



Fig. 13.6. Tomb of a Soviet rocket pioneer Fridrikh A. Tsander in Kislovodsk, Russia. An artistic model of the GIRD-X rocket is at the top right corner of the stone. Tsander was fascinated with interplanetary flight since his childhood years in his native Riga (present Latvia). He graduated as engineer and went to work to Moscow and eventually became the head of the Moscow GIRD group. Tsander remained devoted to spaceflight through all his life. Even the names of his children were influenced by his passion: daughter Astra and son Merkuri. When on vacations at a resort at the North Caucasus, Tsander contracted typhus and died in 1933. The inscription on his tomb reads: "Pioneer of the Soviet Rocketry; Enthusiast of Interplanetary Flight; Fridrikh Arturovich Tsander; 1887-1933." Photo courtesy of Viktor Soloviev, Moscow, Russia.

(*Katyusha*, the nickname of the Soviet solid-propellant missile M-13, literally stood for an affectionate diminutive of the Russian girl's given name equivalent to *Katherine*.)

The M-13 projectiles, or *Katyusha*'s, were 5.1 in. (132 mm) in diameter and 6 ft (1.8 m) long. The projectile mass was 92.5 lb (42 kg), including a 48.2-lb (21.9-kg) explosive warhead. The rocket range reached 3 miles (4.8 km). *Katyusha* missiles proved to be highly reliable and were used for many years after the war had ended. The missile also became a favorite heavy weapon of assorted Soviet-sponsored guerillas during the Cold War. Islamic and Palestinian militants had used the *Katyusha*'s derivatives up to the late 1990s in attacks on Israel's towns and other civilian targets.

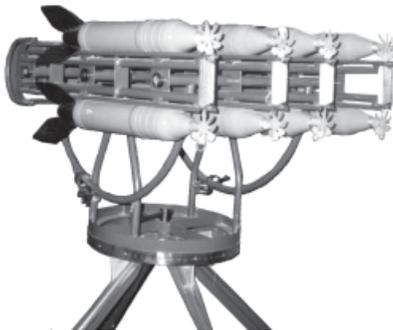


Fig. 13.7. *Katyusha*'s little sister: smaller 3.3-in. (82-mm) rockets M-8 developed by the USSR during World War II. The mobile launcher, called *Stalin Organ*, could fire 30 to 48 such 17.5-lb (8-kg) rockets to a distance of up to 3 miles (4.8 km). A later missile model had mass 31 lb (14 kg) and a larger range. Photo courtesy of Mike Gruntman.

During the purges in the late 1930s, many leading Soviet rocketeers were arrested and interrogated, with confessions often extracted by tortures, and then shot or imprisoned. RNII director Ivan T. Kleimenov and his deputy Georgii E. Langemak were shot in January 1938. Glushko was arrested in March 1938 and sen-

### **Katyusha**

### **Rocketeers Shot and Imprisoned**

M. Gruntman, *Blazing the Trail. The Early History of Spacecraft and Rocketry*, AIAA, Reston, Va., 2004 p. 273

## 13. Road to Sputnik

### “POST-SHOT” RECOGNITION

In June 1991, on the 50th anniversary of the first combat action of the M-13 Katyusha missiles, RNII's Ivan T. Kleimenov and Georgii E. Langemak, both executed in 1938, were posthumously given the highest nonmilitary state award of the USSR, the title of the Hero of Socialist Labor (that included the Medal of the Hero of Socialist Labor and the Order of Lenin), in recognition of their important contributions to the development of Soviet rocket weapons.

### HIGHEST DECORATIONS

The *Order of Lenin* was the highest state decoration of the USSR. The titles of *the Hero of the Soviet Union* (for exceptional military exploits) and *the Hero of Socialist Labor* (for exceptional nonmilitary accomplishments) included special golden star medals and the Order of Lenin.

### Sharashka

M. Gruntman,  
*Blazing the Trail. The Early History of Spacecraft  
and Rocketry*, AIAA, Reston, Va., 2004 p. 274

tenced, after more than a year in prison, to eight years of hard labor. Korolev was arrested in June 1938 and, in three months, sentenced to 10 years of hard labor.

Those Soviet scientists and engineers who happened to be most lucky not to be tortured to death, executed, or sent to labor camps, ended in special prisons — *Sharashka's*. *Sharashka*, an extraordinary invention of the dedicated and ruthless social engineers, combined a prison and research and design establishment. Thousands of imprisoned specialists worked in various *Sharashka's*, which at least provided some hope of survival. A very different fate awaited those millions sent straight to concentration labor camps, where malnutrition, excessive hard work, savage living conditions, starvation, and abuse by the guards took a tremendous toll. Many millions perished without a trace on this glorious march to the socialist paradise.

### APPEALS WENT UNANSWERED

... The interrogators ... of [the People's Commissariat of Internal Affairs] NKVD by beatings and abuses forced me to write [and sign] the cooked-up intentionally false statements, which I declared to be false even before the trial ... . However, all my statements [about my false confessions extracted by the beatings that I had sent to the People's Commissar of Internal Affairs N.I. Yezhov and Prosecutor-General A.Ya. Vyshinsky] as well as my statement [about my false confessions] at the trial went unanswered and I was convicted to 10 years in prison, being absolutely innocent.

Sergei P. Korolev, in the Letter to the Chairman of the Highest Court of the USSR, 10 November 1938

... I was arrested on March 23, 1938, and was subjected to physical and moral pressure by the interrogating apparatus of [the People's Commissariat of Internal Affairs] NKVD; as a result of this violence I was forced to sign the protocol of my interrogation, with the nonsense, fictitious content.

Valentin P. Glushko, in the Letter to the Deputy People's Commissar of Internal Affairs, L.P. Beria, 7 December 1938.

After spending eight months in a transit prison in the town of Novocherkassk, Sergei Korolev landed in a labor camp in the harsh Kolyma region in the North-Eastern Siberia. Korolev was lucky. By a quirk of fate, he was plucked out from this land of no return and sent to a Sharashka directed by an airplane designer Andrei Tupolev. Tupolev, the designer of the famous family of the *Tu* airplanes, was a prisoner himself.

### GERMAN AND SOVIET ROCKETEERS

Wernher von Braun was arrested and spent two weeks in a prison in an internal strife among the rival factions of the Nazi Germany. Two other Peenemünde rocketeers, Klaus Riedel and Helmut Grött-rup, were arrested at the same time and later also released. Von Braun's troubles, however, did not come even close to the sufferings of the Soviet rocketeers.

Many Soviet scientists and engineers, though absolutely loyal to the Soviet State, enthusiastic about the socialist paradise they were building, and devout Communist Party members themselves who had earlier, in the 1920s and early 1930s, cheerfully approved the extermination of millions of the "enemies of state" were now themselves arrested, tortured, murdered, imprisoned, and banished, after token trials or by executive order. The fate of these specialists was not any different from that of many millions of others, annihilated by that time by the enthusiastic socialist state (being aided, abetted, and admired, one should add, by numerous leftists in the West).

Many of those who survived the ordeal carried the fear through the rest of their lives, instilling slavish attitudes to the following generations of their children and grandchildren. Notably, some even preserved the cherished belief in the socialist ideas as the highest achievement of the human race.

viet dictator Joseph Stalin. This decree established the structure of the Soviet rocket and space establishment for many years to come. Five weeks later, another decree, N.12866-525, formed the top secret *Design Bureau 11* (KB-11) at the site *Arzamas-16* near the city of Gorkii. KB-11 headed by Yulii B. Khariton was tasked to develop Soviet nuclear weapons.

In November 1942, Korolev was transferred to Sharashka in the town of Kazan' headed by another prisoner, his former RNII colleague Valentin Glushko. Both Glushko and Korolev were finally released in 1944.

As the war was coming to an end, the Soviet Union had reestablished its rocket development activities. The successes of German scientists and engineers, particularly the development of the V-2 and jet aircraft, were a proof of the value and promise of the new propulsion technologies. The emerging atomic weapons made long-range missiles, even with a limited accuracy, especially important for the future warfare. The Soviet Union promptly began a massive effort to learn and evaluate the German rocket technology sending numerous specialists to the occupied Germany. The American interest in rocketry, with the first V-2 launched at the White Sands Proving Ground on 10 May 1946, also did not pass unnoticed. The American launch was open to the press, and the *Life* magazine did a spread on the shot.

The Soviet leaders acted swiftly. On 13 May 1946, the USSR Council of Ministers issued a special decree N. 1017-419 "Matters of the rocket weapons," signed by the So-

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**Rocketeers  
in  
Sharashka**

**Soviet  
Rocket  
Develop-  
ment Is  
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**Decree of  
13 May  
1946**

M. Gruntman, *Blazing the Trail. The Early History of Spacecraft and Rocketry*,  
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# Blazing the Trail

## The Early History of Spacecraft and Rocketry

**Mike Gruntman**

**AIAA, Reston, Va., 2004**

ISBN 156347705X; 978-1563477058

**505 pages with 340 figures**

**Index: 2750+ entries, including 650 individuals**

This book presents the fascinating story of the events that paved the way to space. It introduces the reader to the history of early rocketry and the subsequent developments which led into the space age. People of various nations and from various lands contributed to the breakthrough to space, and the book takes the reader to far away places on five continents.

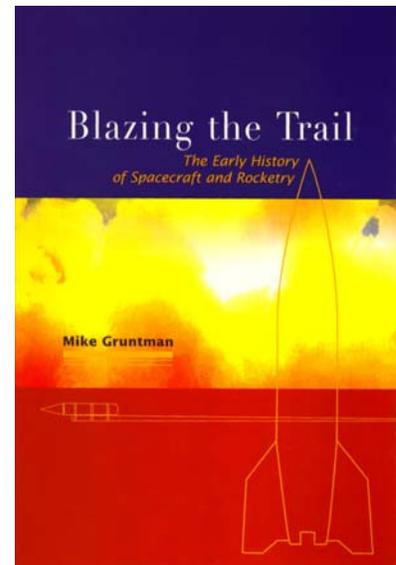
This world-encompassing view of the realization of the space age reflects the author's truly unique personal experience, a life journey from a child growing on the Tyuratam launch base in the 1950s and early 1960s, to an accomplished space physicist and engineer to the founding director of a major U.S. nationally recognized program in space engineering in the heart of the American space industry.

Most publications on the topic either target narrow aspects of rocket and spacecraft history or are popular books that scratch the surface, with minimal and sometimes inaccurate technical details.

This book bridges the gap. It is a one-stop source of numerous technical details usually unavailable in popular publications. The details are not overbearing and anyone interested in rocketry and space exploration will navigate through the book without difficulty. The book also includes many quotes to give readers a flavor of how the participants viewed the developments. There are 340 figures and photographs, many appearing for the first time.

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About the author. Dr. Mike Gruntman is professor of astronautics at the University of Southern California. Accomplished physicist, Mike is actively involved in research and development programs in space science and space technology. He has authored and co-authored nearly 300 publications, including 4 books.