

1996 PIONEER AWARD

Dr. Ali E. Atia and Dr. Albert E. Williams

The Pioneer Award recognizes contributions that have had a major impact on the microwave engineering field and have stood the test of time. The basis of nomination is an archival paper in the field of interest of MTT-S, published at least 20 years prior to the year of the award.

Dr. Ali E. Atia and Dr. Albert E. Williams are the recipients this year of the Pioneer award. They developed the dual-mode cavity filter at COMSAT Laboratories which has been widely used for multiplexers and filters requiring high selectivity in a limited volume.

Each award consists of a plaque and an honorarium of \$1,000. The citations read: "FOR THE INVENTION OF THE DUAL-MODE CAVITY FILTER, A MAJOR ADVANCE IN THE DEVELOPMENT OF SATELLITE COMMUNICATIONS."

In the late 1960's, it was recognized that the most efficient way to design a satellite payload with a large communications capacity was to divide the allocated 500 MHz frequency band into a large number of narrowband transponders, each with its own non-linear power amplifier. In 1968, this could only be achieved with bulky waveguide Chebycheff filters. For example, the INTELLSAT IV payload contained twelve, 10-pole filters of 36 MHz bandwidth, each weighing approximately 2200 grams. A significant filter weight reduction was needed in order to increase the number of channels in the satellite communications systems without adding extra payload.

Dr. Atia and Dr. Williams solved this problem by developing the dual mode cavity filter in which a single cavity could support two electrical resonant modes and, in addition, could generate responses with sharp selectivity and/or flat group delay. An eight-pole elliptic filter constructed in four physical cavities and weighing only 450 grams proved to be electrically equivalent to the INTELLSAT IV 10-pole Chebycheff filter and was first flown in space on the INTELLSAT IV-A communications satellite.

During the next 25 years, this original work lead directly to the development of many types of multiple coupled-cavity filters and multiplexers providing significant reduction in mass and volume for high-capacity satellite payloads. In 1991, collaboration with Lincoln Laboratory led to the development of high-temperature superconducting thin films. Both cavity and superconducting filters are now finding extensive application in the wireless industry.

Ali E. Atia (S '67, M '69, SM '78, F '87) received his B.S. Degree from Ain Shams University, Cairo, Egypt, in 1962, M.S. and Ph.D. Degrees in Electrical Engineering from the University of California, Berkeley, in 1966 and 1969, respectively. In 1994, Dr. Atia joined CTA International where he is presently President. CTA International implements turnkey satellite telecommunications and direct broadcast systems, and currently is managing the implementation of the INDOSTAR Program, a direct broadcast satellite system for the Republic of Indonesia.

Dr. Atia joined COMSAT Laboratories in 1969 where he participated in research and development of a broad range of advanced microwave technologies for communication satellite transponders and antennas. He designed, developed and implemented microwave flight hardware (mixers, filters, multiplexers, amplifiers, switches, antennas, etc.) for several satellite programs covering the L- through the Ka- frequency bands. Dr. Atia participated in and directed system development and software activities for several satellite programs and ground stations projects for customers including INTELSAT, INMARSAT, ARABSAT, and others.



Dr. Atia held several technical and management positions at COMSAT, the most recent of which was Vice President and Chief Engineer for COMSAT Technology Services and COMSAT Systems Division.

Dr. Atia is a Fellow of the IEEE, Associate Fellow of the AIAA, and a member of the Sigma Xi Research society. He has authored or co-authored over one hundred refereed technical articles and presentations in the IEEE transactions and various national and international conferences and symposia. He holds five patents in the areas of microwave filters and receivers.

Albert E. Williams (S' 66, M '66, SM '78, F '87) was born March 27, 1940, in Albany, Western Australia. He received a B.E. degree from University of Western Australia in 1962; a Ph.D. from University College, London University, in 1966; and an MBA from George Washington University in 1990. From 1966 to 1968, he was a lecturer in the Department of Electrical Engineering at the University of Western Australia. In 1969, Dr. Williams joined COMSAT Laboratories as a Member of the Technical Staff in the Transponders Department of the Microwave Technical Division. He is currently Vice President of the Satellite and Systems Technologies Division.

During his tenure at COMSAT, Dr. Williams has also made major contributions to satellite and ground system design for both the INTELSAT and INMARSAT Systems. In recent years, he has led the COMSAT Laboratories team studying the application of low earth orbit, intermediate circular orbit, and geostationary orbits for personal handheld communications.

Dr. Williams is a Fellow of the IEEE (1986), a past chairman of the MTT-S subcommittee, and a member of Sigma Xi, the Scientific Research Society. In 1966, he was joint recipient of the IEEE (London) Sylvanus P. Thompson Premium Award, and in 1984 a joint recipient of the COMSAT Research Award. He has authored/co-authored more than 50 papers and holds seven patents.

