

DLR is Germany's national research centre for aeronautics and space and it is also the German space agency. Approximately 6,900 people are employed at 15 locations in Germany making extensive research and development work in the fields of Aeronautics, Space, Energy, Transport and Security.

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

## MASTER THESIS

### “Identification and assessment of disturbing factors for safety-critical wireless data transmission”

The technological development suffered by electronic in the last decades has enabled research and development in many different technical areas. One of these areas is telecommunications, especially in the field of wireless data transmission.

The department of safety critical systems and systems engineering of the institute of flight systems investigates new and alternative ways of transmitting safety-critical data inside different types of vehicles like airplanes and trains, in order to substitute the wires associated with data transmission inside those vehicles used nowadays, and maintaining the minimum number of cable in them.

Safety-critical data transmission systems must be dependable and must behave in a deterministic way. The electromagnetic waves propagate through open air and consequently they are susceptible of being influenced by the environment in which they propagate. That's why, in order to develop a robust and dependable wireless data transmission system, the possible sources of interferences and disturbances for electromagnetic waves must be identified and analyzed.

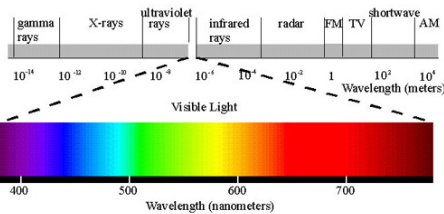


Fig. 1: Electromagnetic spectrum  
Source: Satellite imaging corporation.



Fig. 2: The advanced technology research aircraft (ATRA)

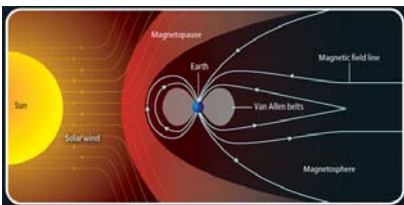


Fig. 3: Solar activity and its effects on earth  
Source: National Aeronautics and Space Administration (NASA)

#### Definition of tasks:

- Introduction and description of radio wave propagation
- Introduction and description of the different sources of disturbances
  - Solar activity
  - Hydrometeors
  - Atmospheric influence
  - Terrestrial influence
  - Etc.
- Introduction and description of the different kinds of electromagnetic noise
- Introduction and description of the different kind of interferences
- Severity assessment of the different disturbing factors
- Development of concepts for modelling the various disturbances

#### Academical background:

- Telecommunications Engineering
- Electrical Engineering

#### Desired skills:

- Knowledge in physics, electromagnetism and radio wave propagation
- 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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