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For our **Institute of Communications and Navigation, Satellite Networks Department** in **Oberpfaffenhofen** we wish to recruit for a

Master's Thesis

Age of information in modern random access for IoT systems

Short Description:

The internet of Things (IoT) is attracting an increasing attention from both industry and academia, and will be a core component of the next generation 6G systems. In an IoT network, a potentially massive number of low-cost, low-complexity devices generate traffic to be reported to a common receiver monitoring the situation. Relevant examples include asset tracking, industrial and environmental monitoring, smart cities, as well as cyber-physical systems. In this context, medium access protocols are paramount to grant an efficient sharing of the wireless channel among a massive number of uncoordinated terminals. Modern random access schemes, combining the principles of ALOHA with advanced signal processing techniques, have emerged as a promising solution, and have proven capable of achieving excellent performance in terms of throughput and reliability. On the other hand, for many relevant IoT applications, information may only be valuable if up-to-date, i.e. if received within a certain amount of time from the moment it was generated. This aspect, often measured in terms of age of information, is fundamental to the design of efficient systems, as transmission of old data packets might not only be useless but even harmful for the network, inducing additional congestion on the channel. Understanding how modern random access schemes perform and can be optimized from this standpoint is a key yet still open question, with profound implications on system design.

Details:

- Duration: 6 months
- Start: As soon as possible
- Requirements
 - Study of Electrical Engineering, Communication Engineering or Computer Science or similar
 - Hands on experience in MATLAB or Python programming
 - Layer 1 (PHY) and Layer 2 (MAC) knowledge

In case of interest, please contact **Dr. Andrea Munari** (andrea.munari@dlr.de), providing a statement of interest, as well as a complete list of Bachelor and Master exams with grades.



**Deutsches Zentrum
für Luft- und Raumfahrt**
German Aerospace Center

