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Cell Selection

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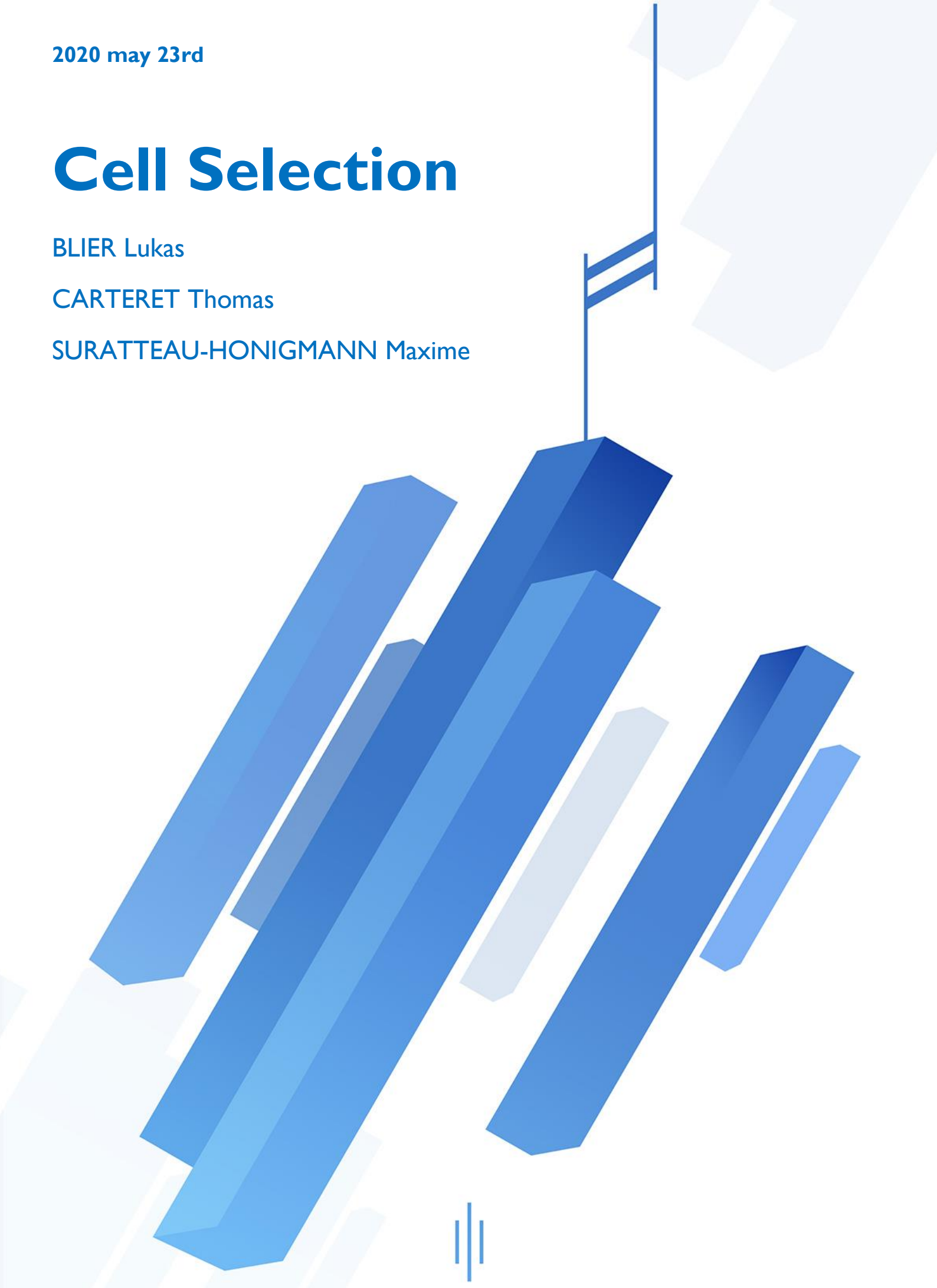

Summary

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I – Introduction

In the context of the RE56 project, we produce a cell selection project mainly consisting of a communication simulation system in UMTS standard. The main objective is to focus on the selection and handover procedures. The system studied will be simplified and should consist of a single User Equipment travelling the map with a set of antennas.

Our simulation should be based on “Radio Mobile Network Tool” which is a Web application simulating radio mobile communication, the project should be a plugin of this app. We should simulate a User Equipment travelling the map with its current connection parameter displayed. These parameters will be produced according to antenna and UE settings. In a second part, we should simulate the antenna selection and reselection procedures.

II – Conception

1) Simulation of a User Equipment in UMTS

As far as we are not taking into account, the relief and city infrastructure, we will use the Friis formula. Indeed, this equation represent radio propagation in free space. That's why we will only consider three parameters to simulate the communication, the antenna gain, the UE gain and the distance between those two. Those three losses should be enough to have a satisfying simulation for our project.

$$\frac{P_r}{P_t} = G_t G_r \left(\frac{\lambda}{4\pi R}\right)^2$$

With $Gt\ Gr$ the two linear gains at transmitter and receiver and R the distance between antenna and UE. Finally, λ is the carrier frequency.

As we are not working in linear scale but with dB, we will use another version of this equation:

$$Pr = Pe + Gt + Gr - Lo$$

Avec $Lo = 32{,}44 + 20\log(f) + 20\log(d)$

On a $P(dBm)$, $G(dBi)$, $f(MHz)$ et $d(km)$.

2) Selection and soft/hard handover procedure

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III – Implementation

1) ??

IV – User Manual

1) ??

V – Conclusion

1) ??