

Integrated sensing and communication for future wireless systems

The separation of communication and sensing has caused huge spectrum, hardware, and energy waste. In recent years, there is a trend to include sensing into communication network to achieve Integrated Sensing And Communications (ISAC). With ISAC, sensing availability and accuracy can be greatly enhanced due to the presence of communication network everywhere anytime. On the other hand, ISAC can provide real-time information for the optimization of the communication network. ISAC can save spectrum, energy & cost, and enable new applications in intelligent transportation, factory automation, remote health, immersive telepresence, extended reality (XR), cooperative robot, digital twin, and many other areas. With the convergence of human, physical & digital worlds in the future, the demand for ISAC will increase and accelerate.

There are different approaches for ISAC, which have different advantages and problems. In 6G, higher frequency like the THz band will be used and massive antenna arrays will be employed. These not only increase the communication throughput and reliability, but also create opportunities for very high accuracy environment sensing, where millimetre level localization and high resolution imaging can be achieved. However, the use of THz band for ISAC also faces many special challenges. In this talk, we will give an overview of the ISAC, the opportunities, the problems, and challenges.

Biography: Yonghong ZENG has been working in the Institute for Infocomm Research, A*STAR, Singapore, since 2004. Currently he is a senior scientist and group leader. His research interests include B5G/6G communications, integrated sensing and communication, cognitive network and communication, vehicular radar and communication, and real time localization systems.

He has co-authored six books and more than 90 refereed journal papers. He received the 2007 and 2009 IES (Institute of Engineers Singapore) prestigious engineering achievement award in Singapore, and ministry-level Scientific and Technological Development Awards four times in China. He received the award for advances in communication from IEEE Communication society in 2022. He was the recipient of the best paper award at IEEE VTC-Spring, 2011, the Inaugural IEEE Communications Society Asia-Pacific Best Paper Award in 2012, IEEE TENCON best paper award in 2017, and APCC best paper award in 2018. He received the Certificate of Appreciation for outstanding contributions to the IEEE 802.22 standard in 2011.

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