

Humanitarian Microwave Detection of Improvised Explosive Devices in Colombia – Project “MEDICI”

Christoph Baer, Jochen Jebramcik, Jan Barowski, Thomas Musch, Ilonas Rolfes, S. Gutierrez, J. Sachs, Felix Vega

Ruhr-University Bochum

Colombia has been the last country in Latin America, where anti personal landmines have been planted until 2016. The statistics are horrifying: over 10,000 people have been injured or killed by landmines in the last 15 years.

According to the International Landmine Monitor 2016, this puts Colombia in sixth place in the casualty statistics, and with up to 99 square kilometers of the country being mined, it is still classified as “heavily mine-contaminated”. The forecast in the ten-year plan drawn up in 2011, that the country would be completely cleared of mines by 2021, is considered as “not on track”.

The reason for this sober prognosis has to do with both, the type of mines used and the relatively inefficient detection techno-

logy employed so far. Unlike purely military conflicts, in which industrially manufactured mines are used, Colombia’s landmines are improvised from everyday objects.

These Improvised Explosive Devices (IEDs) vary drastically in their construction and ignition mechanisms so that established detection methods work very poorly or are even not effective at all. In addition, the terrain in Colombia’s interior is sometimes extremely difficult to traverse, preventing the use of conventional, large-scale clearing technologies. Mine clearance remains a time-consuming manual job.

To help find a solution to this enormous challenge, researchers from Ruhr-Universität Bochum and Technische Universität

Ilmenau in Germany as well as Universidad Nacional de Colombia, and Universidad de los Andes in Bogotá joined forces in the German-Colombian Collaborative Research Initiative in Electrical Engineering (GeCoCo) set up by the DFG. The resulting joint research project, “Humanitarian Microwave Detection of Improvised Explosive Devices in Colombia – MEDICI” was designed to provide new Ground Penetrating Radar (GPR) based approaches to improve the search for IEDs and accelerate mine clearance. This talk gives an

overview on the research results achieved within the last years, including: Low-Ringing UWB Antennas, Ground-Penetrating Synthetic Aperture Radar, and Inertial Navigation Systems for handheld devices as well as characterization of IEDs and surrogate materials for non-hazardous test measurements. Moreover, common international activities which foster the sustainable landmine related research in Colombia are discussed and future research activities will be presented.