Prof. R. Wattenhofer

Aircraft Positioning Service

While GPS is great for outdoor localisation, it does not work well indoors because the received signal strength is extremely low. In fact, the GPS signals are 1000 times weaker than the thermal noise! Current indoor alternatives such as WiFi based methods have limited range and thus are only available in neighborhoods with a sufficient number of ground stations.

An alternative indoor localization method has been developed in our group. It leverages signals sent by aircraft to localize a user. As aircraft signals can be received hundreds of kilometers away from an aircraft and due to the dense air traffic in more and more countries, this system can be considered to be available in most populated areas. Compared to GPS, the received aircraft signals are much stronger and therefore can be received indoors.

The goal of this project is to improve the software on the receivers of our prototype system. As this software is executed on hardware with limited energy and processing power, such as smartphones and Raspberry Pis, the software has to efficiently decode the aircraft messages. Currently, the receivers sometimes lose data samples because they are overloaded with aircraft messages. We have a few ideas how the workload for the receivers could be reduced while increasing the number of received messages. Additionally, the accuracy of the calculated position depends on the exact timestamps computed on the receiver. We want to investigate how these timestamps could be improved by considering transmission effects.

Requirements: Signal processing and programming skills and creativity are advantageous. The student(s) should be able to work independently on this topic!

Interested? Please contact us for more details!

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