



# Mesh network of surveillance cameras using FM radio as a control channel



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# Introduction

## Context

- The industry is asking for WWSNs that provide the best image quality and timely transmissions at the lowest price and energy consumption

## Motivation

- Wi-fi is an attractive solution to achieve such networks but suffer from 3 major problems:
  - Poor performance
  - Throughput Unfairness
  - Energy inefficiency

## Objectives

- Improve the performance, the throughput fairness and the energy-efficiency of a video monitoring system (WWSN) by implementing a FM control channel based on FM-WiFiX

# State Of The Art

## IEEE 802.11 Power Saving Mode

- Not suitable for the video surveillance scenario, where nodes are permanently transmitting video streams

## MAC Protocols

- Try to provide fairness and energy efficiency but there are no suitable solutions for our video surveillance scenario

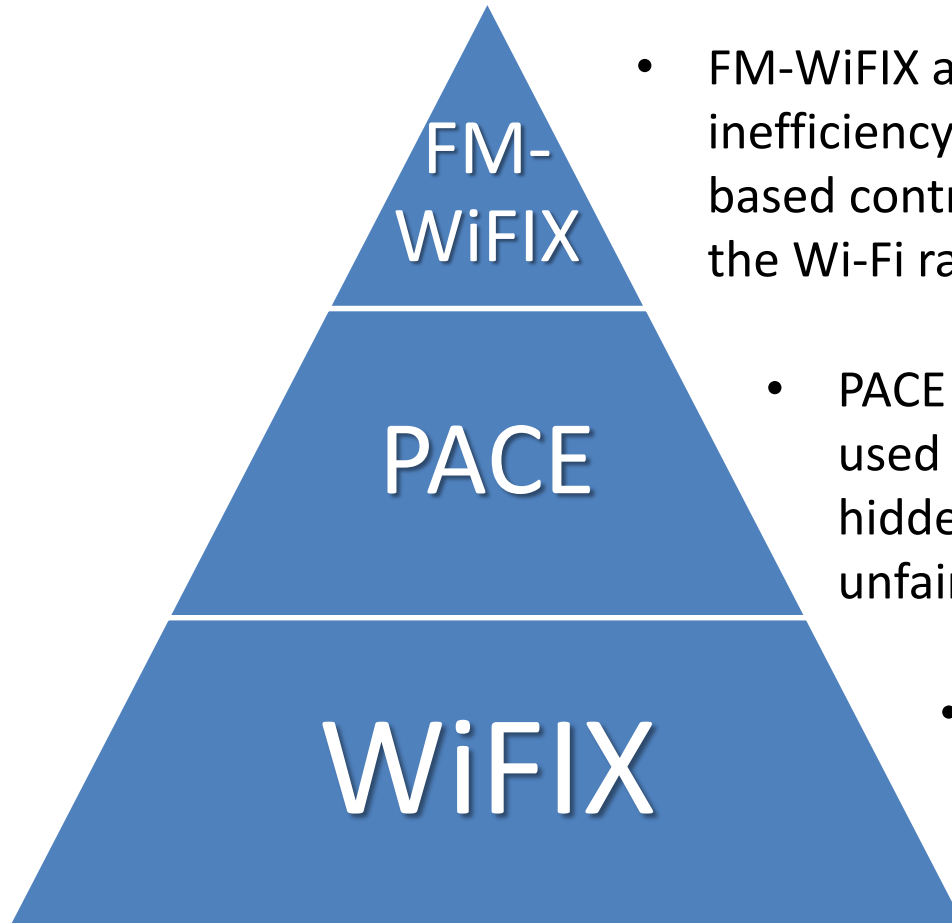
## Energy-aware routing

- Aims at prolonging the lifetime of battery powered networks instead of achieving a network truly energy-efficient

## Video Encoding

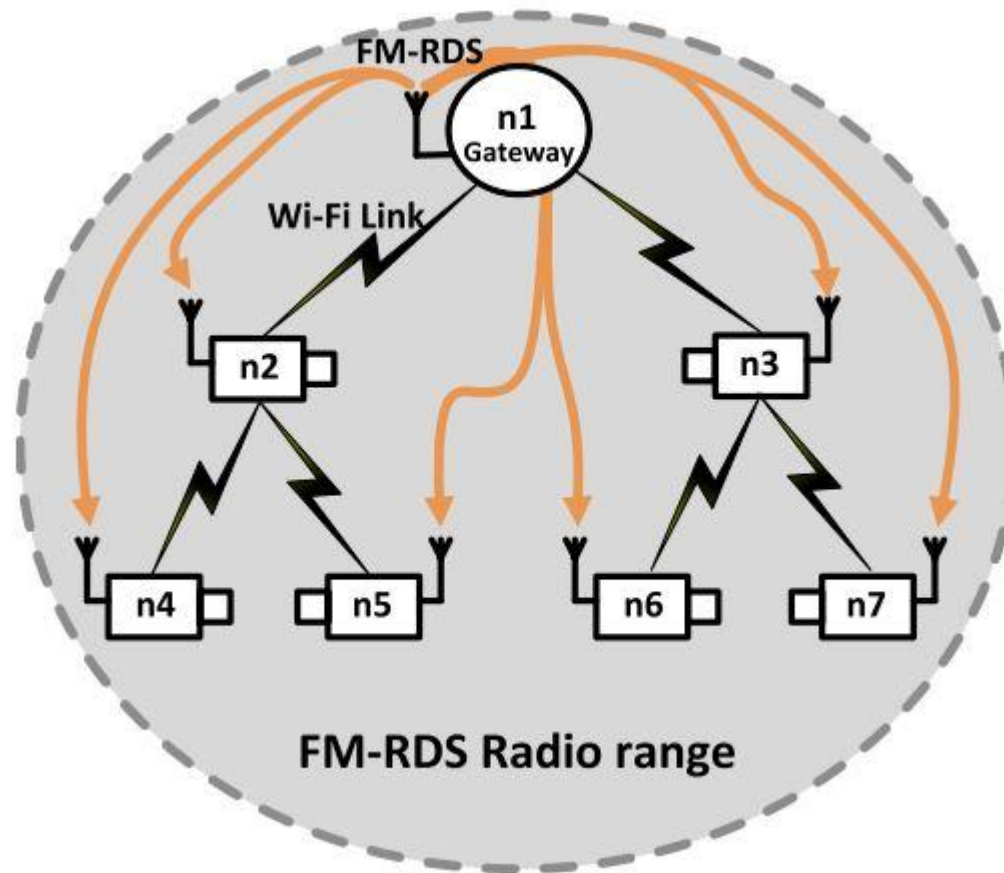
- Through proper video encoding is possible to greatly reduce the amount of data to transmit, thus saving more energy.

# FM-WiFIX



- FM-WiFIX addresses the energy inefficiency problem using a FM-RDS based control channel to turn on and off the Wi-Fi radio interfaces.
- PACE is a scheduling mechanism used to address the problems of hidden nodes and throughput unfairness
- WiFIX creates a logical tree topology, rooted at the sink node

# Reference Scenario



Reference: Filipe Sousa, Rui Campos, and Manuel Ricardo. Energy-efficient wireless multimedia sensor networks using fm as a control channel. In Computers and Communication (ISCC), 2014 IEEE Symposium on, pages 1–7, June 2014. doi:10.1109/ISCC.2014.6912573.

# Methodology

## Construction of a prototype

- Hardware Specifications
- Software Specifications

## Implementation Challenges

- Gathering network topology information
- Control Channel

## Evaluation Scenarios

- Metrics to Evaluate: delay, jitter, throughput and energy consumption