

## RESEARCH ROADMAP

The YZU EM research team covers a broad scope of research activities in the EM areas including RF modules, RFIC, EM theories, numerical techniques, antennas, RCS, EMC/EMI, RFID, biomedical applications and wireless sensor networks. Its recent goal targets on the realization of high-gain antenna technologies and their smart operations, as well as their practical applications. Candidates of research subjects vary.

### (1) Antenna Area:

The researches of antenna technologies have been focused on the realization of high-directive antennas and the investigation of their physical phenomena. Targeted candidates include reflector antennas, phased array antennas and reflectarray antennas. The goals are to realize the antenna operations with multi-beam capability and smart mechanisms. Typical applications include the multi-satellite and multi-point communications. Both applications in the far-zone and near-zone of antenna apertures are examined.

### (2) RF modules/ RFIC

The RF module and RFIC technologies investigated in YZU intend to realize the RF subsystem for the smart operation of antennas and wireless communications. Typical applications include the multi-beam and smart antennas in Ku- and Ka-band for satellite or target ID radar applications, the microwave ETC system, and near-zone target ID applications (car collision detection at Ka band, body sensor technology and reader of RFID systems).

### (3) Supporting Technologies

The supporting technologies intend to enable the realization of microwave components including RFIC and antennas. There are several technologies under investigation in YZU including theoretical and numerical techniques for effective design of RF devices (including antennas and their integration with electrically large platform), measurement system technologies with theoretical device modeling, and integration between software and hardware measurement systems. YZU has dedicated significant efforts to develop the supporting technologies and has become one of the very completed universities in Taiwan in this area.

### (4) Digital Signal Process

YZU team has dedicated significant efforts to develop the architecture, algorithm and platform of digital signal process, which intends to realize the smart operation of high-directive antennas. Typical applications include the radar target ID, hybrid soft-ware and RF beam forming networks, extensions of array antenna to reflectarray antenna for smart operations.

### (5) System Applications

Wireless sensor network and RFID systems are two major RF systems under investigations. A body area network is also under plan in our investigation. In addition, YZU has dedicated efforts to realize on its own the smart antenna system with antennas of more than 64 elements at Ku-band for radar applications.