**Introduction**

This work presents a hardware implementation of a Low-Frequency GPR signal algorithm using Frequency Stepped Chirp Signals in the time domain.

The full description of the algorithm could be found in the previous presentation: "A Simple Algorithm for Simulation of Stepped-Frequency GPR Images of Multi-Layered Media", Vera Behar, Christo Kabakchiev, IRS’08, Wroclaw, session B7-1.

Considering the conclusion of the previous research and simulation about the stepped frequency images in GPR, the stepped-frequency processing method in the time domain has lower sidelobe level than the one in the frequency domain. Therefore, the time domain implementation was chosen for prototype implementation.

The implementation is performed on a reconfigurable hardware platform, in compliance with the requirements of “Multiprocessor Systems” Ltd.

The hardware implementation is compared with the previously developed MATLAB algorithm.

**System description**

All blocks are previously simulated in MATLAB and test benches are made. The results from the hardware implementation, obtained in MODELSIM simulator are compared with the MATLAB test benches.

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**Results**

The correlation is performed for 108 ls.

The total synthesis estimation parameters are:

- Number of slices = 8937
- BRAM = 30
- Mult18x18 = 62

After the simulation performing the real time constraints were approximately found 400 ls.

**References**


