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Professor Prayoot Akkaraekthalin received the B.Eng. and M.Eng. degrees in Electrical Engineering from King Mongkut's University of Technology North Bangkok (KMUTNB), Thailand, in 1986 and 1990, respectively, and the Ph.D. degree from the University of Delaware, Newark, USA, in 1998. From 1986 to 1988, he worked in the Microtek Co.Ltd., Thailand, as a research and development engineer. In 1988, he joined the Department of Electrical Engineering at KMUTNB, as an instructor and researcher. His current research interests include passive and active microwave circuits, telecommunications, and innovative sensor systems. Dr. Prayoot is the author and co-author of over 50 papers in international journals, over 300 conference papers, and four books/ book chapters. He is members of the IEEE, IEICE Japan, EEAAT and ECTI Thailand. He was the Chairman for the IEEE MTT/AP/ED Thailand Joint Chapter during 2007 and 2010. He was the Editor-in-Chief of the ECTI Transactions from 2011 to 2013. He was the vice President of EEAAT association, Thailand from 2012 to 2013 and served as the vice President and the President for the ECTI Association, Thailand from 2012 to 2015. He is now the leader of TRF Senior Research Scholar Project of "Innovative Sensor Technology for Thailand Development" granted by the Thailand Research Fund, Thailand.

Topic:

Innovative Sensor Systems for Thailand's Sustainability

For all manufactures, sensors are key parts of innovation and product design. With advances in micromachinery and easy-to-use microcontroller platforms, the uses of sensors have expanded beyond the traditional fields of temperature, pressure or flow measurement, for example biomedical sensors. Applications of sensors include manufacturing and machinery, airplanes and aerospace, cars, medicine, robotics, smart farms and many other aspects of our day-to-day life. However, there are many different types of sensors, depending on properties, measured or sensed parameters, functional principles, and applications. There are many sensor technologies as well. Therefore, a vast variety of different sensors and classes of sensors are being addressed for many applications. One class of sensors is high frequency and microwave sensors, which includes electromagnetic sensing principles as well as wireless sensors. The later are strongly connected with radio-frequency identification (RFID), used for recognition of individual sensor nodes. Although high frequency and microwave sensors are generally more expensive than sensors working at low frequency, there is a growing interest in using them due to some feature properties can not be provided by other sensors. The most prominent examples are the radar sensors that have already made their way into a large number of applications such as air traffic control, buried object observation, soil inspection and body scanners. These applications use contactless and wireless sensing techniques, being an advantage in harsh or moveable

environments as found in many industrial sites. All these features are currently the main subjects of our research activities.

This talk focuses on the researches of innovative sensors using electromagnetic sensing principles and sensor systems for various applications, especially for agriculture. Several new materials and techniques have been applied to increase the sensor system performances. For examples, the moisture content sensor system with internet of things for real-time drying process in a rice mill will be discussed and demonstrated. Also, the in-house ground penetrating radar system has been developed to detect not only the buried objects and land-mines but also soil layers suitable for agriculture. Several proposed techniques for classifying buried objects will be discussed in details.