

Multi-Channel GPR

Cardno offers Multi-Channel GPR solutions for utility designating and mapping



Understanding the locations of all utilities, both above ground and subsurface, is essential in managing utility risks. Using state of the art Multi-Channel Ground-Penetrating Radar (MCGPR) technology, our team can identify potential conflicts and help reduce risks.

Using electromagnetic pulses in the radio spectrum (radio waves), GPR can safely show designers, engineers, and general contractors what lies below the surface without excavation. Combined with traditional geophysical techniques and direct-exploration, GPR data provides a more thorough and accurate set of data – ultimately reducing the risks associated with underground utility mapping.

Cardno continues to lead the industry with the technical expertise and cutting edge technology. Cardno is one of the only companies in North America that owns Towed- and Pushed-MCGPR Arrays. We have a strategic partnership with one of the premier GPR manufacturers, helping develop this innovative utility designating and mapping solution.

Towed MCGPR Array

The Towed MCGPR Array is a robust 40 channel GPR solution for utility locating and mapping. It can be towed behind a vehicle and simultaneously scan a very wide area mapping of buried utilities.

- > Cost and time reductions – run continuously without interrupting traffic
- > Speed – can be towed up to 15 km/h
- > Increase in accuracy – accurate to less than 5 cm

Pushed MCGPR Array

The Pushed MCGPR Array is a more compact solution, with 32 channels for real-time 3D mapping of underground utilities and features. It is used to survey areas inaccessible to larger systems while still maintaining the same benefits and accuracy.

- > Mobility – used to survey areas with numerous obstacles
- > Automatic Pipe Detection – detect pipes and cables
- > Robust construction – built to the highest standards to be used in harsh, demanding environments

Advantages of Using MCGPR

The use of MCGPR significantly reduces the survey time and provides high density data capture with greater resolution with post processing. Combined with traditional geophysical technology and direct-exploration, MCGPR data augments the SUE process, providing a more complete and



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accurate location of utilities. Cardno's well-trained and well-equipped SUE team has worked on projects across the country, from light rail transit, roadway improvements, to industrial plants, to other high risk projects to gather additional information, helping reduce our client's risk.

Safety Managing Risk & Uncertainty



With decades of experience, top notch equipment, and firmly entrenched safety processes, you can

be confident that we will mitigate impacts and reduce risk over the life of your project, providing a full range of services that minimize the opportunity for costly delays and unplanned expenses. Safety is a core value for Cardno. We are committed to continually improving our safety processes and to providing for the safety of the project site, staff, and the public.

Comprehensive services

Cardno provides broad-based, comprehensive, high-quality services to minimize impacts to utilities and save time and money. Working in conjunction with project design personnel, we accurately locate existing utilities and identify areas of potential conflict well in advance of final design.

Staff and training

Cardno's ongoing focus on staff training and advancement keep us at the forefront of the industry. Our UES field and office teams are highly-

trained and specialized professionals qualified to meet a broad range of client needs. All staff are required to meet rigid safety and industry training requirements as well as complete training that Cardno has developed to provide our teams with additional skills and technical knowledge.

Leading with technology

A wide range of equipment is necessary to detect the variety of subsurface utilities that may be present. We use the most appropriate technology for the project to increase the accuracy of the data, including:

- > LiDAR, or Light Detection and Ranging, to generate precise, three-dimensional information about the shape of the Earth and its surface characteristics.
- > Geographic Information System (GIS), captures, manages, analyzes, and displays all forms of geographically referenced information, allowing one to analyze spatial information, edit data in maps, and create interactive queries.

Reducing risk and delay claims

Our job is to help reduce uncertainties and keep your project moving forward. Our SUE expertise regularly leads to identification and documentation of previously unrecorded subsurface utilities, reducing the risk of potential project impacts.

Leading the Utility Engineering & Surveying (UES) industry

We are proud to be a founding and sustaining member of the American Society of Civil Engineers' (ASCE) Utility Engineering and Surveying Institute (UESI), whose mission is to advance the UES practice. Our experts lead the profession through speaking at industry conferences; developing standards and manuals of practice. We lead the industry by example. We develop professional practices that set the bar regarding the expectations for any SUE or survey investigation.



UTILITY ENGINEERING & SURVEYING INSTITUTE

Charter Organization Member

Cardno is a global provider of integrated professional services which enrich the physical and social environment for the communities in which we live and work. Our team of multidisciplinary specialists around the world has more than 70 years' experience in designing, developing and delivering sustainable projects and community advancement programs. Cardno is listed on the Australian Securities Exchange (ASX: CDD).

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