



Company Description

The University of Navarra is a Catholic University founded in 1952. We are proud of our academic integrity, international focus and the professional development of our students. We are ranked 37th in the world in the 2017 QS Graduate Employability Ranking. We are also ranked as the best Spanish private university by the "El Mundo" Ranking. We are also 245th in the QS World University Ranking. Tecnun shares resources, facilities and personnel with its associated Research Centre, Ceit-IK4, a renowned multidisciplinary institution with more than 200 researchers that carry out applied research for companies at both the local and international level.

Information

 **Deadline:** 2018-12-31
 **Category:** Business
 **Province:** Gipuzkoa

 **Country:** Spain
 **City:** San Sebastián

Company

Ceit



Main functions, requisites & benefits

Main functions

Internet of Things (IoT) is pushing research towards increasing connectivity up to unknown levels. RFID, Bluetooth and NFC are good candidates to set a network of tagged elements as they are consolidated technologies. However, the price of tagging millions of objects often makes the final application unaffordable. In this manner, the intelligence of the network sometimes can be concentrated on smart nodes, reducing the electronics in tags to virtually zero ("chipless tags"). Plus, environment restrictions, such as high temperature, makes electronics fail in certain harsh scenarios and therefore chipless tags would exhibit a competitive advantage respect to their active counterparts. In this context, the combination of identification plus sensing functions will be studied for chipless wireless sensors based on radar technology (backscattered signals).

Several strategies have been employed for radar technology: Impulse Radio based on Ultrawideband (IR-UWB) in time domain and Frequency Modulated Continuous Wave Radar (FMCW) in frequency domain, among others.

The application of these technologies in the present piece of research is moved from localization towards identification and sensing.

The present PhD will build on the following research challenges:

- System analysis for resolution study of wireless chipless sensors within current legal restriction on transmitted power for Short Range Devices (SRD).
- Designing and implementing a smart customized reader that could discriminate among different reflected signals by radar technology.
- Compare time domain pulse technology with frequency domain frequency sweep technology. Commercial test-beds could be adopted for time domain.
- Include the necessary signal processing to make the system robust to environment changes by making use of, e.g. but not restricted to, the polarization of antennas.

Requisites

Telecommunications Engineering or Industrial Electronics and Control Engineering Date of degree: 2014 or later. Good level of english. In the technical side, the candidate should have certain experience with

- Vector Network Analyzers and Spectrum Analyzers • General Signal Processing • Radio Frequency Electronics (ability to program off-the-self evaluation kits for PLLs, LMX/R modules etc) • General propagation and backscattering problems. It would be desirable