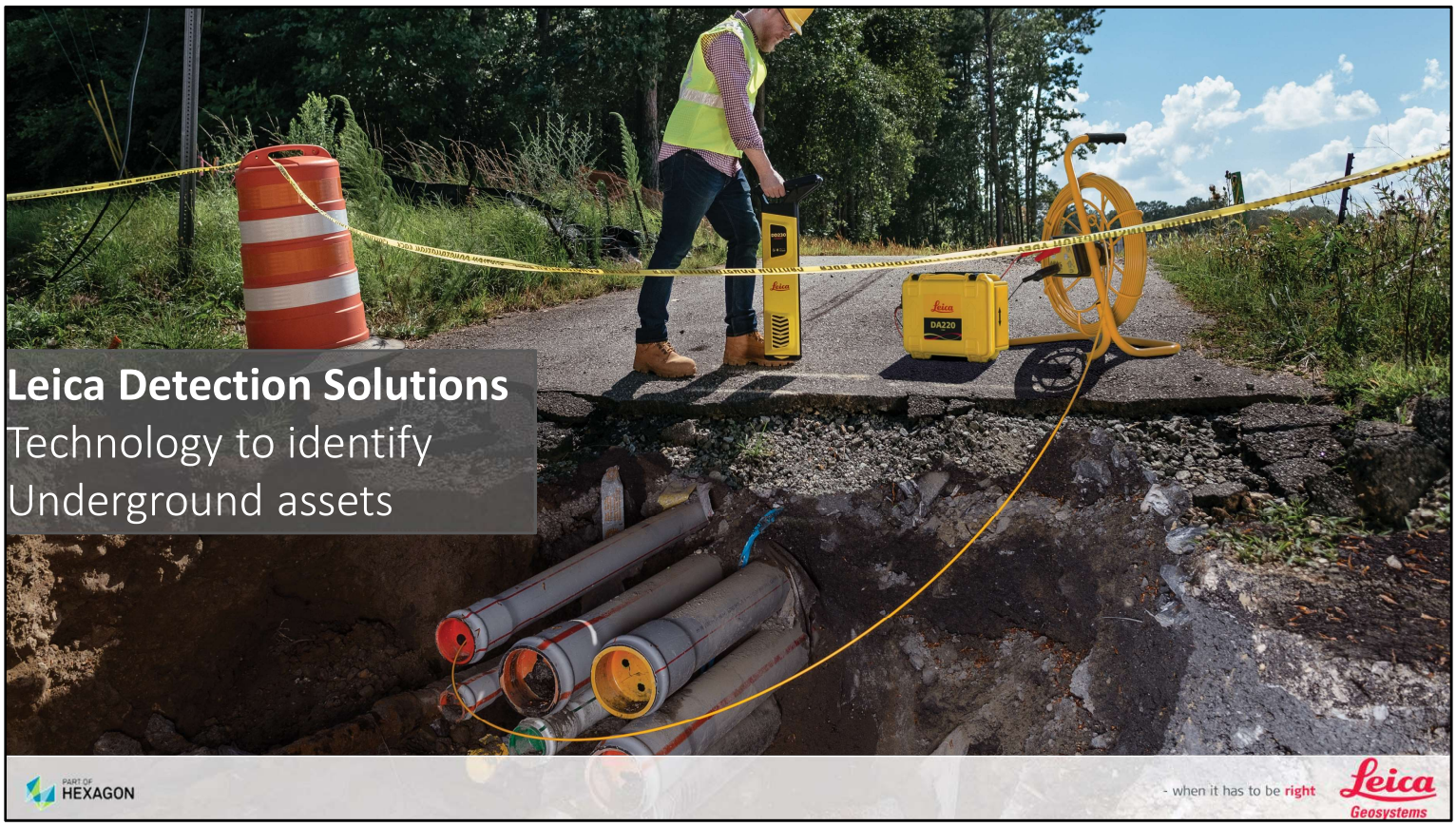


Leica Geosystems
Who We Are

A global company supporting measurement professionals worldwide

Revolutionizing the world of measurement and survey for nearly 200 years, Leica Geosystems is the industry leader in measurement and information technologies. We create complete solutions for professionals across the planet. Known for innovative product and solution development, professionals in a diverse mix of industries, such as surveying and engineering, building and heavy construction, safety and security, and power and plant trust Leica Geosystems for all their geospatial needs.

With precise and accurate instruments, sophisticated software, and trusted services, Leica Geosystems delivers value every day to those shaping the future of our world.

Leica Geosystems
Global Presence

Corporate office in **Switzerland**. Sales, Marketing & Service in **33** countries

More than **3,800 employees** in **46 countries**. More than **700 employees** dedicated to Sales & Marketing

more than **100,000** customers served each year

3 production facilities on 2 continents

Development centers on **4** continents

over **260** **service centers** in **87** **countries**

- when it has to be **right**

Leica Geosystems

Continuing changing environment and increasing population bring the need to construct more buildings and renovate existing ones – we can see the change easily by looking at the streets, the paint mark show the location of utility, pavement scars.

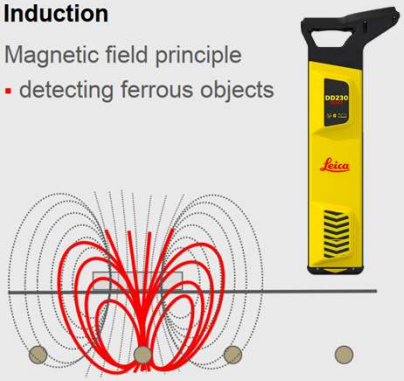
Utilities, must be maintained or repaired continuously. The main challenge for this change is not knowing the accurate position of the utilities. Without knowing the accurate position of utilities, we can't plan them. The quality of detection and the maps is very important – if the location of the utility is wrongly detected, or if the utility cannot be detected, this can lead to hazardous accidents and damages. In order to protect people and assets, the quality of detection and mapping must be ensured.

Technology

Induction

Magnetic field principle

- detecting ferrous objects

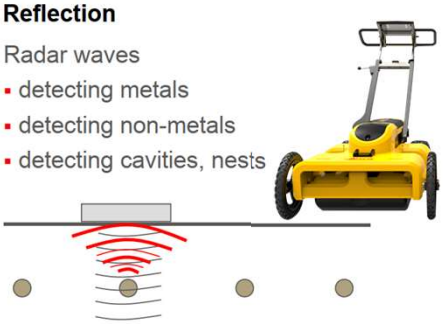


- \+ good accuracy for depth and location
- \+ not influenced by water or soil condition
- – only metal objects

Reflection

Radar waves

- detecting metals
- detecting non-metals
- detecting cavities, nests



- \+ layout for virtually everything
- \+ depth penetration
- – echo signals difficult to interpret
- – results greatly affected by base material, spacing of objects
- – Depth reading accuracy

5

- when it has to be **right**

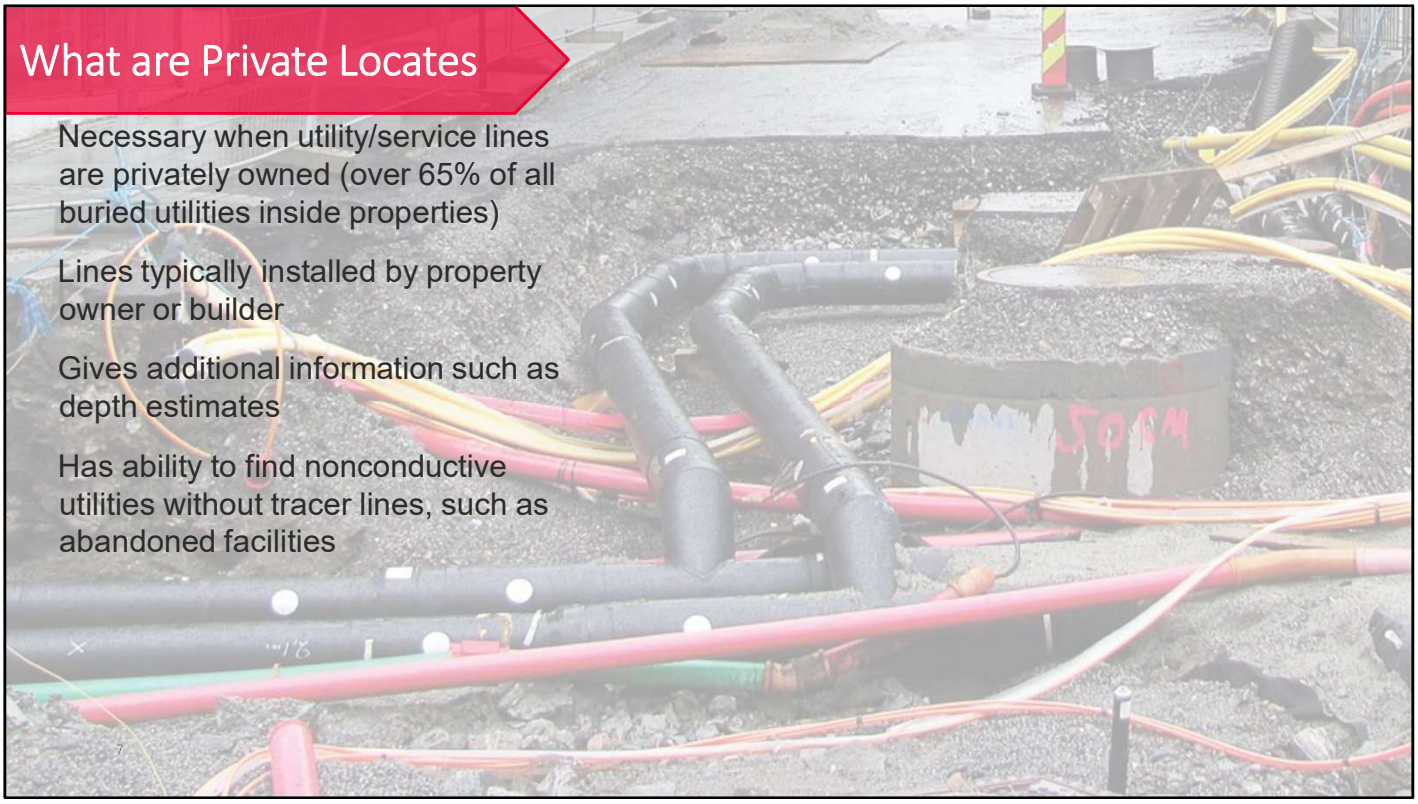
Leica Geosystems

This section is where we discuss the two different technologies which Leica offers to the detection market. The + mean that the tool is good at that application and – means poor. Locators are good a finding metallic lines, their depth measurements when used with a transmitter, and the depth accuracy is +/- 5%.

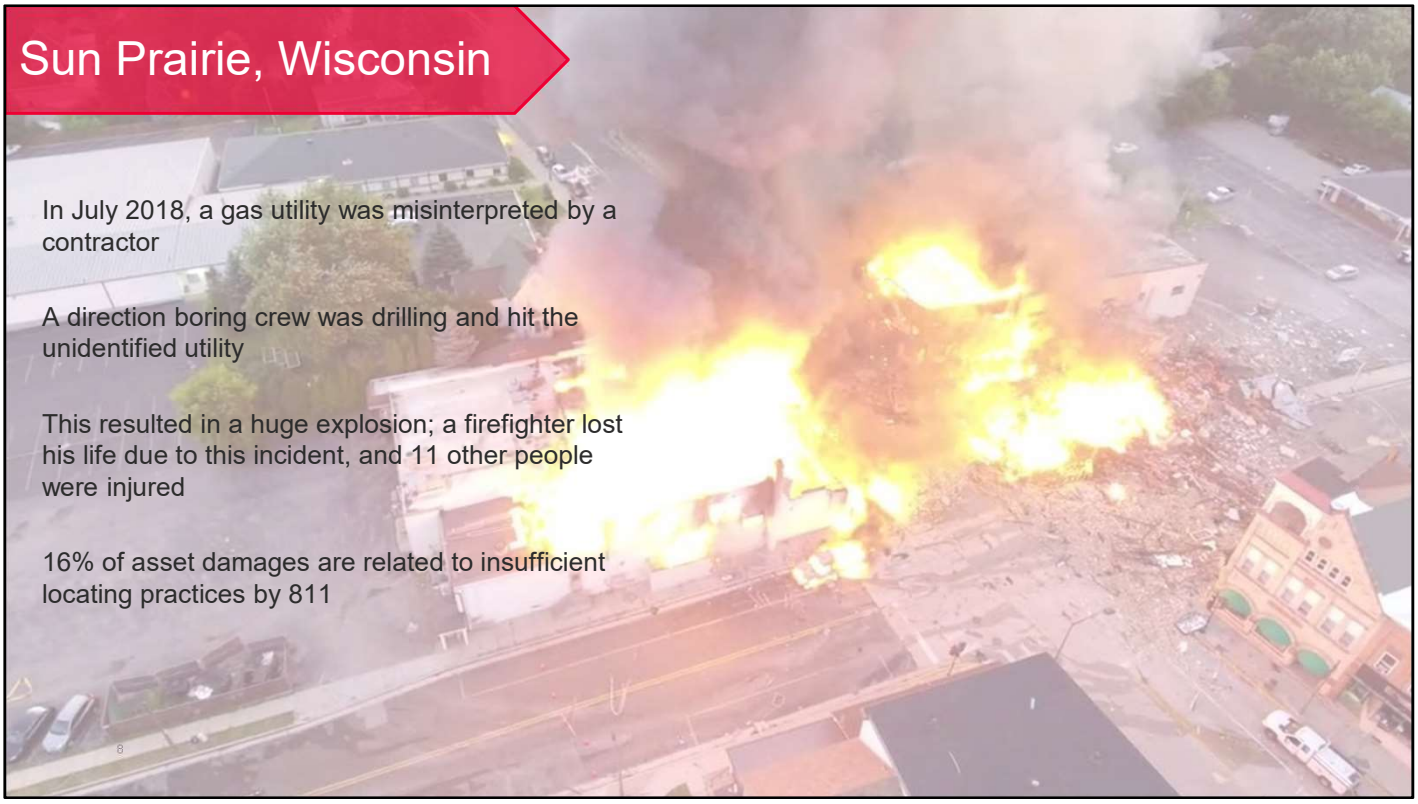
GPR is fantastic at finding everything which is also the worst part of GPR. The user typically have to interpret the return signals which can be difficult, we also have echo signals which make this even harder. Depth accuracy is difficult as we are measuring the two way travel time of a signal. If we think of a laser distance meter where we send a laser beam to a surface, we measure the time it takes to go to the surface and back. We know the density of air so such measurements are very accurate. With GPR, we have no idea what material our signals are traveling through. Software calculates the two-way travel time to make this as accurate as possible but the over all accuracy is approximately +/- 15 – 20%

Any digging requires contacting your 811 center, either by calling 811 from anywhere in the U.S. or making your request through your state 811 website. No matter what sort of excavation is happening a call must be made to 811, a new mail box, fence, any time ground it broken even on private property you must call 811.

811 only use EML (electromagnetic Locators) to detect utilities, if the line is plastic they will utilize a map and spray in accordance with it. If a utility isn't part of the 811 program, this utility will not be located, abandoned lines will also not be located. So, during excavation how do you know if you have found the new gas line or the old abandoned gas line? 811 will only mark the new.



Private locates cover all utilities which need to be located. This work typically utilizes EML and also GPR. They will do all they can to locate the utilities within the excavation area. They will supply depth measurements where possible and also have the ability to documents. The technology we have in Leica allows the contract to perform these tasks himself, quickly and simply.



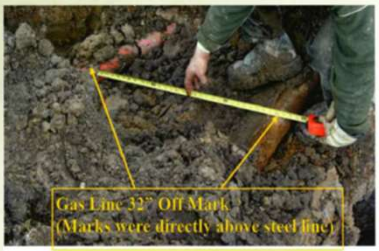
The incident which is show above occurred in 2018. Mistakes happen, they happen not only by contractors but mistakes can also occur with locators also. So, why would a contractor trust only 811 marks? Wouldn't you want to check?

Damage Prevention

Examples of Daily Mis-Marked Line 7' off mark

- A mismarked telecommunication line that was damaged.
- It was 7 ft off the mark.
- This occurred at a sewer project in Montgomery County in May 2017.
- The crew experienced 45 minutes of standby time and management costs contacting the facility owner.
- One resident was left without service.

Mis-Marked Line 32" off mark



Gas Co. marked their old, abandoned steel gas line which excavator found Successfully. Live PVC gas line was not marked and found (and broke) 32" From the mark for the steel gas line. This happened during the winter and 200+ Homes were without heat. Gas Co. won eventual $100,000+ lawsuit for damages. EVEN MARKS OFF BY INCHES CAN BE A VERY BIG DEAL!

9

- when it has to be **right**

Leica Geosystems

There are many examples of miss marked utilities, not only is this a danger for individuals that are digging but there are also huge financial implications. Forget about fines and reinstatements costs. On the job cost also need to be taken into account. If / when a utility is hit then works stops, but the people and machines are still present and are still a cost to the business. For example a typically job will have the following

- Superintendent
- Foreman
- Operators x 2
- Laborer
- Pipes Layer
- Equipment
- Rented equipment

Costs

- Approximately $1,700 / hr

What is happening within the industry to hep reduce the strikes, are 811 improving. Each year the common ground alliance who is responsible for 811 produces the DIRT report. The Damage Incident Reporting Tool (DIRT) details all reported utility strikes, they look at root causes and why the strike occurred. What we can say is that we are hitting more utilities, we are excavating more but only using 811 will not reduce the utility strikes contractors face. It is the perfect starting point, but should be seen as a tool within their tool box, they should check the marks, look for additional utilities which may be present.

The Common ground alliance also produce a best practices document which also support the excavation contractor while digging.

Key Trends and Implications- Detection

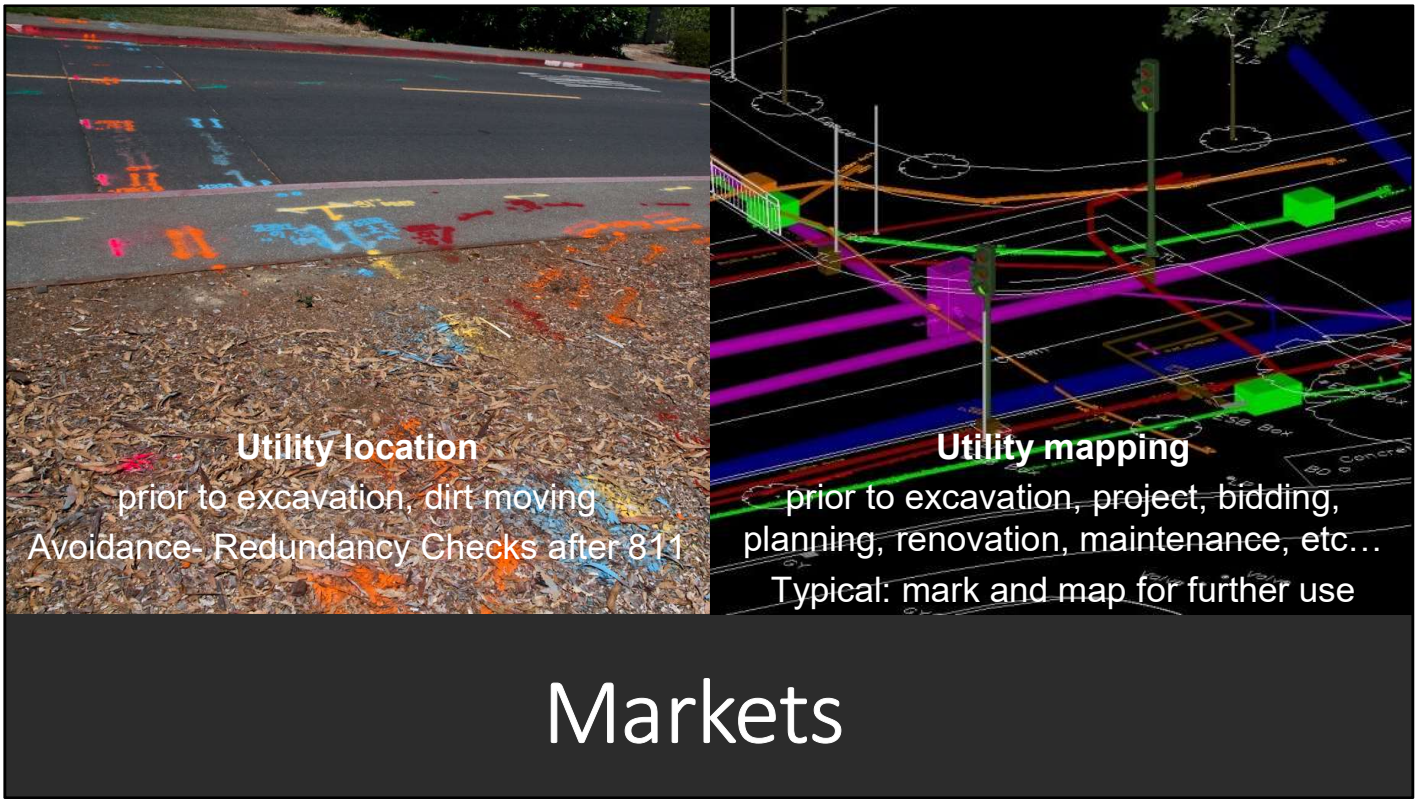
Trend	Implications
▪ Damage Incidents Increasing Nationally	▪ Excavators under greater pressures for avoidance
▪ Reliability for 811 locates inconsistent	▪ Cost Increases, Safety Hazards & Liabilities facing Contractors and Excavators
▪ Contractors seeking solutions to avoid utilities and risks	▪ Technology filling the gaps

11

- when it has to be right

Leica Geosystems

It is also time to point out that we currently have the most efficient machines possible for playing pipe, if this is excavation or drilling. What is interesting that that the volume of pipe been installed by a single machines hasn't increased by the amount of efficiency gains machine manufacture have delivered. These efficiency gains are been lost mainly to utility strikes.



Markets

The products which Leica offer serve mainly two markets, this being the utility location or constructions markets. These are contractors / users who which to check 811 marks, check and locate additional utilities which may be present on private property. Their goal is to be as safe as possible during excavation.

The other market is utility mapping. This is where a 3D map will be created for the design phase of a project. All utilities will need to be located, and identify correctly so accurate maps can be created. Such a discipline utilizes multi technologies, not only detection tools but also measurement tools which Leica are the only manufacture to be able to offer system solutions.

Leica DD Locators

Simple, effective utility avoidance solutions

The DD120 is a basic locator, utilizes power, and radio modes. This means we can use the locator without the transmitter to find power lines under load and potential metallic lines. When used with a transmitter additional metallic lines can be located such a telecom and depth measurements can be taken.

The DD130 builds on the DD120 - it offers additional frequency modes of 512Hz and 640Hz. These frequencies enable long distance tracing but more importantly, allow users to find the end of sewer inspection cameras which generally produce a 512Hz. The unit also has the added feature of “current measurement”. Current measurement is used for target line identification. When the transmitter is connected to the target utility, the locator can measure the transmitted power. If a trace signal is detectable on more than one utility, the signal strength determines the appropriate target line as the highest current reading, which is the line connected to the transmitter.