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A new Dynamic Co-channel Interference Model for Simulation of Heterogeneous Wireless Networks

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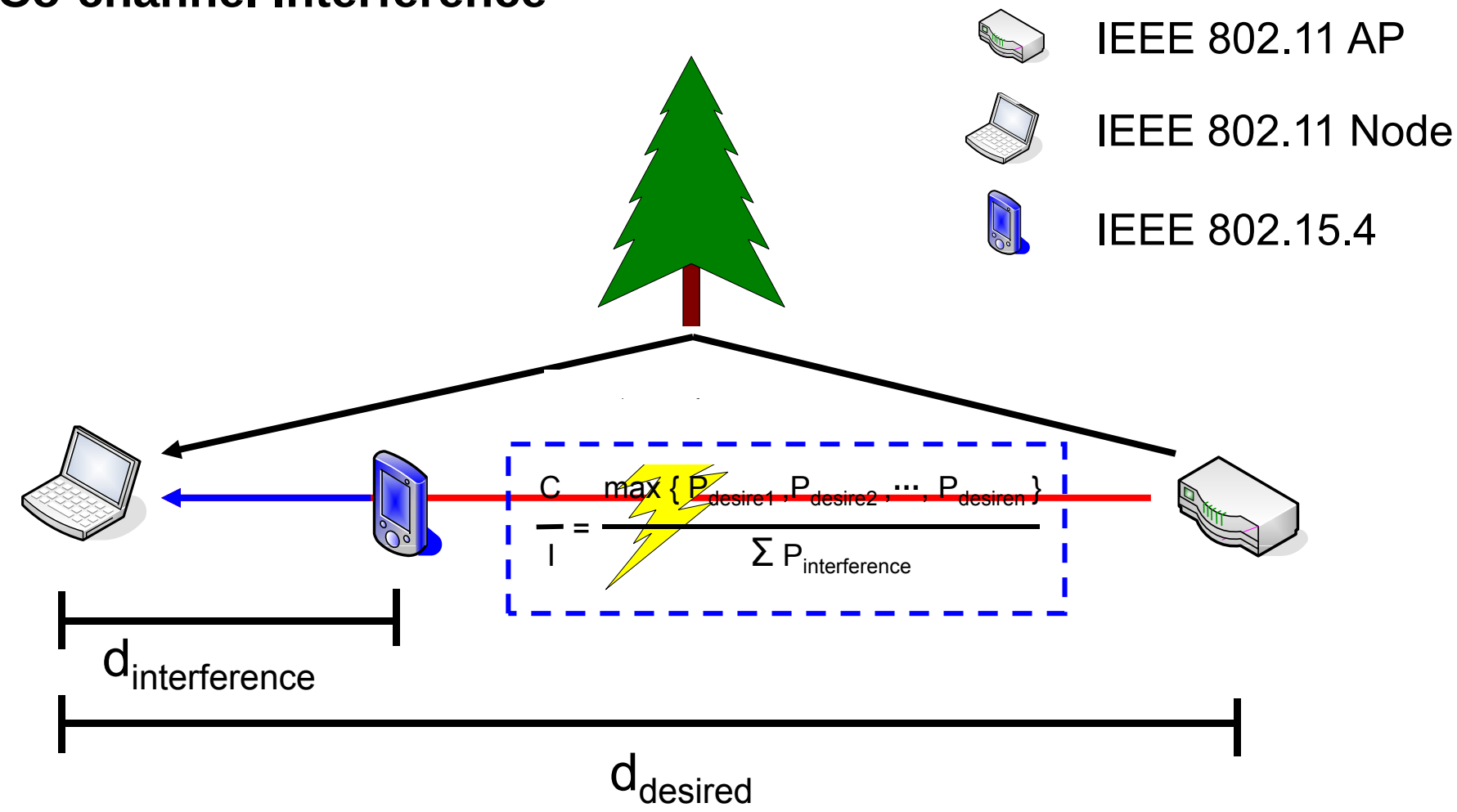
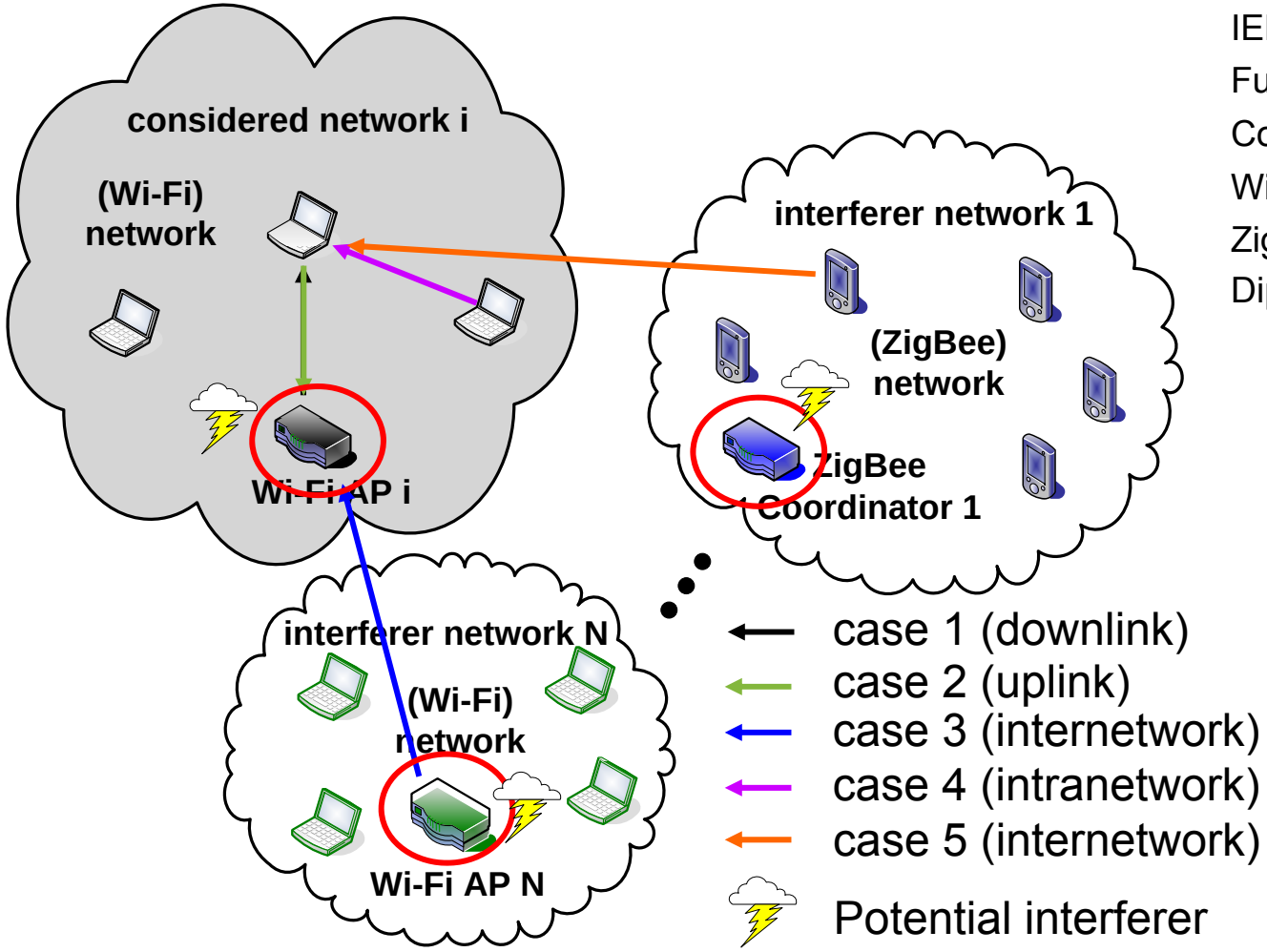
Co-channel Interference



Interference Model



IEEE 802.11b f = 2.4 GHz

IEEE 802.15.4 f = 2.4 GHz

Fully overlapping channels

Constant datastreams

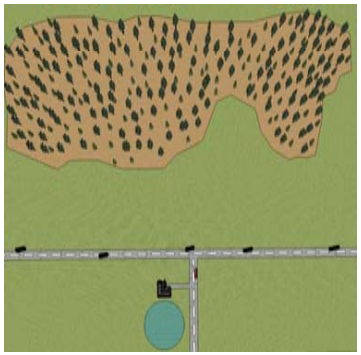
Wi-Fi: 100 mW

ZigBee: 10 mW

Dipole antennas

Multiscale Simulation Environment based on OMNeT++

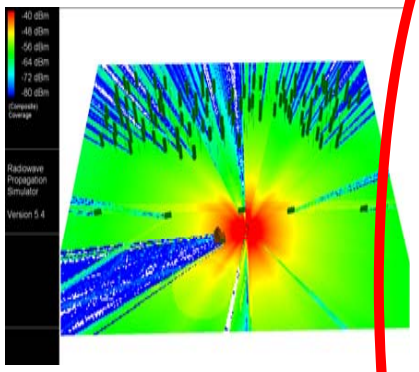
Google SketchUp



- Modeling realistic 3D environments
- Simple User Interface

3D Map

Raytracing Tool



- Accurate Propagation Models
- Channel depends on the environment

Position

RSSI

OMNeT++

Core Element of simulation

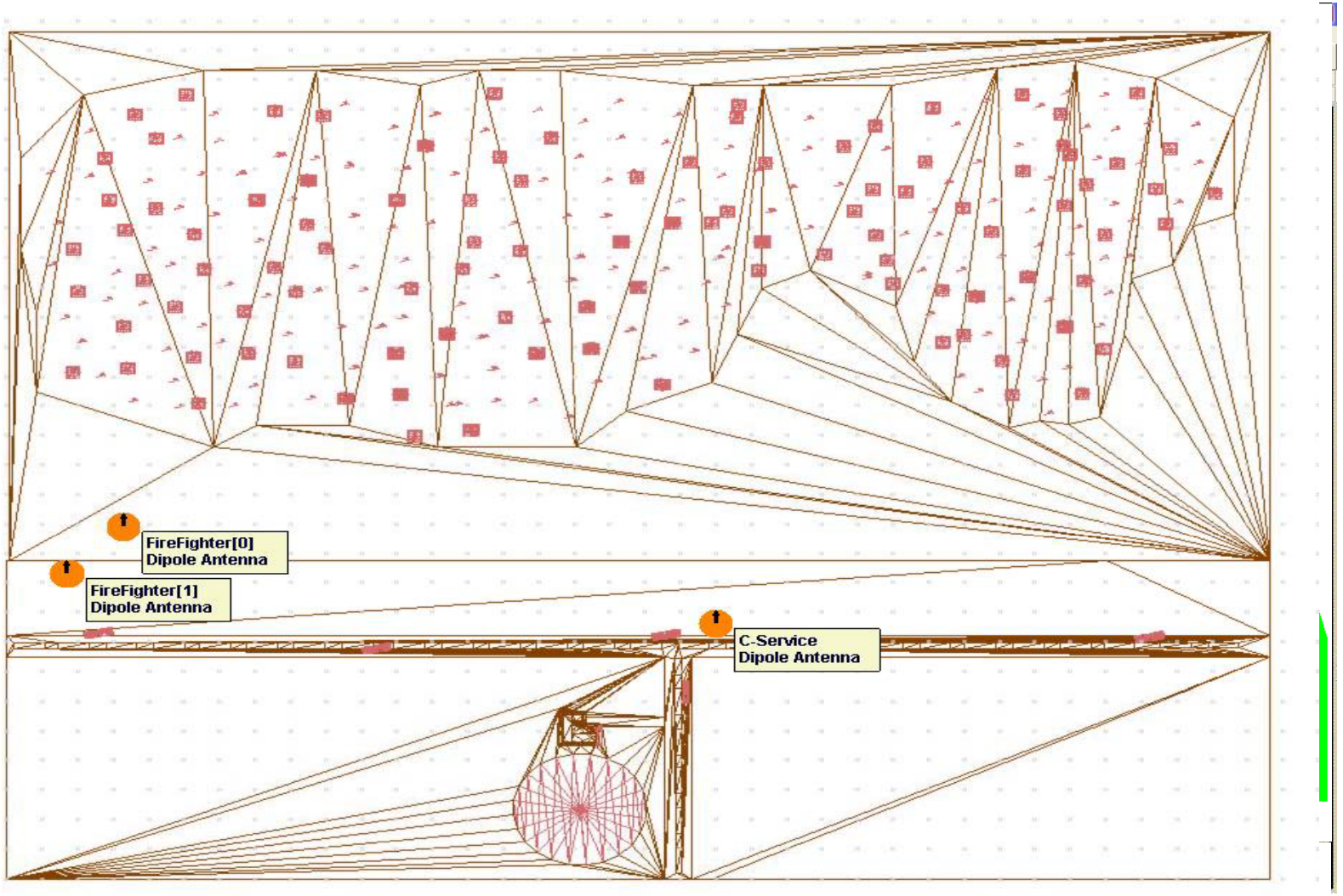
New ChannelControl with Interference Model

- Manages heterogeneity in network

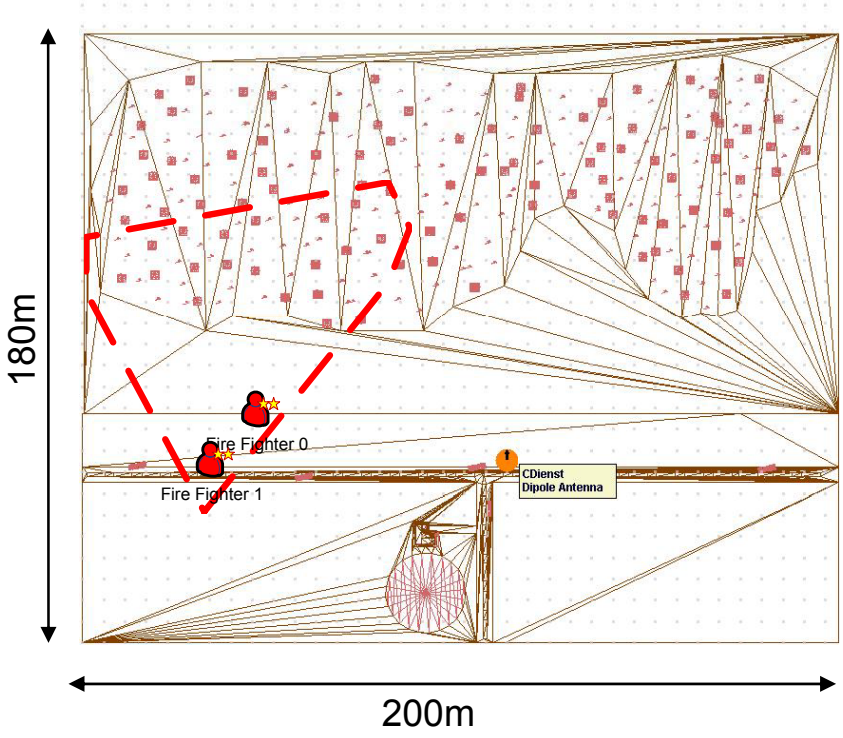
ZigBee | Wi-Fi | Wi-Fi

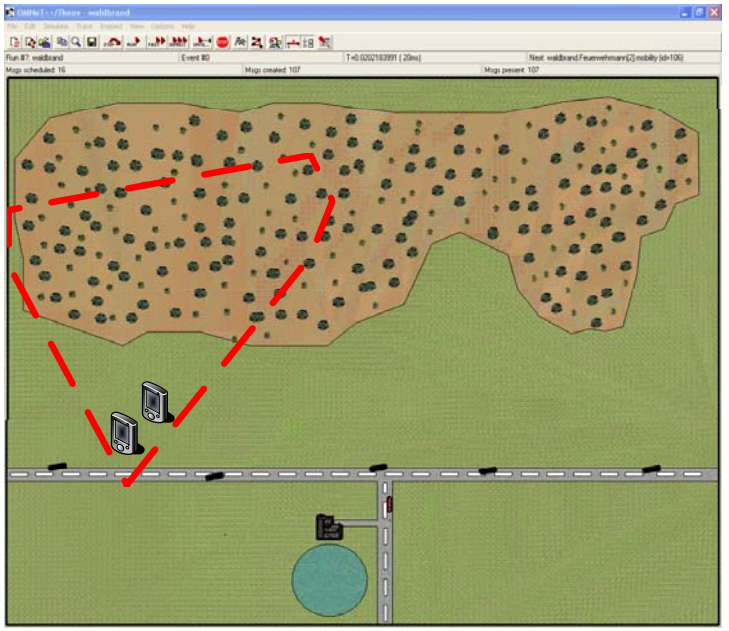
Online Channel Update

Application Scenario Forest Fire



OMNeT++ View on Application Scenario

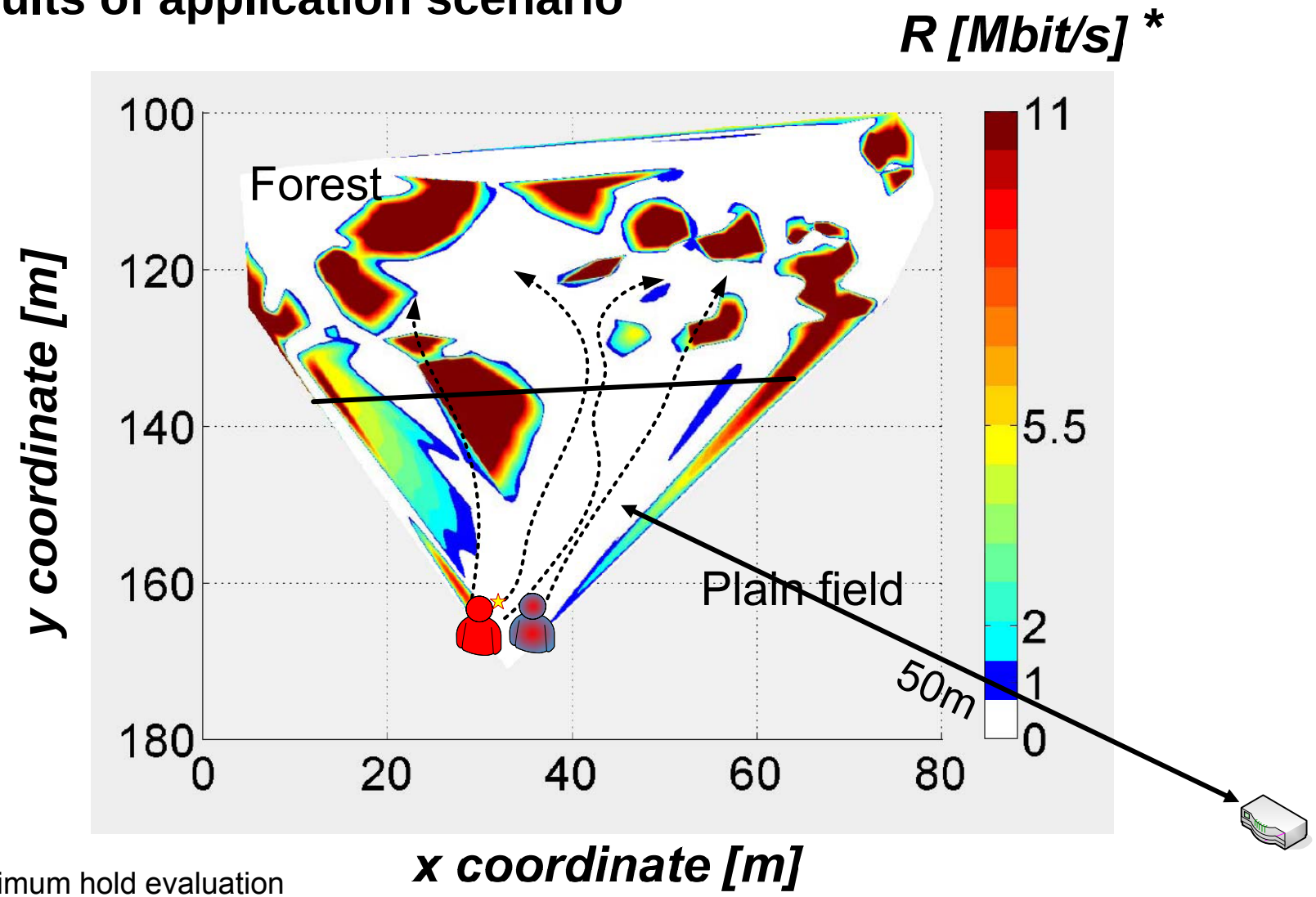




Raytracing Tool

OMNeT++

Results of application scenario



* Minimum hold evaluation

Conclusions

- Online raytracing channel model
- Combination of static RSSI values with dynamical C/I changes
- Interference model adaptable to various application fields
- Much disturbance is expected during simultaneous use of Wi-Fi and ZigBee

Outlook

- Adaptive bitrate adjustment within protocol simulation in OMNeT++
- Adaption to different wireless technologies (e.g. WiMAX or LTE)

Thank you for your Attention

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