyiv Polytechnic Institute was planning to send a delegation with their gliders to the second VPI in September 1924. Arriving at the school just weeks before the event, Korolev clearly expected to be part of the delegation. But his pleas to attend were rejected. Over the next year, he did well in his studies, did volunteer work building the Institute's new glider designs, and took glider flying lessons. These efforts did not pay off. He was left in Kyiv again in



The glider *Koktebel* being towed uphill to the launch site. Sergei Korolev is at the left wing root. Natalia Sergeevna Koroleva photo.

1925, when the school's gliders and pilots left for Koktebel. Political upheaval would, once again, derail Korolev's flying hopes the next year. The forced collectivization of Ukrainian agriculture and the famine that began that year disrupted both the aeronautics faculty at Kyiv Polytechnic and also the national glider tests. There was no VPI in 1926, and aeronautics education at Kyiv Polytechnic effectively ended.

Fortunately for Korolev, his stepfather had been transferred to an engineering job in Moscow in 1925. Korolev was able to move into one of the leading aeronautics academic programs in the country, the Moscow Higher Technical School (Russian acronym: MVTU) and moved into his parents cramped apartment in Moscow. Korolev flourished there, gaining a reputation as a driven student and a motivational leader. Studying under the giants of early Soviet aviation Korolev learned engineering, earned his glider pilot license in early 1927, and finally got to go to Koktebel for the 4th All-Union Glider Tests in September 1927. Although flying conditions were not great



The glider *Krasnaya Zvezda* (Red Star) at the 7th VPI in 1930. Note the CK (Sergei Korolev's initials in Russian) tailflash. Natalia Sergeevna Koroleva photo.

that year, Korolev met many of the leading lights of Soviet aeronautics research at the 1927 VPI. The event left a huge impression on him. In fact, years later, after he became the mysterious Chief Designer, Korolev kept a photograph of pilots (including himself) resting against a glider taken during the event on the wall of his home office.

Korolev participated in the All-Union Glider Tests (VPI) for the next three years. The 1928 session was a relatively small event, but in 1929 Korolev partnered with Sergei Lyushin to design a single-seat high-performance glider for the 6th VPI that fall. Lyushin and Korolev had met at Koktebel in 1927, and wound up working together when Korolev began a work-study program at a Moscow aircraft factory. They spent evenings after work at Korolev's parents'

apartment working on the design. After convincing the Moscow Glider Society that they had a sound design, funding was made available to build it. Larger than any other glider at the VPI in 1929, and painted a striking dark crimson red, the glider they christened *Koktebel* (also known as the SK-5) made a huge impression. The test pilots who flew it gave it high marks. Later in the contest, the 22-year-old Sergei Korolev himself logged a 4-hour 19-minute flight in it.

Returning to MVTU that fall, Korolev started designing another glider. But first he had to defend his thesis project, a small single-engine airplane design (the SK-4). His thesis supervisor was the legendary Soviet aircraft designer Andrei Tupolev. Not surprisingly, Korolev passed with high marks and graduated from MVTU in February 1930. That year he continued work in the aircraft industry, and worked feverishly at night on an aerobatic glider design. This project may have been inspired in part by reports that American Edward Heath had flown a loop in a glider in January 1930. Korolev designed his new glider to withstand up to 10 Gs. In October 1930, this glider, named *Krasnaya Zvezda* (Red Star and designated SK-3 by Korolev) made its debut at the 7th VPI at Koktebel. After examination by the technical committee (headed by Soviet aircraft designer Sergei Vladimirovich Ilyushin), *Krasnaya Zvezda* was test flown by V. A. Stepanchenok, who recommended some adjustments to the rudder. Korolev made a couple of flights in his new glider, but came down with typhoid and spent the rest of the VPI in a hospital. With Korolev out sick, *Krasnaya Zvezda* was sidelined, but test pilot Stepanchenok knew what *Krasnaya Zvezda* had been designed for. Near the end of the VPI, on October 28, 1930, he had *Krasnaya Zvezda* pulled up to the launch site for the usual bungee cord launch. After riding the ridge for a few minutes, he dove into the valley and executed the first loop in a glider in the USSR. Returning to the ridge Stepanchenok regained altitude quickly and flew into the valley for another loop, and did the same one more time before landing to a storm of applause. Russian sources make a major point of the fact that the earlier U.S. glider loops had been made after being towed to altitude, while Stepanchenok and *Krasnaya Zvezda* did not take advantage of this “trick.”



Krasnaya Zvezda in flight at Koktebel, October 1930. Natalia Sergeevna Koroleva photo.

The 1930 All-Union Glider Tests marked the height of Korolev's glider infatuation. In late 1929 he had heard the siren call of rocketry and that increasingly monopolized his attention. There was no VPI in 1931, and by the time of the 8th VPI in October 1932, Korolev was married and deeply involved in leading the Rocket Propulsion Research Group (Russian acronym: GIRD) in the Moscow area. Nonetheless, he arranged

his 1932 vacation time so that he and his wife, Ksenia Maximilianovna Vincentini, could spend a couple of days in Koktebel during the VPI. Korolev continued to fly gliders during the 1930s in Moscow, but work and family demands limited his glider efforts. He did, however, manage to merge his interests in rocketry and gliders with tests and several designs for rocket-powered gliders. His last major glider design was the SK-9, a two-seat glider designed to be aerotowed. He took it to the 11th VPI - aerotowed all the way from Moscow to Crimea. The SK-9 was eventually modified into the RP-318-1 rocket-powered glider that was test flown in 1940.

In the 1930s, glider activity in the USSR was on the wane. There was no VPI in 1936, and the 12th was held near Moscow in 1937 with limited attendance. The Soviet leaders who had promoted gliding got caught up in the Stalinist purges and that dampened participation in the sport. These same leaders had also been promoters of rocket development. The arrest and execution of people like Marshall Mikhail Nikolaevich Tukhachevskii brought the attention of the Soviet secret police on the rocket designers and experimenters at GIRD. Arrests led to forced “confessions” and “denunciations” of coworkers. Korolev was eventually swept up in the purge and arrested in June 1938. Sentenced to hard labor in the gold mines of Siberia, Korolev would certainly have died if the needs of World War II had not intervened. His academic mentor Andrei Tupolev, himself serving time in a prison aircraft design bureau during the war, convinced the secret police that he needed more engineers. In this way he extracted a number of engineers, including Korolev, from hard forced labor and into the relative safety of his prison design bureau.

Near the end of World War II Korolev was freed, but he remained under the watchful eye of the secret police until his record was cleared in the spring of

1957. Yet, his days as the darling of Soviet leader Khrushchev were short-lived. Khrushchev wanted space spectaculars and more powerful ballistic missiles. But Korolev was much more interested in space exploration, and it showed. While Korolev continued to upstage the U.S. space program on a regular basis during the early 1960s, his greater space ambitions were crushed. Khrushchev instead lavished resources on a competitor who promised much but was slow to deliver, Vladimir Nikolaevich Chelomei.

After Khrushchev was deposed in late 1964, Korolev's fortunes rose again as the USSR became serious about beating the United States to the Moon. Sadly, for Korolev, by that time the U.S. had a nearly three-year head start in the Moon

Race. Then, following what was expected to be a routine operation in January 1966, Korolev died. His difficult and remarkable life had brought him from the joys of designing, building, and flying pathbreaking vintage gliders to opening the space age and spurring the United States to landing on the Moon.

Bill Barry

For further reading:

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 Koroleva, Nataliya; Father, vol. 1. Moscow: Restart Press, 2008.
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 Vetrov, Georgii Stepanovich; S.P. Korolev v aviatsii. Idei, Proekty. Konstruktsii. Moscow: Nauka Press, 1988.



A-11 in front of the Hotel Primorje at Koktebel, Crimea. Thorsten Fridlizius photo.

Member Projects

Hot Off the Camera!

Neal Pfeiffer from Wichita is happy to report that the wings of his Ka-2b are now painted with a neat blue stripe and ready to be connected with the fuselage, assuming he “can find the few special nuts and bolts I put somewhere safe.” The fuselage (the one on the top right side of the right photo) is sanded down to the factory primer, thus it is not very photogenic!

