
OBITUARY

In memory of V.A. Kotel'nikov

Russian scientific society has suffered an irrevocable loss. Academician Vladimir Aleksandrovich Kotel'nikov, an outstanding scientist and engineer in radio engineering, radio physics, and informatics, and a councillor of the Presidium of the Russian Academy of Sciences, passed away in his ninety seventh year on February 11, 2005.

A leading trend in these sciences, viz., digital signal processing, is attributed to him. The Kotel'nikov theorem is known to every engineering in digital communication, radar engineering, television, etc. The theory of potential noise immunity due to him defines the quality of communication channels—from the traditional radio relay lines and stations to the latest optical fiber and satellite communication lines, cellular radio telephony, and hidden communication on noise-like signals. A new trend in space research is also associated with his name—planet radio detection and ranging. Without exaggeration, we can say that his activities heralded a new epoch in Russian and world radio engineering and informatics.

Academician V.A. Kotel'nikov was born in Kazan' in the family of a university professor, a well-known mathematician, Aleksandr Petrovich Kotel'nikov. In 1926, Vladimir Aleksandrovich was admitted to the Bauman Institute of Technology (Moscow) and graduated in 1931 as a power engineer from the Power Engineering Institute, which was truncated from the Bauman Institute as an independent organization. For ten years from 1931 to 1941, he lectured at the Department of Radio Engineering, Power Engineering Institute, and was concurrently engaged in research at the Central Institute for Research in Communications, USSR. This was a highly fruitful period of his scientific activities. In 1933, in his paper on the “Transmission Capacity of Ether and Cables in Electric Communication,” he formulated the well-known sampling theorem, which is known after his name. The Kotel'nikov theorem, in reality, is a fundamental principle of the theory of digital systems, and its significance extends far beyond the limits of communication theory, being a corner stone in informatics.

In his doctorate thesis (1947), he developed the classical ideas underlying the theory of noise immunity. In particular, he formulated the concept of potential noise immunity and elaborated methods for its implementation in many concrete cases. By these and other works, Vladimir Aleksandrovich can be regarded as one of the founders of information theory.

Along with his theoretical works, he realized his ideas in practical applications. For example, in pre-war years, he created a unique multichannel single-pole radio communication line between Moscow and Habarovsk. It was then a major breakthrough in radio technology.

In the period of the Great Patriotic War (1941–1945), he fruitfully was engaged in the development of a new special communication device. In particular, he developed a system of encoded radio communication technique. For this discovery, he was twice awarded the Stalin Prize (now the State Prize) in 1943 and 1946.

In 1953, he was elected a full member of the USSR Academy of Sciences at the age of 45, bypassing the associate membership and appointed the deputy director and thereafter in 1954 the director of the Institute of Radio Engineering and Electronics, which was created in 1953.

At this institute, along with administrative and organizational jobs, he created a planet radar and guided and participated in research on radio detection and ranging of planets. Indeed, a new trend in space research, planet radio detection and ranging, was created by him and under his guidance.

These works refined the scale of the Solar system by about 100 times, and this is exceptionally important for control of long-range space flights. For this work, he and his collaborators were awarded the Lenin Prize in 1964.

Special mention deserves his large contribution to the formulation and development of fundamental research in fields, such as noise-immune radio systems, statistical radio physics, millimeter, submillimeter, and optical ranges of radio waves, quantum radio physics, microelectronics, IR and UHF technology, physics of semiconductors and ferrites, acousto- and magneto-electronics, remote radio physical methods of investigation of nature, glass fiber optical communication, automation of scientific research, and many other fields.

Along with scientific research, he was actively engaged in administrative jobs of the USSR Academy of Sciences.

Being the vice president and then the first vice president of the USSR Academy of Sciences for about twenty years since 1969, Kotel'nikov had been coordinating research in communication, radio technology, radio astronomy, and space research. For long he headed the Council "Interkosmos" for research in radio astronomy, automation of scientific research, and other fields. He was the chief editor of "Radiotekhnika i elektronika" and "Vestnik Akademii Nauk SSSR" and an active member of the Committee for Lenin and State Awards.

Academician V.A. Kotel'nikov was a well-known public worker. He was elected a deputy of the USSR Supreme Soviet and President of the Supreme Soviet of the Russian Soviet Federation of Socialistic Republics.

He was highly esteemed for his works. He was a Lenin Prize laureate and twice awarded the USSR State Prize. He was twice honored with the title Hero of Socialistic Labor, awarded six Lenin orders, I and II degree orders for Patriotic Services, and other medals. He was internationally recognized and elected as a member of academy of sciences of many countries, a honorary member of IEEE, and honored with International Awards—the Rein Prize in 1999 and the Bell Gold Medal in 2000. By a decision of the International Astronomy Association, asteroid No. 2726 is called the Kotel'nikov asteroid.

Vladimir Aleksandrovich continued his activities till the end of his life. He published a large number of scientific papers and works, took part in the meeting of the Presidium of the Russian Academy of Sciences, was a honorary director of the Institute of Radio Technology and Electronics, Russian Academy of Sciences, and Chairman of the Scientific Council of the Institute of Radio Technology and Electronics.

All of us who knew Vladimir Aleksandrovich Kotel'nikov, an outstanding scientist and a remarkable man, will always cherish him in our hearts.