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MICROWAVE COMMUNICATION TECHNOLOGY

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Communications represent the largest microwave market segment, worldwide. Analog terrestrial microwave links carry more than half of the long-distance communications in the U.S. and in most other countries. Growing and diversifying applications led to spectrum crowding, which demanded better spectrum utilization. This is being implemented in two ways: (1) through improvements in the spectrum efficiency, i.e., by increasing the transmission capacity within a given channel bandwidth, and (2) through spectrum sharing between different transmission systems (e.g., terrestrial and satellite). The advent of digital microwave transmission introduced additional elements of complexity. Under these circumstances, the microwave industry faces unprecedented challenges in the development and manufacture of communications equipment, components and devices. The talk is intended to concentrate on technological developments in response to the prevailing operational requirements and competitive pressures.

Most major development efforts are oriented at high-capacity digital transmission in the preferred communication bands below 12 GHz. Microwave power amplification seems to be attracting the greatest attention as GaAs FET amplifiers become increasingly successful in competing with TWTs, but other related development efforts are making significant progress, as well.

Other areas of progress in microwave communication technology to be highlighted in this talk are: the ongoing expansion into the millimeter-wave range, the growing point-to-multipoint transmission requirements, the beginning of commercial spread-spectrum transmission applications, and last—but not least—the continuing progress in the development of analog microwave transmission equipment.

Terrestrial microwave communications owe their initial rapid growth to the availability of the previously developed radar technology, and they continue to benefit from this and from the other areas of military and commercial microwave systems development, including satellite communications which introduced a new element of competition. The more recent development of microwave receivers for direct satellite broadcasting promises to bring about new designs and manufacturing techniques that could be advantageously applied to equipment for terrestrial microwave communications, especially in reducing manufacturing cost. These important interrelationships deserve special mention in the lecture.

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Born in Yugoslavia, Ferdo Ivanek obtained his Dipl. Ing. and Dr. Techn. degrees in Electrical Engineering form the Technical University of Vienna, Austria in 1948 and 1965, respectively. His consecutive associations with the R&D laboratories of the Yugoslav Broadcasting and PTT organizations, and of the Iskra Corporation included management in planning the first major Yugoslav radio-relay link, and in developing the first domestically manufactured microwave communication equipment. He also taught at the EE Department, Split, of the University of Zagreb, where he was appointed as Associated Professor.

Professor Ivanek is a Senior Member of the IEEE and a member of the Sigma Xi Society. He served as Chairman of the Santa Clara Valley Chapter of the MTT Society, and is currently Chairman of the Microwave Systems Committee (MTT-16). He also serves on the IEEE Solid-State Circuits Council as representative of the Communications Society. His active participation in the CCIR includes the first chairmanship of the Study Group 9 Working Group on Radio-Relay Systems for Developing Countries. He published over 40 articles and one book chapter, and holds one patent.