



Master Degree Project

Localization System based on Wireless Communication in Underground Mines.

Background

The mining industry is facing a new challenge. There is a global increase in demand for commodities driven by the developing countries. At the same time easy access to high grade ore is decreasing. Increasing the level of automation and improving operational performance is a key to meet these challenges. One important step towards a more automated mine is tracking of material and equipment underground. Knowing the location of assets is crucial both from a safety and operational point-of-view. Tracking requires a robust and agile wireless infrastructure that can sustain the harsh radio environment in a mine.

The tracking application will improve the personnel safety, enhance the plant security and improve the productivity. Time spent on looking for assets can be reduced, minimizing production disruptions and delays during major turnarounds, emergencies and new construction projects. Traditional wired networks are poorly suited for reaching all the corridors of an intricate, multilayered mine network whereas a wireless solution based on WLAN and Wireless Sensor Networks (WSNs) offers good coverage, mobility, freedom from cables, and enough bandwidth to for mining operations to run smoothly and be able to recover from emergencies.

Problem Statement

The questions in this work are, in order of priority (all are not necessarily addressed):

- Investigate suitable localization technologies and their accuracy
- Different Wireless systems will be used (WLAN, WSN, UWB, etc.)
- Impact in harsh radio environment
- Complexity issues

Tasks and tools

The thesis work should comprise the following tasks:

- Theoretical study of the approaches, the industry-specific constraints and standards
- Preliminary evaluation through simulation and computations (Matlab or similar)
- Final report describing the work and results

Requirements

Students in MSc programs in Electrical Engineering, Engineering Physics, Control Engineering, and Computer Engineering or similar is suited for this job. Candidates are expected to have a strong background in communication theory and sensor fusion. Good mathematical and programming skills are desired. It is also important that the applicant have good writing and communication skills. Please indicate a list of courses with marks and a CV in your application.

Contact persons

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Starting date: ASAP