Dr. Werner Wiesbeck,
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BIOGRAPHY

Werner Wiesbeck (SM 87, F 94) received the Dipl.-Ing. (M.S.E.E.) and the Dr.-Ing. (Ph.D.E.E.) degrees from the Technical University Munich in 1969 and 1972, respectively. From 1972 to 1983 he was with AEG-Telefunken in various positions including that of head of R&D of the Microwave Division in Flensburg and marketing director Receiver and Direction Finder Division, Ulm. During this period he had product responsibility for mm-wave radars, receivers, direction finders and electronic warfare systems. From 1983 to 2007 he was the Director of the Institut für Höchstfrequenztechnik und Elektronik (IHE) at the University of Karlsruhe (TH) and he is now Distinguished Scientist at the Karlsruhe Institute of Technology (KIT). Research topics include antennas, wave propagation, Radar, remote sensing, wireless communication and Ultra Wideband technologies. In 1989 and 1994, respectively, he spent a six months sabbatical at the Jet Propulsion Laboratory, Pasadena. He is a member of the IEEE GRS-S AdCom (1992-2000), Chairman of the GRS-S Awards Committee (1994 – 1998, 2002 -), Executive Vice President IEEE GRS-S (1998-1999), President IEEE GRS-S (2000-2001), Associate Editor IEEE-AP Transactions (1996-1999), past Treasurer of the IEEE German Section (1987-1996, 2003-2007). He has been General Chairman of the ’88 Heinrich Hertz Centennial Symposium, the '93 Conference on Microwaves and Optics (MIOP '93), the Technical Chairman of International mm-Wave and Infrared Conference 2004, Chairman of the German Microwave Conference GeMIC 2006 and he has been a member of the scientific committees and TPCs of many conferences. For the Carl Cranz Series for Scientific Education he serves as a permanent lecturer for Radar systems engineering, wave propagation and mobile communication network planning. He is a member of an Advisory Committee of the EU - Joint Research Centre (Ispra/Italy), and he is an advisor to the German Research Council (DFG), to the Federal German Ministry for Research (BMBF) and to industry in Germany. He is the recipient of a number of awards, lately the IEEE Millennium Award, the IEEE GRS Distinguished Achievement Award, the Honorary Doctorate (Dr. h.c.) from the University Budapest/Hungary, the Honorary Doctorate (Dr.-Ing. E.h.) from the University Duisburg/Germany and the IEEE Electromagnetics Award 2008. He is a Fellow of IEEE, an Honorary Life Member of IEEE GRS-S, a Member of the IEEE Fellow Cmte, a Member of the Heidelberger Academy of Sciences and Humanities and a Member of the German Academy of Engineering and Technology (acatech).

TITLE

Talk Abstract: Digital Beam-Forming in Remote Sensing

ABSTRACT

The invention of the Synthetic Aperture Radar (SAR) principle dates back to the early 1950s. The basic idea is to filter targets in a side looking radar according to their Doppler history in azimuth and by pulse or FM modulation compression in range. Since this time SAR systems have been, from a technical point of view, considerably refined to the state of the art where resolution and accuracy are close to the theoreti-

cal limits. The best innovations have been reached in polarimetry and interferometry. Nevertheless, the principles are still the same: The SAR is a side-looking radar where resolution is achieved in range by bandwidth and in azimuth by Doppler processing.

The beam-forming concepts for coverage are still the same: dish antennas (scanned or fixed), antenna arrays (phased or fixed) or switchable antenna systems. All these have the drawback that the coverage defines the synthetic aperture length and by this the azimuth resolution or for scanned beams the loss of coverage has to be taken into account. These draw backs can be overcome by Digital Beam-Forming. Significant advantages result by this. In its simplest form the transmit antenna illuminates a usually larger footprint, as do the multiple receive antennas. The beam-forming is accomplished in a digital process. Multiple receive beams may be processed simultaneously. The RF losses can significantly be reduced, allowing lower gain for the antennas, and thus larger footprints. In addition Digital beam-forming can handle coded signals, like OFDM, for range and azimuth compression.

This talk will present the principles and applications and latest results of Digital Beam-Forming in Remote Sensing.

Time: 45 – 60 min;

Required: beamer

CONTACT INFORMATION

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