The EBU Technical Review begins here a new series of portraits honouring leading figures in broadcast engineering. Their contributions have had a major impact on the development of the industry, and by presenting the work and achievements of these men and women, their personality, and their professionalism we shall illustrate some of the lesser–known facets of radio and television development.

M.I. Krivocheev – an engineer's engineer

Professor Mark I. Krivocheev, who in 1992 celebrated his 70th birthday, has had a career that must correspond very closely to an engineer's dream. He has had the merit of working both as a practical and as a research engineer, with a great many publications and dozens of patents to his name. He is known both in his own country and on the international scene. He is a respected teacher. He is still contributing very actively to the technical development of television on all fronts.

Mark I. Krivocheev was born in the USSR on 30 July 1922. In 1946 he graduated from the Moscow Telecommunications Institute, where he designed a scanning unit that led for the first time to the display of a new standard 625–line raster. He then went to the Moscow Television Centre, where he worked on the development of the first 625–line equipment, becoming the head of the studio production complex in 1947. (The story goes that the 25–year–old engineer so impressed his colleagues with his practical skills that they elected him their chief.) On 3rd September 1948 he pressed the button to switch on the equipment to inaugurate the world's first 625–line transmissions. This was an enviable way for a young man to begin his career, and Mark Krivocheev has managed, over 45 years, to maintain the same high pitch of intensity in all his activities.

For instance, in 1951 he was responsible for working out the first frequency plans for Soviet television stations. This was in the days before computers, and at a time when transmitters and antennas – and even domestic receivers – were built to operate on just one frequency and were difficult to modify once in service. Mistakes would have been costly and the exercise no doubt encouraged the young engineer to adopt a careful, methodical approach which has characterised his work ever since.

However, Mark Krivocheev was not content just to invent, design and build. He wanted to understand too – and help others understand in their turn. In 1959 he became a Candidate of Technical Sciences, in 1966 a Doctor of Technical Sciences, and in 1968 he was awarded the rank of Professor. His attachment to the academic world has stayed with him; in 1992 he became a Corresponding Member of the Academy of Technological Sciences of the Russian Federation. Active contribution to the wider engineering profession has also been important to Professor Krivocheev. For many years he has been Chairman of the TV Section of the A.S. Popov Scientific Technical Society of Radio Engineering, Electronics and Telecommunications. He is an Honorary Member of the A.S. Popov Society, and one of just five Honorary Members of the Institute of Television Engineers of Japan (ITEJ). He is a Fellow of the SMPTE and of the Chinese Institute of Electronics (CIE). The latest in a long series of honours came in June 1992, in Chicago, when he was made an Honorary Member of the the Institute of Electrical and Electronics Engineers (IEEE).

Through all this period, from 1959 to the present day, he has been the Head of a scientific department on television in the Radio Research Instutute and Head of the laboratory for TV measurements and monitoring. Television complexes he designed in the early 1960s for the first Molnya satellite system made it possible to measure and monitor international satellite television links for the first time. Under the Soviet–French agreement on cooperation in satellite communications (1965–1966), work done under Professor Krivocheev's leadership provided the basis for the alignment and measurement of equipment used on the communications link Moscow–Molnya 1–Paris and vice versa, for the first colour television transmissions between the USSR and France.

In fact, many of Professor Krivocheev's major personal engineering achievements are related to measurement science in television. He was a co–founder and head of his country's school for television monitoring and measurement.

He is the originator or co–originator of more than 90 inventions and patents in this field; he contributed to the definition of signal data for use in test lines – the fore–runners of today's insertion test signals (ITS); he was the first to develop the theory of the measurement of distortions affecting vision scanning rasters and the theory behind weighting filters. He developed methods and devices for measuring the parameters and distortion of pick–up tubes and monitors; he worked also on the first 625–line television test cards. His recent work includes digital methods of measuring random noise and the parameters of television signals, the automation of measurements, and the problems of monitoring television chain performance using a computer–based system, including HDTV systems. A large proportion of his publications deal with measurement. Altogether he has written 250 technical papers and a number of books, all frequently cited. The titles are indicative of the breadth of Professor Krivocheev's interests: *The Basis of TV Measurements*, *Digital Television*, *The Prospects for the Development of Television*, etc. He is co–author of *Lighting Measurements in TV*, *Colour Measurements* and many other books and articles on digital television, additional data transmission etc. His writings have been translated into Chinese, Czech, English, French, German, Hungarian, Polish, Rumanian, and Spanish, and published in several countries.

Professor Krivocheev's international career began in 1954 when he was appointed Vice–Chairman of Study Group III of the OIRT, dealing with television. Here he was influential in establishing the OIRT policy in favour of the 625–line television system developed in the USSR. Another highlight of this period included work on the creation of the Intervision programme–exchange network. He was, and remains, responsible for much of the technical basis of policy–making in broadcasting, and for forward planning based on technology projections, the implementation of which has made a significant impact on the evolution of Soviet television.

However, Mark Krivocheev is best known outside Russia for his work in the International Radio Consultative Committee (CCIR) of the International Telecommunication Union, with whose activities he has been associated since 1948. In 1970 he became Vice–Chairman of CCIR Study Group 11 (Television) and in 1974 he was elected Chairman. His function is to coordinate studies carried out all over the world towards international standards in television broadcasting – a kind of pooling of effort. In this field, the proposal for a world television digital standard (Recommendation 601) earned the CCIR the Emmy Engineering Award of the US National Academy of Television Arts and Sciences. Other recent texts of prime importance adopted by the CCIR are *Basic parameter values for the HDTV standard for the studio and for international programme exchange* (Recommendation 709); *Method for the subjective assessment of of the quality of television pictures* and *Subjective assessment methods for image quality in high–definition television* (Recommendations 500–4 and 710), which have made assessments all over the world not only more precise, but also easier to compare. Other notable texts agreed under Professor Krivocheev's guiding influence include a number of Recommendations on radio frequency protection ratios which not only have become standard works of reference, but also provide the technical foundation for international regulations and agreement procedures relating to widely–developed terrestrial transmitting networks.

Finally, Mark Krivocheev is universally recognized as the instigator of the *global approach* to new television services and systems. The basic reasoning is that, when a major social demand emerges for a particular innovation, the first thing to do is develop a comprehensive approach to the international solution of the problem, whereby inter–relationships between the main components of the global model are identified and analysed. This makes it possible to speed up the process of finding a solution by harmonizing the interests of the different services, agencies, manufacturers, and consumers involved. With these ideas in mind, the global approach he has proposed for the integration of HDTV implies active harmonization of broadcast and non–broadcast applications and the development of systems suitable for the terrestrial emission of narrow–band enhanced and high–definition television in RF bandwidths of 6, 7 or 8 MHz. Known as the *HDTV 6–7–8* concept, the aim would be to ensure, in an economic manner exploiting existing transmission channels and hardware where possible, the option for worldwide application of a core emission system which might occupy only 6 MHz (if there is no appreciable difference compared to systems using 1 or 2 MHz more), whilst offering capacity for supplementary information in those countries where additional channel width is available. Taking these methodical ideas further, he proposes an MPTV 6–7–8 (multi–programme digital television broadcasting) concept which, as recent experiments have shown, is already attracting interest in several countries.

Professor Krivocheev's contributions to the furtherance of television engineering have been recognized by many national and international bodies. For instance, he has received many government awards and the USSR State Prize, the Montreux Symposium gave him its Gold Medal in 1987, the EBU awarded him a certificate on the occasion of the 60th anniversary of the CCIR in 1988. In 1990, following the adoption of a series of CCIR Recommendations on HDTV, his achievements as Chairman of Study Group 11 and his valuable contributions to the theory and practice of television technology were praised at the four corners of the globe: NANBA awarded him a special plaque, the Australian Department of Communications and Broadcasting awarded him a certificate, and France has made him a *Chevalier de l'Ordre National de Mérite*.

Professor Krivocheev himself claims to have been lucky in his career, in the sense that he entered the broadcast profession right at the start of "modern" television in his country and has had a hand in every major development through to the present day – and beyond. But, as this brief account of his contributions has indicated, that good fortune has been backed up by a personal comittment to broadcast engineering, to the sharing of expert knowledge and to the methodical pursuit of international consensus from which all the world's broadcasters – and all the world's television viewers – have very greatly benefitted.