

1992 Microwave Application Award

Bernard Hershenov

The Microwave Application Award is presented aperiodically to an individual for an outstanding application of microwave theory and techniques. The eligibility requirements are creation of a new device, component, or technique, novel use of components or both.

The 1992 recipient of the award is Dr. Bernard Hershenov, Director, East Asia Business Development of the David Sarnoff Research Center, a subsidiary of SRI International.

The award citation reads: "For the Introduction of the Microstrip Ferrite Circulator"

A key component in any microwave system is the non-reciprocal element known as the circulator. It is essential to the design of high performance, stable microwave systems.

In retrospect, the microwave circulator was an obvious solution to the problem of designing microstrip systems. But at the time of its invention it was far from obvious that a small, magnetized ferromagnetic puck could resonate with unconfined fringe fields in such a way that the sum of the clockwise and counterclockwise modes, excited at one port, would add at the second port and subtract at the third port over a relatively wide bandwidth. This circulator was used in the first low noise X-band receiver fabricated at RCA Laboratories.

The microwave circulator was first published in the IEEE Proceedings in December 1966 by B. Hershenov, entitled: "X-Band Microstrip Circulator". He received Patent #345 6213 on 7/15/69 for "Single Ground Plane Junction Circulator Having Dielectric Substrate."

Bernard Hershenov received his BS degree in Physics in 1950, his MS degree in Mathematics in 1952 and his PhD in Electrical Engineering in 1959, all from the University of Michigan, Ann Arbor, Michigan. From 1951 to 1952 he worked for the University of Michigan Dental Materials Laboratory, studying the physical properties of dentin. From 1952 to 1959 he was employed as a research assistant, research associate, and finally, associate research engineer with the University of Michigan Research Institute. During this period he worked on domain wall resonance in ferrites, high-power traveling-wave tubes, and crossed-field devices. From 1959 to 1960 he worked on high-power unimoded magnetrons for General Electric Company.

In 1960 Dr. Hershenov joined the Microwave Research Laboratory of RCA Laboratories (also known as the David Sarnoff Research Center), Princeton, New Jersey, and, in 1968, became Head of the Microwave Integrated Circuits group. In 1972 he was appointed Director, RCA Research Laboratories, Tokyo, where he redirected the work into areas including penetration phosphors, solar cells using aqueous deposition of II-VI compounds, photocatalytic semiconductors, electrochromic displays, latex displays, and microsonics. He returned to RCA Laboratories, Princeton, in 1975 as a Staff Advisor, and in 1977 headed the Energy Systems Analysis Group. In 1979 he was appointed Director, Solid State Devices Laboratory and in 1983 he assumed responsibility as Director, Optical Systems and Display Materials Research Laboratory. In 1984 he was appointed Director, Optoelectronics Research Laboratory. Following the purchase of RCA by GE in 1986, and the subsequent transfer of the David Sarnoff Research Laboratories to SRI International as a subsidiary in April 1987, Dr. Hershenov was appointed Director, East Asia Business Development.

At RCA Labs, he worked on space-charge waves in electron beams, crossed-field amplifiers, ferrite devices, magnetic semiconductors, microwave circuits, and microwave integrated circuits. He directed work on millimeter wave devices and circuits, microwave FETs, TRAPATTs, surface-state chemistry and physics related to boundary lubricant properties for VideoDisc, energy conversion, displays, microsonics, phosphors, discrete silicon power devices, electro-optic devices, optical recording and communications. In 1964 and 1967, he was the recipient of RCA Outstanding Achievement Awards.

Dr. Hershenov served as Secretary-Treasurer of the IEEE Magnetics Society and was a member of the Magnetic Materials Conference Advisory Committee, the Technical Committee on Microwave Integrated Circuits of the PGMITT, and the Editorial Board of Transactions on MTT. He was the first chairman of the Microwave Magnetics Technical Committee of the Magnetics Society (1965-1969). From 1964 to 1966 he was co-adjutant in the Mathematics Department of University College, Rutgers University, at New Brunswick, New Jersey. He is currently a member of the Physics Advisory Council of the University of Michigan.

Dr. Hershenov is a Fellow of the IEEE and a member of Phi Kappa Phi. He is listed in Who's Who in America, American Men of Science, Who's Who in Technology Today, Who's Who in Engineering, Who's Who in Engineering International, and American Men and Women of Science.

