Deutsches Zentrum
für Luft- und Raumfahrt e.V.
in der Helmholtz-Gemeinschaft

www.DLR.de

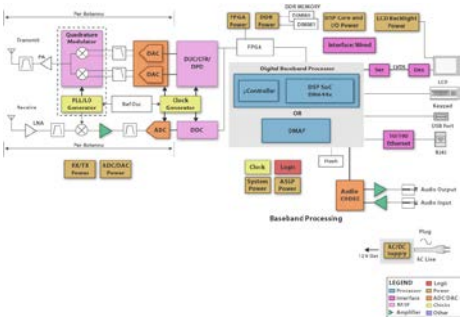
DLR is Germany´s national research center for aeronautics and space and it is also the German space agency. Approximately 5,700 people are employed at 13 locations in Germany making extensive research and development work in the fields of Aeronautics, Space, Transportation and Energy.

The **Department of Safety Critical Systems & Systems Engineering**, part of the **Institute of Flight Systems** in Braunschweig, offers with immediate effect a:

MASTER THESIS

"Design and modelling of a cognitive radio's cognitive engine for airborne safety-critical wireless data transmission"

Advanced Technology Research Aircraft (ATRA)



Block diagram of a software defined radio system
Source: Texas Instruments

One of the main concerns in the field of aeronautics is the increase of efficiency and the reduction of design, maintenance and operation costs. The increase in the number of installed functionalities onboard aircrafts which need a radio link has derived in a congestion of the electromagnetic spectrum available for aeronautical purposes.

The department of safety critical systems and systems engineering of the institute of flight systems investigates new and alternative ways of transmitting data inside an aircraft for flight control purposes in order to substitute the wires associated with data transmission inside aircraft used nowadays, and maintaining the minimum number of cable in it.

The increase in the capabilities of programmable logic devices like DSPs and FPGAs due to their technological evolution has enabled the use of software defined radio and cognitive radio for RF communication purposes, which could revolutionize the architecture of current avionic systems.

Definition of tasks:

- Literature research
  - Cognitive radio
  - Cognitive engine
  - Artificial intelligence
  - Neural networks
  - Decision making
- Design and modelling of the cognitive engine
- Simulation of the cognitive engine

Academical background:

- Telecommunications Engineering
- Electrical Engineering

Desired skills:

- Knowledge in system modelling and simulation
- Doors®/IRQA®
- Matlab® and Simulink®
- German language (the master thesis will be written in English)

Thesis duration: 6 Months (prolongable)
Supervisor: Dipl.-Ing. Oroitz Elgezabal Gómez

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