Foreword

THE MILLIMETER-wave community has had a roller coaster career over the last thirty years. The reasons are varied and have been adequately documented in great detail in the literature. The results have, however, been traumatic in that great efforts have been started, promises made, and finally, deliveries not met, followed by a drought in support till the next resurgence. Happily, this condition has changed since the early 1970's to a monitonically increasing support and interest, driven primarily by military requirements (see and fight on an obscured battlefield) and a still small but rapidly growing industrial/academia requirement. A barometer of this fact has been the increased publication rate, including special issues in this Journal plus the emergence of various specialist conferences. Today we stand on a threshold in the art, i.e., we must soon start delivering on our promises. Some other subtle issues also arise, specifically the question of industrial base. Picture, if you will, the hypothetical situation in which industry grows exponentially in the near future. Will there be an adequate industrial support base? Additionally, will second sources be available for system contractors? Obviously, the objective of this Special Issue is to present the latest efforts in the millimeter art, the previous comments being offered only as food for thought.

This Special Issue contains representive papers indicating the present state-of-the-art and illustrating where primary emphasis is being placed on new developments. For instance, there is considerable interest in millimeter-wave integrated circuits with papers covering different hybrid technologies such as microstrip, finline, imageline, and leaky wave antennas. In addition, two papers are offered (Dixon and Malik, and Wang and Schwarz), pointing to monolithic approaches. Other emerging areas include combiners and higher power transmitters, improved mixers and detectors, Josephson oscillators, phase shifters and varactor diodes, and precise measurements of dielectric permittivity and loss tangents of semiconductors and insulators (Afsar and Button).

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Dr. Jacobs received the IEEE Fellow Award in 1967 for his semiconductor devices contributions and the Army's Decoration for Exceptional Civilian Service in 1969 for millimeter-wave imaging investigations. In 1973 he was recipient of the IEEE's Harry Diamond Award for identification of bulk semiconductor effects at millimeter waves with application to imaging and surveillance.