

## Bachelor's Thesis

# Higher accuracy of WiFi FTM simulation in ns3 based on packet detection

## Abstract

The WiFi standard IEEE.802.11.mc introduces the FTM method to measure distances based on round trip times. This standard aims to close the gap in indoor localisation, where GNSS fails because of shadowing of ceilings and walls. With FTM we can set up an indoor localisation service and can use the same hardware for communication. However, several works show, that FTM suffers from inaccuracy time of flight (ToF) measurements in scenarios which are prone to multipath (e.g. indoor scenarios). Ns3 can help to analyse strategies to deal with this erroneous measurements. However, a model for generating the measurements is needed. We already introduced an probabilistic model based on our measurements. However, some behaviours of a multipath environment is not covered. In this thesis the behaviour of the model should be improved by use of the Sionna raytracing simulator.

## Content

In another Bachelor's thesis ns3 and sionna is already connected to allow a more detailed path loss calculation. Aim of this thesis is to combine this approach with FTM-ns3 which allows FTM ranging within ns3. Part of this work is to further extend the sionna limit the ns3-sionna approach to WiFi but to additionally simulate the time of arrival (ToA) of a packet in sionna. This should be connected to the FTM-ns3 approach. After validation the influence of different parameters should be studied and the computational costs should be analysed.

## Requirements

\* Scientific work \* Programming skills C/C++ and one data analysis tool (Python, Matlab, or R) \* Interest in simulations