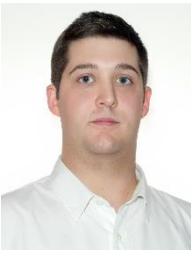
LUÍS DIOGO MEDINA DUARTE



Leiria, Portugal
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Electrical Engineer with 6+ years of specialized experience in advanced radar and telescope systems, including polarimetric radar, synthetic aperture radar (SAR), and space surveillance applications. Proven expertise in FPGA-based signal processing, RF front-end and antenna systems.

ACADEMIC BACKGROUND

Instituto Piaget – Portugal *(In progress)*
Post-Graduate Diploma in Higher Education Teaching

University of Aveiro – Portugal *(2023)*
Doctoral Degree in Electrical Engineering
Thesis title "*Concealed target tracking using enhanced radar techniques*".

University of Aveiro – Portugal *(2015)*
Master on Electronic and Telecommunications Engineering
Master thesis theme "*DLL architecture for OFDM based Visible Light Communication transceivers in FPGA*".

WORK EXPERIENCE

Research in Innovation in Additive Manufacturing project – Polytechnic of Leiria, PT *(April 2024, …)*
- Reports the study of Non-Destructive Radar Imaging techniques for additive manufacturing inspection.

Research in Space Surveillance and Tracking project-Instituto de Telecomunicações, PT *(Dec 2023 – Dec 2025)*
- Technical Lead for PASO Radar System Development.
- Reports the study of radar techniques for space debris tracking.
- Implementation of baseband with RF conversion of custom radar waveforms, using COTS devices to accomplish higher waveform bandwidth.

Ph.D. Research grant from Fundação para a Ciência e a Tecnologia, PT *(January 2021 – June 2023)*
- Reports the RF front-end improvement to a MIMO architecture and improvement of the radar baseband to generate two orthogonal waveforms, to accomplish, in the end, a polarimetric RADAR.
- Reports the implementation of MatLab app to fully automate the FPGA setup and control the radar parameters with a microblaze soft-core, while visualising the radar PDP, Waterfall and PPI images.
- Implementation of Synthetic Aperture Radar algorithm that together with a 3-D scanner accomplished concealed target imaging.

Invited Assistant Professor in ESTG – Polytechnic of Leiria, PT *(October 2018 – up to…)*

Teaching assistant in University of Aveiro – Aveiro, PT *(February 2019 – July 2019)*

Research grant in RADAVANT project - Instituto de Telecomunicações Leiria, PT *(Nov 2018 - Dec 2020)*
- Reports the study of RADAR techniques, namely with PN sequences (STDCC) and FMCW.
- Reports the implementation of reconfigurable PN sequences generation in FPGA with on-the-fly sequence and sampling frequency change.
- MatLab app implementation for serial communication with FPGA to change the radar performance (change output sequences, clock frequencies, get the XADC captured data and merge all FPGA environment software use (Xilinx Vivado and SDK)).
- Reports the implementation of a reconfigurable mmWave RF front-end operating at 24-28GHz.

Research grant in 5G MIMO TESTBED for 5G mmWave Wireless Communications project - Instituto de Telecomunicações of Leiria, PT *(May 2018 – November 2018)*
- Reports the implementation of a 2x1 and 2x2 STBCC algorithm (Alamouti) in FPGA to implement a mmWave MIMO testbeds (27GHz and 60GHz). The algorithm was implemented in Xilinx System Generator and evaluated in MatLab environment before FPGA integration.

Consultant in HELPTRONIC (CHIP7 Aveiro), Aveiro PT *(February 2017 – September 2018)*
- Reports the consulting in the HELPTRONIC start-up, which had the main goal of electronic technical assistance and sales in Aveiro, opened as a CHIP7 franchisee.
- Supervision of technical and commercial staff, as well as, tutoring professional and academic internships.
- Reports the invoice software configuration and management (SAGE, Wisedat and TOConline).
- Implementation of technical Backoffice, commercial CRM and sales website (Magento).
- Reports the commercial department coordination, namely in the orders, payment control together with the accountant, shipping tracking in close contact with the suppliers and business client quotations.

Research grant in Pure5Gnet project - Instituto de Telecomunicações of Aveiro, PT *(June 2016 – March 2018)*

- Reports the implementation and verification of a joint cooperative and cognitive transmission algorithm for multiple users using radio technology on reconfigurable devices (FPGA) with Analog Devices FEs.
- Reports the hardware implementation with its respective C code to use two radio development boards (FMCOMMS3) on a single FPGA. Development of the required hardware for optical fiber communication between multiple development boards (FPGA). Verification and measurement in anechoic chamber of the cooperation algorithms of HETCOP project.

Research grant in HETCOP project - Instituto de Telecomunicações of Aveiro, PT *(Dec 2015 – May 2016)*

- Reports the implementation of a multiple user OFDM for LTE (4G) algorithm (MU-MIMO). Study and development of the hardware in FPGA to cancel the interference signals of other users present at the base station. All the hardware development required was performed in Xilinx System Generator.

STUDENT MENTORSHIP

Supervisor of master student on "Development of a Dual-Mode SAR Radar System for NDT Comparative Analysis of COTS and VNA-Based Solutions in Harsh Environment Applications" *(2025-26).*

Co-supervisor of undergraduate student on "Non-Destructive Inspection of 3D-Printed Structures Using SAR Radar Imaging and Artificial Intelligence" *(2025-26).*

Co-supervisor of undergraduate students on "Posicionamento em redes privadas 5G" *(2024-25).*

Co-supervisor of undergraduate student on "Sistema wireless de medição de vácuo para o CERN" *(2020-21).*

Co-supervisor of undergraduate students on "Carta de Controlo de Válvula de Vácuo baseada em CPLD" *(2019-20).*

SCIENTIFIC PUBLICATIONS

Journals:

- Co-author of "Performance evaluation of OFDM data transmission using an 2D beamsteering transmitarray" on International Journal on Communications Antenna and Propagation, 2019.
- Co-author of "Multi-Gigabit/s OFDM real-time based transceiver engine for 5G MIMO applications" on the Physical Communication journal (PHYCOM), 2019.
- First author of "A Software-Defined Radio for Future Wireless Communication Systems at 60 GHz" on MDPI Electronics journal, 2019.

Conferences:

- Co-author and presenter of "VLCLighting - A Collaborative Research Project on Visible Light Communication" on ConfTele 2015, Portugal.
- First author of "DLL architecture for OFDM based VLC transceivers in FPGA" on Communication Systems, Networks and Digital Signal Processing (CSNDSP) 2016, Czech Republic.
- Co-author of "On Real Time Optical Wireless Communication Channel Emulator Design with FPGAs" on West Asian Colloquium on Optical Wireless Communications (WACOWC) 2018, Iran.
- Co-author of "Implementation of an OWC channel emulator in FPGA" on CSNDSP 2018, Hungary.
- Co-author and presenter of "5G Testbed for OTA Testing at 60 GHz: From GbE-based to UHD Multi-stream Video" on ConfTele 2019, Portugal.
- Co-author of "Disruptive Future of Radar Based on All-Digital PN Signal Processing" on Conference on Antennas and Propagation in Wireless Communications (IEEE APWC) 2019, Spain.
- Co-author and presenter of "MIMO-OFDM Alamouti for 5G system at 28 GHz" on International Microwave and Optoelectronics Conference (IMOC) 2019, Portugal.
- First author and presenter of "All-digital reconfigurable STDCC radar baseband implementation in FPGA" on IEEE/IET Communication Systems, Networks and Digital Signal Processing (CSNDSP) 2020, Portugal.
- Co-author and presenter of "STDCC radar at 24 GHz: first measurement trials" on URSI20, Italy.
- First author and presenter of "Reconfigurable millimetre-wave RF front-end for radar and 5G applications", ConfTele 2021, Portugal.
- First author and presenter of "A feasibility study on real-time concealed object detection in foliage using STDCC radar", IEEE/IET Communication Systems, Networks and Digital Signal Processing (CSNDSP) 2022, Portugal.

- First author and presenter of “Enhanced High-Resolution Imaging for Non-Destructive Testing Using STDCC radar”, EUCAP 2025, Sweden.
- First author of “mmWave Imaging for Non-Destructive Inspection of 3D Printed Components”, INOVAM Conference 2024, Portugal.
- Co-author of 9 papers on the INOVAM International Conference 2024, Portugal.
- First author of “Experimental Evaluation of a Reconfigurable Polarimetric Radio Channel Sounder for 24 – 28 GHz Propagation Characterization”, IEEE RADIO 2025, Mauritius.
- Co-author of 2 papers on EUCAP2026 (submitted).

OTHER REFERENCES

- Elaboration of a Photovoltaic power station with its respective monitorization infrastructure to study its revenue.
- Represented the VLCLighting project on the Students@DETI event of 2015 with a live demonstrator and a poster.
- Participation on the workshop IWOW of 2015 in Turkey - International Workshop on Optical Wireless Communication.
- Presentation of the doctoral thesis theme and the status of the research work on the Students@DETI 2016, Students@DETI 2017 and ResearchSummit19.
- Representative of the Telecommunications Institute company on their Techdays 2016 stand in Aveiro – poster and live demonstrator of a 150Mbps visible light communication setup using DCO-OFDM modulation.
- Training program participation with the name “*LabVIEW Communications Training – NI SDR and LabVIEW Communications for FPGAs*”, in June of 2017.
- Development of an online sales store in Magento platform– www.helptronic.pt.
- Development of a BackOffice for repair management and a CRM for HELPTRONIC sales department (PHP, Javascript and mySQL).
- Invited for paper reviews in Elsevier Physical Communication 2017, CSNDSP 2018 and Journal of Communication Systems 2019.
- Representative of the Telecommunications Institute Leiria branch on the Ciência Viva 2018 and 2019.
- Representative of the Telecommunications Institute company on the ISWCS'18 stand in Lisbon – poster and live demonstrator of a 1Gbps radio system @ 18GHz using OFDM and transmitting 7 FHD video streams captured by real time cameras.
- Presentation of scientific publication in ConfTele 2019 in Lisbon.
- Live demonstration of real-time 5G testbed at 3,6GHz with in “5G Challenges” at DETI Talks, Aveiro.
- Part of the technical support on the IEEE/IET CSNDSP 2022 Conference.
- Presented the private 5G IPLeiria network on 5GOIL Workshop at INTERACT 2025 part of IEEE COST Action CA20120 - 8th Training School on Decision-Making Systems in Wireless Communications: From Theory to Practice.

LANGUAGE AND INFORMATIC SKILLS

Portuguese: native; **English:** Proficient user (C1 - Royal School of Languages and B2 - Cambridge FCE)**;** **Spanish:** Independent user (B2 – Enforex).
Microsoft Office: advanced user in Excel, Word, PowerPoint, Visio and Outlook. user**.**
Programming languages: experienced - Java, C, C++, VHDL and Verilog; competent – assembly, HTML, PHP and JavaScript.
Xilinx ISE Design Suite – experienced; **Xilinx Vivado Suite** – experienced; **MatLab** – experienced

VOLUNTEER AND HOBBIES

Professional and cultural visits experience on 32 different countries.

Coordination of Erasmus students of the University of Aveiro by ESN Aveiro in the years 2014 and 2015.

Federated golf, padel, tennis and karate goju-ryu athlete. Eletric and acoustic guitar musician.

European Association on Antennas and Propagation (EurAAP) Microsoft Teams Manager.

Homelab systems administration (Proxmox virtualization, Docker containerization, NAS management).