

## HARDWARE & FIRMWARE FPGA ENGINEER

---

Electronics Design Engineer for high-performance systems. Ensuring the highest throughput and reliability standards are met in complex Defense systems such as 3D RADAR, Electronic Warfare, and Medical devices that require Life-Critical operation. Specialized in development of HDL Firmware for highly parallelized and pipelined FPGA processing, and FPGA-based hardware design.

## WORK EXPERIENCE

---

### 2014 – current **INDRA**

- Hardware Mixed-Signal Design for High-Speed RF AD/DA converters. Signal integrity preservation, pSPICE simulation, Electromagnetic Compatibility and Susceptibility for best-in-class signal conversion hardware.
- Power Supply Design, analog and digitally controlled DC/DC design, efficiency maximization, load curve control, multi-module grounding, current return path optimization, isolation and filtering. Safety-critical design.
- PCB layout and routing for enhanced EMC, low clock skew, equalization. High aspect ratio, buried/back-drilled vias, mixed stackup FR4+Rogers, Rigiflex... Production Acceptance Tests, test software, automated test-bench.
  
- FPGA Firmware Design for high-throughput, ultra-low-latency RADAR Detection / Countermeasures (VHDL).
- Design and implementation of a custom Redundant Fiber Optics Communications Network to provide Fault-Tolerant operation in a phased-array RADAR system. Physical layer and FPGA firmware stack.
- Signal converter Front-end for High-Speed ADC/DAC and signal processing including up/down-conversion.
- Software multiprocessor boards interfacing and communications (PCIe, Aurora...).
- High-throughput processing, RADAR process parallelization and pipelining. I established optimal design guidelines for FPGA architectural design (VHDL, Verilog), cross-domain and multirate design.
- Verification methodologies for HDL, custom TCL, Python tools for cross-language simulation, integration with software processes, test-bench randomization and self-verification, hardware-on-the loop runtime verification.
- Specification of new techniques to perform Electronic Countermeasures on Complex Emitters.

### 2016 **ISSE**

- Lecturer about entrepreneurial project management tools in the International Summer School in Entrepreneurship.

### 2013 **Sky Languages**

- English teacher at Ferrovial. Intensive English course to prepare the employees for upcoming certification tests.

## AWARDS

---

### 2017 **Top 10 Innovators** (INDRA)

Global in-company initiative to credit the individuals whose disruptive thinking brought new business development opportunities and workflow improvements.

### 2016 **Tech Impact Challenge** (BBVA)

1<sup>st</sup> national prize. Leading a multidisciplinary team, we evaluated in the market our technical proposal of a reforestation system using collaborative robots.

### 2014 **Telecom Seeds For The Future** (Huawei)

1<sup>st</sup> national prize. Wireless Sensor Network – based project to increase the power distribution efficiency in smart cities.

## LANGUAGES

---

### English

Fluent spoken/written.  
(C2 - EOI)

### German

Intermediate level.  
(A2.2 – Goethe Inst.)

### French

Basic level.  
(High school)

### Chinese

Introductory.  
(Intensive Univ. Beijing)

## EDUCATION

---

**2016 – current Telecommunications Engineering Master's Degree** UAH (Spain) (*currently*)  
RADAR, Digital Communications, Microtechnology, Instrumentation. Operative Systems Architecture.

**2010 – 2015 Electronics and Industrial Automation Engineering Degree** UAH (Spain)  
Control Engineering, Electronic Control. Electric Machines. Calculus, Algebra, Statistics. Physics, Chemistry. Digital Electronics, Analog Electronics, Electronic Instrumentation. Manufacturing and Automation. Industrial Robotics.  
- Honors in Digital Electronic Systems.  
- Final Degree Project: "Design, Simulation and Implementation of a RADAR pulse predictor". 10/10, ppsd. Honors.

## FURTHER TRAINING

---

**2017 Coaching** by Grado3 (Madrid). Training on coaching techniques and activities to help others focus on key goals and work towards them. Practical experience as volunteer of the CoachExit foundation.

**2016 Startup Acceleration Program** by Impact Hub (San Francisco). Fundraising, teamwork strategies, rapid prototyping, **Design Thinking** by Stanford University. Direct contact with investors and product presentation.

**2015 Lean Project Management** by Nestor&Co, H2i (Madrid). Product development techniques based on scientific experimentation. Provides real-market-test for hypothesis made about fast iteration prototypes.

**2014 4G Networks Intensive Course** by Huawei University (Beijing). Theory and application of the mechanisms used to establish connections in current 4G networks. New development paths for MIMO connections.

## OTHER PROJECTS

---

- **Safety-Critical Software and Hardware:** Newborn blood oxygen monitoring with fiber optics system (Embedded C RTOS ARM). Medical-grade power supply. Space radiation-resistant systems, enforcing MISRA, CERT standards when working with C/C++ (mainly for Real Time applications).
- **Drones/UAV:** Power Electronics, lithium battery management, active balancing and aging prevention. EKF Control-Loop firmware. Civilian space protection with advanced (non-jamming) Drone Countermeasures.
- **3D Printing:** Complete Mechanical + Electronic 3D printer design. Novel heated-bed sensing device. FDM Design For Manufacture. 3D modeling and stress simulation (SolidWorks, AutoCAD).
- RPA tracker, blockchain Progressive WebApp (VueJS + Django + Python), insulin monitor, fine position and torque control of DC motors (FreeRTOS), Signal and Event processing (Multithreaded POSIX on CentOS Linux), Wireless Sensor Network (Motas, TinyOS)...
- **MATLAB, Simulink** system-level modeling and simulation.
- **Team-work skills** – Scrum, Agile development and other collaboration techniques are part of my day-to-day job to succeed at integrating such complex systems, taking the best of everyone and fueling innovation. I have overseen several groups of senior engineers and important *task-forces*.

### AREAS OF INTEREST

---

#### R&D

Electronic Countermeasures.  
Drone navigation.  
UAV threats interception.  
Ultra-low-latency and high-throughput systems.  
Life-critical medical devices.

#### Technical management

Technical project team management.  
Client needs capture, specification, Lean Development.