# ImpulseRadar offers a different view

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The Raptor GPR vehicle mount.

**ImpulseRadar offers superior efficiencies that reduce the time spent on both data collection and processing when using multi-channel ground-penetrating radar array systems.**

The last five years have witnessed significant uptake in the use of multi-channel ground-penetrating radar (MCGPR) array systems, particularly in the utility space.

A key driver for the increasing acceptance of such advanced systems is the desire to obtain more data with better quality and more rapidly than through the more traditional single-channel GPR approach.

Advancements in both MCGPR array hardware and the supporting software (acquisition, processing, and interpretation) have been just as influential by making the technology more accessible and much easier to use. A good example is the Raptor 3D Array solution with Condor 3D GPR processing software from ImpulseRadar of Sweden.

**Raptor 3D GPR Array**

Unlike MCGPR arrays with a fixed number of channels, the design of ImpulseRadar's Raptor allows you to choose the number of channels by quickly adding or removing physical antennas (transmitters and receivers) as needed.

While most users opt for configurations that fit the company's standard carriers (pushcart or vehicle-mount), the Raptor's plug-and-play antenna concept allows array configurations from as few as four channels up to 30 channels as standard.

However, more extensive bespoke arrangements are available upon request and this approach also allows users to define an array solution to suit a specific application or project.

Following user feedback, the company recently announced a redesign to the internal mechanics of the vehicle-mount carrier.

This change increases the flexibility of Raptor by enabling quicker reconfiguration between the pushcart and vehicle-mount carriers. While it has always been possible to make such changes due to Raptor's modular design, the new arrangement makes it much easier and faster.

**Condor 3D GPR Processing Software**

Regardless of the size or configuration of your Raptor array, acquiring data is efficient so that less time is spent in the field collecting data, meaning you have more time to process.

In the past, processing array data has typically been a time-consuming exercise and a bottleneck in the overall process. Consequently, ImpulseRadar has focused effort into simplifying and streamlining this process, with a positive outcome in the form of Condor 3D GPR processing software.

ImpulseRadar continually seeks effective methods for managing the huge datasets associated with MCGPR array data.

The company aims to ensure the best import quality, without loss of resolution/detail, and preserve depth, positional awareness, and accuracy.

Fulfilling this goal aids in the interpretation process to enable more precise picking of targets, enhancing the export to CAD/GIS environments.


*OspreyView peers through Raptor data layers to offer a top view image of all features within a thick wedge of data.*

**OspreyView**

Condor includes several useful visualisation and interpretation tools; however, ImpulseRadar offers a different view through a recent feature addition we refer to as thick-slice processing – a novel method for visualising 3D-GPR data more effectively. This method has not been commercially available until now.

The original concept was presented to us by Mark Grasmueck (et al.), of the University of Miami. While Mark remains the innovator, ImpulseRadar has adapted it as a feature within Condor, which we call OspreyView.

Like its namesake, OspreyView peers through Raptor data layers to offer a top view image of all features within a thick wedge of data.

OspreyView enhances the interpretation process, as the elements are automatically colour-coded by amplitude and depth so that the operator can more easily visualise them in a single top-view.

The combination of Raptor's high-quality data with Condor's efficiency and ease-of-use, and the enhanced visualisation offered by OspreyView, makes this a winning combination.

For the uninitiated, the processing of MCGPR data is different to 2D GPR. For the latter, you look at a B-scan radargram image to pick anomalies, usually in the form of hyperbola reflections, to mark physical position and depth.

However, for MCGPR data, the dense collection of radar profiles and their associated B-scans are processed into a single top-view (C-scan), or birds-eye view, of the whole survey area.

Rather than looking to pick hyperbolas, one looks for the linear presentation of features as they are positioned within the survey area and scroll down through thin time/depth slices to see where features are at depth.

So, a depth slice is effectively a horizontal cut through the dataset, showing the data's amplitudes after the processing is applied. The resulting image (C-scan) has some significant characteristics.

It gives an excellent overview that is somewhat cumbersome to achieve through single line profiling while preserving the full resolution of the GPR-system and data collection. The depth localisation of targets is precise and moving through the data can be swift.

As good as this type of thin-slice visualisation is, the obvious drawback is that you only see what the GPR detects at the time/depth cut through by a given slice. There is no effective visualisation of dipping targets (on-grade utilities), nor can it be possible to see those at entirely different depths.

Scrolling is needed, which can add time, but more importantly, it does not give the operator a complete overview. Now, compare this traditional thin-slice against Condor's new OspreyView (thick-slice).

Although both data images are good, at least five utilities are shown clearly in the OspreyView image, which is not clearly present in the thin-slice. The image speaks for itself, and if you are familiar with MCGPR data you can see the immediate advantage.

What is more impressive is that you can make interpretations directly in OspreyView.

ImpulseRadar's Raptor and Condor package offers unsurpassed efficiencies that reduce the time spent on data collection and, more importantly, processing. Consequently, you can complete projects more quickly, which means you can take on more work.

For more information visit the Access Detection website.