IEEE PoliTo Student Branch TechTalk

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Universidade de Aveiro

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# FPGA-based all-digital transmitters

## Pushing the bits closer the antenna

### Bio

Arnaldo S. R. Oliveira *(Member, IEEE) received the B.Sc. and M.Sc. degrees in electronics and telecommunications and the Ph.D. degree in electrical engineering from the University of Aveiro, Aveiro, Portugal, in 2007. Since 2001, he has been teaching computer architecture, digital systems design, programming languages, and embedded systems with the University of Aveiro, where he is currently an Assistant Professor. He is also a Researcher with the Telecommunications Institute, University of Aveiro. He participates in several national and European funded research projects. He is the author or coauthor of more than 100 journals and international conference papers. His research interests include reconfigurable digital systems, software defined radio, and next generation radio access networks.*


### Abstract

The Software Defined Radio (SDR) idea, originally proposed by Mitola, envisioned a novel architecture for the radio systems, with the waveforms completely synthesized in the digital domain, achieving greater flexibility, reconfigurability and efficiency. The opportunities arising from this paradigm are unimaginable. The idea of having only one radio transceiver front-end completely independent from the standard, from the number of frequency bands, and completely agile, together with the capability of being real-time reconfigurable and upgradeable, is so ambitious that has caused a significant interest among all the research community.

In the pursuit of this idea, the concept of All-Digital Transmitters (ADTs) was proposed. Taking advantage of the highly integrated digital systems, this concept would bring the RF digital domain closer to the antenna. Moreover, due to its small footprint and potential higher energy efficacies, ADTs are a great candidate for the next generation of mobile communications, where energy efficiency and large number of antennas are among the main requirements.

This talk will provide an overview of the contributions on this topic during the last decade, as well as a discussion on the challenges and open issues.


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