

OBITUARY

KONSTANTIN IOSIFOVICH GRINGAUZ, 1918–1993



Professor Konstantin Iosifovich Gringauz of the Space Research Institute in Moscow died at 2 AM on June 10 of a heart attack.

Born on July 5, 1918 in Tula (about 200 km south of Moscow) he has had a long and successful career in space physics and will keep a special position in the history of space research.

With his father (a pharmacist) and mother he moved to Samara City on the banks of the Volga river in 1921, where he attended school and became a radio amateur. Upon graduation in 1935 he enrolled in the Electro-physical Faculty of the Leningrad (St. Petersburg) Electro-technical Institute.

In the spring of 1941 K. I. Gringauz obtained his diploma through a study of frequency modulation, then a brand new topic, and continued his work in a radio-technical laboratory, which he joined in 1940.

He remained in Leningrad for the first months of the German blockade, and was evacuated to Moscow in the winter of 1942. From the summer of 1942 onward K. I. Gringauz worked in a factory in Belovo city in Siberia, which produced small, rugged, and sensitive radio transmitters and receivers for tanks.

Close to the end of WW II, in the winter of 1944, he was assigned member of a Commission for studying the effectiveness of tank radio communications under battlefield conditions in Poland. Using a short visit to Moscow, K. I. Gringauz passed entry examinations for postgraduate studies in the winter of 1945, and, after V-J day in November 1945, he obtained a position in a classified radio institute, where he continued his postgraduate studies of radio wave propagation in the ionosphere.

In 1947 K. I. Gringauz began to collaborate with Sergei Korolev and moved to a laboratory for radio-wave propagation in Korolev's new Bureau for Rocket Development. In 1948 he participated for the first time in the launching of a V2 rocket (at Kapustin Yar), which carried a radio sounder to study the ionosphere. In 1949 he gained his Ph.D. degree and was put in charge of a laboratory for radio technology.

In 1954 K. I. Gringauz married Irina Nikolaevna Danilova.

In 1956 he began designing instruments for measuring ions in the Earth's atmosphere from a satellite that became Sputnik 3, and was assigned to design the transmitter-antenna system for what became Sputnik 1. His idea that this satellite should use a decameter transmitter was intensely debated and Korolev decided in favour of K. I. Gringauz's position, partly because he wished Sputnik 1 to be heard around the globe.

During 1957 K. I. Gringauz continued his ionospheric studies, and had radio and Langmuir probe experiments on two geophysical rockets. On October 3 he climbed the rocket at Tyuratam to check out the Sputnik 1 antennae and transmitter. He was the last person to touch the satellite. Following the launch of the World's first artificial satellite, SPUTNIK 1, on 4 October, 1957 the 'beep, beep' of the transmitter which was produced in his laboratory was heard by politicians as well as by radio scientists and others around the world.

From 1958 onward his research concentrated on in situ measurements of ionized gases surrounding the Earth and the planets Venus and Mars, where he is credited with numerous scientific discoveries and 'firsts'.

These include the first satellite-borne ionosphere experiments (SPUTNIK 3); the discovery of the plasmasphere and plasmopause and the first measurements of the interplanetary 'solar wind' (first lunar spacecraft, the LUNIKs, 1959–1960). He was also able to show that early estimates of the energetic particle fluxes in the outer radiation belt were incorrect by a factor of 1000. Together with his colleagues, he detected the magnetospheric plasma sheet and the magnetosheath plasma, although the interpretation that these were identical (the 'third radiation belt') was later found to be an oversimplification. He received the Lenin Prize of the USSR in 1960 in recognition of his pioneering work in these fields.

In 1959 K. I. Gringauz moved with his group to the Radio-technical Institute of the USSR's Academy of Sciences and became head of the space research department, which was transformed in 1971 to the laboratory for interplanetary and near-planetary plasma studies of the newly organized Space Research Institute of the Russian Academy of Sciences. He received a professorship in radiophysics in 1970.

During the 1960s and 1970s, Professor K. I. Gringauz remained active in ionospheric and magnetospheric physics, particularly with regard to systematic surveys of ionospheric parameters (VERTICAL rockets, COSMOS satellites) and variations in the shape of the plasmasphere (PROGNOZ satellites).

As the opportunity arose, he also became interested in planetary investigations

and made numerous observations of the plasma environments of the Moon, Venus, and Mars. He participated in the discovery of the Martian magnetosphere (MARS 2, 3, 5 satellites) and discovered the origin of the mysterious night-time ionosphere of Venus (VENERA 9, 10 orbiters).

Perhaps the crowning point of his career occurred during the encounter of the twin spacecraft VEGA 1 and 2 with Halley's comet, when his 'Plasmag' experiment provided high-resolution measurements of the solar wind and cometary plasma environment. In particular the bow shock, the distribution of the neutral gas, the heavy ion envelope of the comet and the cometopause were observed by the Plasmag team, and, for this, Professor Gringauz was awarded the State Prize of the USSR in 1986.

In recognition of an outstanding career which has spanned the whole space era, COSPAR was delighted to bestow the 1988 Space Science Award on Professor Konstantin Gringauz.

The last space experiments TAUS, HARP, and SLED in which K. I. Gringauz actively participated during the PHOBOS 2 mission brought evidence of the existence of the plasma sheet in the Martian magnetotail, and revealed the ionization source of the night-time ionosphere of this planet. Death overcame him during the preparation of a set of experiments for the planned MARS 94 mission.

The creative activity of K. I. Gringauz is very well known and widely recognized by the scientific community. For a long time he was Chairman of the solar wind and interplanetary magnetic field section of IAGA, Vice-chairman of the Interdisciplinary space plasma scientific commission of COSPAR, he was an initiator and Chairman of the solar wind and interplanetary magnetic field section of the Russian Geophysical Committee, and a member of the editorial board of the international scientific magazine *Il Nuovo Cimento*. He was member of the Editorial Board of Space Science Reviews. He was also elected full member of the International Academy of Astronautics, and participated in the activity of the Russian Association of the members of this academy.

A cultured and well-read person, he was known for his persistence and dedication to fundamental scientific research with robotic spacecraft. He was also a devoted family man and is survived by his wife Irina, daughter Tatiana, and granddaughter Masha.

MIKHAIL I. VERIGIN, Moscow

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