



## **Using thresholding for an automated helicopter-based detection of avalanche victims with ground-penetrating radar (GPR)**

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The detection of buried avalanche victims not wearing a beacon is a demanding issue for rescue operations. A fast and reliable method not depending on active or passive location devices would simplify the task for organised rescue teams. Our goal is to develop a GPR-based plug and play system, which is mounted below a helicopter and scans an avalanche deposit automatically in a fixed raster. The data retrieved should be analysed on victim reflections by a simple and easy to use software system. From a self-made aerial railway system the radar signatures for various snow and environmental conditions were measured and an automatic location algorithm with very low computational costs could be developed. The results gathered by this railway system were verified on various environmental parameters. The height dependence of the algorithm was analysed with several tests-flights below a gondola and some actual helicopter tests. In addition other antenna constellations were examined and we buried several various phantom bodies as skis, ski boots, trees and three water bags which were even completely frozen. In dry snow the location algorithm is not influenced by any snow parameters if using a 400 MHz GPR antenna. In wet snow conditions, the various electrical conductivity of snow layers and higher dielectric constant values reduce the contrast and make a detection difficult or impossible.