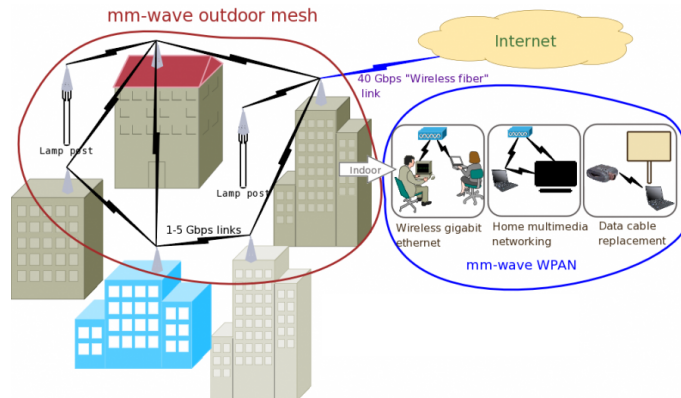# Call For Master Thesis Project

Title: Developing a simulator for millimeter wave personal and local area networks

Introduction

There is a growing consensus both in Academia and Industry to use millimeter wave (mmWave) communications to support extremely high data rate in next generation wireless networks. MmWave communication systems are particularly attractive for gigabyte file transfer, wireless gigabit ethernet, wireless gaming, and uncompressed high definition video transmission. Due to the mmWave great commercial potentials, several industry-led efforts and international organizations have emerged for the standardization within wireless personal and local area networks, such as IEEE 802.15.3c and 802.11ad, respectively. Although drafts of these standards are available, there is no mmWave open-source simulator allowing scholars around the world to implement their algorithms. The mmWave simulator accelerates algorithm development for mmWave networks, especially at the physical and medium access control layers, performance evaluation, and system validation.

Challenges

The challenges of this thesis consist of understanding the existing IEEE 802.15.3c and 802.11ad mmWave standards and further enriching and developing a system-level mmWave simulator. The mmWave simulator

should be modular and implemented in a systematic way to provide easy settings of parameters and advanced user flexibility to customize simulation. Besides having a friendly graphical user interface, it should also support user-defined input and output data and open architecture to integrate user-defined function blocks.

Objectives

The master thesis project aims at developing an NS-3 based mmWave simulator capable of satisfying the requirements listed above. The resulting system will find many application in the fields of mmWave communications, algorithm developments, and conformance test, among others. The thesis project will be developed in KTH. Those who are interested to work in the exciting project, learn new techniques, and broaden the knowledge are encouraged to apply. All Master students with interests in programming and algorithm development are welcome. Software engineering and computer science students are encouraged to contact the persons below.

Required Qualifications

- Extensive knowledge of C++
- Strong Object Oriented skills
- Basic knowledge of wireless communications

Desirable Qualifications

- Experience with Boost and STL
- Light knowledge of NS-3

Starting time: July 2015

Contact Persons

Master Thesis Examiner: Associate Prof. Carlo Fischione, School of Electrical Engineering, KTH Royal Institute of Technology, `carlofi@kth.se`

Master Thesis Supervisor: PhD Student Hossein Shokri-Ghadikolaei, School of Electrical Engineering, KTH Royal Institute of Technology, `hshokri@kth.se`