

Masterarbeit

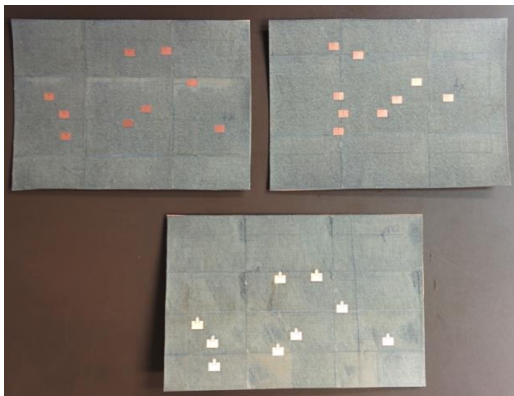
Topic: Optimization of a Non-Uniform Antenna Array

In this work, a non-uniform arrangement of 16(24) planar antennas in an antenna array should be investigated. The antennas will be arranged in a dome structure to achieve a hemispherical coverage.

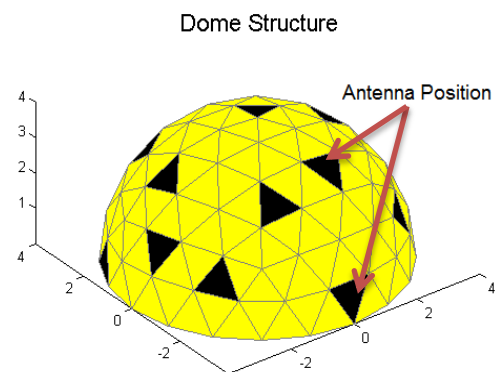
The main problem to solve when designing such a sparse antenna array is how to distribute the few antenna elements on the surface of the dome. The goal is to achieve good array characteristics by optimizing array parameters like sidelobe level and mainlobe beamwidth. This optimization problem should be approached by an iterative evolutionary method as particle swarm optimization (PSO) algorithm, which needs to be extended from an existing implementation in Matlab.

Tasks:

- Defining parameters and fitness function according to required array constraints
- Adapting PSO algorithm (Matlab-code) for case of conformal shape
- Generating non-uniform array arrangements with the best parameters trade-off



Examples of non-uniform 2D-Arrays
optimised with PSO-algorithm



Concept of a non-uniform Antenna Array
on the surface of a geodesic Dome

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