

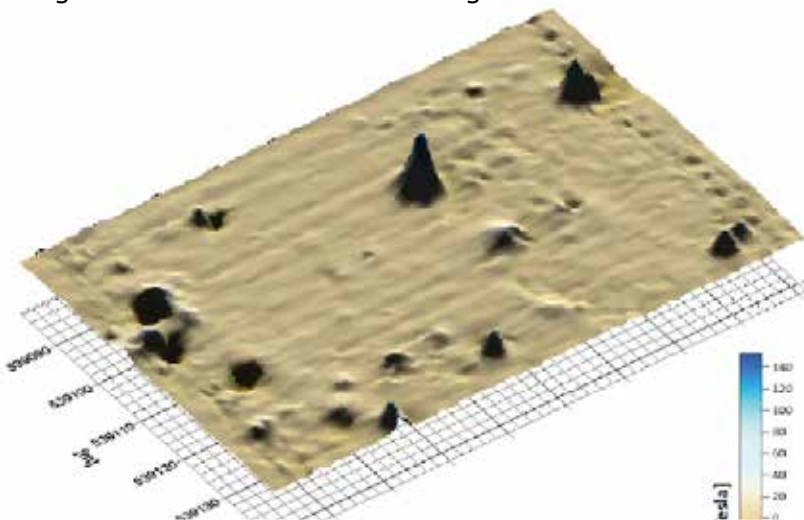


A demonstration survey using a drone-based 5-magnetometer system was flown at 1.4 meters above grade at a military test site in Germany last year; the preliminary results were presented at the annual landmine removal workshop in Basel, Switzerland.

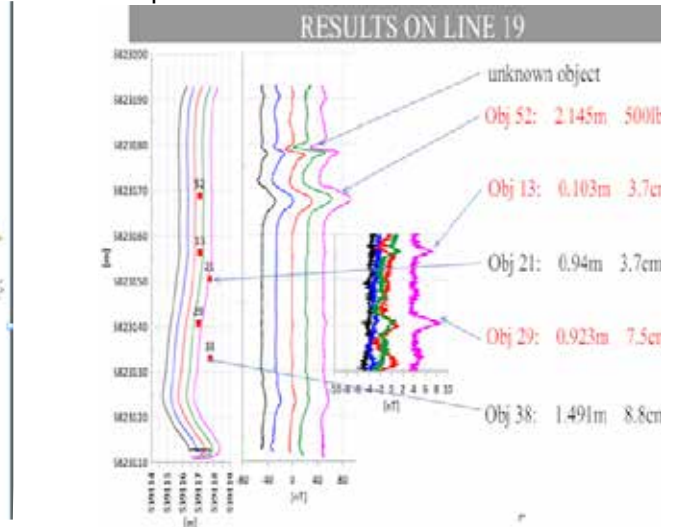
A 2-meter wand with 5 equally spaced magnetometers hangs suspended from the drone at the left in the photo below. The pilot of the drone is shown at the lower right. The drone was programmed to use real time gps to go from one selected point on the survey to the next. With 2.5 meter line spacing for complete and uniform coverage over the entire survey area, 30 flight lines over a 60x90 meter area were flown.



The 3-D map of the magnetic field signals from targets planted in the test area is displayed below using a commercial plotting program designed for mineral exploration. As you can see, the signals from large targets such as a 500-pound bomb or smaller targets at various depths tend to obscure the small signals generated by landmine-like targets which are lost in the background



The lines of magnetic data presented below shows the actual flight path of the drone on the left side, with the 5 separate magnetic signal curves presented in the middle at two scales, regional and locally amplified. The bomb shows as a clear signal on the regional scale, and a landmine-sized shallow target is clear in two curves in the amplified section.



With well over 100,000 line meters of mag data to evaluate on a meter by meter basis, smart computer analysis is clearly necessary. EFH is working to develop both data presentation and analysis algorithms to separate the background noise and signals from those generated by a recognizable target.

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 Email: ajviking@aol.com
 Tel: 1-925-322-8893

Exploration For Humanity Inc.

1300 Oakmont Drive #4
 Walnut Creek, CA 94595 USA
 URL: explorationforhumanity.org

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