

## RESEARCH AND MAPPING OF **UNDERGROUND UTILITIES**


### **ADVANCED TECHNOLOGIES**

Adastra Engineering is specialized in the identification and mapping of **underground utilities** buried in the first subsoil. Our systems, which rely on the most advanced technologies, allow to obtain, at reduced costs and with the **maximum rapidity**, the network graph of utilities **to plan interventions** or **to avoid interference with buried artifacts** in the case of excavations (laying of cable ducts, sewers, pipes, etc.).

### **MORE SYSTEMS FOR A GREAT RESULT**

The **georadar methodology** allows the identification, with centimeter precision, of pipes, ducts and electric cables up to a **few meters of depth**. It also allows to discriminate the different types of buried artifacts and to obtain a complete reconstruction of the networks of underground utilities.

The **Ground Probing Radar systems** can operate in **city traffic** even in critical conditions **without interfering with the circulation** of other vehicles.



### **ADVANTAGES OF THE USE OF THE GPR IN THE SEARCH FOR UNDERGROUND UTILITIES**

- Research on very large areas at reduced costs
- High resolutive capacity
- Cheaper alternative to excavations and exploratory surveys
- No functional interruptions and costly damages during excavation
- Integrated reconstruction on digital support of underground utilities

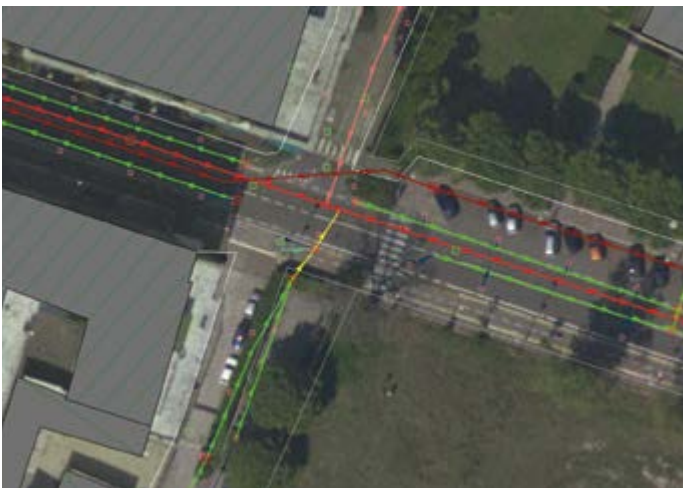
## OPERATING PRINCIPLE

The operating principle is based on the generation of **electromagnetic waves** that propagate underground and that are reflected with a different intensity when they encounter **buried objects** (power lines, pipes, chambers, wells, cavities, etc.).

The reflected echoes are transformed into images through the application of particular calculation algorithms; the images are subsequently interpreted by specialized personnel and the **map of underground utilities** is drawn on a digital GIS / CAD support.

Adastra Engineering uses integrated methodologies that include in sequence:

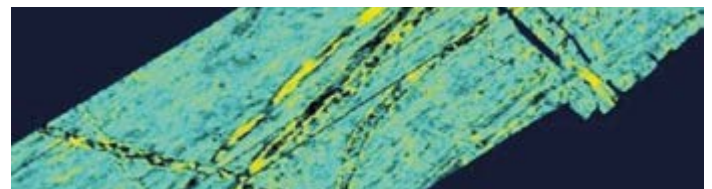
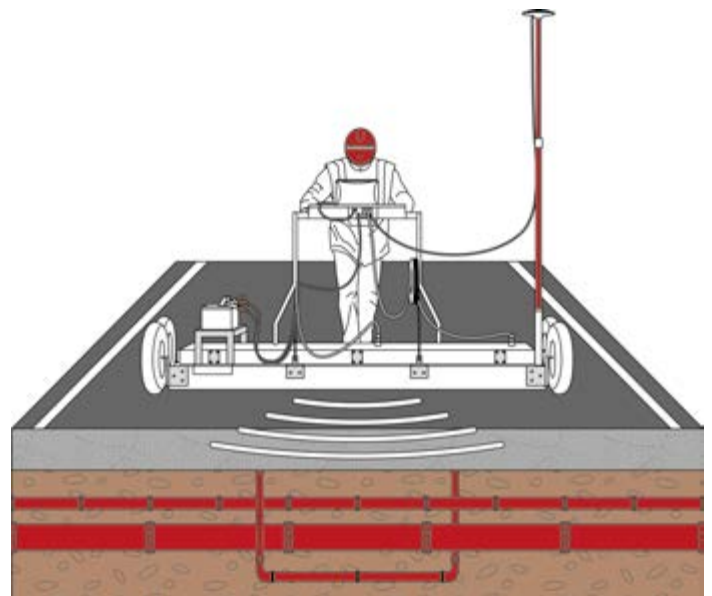
- **multi-channel wheeled georadar** survey;
- **electromagnetic survey**;
- high precision **topographic survey** with GPS systems or robotic TS;
- **video inspection**;
- **monographs** of wells;
- **implementation of a GIS / CAD** that integrates the set of data collected and known data.



*Example of reconstruction of drainage network of rainwater and wastewater. In this case study the network has been rebuilt up to the level of the connection with the single road drain.*

## MAIN INSTRUMENTATION

- IDS X-Stream multiarray system (up to 40 antennas);
- GPR GSSI type SIR with antennas from 75 Mhz to 900 Mhz;
- C.Scope MXL2 cable avoidance tool with MXT energizer for electromagnetic investigation in the frequency domain;
- Trimble R7 dual receiver GPS (RTK and VRS mode);
- Robotic TS Trimble 5600 DR200 +;
- Inspection cameras;
- Workstations with dedicated geophysical programs and GIS / CAD.



*GPR scans: planimetric representation of a networks of underground utilities in a roadway.*



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