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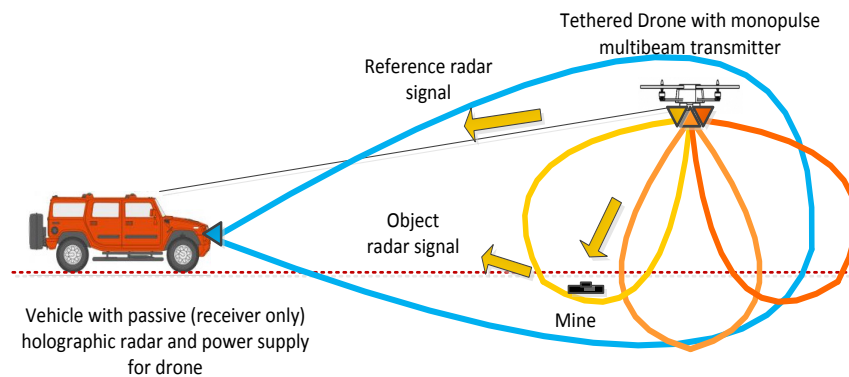
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## MINE DETECTION, GROUND PENETRATING RADAR ON A TETHERED DRONE



Proposed new bi-static ground penetrating radar concept with holographic imaging. Multibeam monopulse radar transmitter positioned on tethered drone. Ultra-wide band multibeam monopulse radar receiver with array of angle shifted directional antennas positioned on ground vehicle. Radar signals simultaneously received by a few directional antennas used for high-accuracy high-resolution measurement. Digitizing of signals in separate directional antennas relative to processor reference signals allows to record real time digital hologram with amplitude and phase information about underground targets. Resolution of digital hologram and corresponding image resolution will be determined by sampling frequency of digitizer. High speed sampling with high-accuracy processor clock will provide high resolution of images even for low frequency radar waves. Holographic digital phase/time domain processing of received signals allows to restore images of detected objects. Fourier transform (frequency domain processing) of received radar signals provides signatures and information not only about shape, but about material of buried objects.

### REFERENCES

- [1] A. Gorwara, P. Molchanov, O. Asmolova, Doppler micro sense and avoid radar, 9647-6, Security+Defense 2015, Toulouse, France, September 2015, (<http://pmi-rf.com/documents/DopplerMicroSenseandAvoidRadarPaper.pdf>).
- [2] P. Molchanov "All digital radar architecture." Paper 9248-11, Security+Defense Conference, Amsterdam, September 25, 2014, (<http://spie.org/Publications/Proceedings/Paper/10.1117/12.2060249>).
- [3] P. Molchanov, O. Asmolova. "Sense and avoid radar for micro-nano robots (Invited Paper)," Security+Defense Conference, Amsterdam, September 24, 2014, (<http://spie.org/Publications/Proceedings/Paper/10.1117/12.2071366>).