

MTT Awards for 1973

JOHN B. HORTON

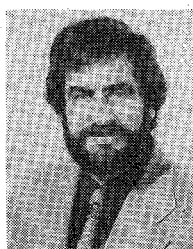
THREE Society awards were presented at the annual MTT banquet held at the Sheraton-Biltmore Hotel during the 1974 MTT Symposium. These awards were the *Microwave Prize*, the *Microwave Applications Award*, and the *Microwave Career Award*. The Microwave Prize is given for the best paper on a microwave subject published during the previous year. The Microwave Applications Award is a new award, presented aperiodically to an individual for an outstanding application of microwave theory and techniques. The Microwave Career Award is also a new award, to be presented aperiodically to an individual for a career of meritorious achievement and outstanding technical contributions in the field of microwave theory and techniques.

MICROWAVE PRIZE

The 1973 Microwave Prize was awarded to W. R. Smith, H. M. Gerard, and W. R. Jones for a very significant contribution to the field of endeavor of the IEEE MTT Society in their paper entitled "Analysis and Design of Dispersive Interdigital Surface-Wave Transducers," published in the IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES, Volume MTT-20, pp. 458-471, July 1972. The recipients each received a certificate and a cash sum of \$100. (A photograph of the certificate and biographies of Drs. Smith, Gerard, and Jones are shown.)

joined the technical staff at Hughes Aircraft Company, Fullerton, Calif., where he is now a Staff Physicist. His present research is concerned with the application of surface acoustic waves to filters, delay lines, radar, and signal processing devices.

Dr. Smith is a member of Sigma Xi and is currently secretary of the Orange County Joint MTT/AP Chapter of the IEEE.



Henry M. Gerard was born in Brooklyn, N. Y., on November 7, 1942. He received the B.S. and M.S. degrees in physics in 1964 as a participant in the Unified Honors Program of the Polytechnic Institute of Brooklyn, Brooklyn, N. Y. As a research assistant at the Microwave Laboratory of Stanford University, Stanford, Calif., from 1964 through 1969, he studied piezoelectric surface waves and interdigital transducers leading to conferral of the Ph.D. degree in applied physics in 1970.

In 1969 he joined the technical staff at Hughes Aircraft Company, Fullerton, Calif., where he is now a Staff Physicist in the Receiver and Frequency Control Department. Since 1969 he has been engaged in the development of acoustic surface-wave filters, such as tapped delay lines, pulse compression filters, and phase-coded devices for broad-band analog signal processing applications. He is presently involved in the study of reflective grating techniques for high-efficiency broad-band surface-wave applications.

Dr. Gerard is a member of Sigma Xi.



Microwave Theory and Techniques Society
1973 Microwave Prize

to
W. Richard Smith
Henry M. Gerard
William R. Jones

for a very significant contribution to the field of endeavor of the IEEE MTT Society in their paper entitled "Analysis and Design of Dispersive Interdigital Surface-Wave Transducers" published in the IEEE Transactions on Microwave Theory and Techniques, Volume MTT-20, Number 7, July 1972.



June 12, 1974

Robert R. Smith
President, MTT

John B. Horton
Chairman,
MTT Awards Committee

MICROWAVE THEORY
AND TECHNIQUES



W. Richard Smith was born in Salem, N. J., on July 2, 1942. He received the A.B. degree in physics from Princeton University, Princeton, N. J., in 1964 and the M.S. and Ph.D. degrees in applied physics from Stanford University, Stanford, Calif., in 1966 and 1970, respectively.

In 1969 he served as a Technical Consultant to North American Rockwell Corporation, Autonetics Division, in the area of microwave acoustic surface waves. In 1970 he



William R. Jones (M'61-SM'69) was born in Globe, Ariz., on November 8, 1932. He received the B.A. degree in mathematics from the University of California, Riverside, in 1957, and the M.S. and Ph.D. degrees in mathematics from Stanford University, Stanford, Calif., in 1958 and 1967, respectively.

From 1952 to 1954 he served in the U. S. Navy as a Training Devices Technician. From 1954 to 1957, while at the University of California, he was employed at the U. S. Naval Ordnance Laboratory, Corona, Calif., as a Microwave Technician. From 1958 to 1960 he was employed at the IBM T. J. Watson Laboratory, Yorktown Heights, N. Y., as a member of a microwave computer group investigating the application of microwave techniques to the development of high-speed logical circuits. In June 1960 he joined Hughes Aircraft Company, Fullerton, Calif., where he concentrated primarily on the study of electromagnetic surface-wave excitation and diffraction problems. From 1962 to 1966 he returned to full-time academic study at Stanford University with the aid of a Hughes Fellowship. At present he is a Senior Scientist at Hughes Ground Systems Group, where he is involved primarily with research and development in the areas of microwave acoustics and signal processing applications.

Dr. Jones is a member of Sigma Xi.

MICROWAVE APPLICATIONS AWARD

The Microwave Applications Award was presented to E. G. Cristal for his recent contributions to the application of microwave theory and techniques to stripline and microstrip filter design. Dr. Cristal received a certificate and a cash sum of \$100. (A photograph of the certificate and Dr. Cristal's biography are shown.)



Microwave Theory and Techniques Society 1973 Microwave Application Award

to

Edward G. Cristal

for his recent contributions to the Application
of Microwave Theory and Techniques to
Stripline and Microstrip Filter Design.

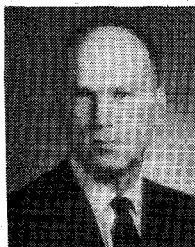


June 12, 1974

Robert J. Baker
President, MTT

W. H. Haddad
Chairman,
MTT Awards Committee

MICROWAVE THEORY
AND TECHNIQUES



Edward G. Cristal (S'58-M'61-SM'66) was born in St. Louis, Mo., in January 1935. He received the B.S. and A.B. degrees in electrical engineering and mathematics and the M.S. degree in electrical engineering from Washington University, St. Louis, Mo., in 1957 and 1958, respectively, and the Ph.D. degree in electrical engineering from the University of Wisconsin, Madison, in 1961.

From March 1961 to January 1972 he was with the Electromagnetic Techniques Laboratory, Stanford Research Institute (SRI), Menlo Park, Calif. At SRI he participated in programs of applied research and development of microwave and UHF components, including filters, multiplexers, directional couplers, impedance matching networks, equalizers, and multipliers. From January 1972 to June 1973 he was Associate Professor of Electrical Engineering, McMaster University, Hamilton, Ont., Canada. He joined the Hewlett-Packard Laboratories, Palo Alto, Calif., in June 1973, where he is currently working in the area of telecommunications.

Dr. Cristal is a member of the IEEE Communications, Circuits and Systems, and Microwave Theory and Techniques Societies.

MICROWAVE CAREER AWARD

W. W. Mumford received MTT's highest award, the Microwave Career Award, for a career of meritorious achievement and outstanding technical contributions in the field of microwave theory and techniques. Mr. Mumford received a standing ovation of several minutes. He received a certificate, a cash sum of \$500, and a plaque. Mr. Mumford has had a career of over four decades in the microwave field and was one of the early members of the MTT AdCom. As can be seen from his biography, he has been one of the truly outstanding members in the microwave field.



Microwave Theory and Techniques Society 1973 Microwave Career Award

to

William Walden Mumford

For a Career of Meritorious Achievement
and Outstanding Technical Contributions
in the Field of Microwave Theory and Techniques.

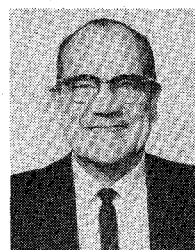
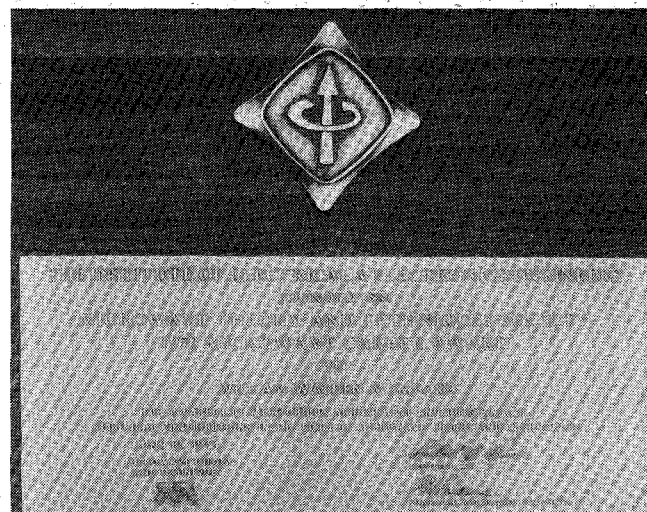


June 12, 1974

Robert J. Baker
President, MTT

W. H. Haddad
Chairman,
MTT Awards Committee

MICROWAVE THEORY
AND TECHNIQUES



William W. Mumford (A'30-SM'46-F'52-L'70) was born in Vancouver, Wash., on June 17, 1905. He received the A.B. degree majoring in physics and mathematics from Willamette University, Salem, Oreg., in 1930.

In 1930 he joined the technical staff of Bell Laboratories with the Radio Research Department, Holmdel, N. J., where he worked on ultrahigh-frequency propagation and microwave components for radio relay systems and radars. In 1953 he transferred to the Military Development Department, Bell Laboratories, Whippany, N. J., where he was Supervisor of a group engaged in the study of microwave radar problems and the exploratory development and exploitation of the latest techniques for improving noise figures of receivers. He transferred to the Device Development Department, Murray Hill, N. J., in 1963. In 1964 he returned to Whippany to organize a group to do forward-looking radar development. He consults on the subject of Radio Frequency Radiation Safety, not only for the Bell System, but also for the Office of Telecommunications Policy. He retired from Bell Laboratories in 1970 after 40 years of service there. His contributions in the microwave field include filters, directional couplers, wide-band coaxial-to-waveguide transducers, helix-to-waveguide transitions, and the gas-discharge noise generator. These are covered in 37 published papers and 19 patents. He is a coauthor of *Radar Systems and Components* (Princeton, N. J.: Van Nostrand, 1949); a contributor to the *Reinhold Encyclopedia for Electronics*, 1962; and coauthor of the book *Noise Per-*

formance Factors in Communication Systems (Horizon House Microwave, Inc., 1968). In 1955 he served as Visiting Mackay Professor of Electrical Engineering at the University of California, and in 1962 he was Visiting Ford Professor of Electrical Engineering at the University of Wisconsin.

Mr. Mumford received the IEEE Morris E. Leeds Award in 1967 and an alumni citation from Willamette University in 1968. He has served on the technical program committees of the Institute's International Conventions and Microwave Symposia. He has served continuously on the AdCom of the MTT Society since its inception and has acted as Secretary, Vice-Chairman, and Editor of the TRANSACTIONS. He has been a member of the IEEE Groups on Circuit Theory, Electron Devices, and Antennas and Propagation. He served as the first Chairman of the Quantum Electronics Council. He became a Registered Professional Engineer in the State of New Jersey in 1950, and is listed in *Engineers of Distinction* 1970. He

was a member of the URSI National Committee representing Commission I from 1966 to 1969, and is active on the U.S. Standards Institute Committee C-95 having to do with radio frequency radiation hazards, being a coauthor of Standard C-95.1. After retiring from the Bell Telephone Laboratories in 1970, he served a term on the Board of Directors of the Weinschel Engineering Company and did some consulting work with them. In 1971 he was appointed Adjunct Associate Professor of Environmental Medicine, part time, at the New York University Medical Center where his chief contributions are in the field of Microwave Biological effects and Radio Frequency Radiation Hazards. He is still active as an independent consultant and also is a member of the Electromagnetic Radiation Management Advisory Council of the Office of Telecommunications Policy in the Executive Office of the President of the U.S. He is listed in *American Men of Science*, *Who's Who in Engineering*, and *Who's Who in America*.

The 1974 S-MTT National Lectureship

LOW NOISE RECEPTION AND TECHNOLOGY

NOISE has always played a major role in the design of microwave systems. The tradeoff problems of transmitter power versus receiver sensitivity in radar, antenna size versus receiver sensitivity in communications, system noise temperature versus bandwidth and integration time in radiometry, etc., have always challenged the design engineer in the past and will continue to do so in the future. This lecture concerns itself with these tradeoff problems and presents several points of view relative to optimum performance.

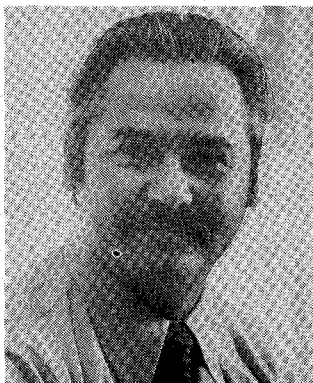
The basic theme of the lecture concerns itself with the noise encountered in the reception process. Comparisons are given of all of the major low-noise receivers such as parametric amplifiers, upconverters, image-enhanced mixers, bipolar and FET transistor amplifiers, etc. In addition, a review of the basic concepts of noise and the methods of characterizing noise in different components and systems is presented.

For many years, teams of engineers were concerned with system design from the point of view of maximizing performance characteristics. It was, and in many cases still

is, important to have a radar with a maximum of range and resolution, communication systems that have a maximum of channel capacity and data rates, and radiometers that can detect extremely small changes in background radiation. However, in today's climate, economics is becoming a continually growing parameter that enters the design concept. Many end users of systems are not specifying maximum performance but are stressing a given performance with a "design to cost" parameter. Therefore, a fresh approach must be used in configuring a system so that optimum use (from an economic and performance point of view) of all components and subsystems can be realized. This lecture also discusses microwave noise from the above economic point of view.

Detailed system descriptions of tradeoffs in radar, communications, and radiometry are given showing the compromises between transmitter power, receiver noise temperature, antenna diameter, etc. In addition, projections are made as to the performance that will be achieved in the future with continued advances in receiver technology.

SEYMOUR OKWIT



Seymour Okwit (A'55-M'60-SM'61-F'66) was born in New York, N. Y., on August 31, 1929. He received the B.S. degree from Brooklyn College, Brooklyn, N. Y., in 1952, and the M.S. degree in applied mathematics and the M.S. degree in physics from Adelphi College, Garden City, N. Y., in 1957 and 1961, respectively.

He is President of LNR Communications, Inc., Farmingdale, N. Y. He has published, as author or coauthor, over 40 papers and holds several patents for his work in the low-noise reception field. He has presented many of these papers at conferences and symposia and has been an Invited Lecturer at a number of IEEE lecture series particularly associated with solid-state and low-noise systems and components. He has also acted as Session Chairman at several conferences. From 1965 to 1968 he was Editor of the IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES. He has been an elected member of the G-MTT AdCom since 1966 and was the elected Chairman for 1971. He was an appointed member of the IEEE Publications Board, Chairman of the Finance Committee of the Publications Board, and a member of the IEEE Budget Advisory Committee.