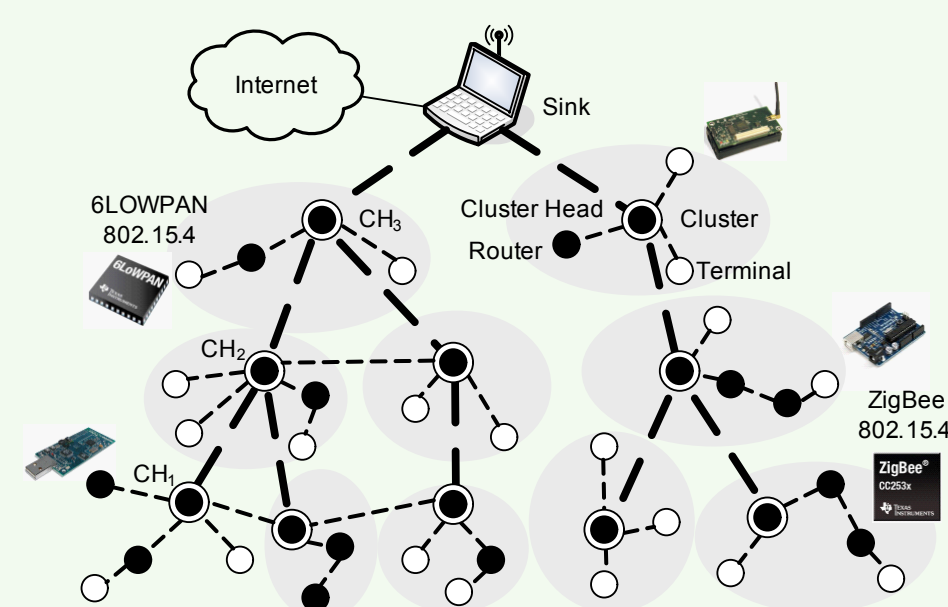# Development of models and algorithms dedicated to transmission in multi-hop wireless networks

Networks

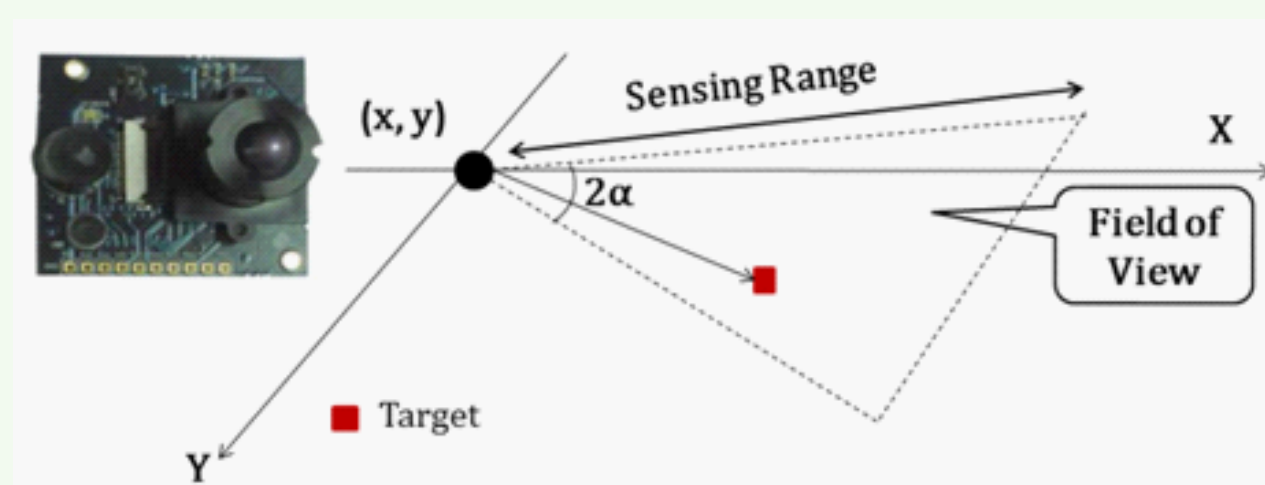## Multichannel transmissions in sensor networks

One of the solutions to improve the performance of transmissions in sensor networks deployed in a hierarchical topology is based on graph coloring algorithm which allows optimizing the channels distribution on clusters or on sub-trees.

Security and incentive trust models in Vehicular Ad hoc Networks (VANET)
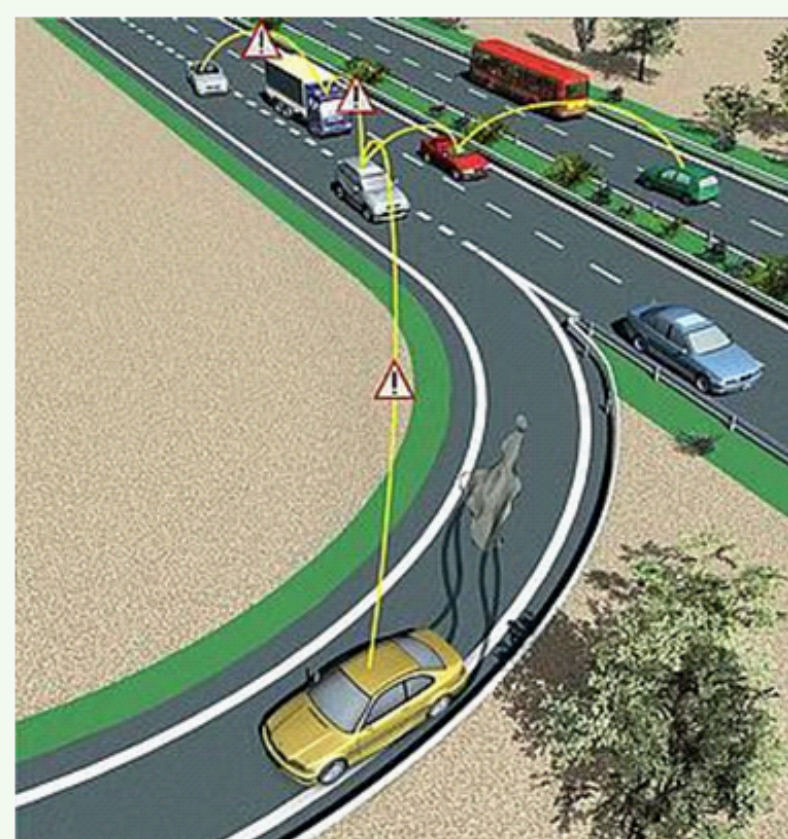
The goal is to secure the communication between vehicles, to incite selfish vehicles to cooperate, and to mitigate the negative impact of malicious vehicles. The proposed solutions are inspired from economic models like the Spence model, and analytical models based on Markov chains.

Localization and object tracking in sensor networks

Distributed architecture of virtual machines for Internet of Things

Creating Internet of Things' applications (IoT) is facing several difficulties due to heterogeneous platforms, systems and networks that are its foundations. Our proposal promotes the construction of small choreography algorithms cooperating to achieve the expected user interactions. The specificity of the elements is hidden by a hardware abstraction. Dynamicity required by the IoT applications is facilitated by the top-down approach of application logic deployment.
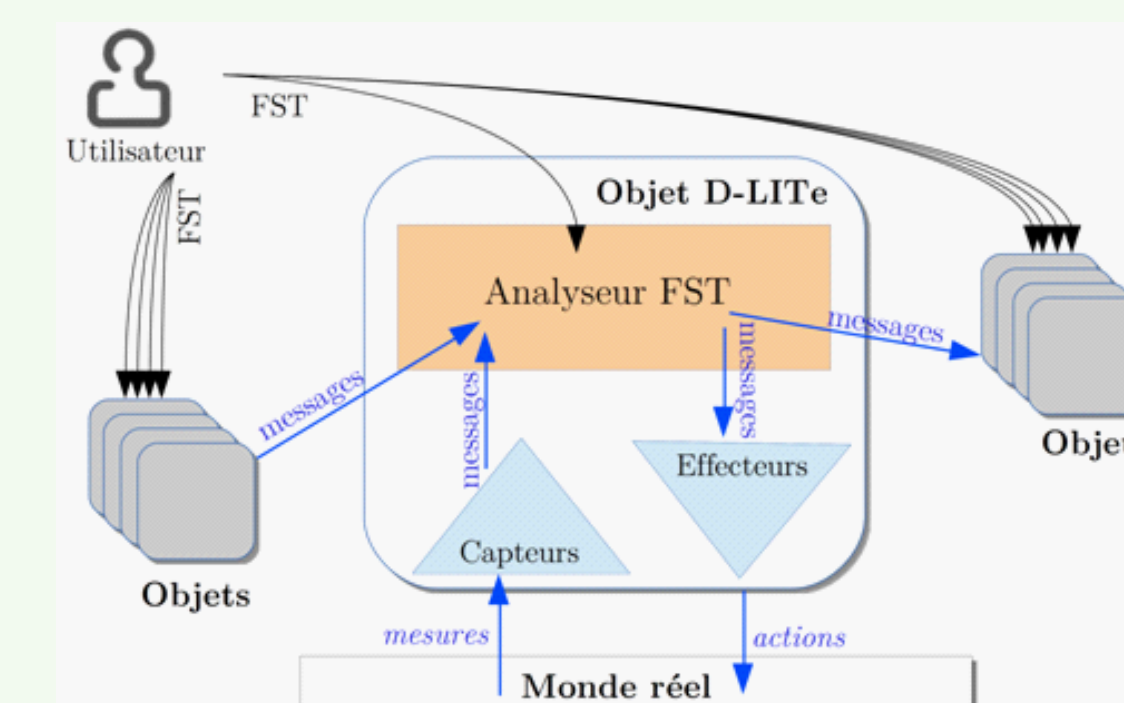
MIMO communications for wireless multi-hop networks

Our objective is to develop a cross-layer design that exploits benefits of multiple antennas in wireless multi-hop networks. We use different techniques based on stochastic geometry and the theory of random geometric graphs including percolation theory.

The objective is to develop distributed algorithms for sensor deployment, detection and localization of a target and the prediction of its trajectory, taking into account the tracking accuracy and energy independence. The proposed solutions are based on analytical models and graph theory.
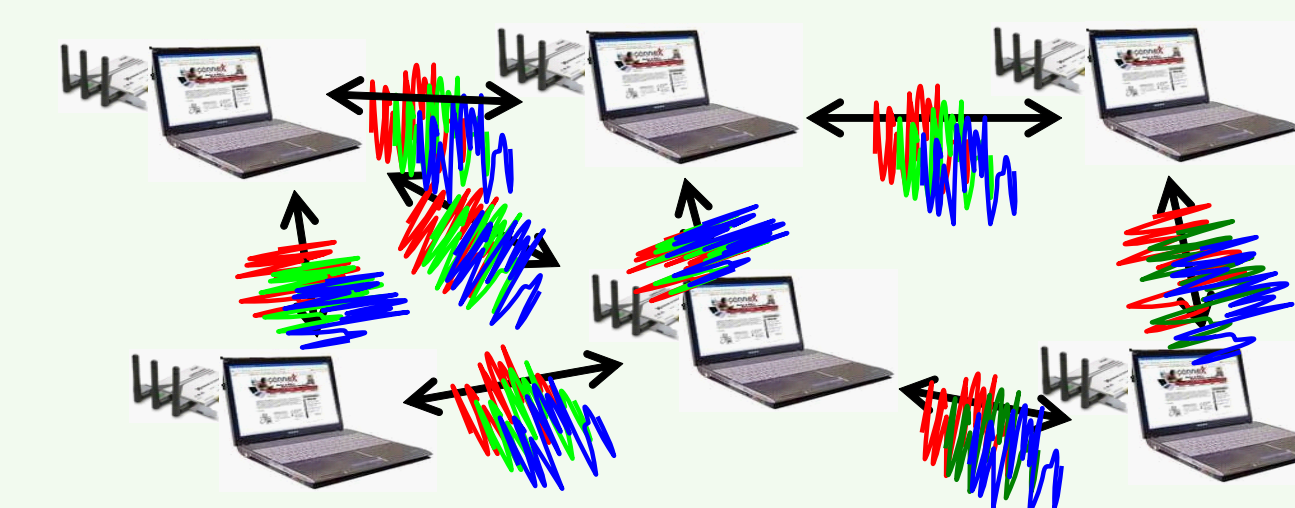
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