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Chapter 4

Viacheslav Kovtunenko: His Life and His Place in the History of Astronautics*

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There were several prominent figures in Soviet (later Russian) astronautics, who contributed much to the problem of space exploration. Tsiolkovsky and Kondratjuk were pioneers in this field—they created the theoretical background for space flight. Korolev, Glushko, Yangel and others were among those who designed the first spacecraft and coordinated the outstanding space programs, which began with launching of the first Earth satellite.

Viacheslav Kovtunenko also left his mark in the history of astronautics. But due to some reasons, his name is still less known to the broad international audience. An acquaintance with his professional life story might help us understand his role in space exploration and his contribution to the history of astronautics.

Viacheslav Kovtunenko was born August 31, 1921 in a small town, called Engels, in the Saratov district of the USSR. In 1941, after the beginning of the war with Germany, he was drafted into the army. Two months later he was badly wounded and brought to a military hospital. After recovering he entered Leningrad University. In 1946 he graduated from the mathematical and mechanical department of this University and began his professional career in one of the Moscow research institutes, oriented towards the creation of ballistic mis-

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siles. The subjects of particular interest to him were aerodynamics and flight dynamics. Here he began his research work, defended his dissertation and in 1953 obtained his scientific degree.

At the beginning of the 1950s the special complex, oriented towards the design and production of ballistic rockets, was created in Dniepropetrovsk Ukraine. This complex consisted of two units, which later were called the Yuzhny Machine-building Plant (YMP) and the Yuzhnoje State Design Office (YSDO). In 1953, a group of leading specialists in this field were sent from Moscow institutions to Dniepropetrovsk in order to start new projects. Among them were Vasily Budnik, Nicolai Gerasiuta, Viacheslav Kovtunenko and others. At the same time a new faculty had been gathered at Dniepropetrovsk State University, aimed at preparing specialists for the new defense industry.

For the first several years YMP manufactured ballistic missiles, which were designed under the supervision of Sergey Korolev in the Moscow design offices. But later the chief designer of YSDO, Michail Yangel, decided to create a new rocket, which would be designed and manufactured in Dniepropetrovsk. At this time V. Kovtunenko was a head of the Design Department, which was a principal subdivision of YSDO. In 1956, a newly designed rocket was manufactured at YMP. This rocket substantially differed from those produced before. It had a new powerful four-chamber engine, which used new liquid propellant and had many other innovations. The next year it was successfully launched at the launch site at Kapustin Yar. This rocket had the serial number 63, or R-12 (according to the local terminology).

Soon after this event V. Kovtunenko and his colleagues initiated the program having the goal of transforming a ballistic missile into a spacecraft launcher. In fact it was the beginning of Kovtunenko's activity in the field of space exploration. To this aim he devoted the rest of his life. In order to put into Earth orbit a satellite with a weight of up to 500 kg it was necessary to design a second stage for the R-12 rocket. This work was performed at the Design Department under his supervision. The first Dniepropetrovsk satellite KOSMOS-1 was launched in March 1962. It was the start of the new and numerous KOSMOS-series of satellites. The new program of space exploration had been worked out at YSDO. Several new booster rockets and space vehicles were designed and manufactured. For this purpose a special complex, which included several departments of YSDO, was created. In 1965, it was transformed into the Spacecraft Design Office headed by V. Kovtunenko. It was a separate subdivision of YSDO. For the next decade a large number of space vehicles, serving different purposes, were designed here and launched. Among them were: a unified space platform, adjustable for the installation of different measuring equipment and other instruments; the OCEAN series of spacecraft aimed at the exploration of the Earth's surface from space; several spacecraft serving defense purposes, and so on.

V. Kovtunenko was among the initiators and coordinators of international cooperation in space, which later was organized within the framework of the INTERKOSMOS program. The first satellite of the INTERKOSMOS series was launched in October 1969. Later, almost all the countries of Eastern Europe as well as France, Sweden and other countries participated in this program. V. Kovtunenko supervised a common Soviet-Indian program that resulted in the creation of the first Indian satellites.

From 1953 until 1977 V. Kovtunenko worked at Dniepropetrovsk State University on a part-time basis. He taught students, assisted with curriculum development and coordinated research work in the field of aeronautics and astronautics. Here he supervised the creation of the Gas Dynamics Laboratory with a subsonic wind tunnel. For more than 15 years he headed the Fluid Mechanics Department of the University. Hundreds of students, who attended his lectures, have a high estimate of his pedagogical skill. He educated and trained many postgraduate students, young research workers, and engineers, who later became well known specialists in the field of aeronautics and astronautics.

In 1977 V. Kovtunenko was given a new assignment—to be the chief designer at the Lavochkin Research and Production Association (LRPA) in Moscow. Here he began to coordinate the design of several sophisticated space vehicles used basically for outer space missions. Most of these missions have been oriented towards planet Venus (Venera in Russian). The spacecraft VENERA-11 and VENERA-12, designed at LRPA, landed on the surface of Venus in December 1978. They were designed to investigate the upper and lower atmosphere composition and conduct a cloud analysis of Venus. Important data have been obtained, especially those concerning Argon isotopes, and Helium and Neon contamination in the atmosphere. Along the flight path from Earth to Venus Solar and Galaxy radiation have been measured. Aside from Soviet-made instruments installed aboard the spacecraft, French measuring equipment has been also used. The spacecraft VENERA-13 and VENERA-14 reached Venus in March 1982. This time color pictures of the planet surface were made and soil composition tests had been performed. The space missions involving VENERA-15 and VENERA-16 were oriented towards the exploration of the surface of Venus from satellite orbit. Detailed mapping of the planet was performed in October 1983.

The next space mission, called VEGA, demonstrated outstanding achievements in space exploration. Designed at LRPA, the spacecraft was double-purposed. Two celestial bodies—the planet Venus and Halley's comet—would be explored during one space mission. One space probe was used for sounding the atmosphere of Venus and the other met Halley's comet on its orbit.

According to the program, which was worked out by the Academy of Science, the new space mission—to the planet Mars and its satellite Phobos—was performed. The new generation of space vehicles PHOBOS-1 and PHOBOS-2 were designed at LRPA and used for this purpose. LRPA participated in the re-

alization of many other space programs. Among them were the design of the space astro-observatories ASTRON, GRANAT and others.

It is necessary to note that almost all space projects, coordinated by V. Kovtunenko, were performed in the framework of international cooperation. V. Kovtunenko worked productively up to the last days of his life. He coordinated the preparation of the MARS-96 mission, but did not accomplish it because of his death in July 1995.

Professor Kovtunenko was a well-known scientist in the field of aeronautics and astronautics. He published many scientific papers and several books. The book *Orbital Spacecraft Aerodynamics* reflects his basic scientific achievements during his work at the Yuzhnoje Design Office. Among the problems observed were: the problem of Earth upper atmosphere investigation with the aid of satellites; development of orbital spacecraft stabilization systems, determination of complex bodies aerodynamic characteristics in rarefied gas flow, and many other problems.

The design of space vehicles able to secure a soft landing on a planet's surface and to investigate different celestial bodies requires the solution of many complicated problems. Here are some of these problems: providing the necessary flight parameters of spacecraft approaching a planet and descending into its atmosphere; selection of the type and configuration of the landing vehicles; determination and regulation of aerodynamic loads and heating during the entry into the atmosphere, and many others. All these problems were the subject of research work, coordinated by V. Kovtunenko.

A large group of scientists performed their research work under his supervision. Kovtunenko was among the founders of the first space-oriented research institutions in Ukraine—the Institute of Technical Mechanics of the Ukrainian National Academy of Science. He coordinated the research work done by the Fluid Dynamics Complex at this institute.

V. Kovtunenko received his doctorate and professorship in 1962. Later he was elected to the Ukrainian and Russian Academies of Science and to the International Academy of Astronautics.

For his remarkable achievements he received many other honors and awards.

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