SCS Switzerland Webinar on vertical integration for mmWave systems : Building a bridge between antennas and AI, by Dr. Alberto Valdes-Garcia

The IEEE Solid-State Circuits Society (SSCS) Switzerland Chapter organized its first webinar of 2020, Together with Dr. Alberto Valdes-Garcia, Research Staff Member and Manager of the RF Circuits and Systems Group at the IBM T. J. Watson. We invited Alberto to lecture on the topic of vertical integration for mmWave systems: Building a bridge between antennas and AI.

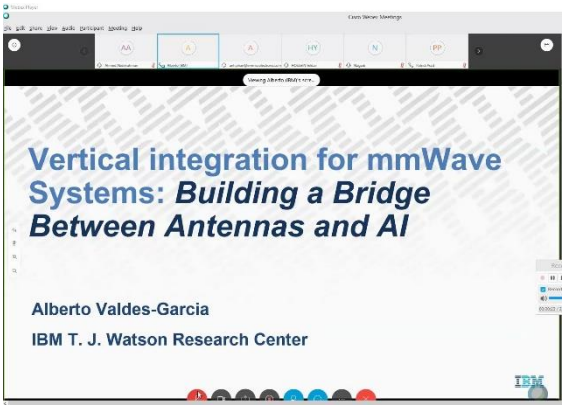

Figure 1: Dr. Alberto Valdes-Garcia, Introducing its lecture

The event took place online thanks to the Webex services provided by IEEE Headquarter to the organisational units.

The idea of connecting antenna and AI is actually not new [1], nevertheless the availability of complex silicon-based mmWave multi-antenna systems, the growth in demand and infrastructure for ubiquitous communication and sensing as well as AI capability. Are the three-factor creating a key opportunity for a vertically integrated “Antenna to AI” systems for communications and sensing. Particularly with 5G directional communications.The presentation was divided into two main parts.

The first par discussed the availability of complex silicon-based, mmWave multi-antenna systems, where it was exposed numerous fabricated circuit and antenna module made between 2003 and today with the world first monolithics mmWave radio operating at 60 GHz into the DARPA TEAM Program and more recently the 28 GHz 64 elements phase array transceiver for last mile 5G transceiver [2] and a more recent activity on Multi-spectral imager[3].

A second part discussed the path forward to build a bridge between antenna and AI for mmWave: Vertically integrated platforms. Such as Software Defined array (SDPAR) and Multi-spectral imager. Where it was discussed the key importance of sensing and collecting data to actually bridge with interesting feature of AI.

The talk attracted 17 SSC members and 6 Guest, which then could participate into a Q&A session. Material are made available online [4].

References

[1] H. L. Southall, J. A. Simmers and T. H. O'Donnell, "Direction finding in phased arrays with a neural network beamformer," in IEEE Transactions on Antennas and Propagation, vol. 43, no. 12, pp. 1369-1374, Dec. 1995

[2]B. Sadhu et al., "7.2 A 28GHz 32-element phased-array transceiver IC with concurrent dual polarized beams and 1.4 degree beam-steering resolution for 5G communication," 2017 IEEE International Solid-State Circuits Conference (ISSCC), San Francisco, CA, 2017

[3]J. Plouchart et al., "Si-Based 94-GHz Phased Array Transmit and Receive Modules for Real-Time 3D Radar Imaging," 2019 IEEE MTT-S International Microwave Symposium (IMS), Boston, MA, USA, 2019,

[4] https://events.vtools.ieee.org/m/218555

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