1989 Microwave Career Award

Harry F. Cooke

The *Microwave Career Award* is presented to an individual "for a career of meritorious achievement and outstanding technical contributions in the field of microwave theory and techniques". It is the highest award given by the Microwave Theory and Techniques Society. The 1989 Microwave Career Award recipient is Mr. Harry F. Cooke.

Harry F. Cooke (S'46,M'55,LM'87) was born in Little Rock, Arkansas in 1921. After serving with the R.A.F. and the U.S.A.A.F. (1941–1945) he graduated from the University of Arkansas in 1948 with the B.S.E.E. degree. His postgraduate work at Southern Methodist University was in the field of microwaves and non-linear circuits. While at the U. of Arkansas his senior paper on locked oscillators won the Southwestern IEEE student prize. Between 1948 and 1957 he worked in the area of instrumentation (U.S.D.A.), proximity fuzes, and low noise vacuum tube amplifiers. In 1957 he joined the Semiconductor Research and Development Laboratory at Texas Instruments. While at T.I. he initially managed the applications group. Following this he worked with Roger Webster on the first solid state TV receiver, FM receiver, and hand held transceiver. He was a member of the team which developed the first bipolar microwave transistor and the first solid-state radar. He, in conjunction with two other team members, holds the basic solid-state radar patent. From 1970 to 1979 he was manager of device design and analysis at Avantek. While at Avantek he published a number of tutorial papers including one in the Proceedings of the IEEE on bipolar microwave transistors. In 1979 he joined Varian Associates as a senior scientist working on GaAs FET design and testing. He retired from Varian in 1987 and now works as an independant consultant in the design of microwave devices and test systems for amplifiers and devices. He also writes software for device design and automated test.

He is the author of over 50 papers in the fields of VHF to MM devices and circuits. He has 14 patents covering devices, circuits, and systems.

Mr. Cooke is a member of Tau Beta Pi.

1989 Microwave Career Award

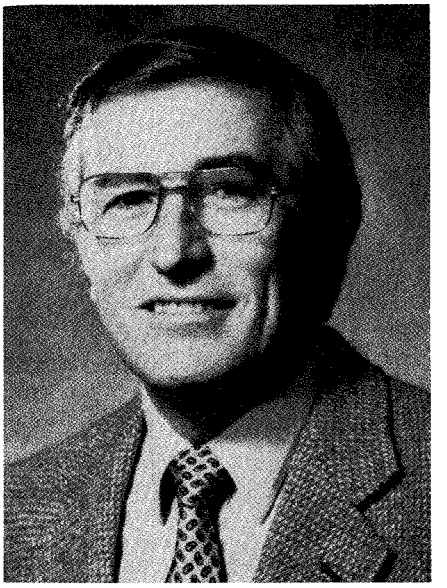
Alexander L. Cullen

The *Microwave Career Award* is presented to an individual "for a career of meritorious achievement and outstanding technical contributions in the field of microwave theory and techniques." It is the highest award given by the Microwave Theory and Techniques Society. The 1989 Microwave Career Award recipient is Dr. Alex L. Cullen.

Alex Cullen (M'56,SM'60,F'67) was born in Wood Green, London, in 1920. He was educated at Lincoln School and Imperial College London. Imperial College had at that time an excellent option in Communications Engineering. One of the lecturers on that course, David Tomba, gave a special lecture one day on the Klystron; this was hot-off-the-press stuff since the classical Varians and Webster papers had only just been published, so it was tremendously exciting, and was the start of an enduring love of microwave engineering in all its varied aspects. In July 1940, Cullen joined the staff of the Royal Aircraft Establishment in Farnborough, where he worked on radar. After a brief period touring the original "CH" chain of ground radar stations with a small team responsible for phasing the "aerials", as they were always known in the UK at that time, he returned to base at Farnborough to work on the newer 1.5 m wavelength "GCI" (ground control interception) radars which he found more to his taste than the 5 to 10 m wavelengths used in the "CH" stations. Microwaves were coming nearer! At last he was put onto real microwave work in an antenna group working on shaping radiation patterns. The need to measure the result of theoretical design work held an interest for him as strong as the design work itself and his subsequent research work has been largely in the two fields of microwave antennas and microwave measurements. In 1946 he joined the staff of the Electrical Engineering Department at University College London at the invitation of Professor Harold Barlow, who had been Head of Radio Department at RAE, Farnborough and had taken an interest in Cullen's work during that period. Cullen helped Professor Barlow to establish a research school in microwaves at UCL and collaborated with him in writing a book "Microwave Measurements". In 1955 he was appointed to the first Chair in Electrical Engineering at Sheffield University, building up another microwave research group there. In 1967 he was invited to return to UCL as Pender Professor of Electrical Engineering on the retirement of Professor Barlow, who, however, remained in the Department as an Honorary Research Associate.

In 1980 Cullen was awarded a Senior Fellowship, tenable at UCL, which enabled him to concentrate wholly on research. He is currently an Honorary Research Associate in the Department of Electronic and Electrical Engineering at UCL, where he continues his research in antennas and measurements at microwave and millimetre wave frequencies.

1989 Microwave Applications Award



Kenneth L. Carr

"For the application of microwave technology to the detection and treatment of cancer."

The Microwave Applications Award is presented periodically for an outstanding application of microwave theory and techniques. The elegibility requirements are the creation of a new device, component or technique, novel use of components, or both. This years recipient is Mr. Kenneth L. Carr.

Mr. Carr has been involved in the application of microwave technology to the detection and treatment of cancer for many years. In 1979, under NASA support, he delivered a microwave radiometer to the staff of the Eastern Virginia Medical School at Norfolk, VA. A second system was installed in Japan in 1984 at the Nippon Medical School Hospital. Results from these and later systems have shown that microwave thermography is effective in monitoring the course of treatment, and that the application of heat, regardless of the technique or frequency, can be used to enhance detection. Other medical applications have developed from his work. One is a microwave sterilizing device for use in kidney dialysis. This patented device, now under test, is intended to reduce the risk of contamination and infection in dialysis patients.

Mr. Carr (S'53,A'54,M'59,SM'81,F'86) was born in Cambridge, Massachusetts on 15 February 1932. He received his B.S. in Electrical Engineering from Tufts University in 1953.

During the past thirty-five years, he has worked at Philco, Sylvania, and Airtron.

In 1958 Mr. Carr co-founded Ferrotec, Inc., serving initially as Technical Director and later as President. Following the acquisition of Ferrotec in 1970 by M/A-COM, INC., Mr. Carr became Senior Vice President and Technical Director.

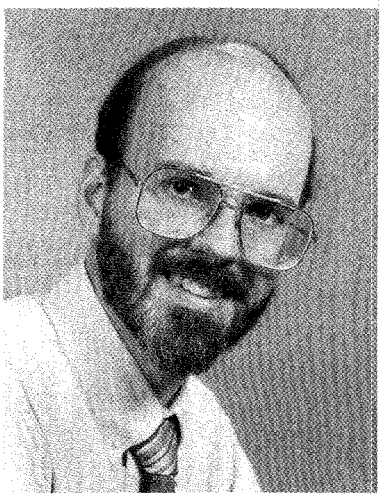
In January 1985, while maintaining his position at M/A-COM, INC., he co-founded Microwave Medical Systems, Inc., serving as its Chairman and Technical Director.

Mr. Carr is currently a Trustee of Wentworth Institute of Technology, Boston, Massachusetts; a Director of the East Coast Aeronautical Technical School, Bedford, Massachusetts; a Member of the staff of the Eastern Virginia Medical School, Norfolk, Virginia; and a member of the Engineering Advisory Council for Southeastern Massachusetts University, North Dartmouth, Massachusetts. He is also serving as Technical Advisor to both the University of Pennsylvania and the Medical Physics Department at Tufts New England Medical Center. In conjunction with his duties at the University of Pennsylvania, Mr. Carr is now serving as Chairman of their Bioengineering Advisory Council.

He also maintains membership in the AAPM, NAHG, BEMS, IMPI, RRS and the Association of Old Crows. In December 1985, Mr. Carr was made a FELLOW of the IEEE. He was also appointed the 1985–1986 MTT Distinguished Microwave Lecturer. Most recently he has accepted a position on the newly formed Health Care Engineering Policy Committee of the IEEE.

Mr. Carr presently holds 14 patents with 3 patents pending, and is widely published in peer related journals. He was the recipient of the 1978 IR-100 Award for the TERRASCAN® Underground Utility Locator. Much of his recent work has been in the development and application of microwave techniques to medicine and, in particular, to the detection and treatment of cancer for which he received NASA's Certificate of Recognition in 1980 and again in 1983 for his technical innovations and scientific contributions.

1989 MTT-S Microwave Prize



Stephen A. Maas

The *Microwave Prize* is awarded annually to the author of that paper, published in the IEEE Transactions on Microwave Theory and Techniques, Proceedings of the IEEE, or any other official IEEE publication, which is judged to be the most significant contribution in the field of interest of the Society. The paper must have been published in the calendar year prior to its selection.

The 1989 Microwave Prize has been awarded to Dr. Stephen A. Maas for his paper, "Two-Tone Intermodulation in Diode Mixers" published in the *IEEE Transactions on Microwave Theory and Techniques,* vol. MTT 35, March 1987, pp. 307–314.

Stephen A. Maas (S'80,M'83) received the BS and MS degrees in Electrical Engineering from the University of Pennsylvania in 1971 and 1972, respectively, and the Ph. D. degree in Electrical Engineering from UCLA in 1984. His dissertation research involved the analysis of GaAs MESFET mixers, and was one of the first applications of harmonic-balance analysis to microwave FET circuits.

From 1973 to 1974 he developed instrumentation for LIDAR studies of the atmosphere at the US National Oceanic and Atmospheric Administrations' Environmental Research Laboratories in Boulder, CO. In 1974 he joined the National Radio Astronomy Observatory in Socorro, NM, where he was responsible for the development of the cryogenic low-noise receivers for the Very Large Array (VLA) radio telescope program. Since 1978 he has been involved in the research and development of microwave and millimeter-wave systems and components for space applications, first at The Hughes Aircraft Co. and later at TRW. The components he developed include FET and HEMT amplifiers, millimeter-wave diode mixers, active FET and HEMT mixers (including a 45-GHz HEMT mixer), and integrated mmW downconverters using HEMT low-noise amplifiers. In 1985 he joined The Aerospace Corporation as a Research Scientist, working on the analysis of nonlinear microwave circuits and systems. At Aerospace his primary interests are in the application of Volterra-series techniques to nonlinear microwave CAD, and in practical means for improving the dynamic range of microwave systems and components. He also teaches electronics and microwave courses at UCLA and consults for companies in the Los Angeles area.

Dr. Maas is the author of two books on microwave subjects, *Microwave Mixers* and *Nonlinear Microwave Circuits,* published by Artech House Books (Norwood, MA) in 1986 and 1988, respectively.

1989
Distinguished Service Award

Don Parker

"For his outstanding and dedicated service to the Society."

The Distinguished Service Award is presented to honor an individual who has given outstanding service over a period of years for the benefit and advancement of the Microwave Theory and Techniques Society. The 1989 recipient is Dr. Don Parker, Assistant Manager, Radar Microwave Laboratory, Hughes Radar Systems Group. Don Parker has served MTT-S in a variety of roles, many visible, some less obvious. His opinions are invariably well reasoned, and his style is warm and cooperative. He is one of those rare contributors who gives much and asks little.

Don Parker (S'61,M'63,SM'73,F'82) was born in Ogden, Utah in 1933 and received his undergraduate education in electrical engineering at Brigham Young University. He received an M.S degree from Harvard University in Applied Physics in 1957, and a Doctorate of Science (D. Sc.) in Electrical Engineering from the Massachusetts Institute of Technology in 1964.

Dr. Parker was a member of the Technical Staff of MIT Lincoln Laboratories from 1956 to 1961 and from 1964 to 1969. He designed and developed solid-state microwave power sources including frequency multipliers and IMPATT diode oscillators.

From 1961 to 1964, Dr. Parker served as a Lieutenant in the U. S. Air Force and assisted in the development of an R&D program in the Electronic Systems Division at Hanscom Field, Bedford, Massachusetts.

Dr. Parker joined Stanford Research Institute in October 1969 and became manager of the Electromagnetic Techniques Laboratory in 1970. The Laboratory developed state-of-the-art microwave components, antennas, and subsystems for radar and communication systems. He helped develop the use of automatic network analyzers for making rapid broadband radar cross-section measurements.

Dr. Parker joined Hughes Aircraft Company in 1976 as manager of the Microwave Department in the Missile Systems Group. Later he became manager of the Radar Laboratory where he directed a staff of 150 scientists, engineers, and technicians in the design and development of RF subassemblies for tactical missle radars. He managed the design teams that developed the solid-state transmitter for the Phoenix Missile, the solid-state transmitter, guidance antenna, fuze antenna, data link, and RF processors for the AMRAAM validation missile. The millimeter-wave sensor for the WASP missile was developed by design teams under his direction. Dr. Parker transferred to Hughes Radar Systems Group in 1986 as an Assistant Manager, Radar Microwave Laboratories, and is responsible for all active array programs in the Engineering Division.

Dr. Parker served as secretary to the Administrative Committee of the MTT Society in 1972. He was elected to AdCom in 1973 and served as a member through 1982. He was Vice President of the Society in 1978 and President in 1979. Dr. Parker was editor of the *IEEE Transactions on Microwave Theory and Techniques* 1975 through 1977 and has been a member of the Editorial Board from 1970 to present. He was Chairman of the Awards Committee from 1983 through 1986. Dr. Parker was Chairman of the Technical Program Committee for the 1981 Symposium and has been a member of the Technical Program Committee for many MTT-S symposia. He is Vice-Chairman of the 1989 International Microwave Symposium and is Chairman of the 1994 Symposium. As a member of AdCom, Dr. Parker has served in several other capacities including: MTT-S representative to the Solid State Circuits Council 1973–1975; Meetings & Symposia Committee, 1973–1974; Chairman, Publications Evaluation Committee, 1982; Long Range Planning Committee, 1982; and as a Member of the IEEE Technical Advisory Board (TAB) Awards Review Committee, 1985. Dr. Parker is presently Chairman of the Past Presidents Council for MTT-S.

Dr. Parker is a Fellow of the Institute for Electrical and Electronic Engineers. He was awarded the Centennial Medal by the MTT-Society in 1985.

1989 N. Walter Cox Service Award

Richard A. Sparks

"For exemplary service given in a spirit of selfless dedication and cooperation"

The N. WALTER COX SERVICE AWARD recognizes a contributor to MTT-S "For exemplary service given in a spirit of selfless dedication and cooperation" and has been established in recognition of the service provided to the Society by N. Walter Cox prior to his untimely death on June 29, 1988. The Award will be presented for the first time at the Awards Banquet.

Walter Cox approached every person or problem with a positive and enthusiastic attitude. He was diligent, courageous, flexible and untiringly gave support to others. The N. Walter Cox Award will be given aperiodically to a society volunteer whose efforts on behalf of MTT-S best exemplify the spirit and dedication of Walter Cox.

The first recipient of the Award is Richard A. Sparks, a long time member of the MTT-S Administrative Committee and a past President (1982) of the Society. Even after achieving the highest elected office the Society can bestow, Dick has continued to serve the Society on both technical and administrative committees, most recently as Society International Liaison Chairman. The Award will be presented by Mrs. Mary Ann Cox.

1989 IEEE Fellow Awards

Twenty-nine members of the Microwave Theory and Techniques Society were elected Fellow, IEEE. Of these, twelve were evaluated by MTT-S. The names and citations for these twelve are listed below.

Mohammed N. Afsar — *For contributions to the development of measurement techniques for determination of complex dielectric and optical parameters of solid, liquid, and gaseous materials at millimeter frequencies and above.*

Inder J. Bahl — *For contributions to microstrip technology, and to the theory and design of hybrid and monolithic microwave integrated circuits.*

Prakash Bhartia — *For contributions to the development of microwave and millimeter wave transmission lines and microstrip antennas.*

Harold C. Bowers — *For leadership in the development of microwave devices, components and systems, and in the establishment of major businesses in the areas.*

Chung-Kwang Chou — *For contributions to the understanding of biological effects and medical applications of microwave energy.*

Madhu S. Gupta — *For contributions to the characterization and modeling of noise in high-frequency semiconductor devices in microwave integrated circuits.*

Tom M. Hyltin — *For contributions to monolithic microwave integrated circuits and solid-state, phased-array radar systems.*

Rolf H. Jansen — *For contributions to field-theoretical analysis of microwave IC structures and the development of advanced CAD tools.*

Reynold S. Kagiwada — *For contributions to low-temperature ultrasonics and technical leadership in the development and insertion of microwave acoustic devices in space.*

Edward C. Niehenke — *For contributions to the development of low-noise microwave oscillators and amplifiers.*

Christen Rauscher — *For contributions to linear and nonlinear circuit applications of microwave field-effect transistors.*

Herbert L. Thal, Jr. — *For contributions to the application of computer-aided procedures in the development of microwave components.*

The names and citations for those MTT-S members who were evaluated by another society are given next. The evaluating society is also noted.

Yasuo Akao, EMC — *For leadership in the field of electromagnetic compatibility and related contributions to research and education.*

Jerome K. Butler, LEO — *For contributions to semiconductor lasers and the theory and radiation characteristics of optical waveguides.*

Charles A. Cain, EMB — *For contributions to the understanding of biological effects of microwave and ultrasound radiation and for contributions to advancement of hyperthermia cancer therapy.*

Richard F. Clark, IM — *For contributions to the development of microwave standards.*

Kazuo Fugisawa, ED — *For contributions to research in the field of microwave electronic devices and leadership in engineering education.*

Herbert Goronkin, ED — *For contributions and technical leadership in compound semiconductor transistor technology.*

Tor Hagfors, AP — *For contributions and leadership in the sciences of incoherent scatter, radar, and radio astronomy.*

Charles F. Krumm, ED — *For contributions to the development of ultrahigh-performance GaAs devices and circuits.*

Bruce R. McAvoy, UFFC — *For leadership in microwave acoustics with contributions to high-frequency resonators and signal processing devices.*

Benedikt A. Munk, AP — *For contributions to the theory and design of frequency selective surfaces and phased arrays.*

Edward H. Newman, AP — *For contributions to modeling the electromagnetic radiation and scattering from complex structures.*

Krishna P. Pande, ED — *For contributions to III-V semiconductor materials and device technology, particularly for advancing the indium-phosphide metal insulator semiconductor field effect transistor technology.*

Daniel H. Schaubert, AP — *For contributions to the design and analysis of printed circuit antenna and to electromagnetic interaction with complex dielectric bodies.*

Luther G. Schimpf, COMM — *For contributions to the digital transmission of speech.*

Kishore Singhal, CAS — *For contributions to computer-aided design of circuits and systems and in particular the development and implementation of efficient centering and tolerancing algorithm.*

Armand Staprans, ED — *For leadership in the development of linear beam microwave tubes.*

Tadasi Sueta, LEO — *For contributions in research and development on optical and quantum electronics, especially in the field of guided-wave optics.*