Scientific Workshop

Title:

Waveguide Antenna Array Technologies for Space and Beyond

Abstract:

Waveguide arrays are the antenna technology of choice when high-performance and low-profile are desired, for their high efficiency and robustness. This is especially so for space applications. Waveguide arrays take different forms from short slots, apertures, to long slots or continuous transverse stub (CTS) arrays. Various manufacture and assembly techniques have also been developed from traditional milling, to micromachining, diffusion bonding, and more recently 3D printing. With expert speakers from both industry and academia, this workshop will provide an overview on the state-of-the-art in this field, identify the challenges and opportunities for space applications and beyond.

Workshop outline:

The proposed schedule and format of the workshop, including the topics of the talks, is as follows:

5 min	Welcome introduction
30 min	"Waveguide slot array antennas by diffusion bonding of laminated thin plates," Prof Jiro Hirokawa, Tokyo Institute of Technology, Japan (confirmed) This talk presents the waveguide slot array antennas for diffusion bonding of laminated thin plates. Metal plates with conventional chemical etching can be used for fabrication up to about 150GHz band while gold-coated silicon wafers should be used for higher frequency bands. This talk also includes the parallel plate waveguide slot array antennas for space-borne X-band synthetic aperture radars.
30 min	"Gap waveguide technology for mm-wave antennas," Prof Ashraf Uz Zaman, Chalmers University of Technology, Sweden (confirmed) The talk will have a focus on the application of gap waveguide technology for antennas from 30 to 140 GHz. In particular, it will discuss the integration of RF electronics with the slot arrays towards a complete RF front-end at E-band for point-to-point links and automotive radars.
30 min	"Design and Development of Full-Metal Planar Array Antennas," Prof Jifu Huang, Ningbo University, China (confirmed) The talk will review the group's progress on full-metal planar array antennas for mm-wave point-to-point and Satcom. It will discuss new quasi-TEM wave generation method, co-aperture array antennas, and the novel slow-wave structure for dual-frequency co-aperture VICTS antenna, as well as the future challenges and prospects for full-metal planar array antennas.
20 min	Break

30 min	"Array antennas for space applications," Dr Nelson Fonseca, Anywaves, Toulouse, France (confirmed) The presentation will provide a discussion of the typical needs and constraints for onboard satellite antenna design, with focus on satellite communications and RF sensing. A brief historical review will be provided on fully metallic antenna designs and their benefits. Finally, the presentation will cover recent technological developments.
30 min	"Long slot arrays for Space applications," Prof Mauro Ettorre, Michigan State University, USA (confirmed) The talk will provide an overview on wideband arrays based on long slot arrays for space applications. Fundamental limits and feasibility of the concept will be discussed. Several prototypes will be presented to illustrate and validate the analytical analysis.
25 min	"Multi-band and wideband waveguide arrays for Satcom and 5G backhaul," Prof Yi Wang, University of Birmingham, UK (confirmed) This talk will focus on the multi-band and wideband designs and implementation of metal waveguide arrays. It will also demonstrate the use of 3D printing technology in manufacture all-metal waveguide arrays at mm-wave frequencies.
15 min	Discussion

All speaks have been confirmed. Each talk is expected to have 5 min Q&A. There will be further opportunity for discussion and Q&A towards the end of the workshop.

Short CVs of key speakers:

All speakers are regular contributors and authoriative experts in the field of waveguide antenna array technologies. The short bio of the speakers can be found in the following links.

Prof Jiro Hirokawa, https://ieeexplore.ieee.org/author/37280655700

Prof Mauro Ettorre, https://ieeexplore.ieee.org/author/37400657800

Prof Jifu Huang, https://ieeexplore.ieee.org/author/37085806531

Dr Nelson Fonseca, https://ieeexplore.ieee.org/author/37305142400

Prof Ashraf Uz Zaman, https://ieeexplore.ieee.org/author/37543335700

Prof Yi Wang, https://ieeexplore.ieee.org/author/37281432500