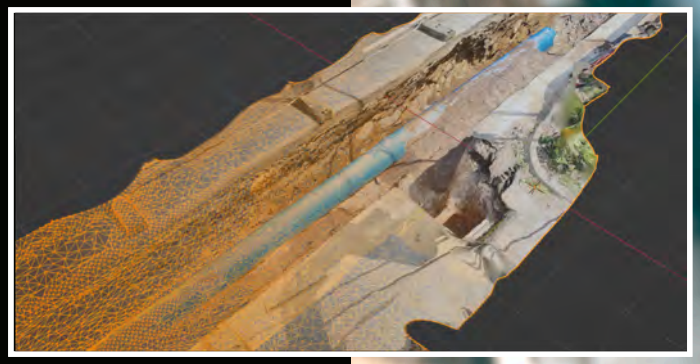
3D Photo Survey

ARCODA Next

arcoda INFORMATION TECHNOLOGY

Get the digital models of your networks directly with your smartphone.

3D Photo Survey you will be able to have the 3D models of your network infrastructure. All you will need is your smartphone paired with a precision GPS, and you will get geo-referenced, high-precision, true-to-life 3D models, thanks to which you will obtain the digitisation of numerous business processes. Find out how.



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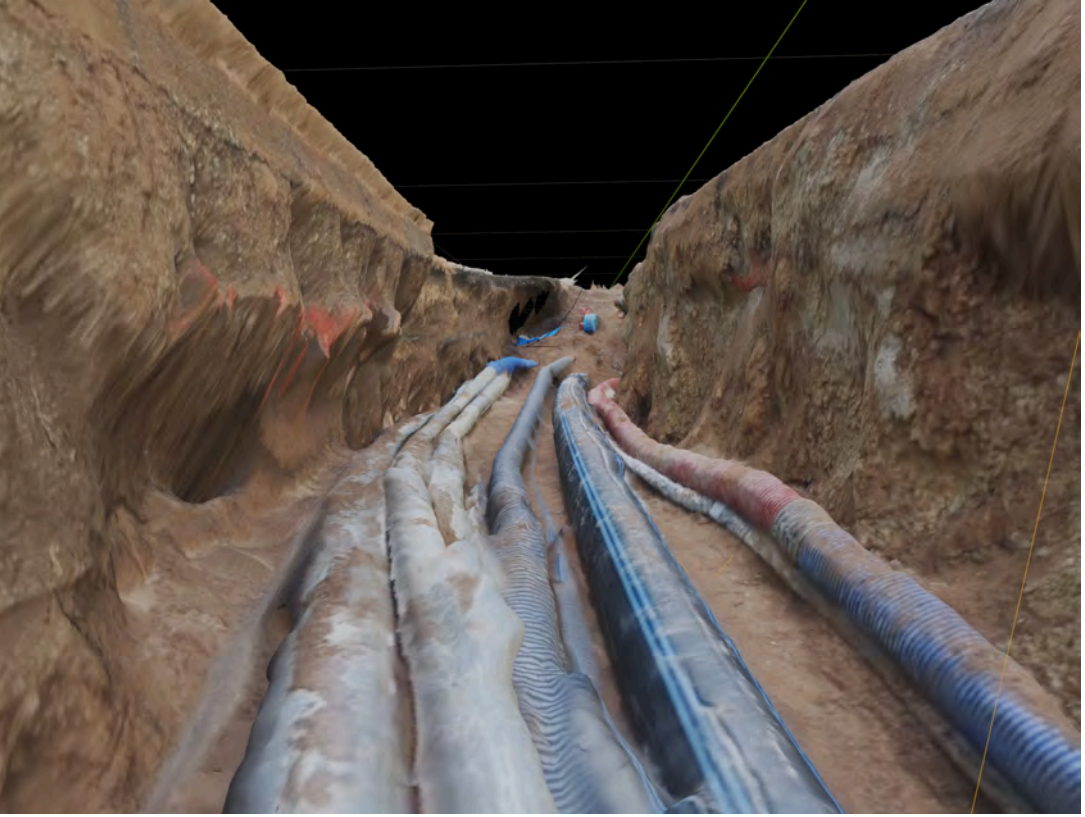
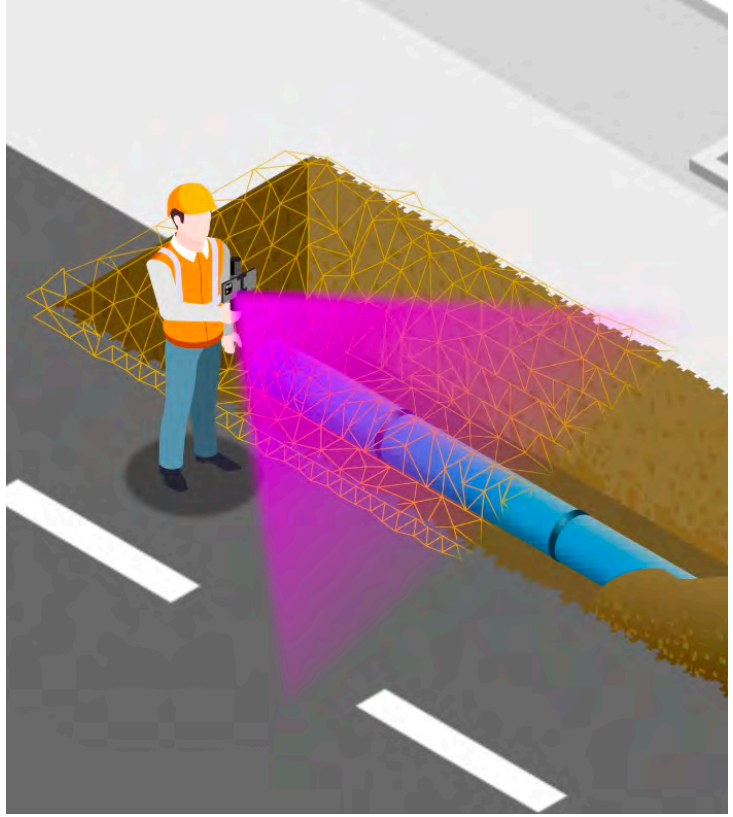
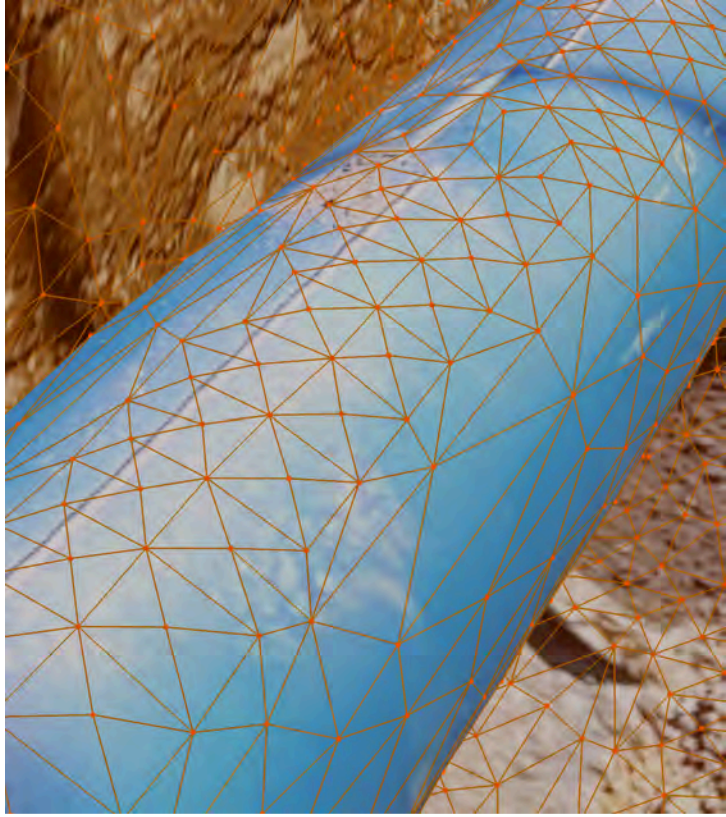


What is 3D Photo Survey? What does it do?

Our ongoing commitment to the development of technologies at the top of innovation has led to 3D Photo Survey, the solution that enables the easy acquisition of three-dimensional models of specific areas. Due to the accuracy and realism of these models, they enable the development of numerous features. These 3D models are ideal for multiple uses, some of which will be described below.

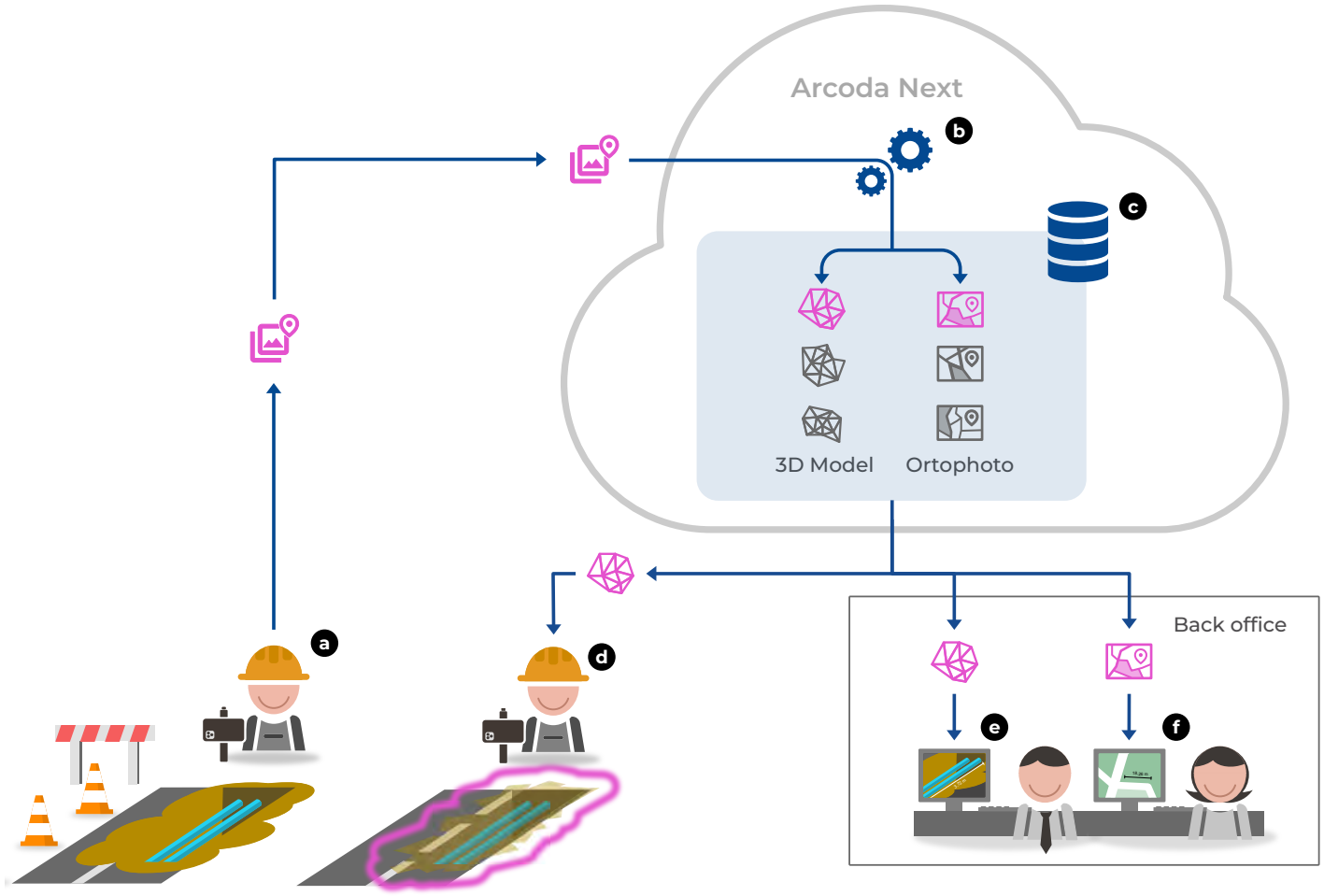




How does it work?

The operator goes to the location that needs to be scanned and runs the Next app. It connects with the GPS receiver via Bluetooth, from which it obtains the positioning signal. When the 3D Photo Survey is launched, the app activates the camera, and the operator starts **capturing images from the app** (e.g., a road excavation for laying underground utilities). Once captured, the **images** of the scanned area, combined with the **camera pose data and precision coordinates** obtained through the GPS receiver, will be sent to the **server and processed.** The processing is concluded with the production of a **precise, realistic, georeferenced and oriented 3D model.**

Workflow in a nutshell

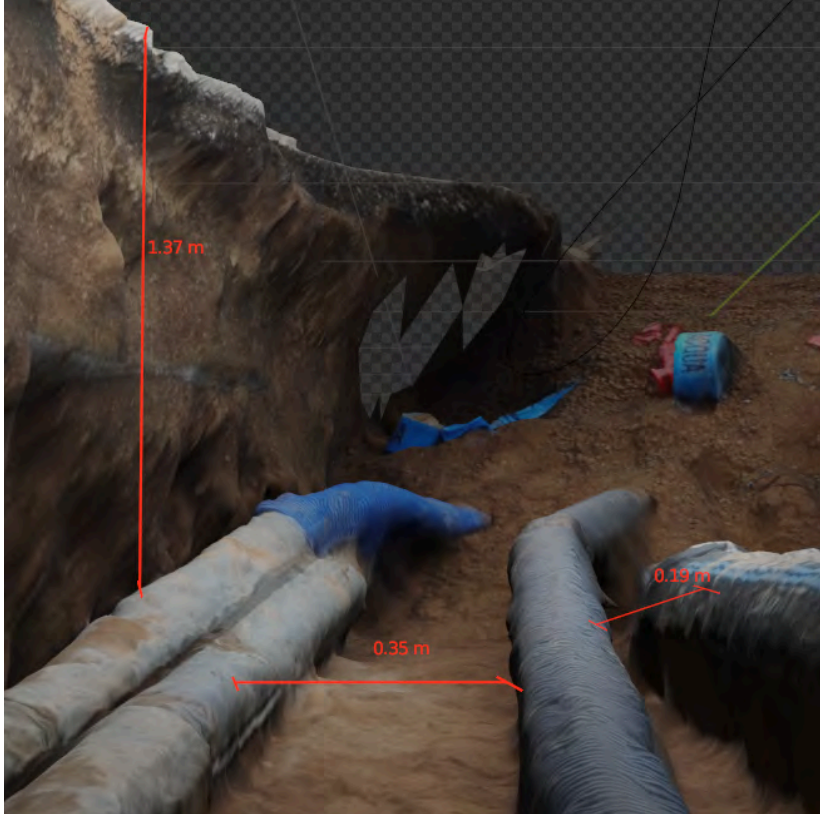


- **a** The operator runs the Next app and **captures images** of the excavation with underground utilities. The images are automatically sent to the server, along with the **laying data and precision GPS coordinates.**
- **b** Specific **algorithms** analyse and process the incoming images, generating a **3D model and orthophoto.**
- **c** The 3D model and orthophoto will be **stored** in the Arcoda Work portal, and ready for various uses.
- **d** One possible use is the visualisation of underground utilities in **augmented reality** when the excavation is closed. In fact, the 3D model is provided to the Next app to display **holograms of buried network infrastructure** in augmented reality.
- **e** The 3D model is used in the back office to make **virtual measurements and inspections** of the work carried out and of the network facilities.
- **f** Orthophotos are used in the back office for **measurements, mapping networks, and elaboration of maps.**

Use cases

Expeditious excavation survey

Thanks to the smartphone equipped with the precision GPS, the **3D model of the excavation and underground utilities** can be easily obtained. It will be enough to **"scan" the excavation with the smartphone** equipped with the 3D Photo Survey. The server will process the images obtained by the smartphone, and will produce a realistic, precise, georeferenced and oriented three-dimensional model showing the underground utilities. The resulting model will be made available to the company's GIS. In addition, if more complete information is needed, **multiple scans of the excavation can be taken at intervals of time.** In this way, the **evolution of the work** can be analysed and **elements intended to be buried** in later stages of the work, or that have been moved, can be captured - and then conveniently reviewed digitally.
To survey excavations, choose the speed and accuracy of Arcoda Next!



Virtual surveys from the office and final reports

With 3D Photo Survey you will be able to conduct network facility surveys without leaving the office. How? 3D models of underground utilities acquired by Next during excavation and laying are automatically available in the company's GIS, allowing the back office to operate autonomously, **without sending operators to the site.** From your desk, you can then conduct a **virtual survey,** exploring the network and taking **centimetre-precision measurements directly on the digital models.** Remote access to all desired geometric information is also ideal for **accounting the work performed.**
Choose the convenience of digital!

From second half of 2024

On site inspections in augmented reality

Relocalising infrastructure under the road surface is an operation that requires **high accuracy in the laying phase,** during the acquisition of the dimension and in the digitisation phase of the information. An operator is in charge of **manually checking the data,** interpreting them, and reporting them to cartography. The level of accuracy of these operations thus impacts subsequent excavation and intervention operations. Poor accuracy increases the **risk of network damage or disruption,** leading to **service interruptions, safety** risk to operators and users, and **economic implications.** With 3D Photo Survey, using the smartphone, **holograms** of network infrastructure are **superimposed in augmented reality on the road surface,** with **centimetre accuracy.** When the excavation is closed, during surveys, excavations and interventions, on-site personnel will be able to relocalise in augmented reality, with accuracy, the underground utilities, and **intervene at a glance,** reducing the risk of damage to people and infrastructure. In addition, superimposed 3D models can also show network interferences, making interventions even safer.

Underground utilities mapping

Once technicians have surveyed the underground utilities and marked the traces with spray, the area of interest can be "scanned" with a smartphone. On the basis of this scan, the system will automatically generate the **3D model of the road surface** and also the related very high detail "orthophotos" **showing the traces made with the spray.** The orthophotos thus processed will be available in the Arcoda Work web portal, and can be exploited as a **visual reference to accurately map the networks.**

Digital models of the networks

The 3D models acquired through 3D Photo Survey are accurate, high-fidelity, georeferenced and oriented, and are a valuable resource to better perform **monitoring, simulation and optimisation activities of network infrastructure.**

Automatic processing of ultra-high detail orthophotos

Using images acquired with 3D Photo Survey, **"orthophotos" are automatically obtained at such a high detail** that they can be used as a reference for **centimetre-precision measurements.**

From the comfort of your desk, it will therefore be possible to take measurements and plot routes using the orthophotos generated by the system as a reference. **The back office will be made independent** in carrying out these activities, and **the dispatch of specialised personnel to sites of interest will be avoided!**

Production of maps to support those who will do the excavation works

Avoid on-site measurements! With 3D Photo Survey, you scan the site of interest with your smartphone and easily get the **3D model of the road surface.** The processed model is accurate, realistic, georeferenced and oriented. In addition, **it accurately shows the traces made with the spray in the subsurface survey phase.**

By importing the model into the CAD software with which the maps are processed and displaying it top view, it will serve as a **reference for accurately drawing digital maps showing the traces made on the road surface,** making it easier for those who will be in charge of the excavations and allowing them to work with no ambiguity even if the traces are faded due to weather and abrasion.

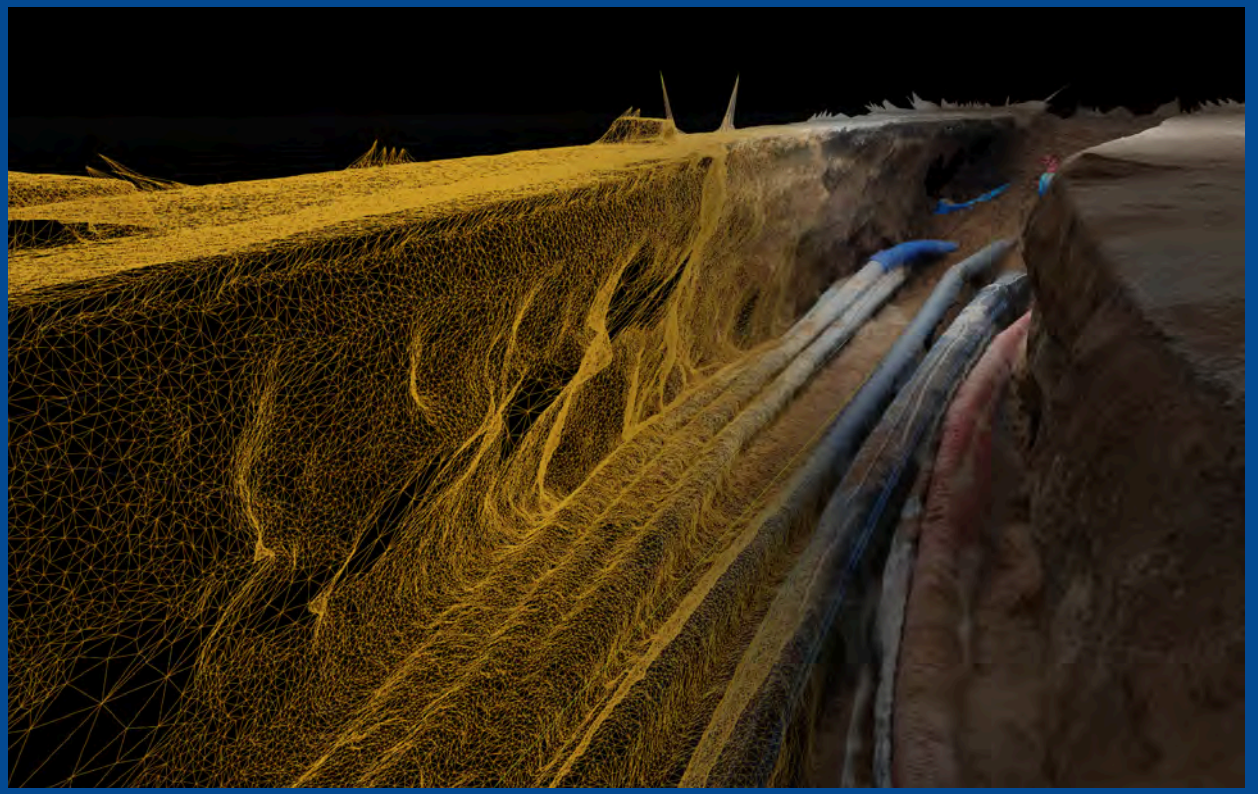
In addition, **the acquisition of the 3D model is very simple** and requires no special training or specific technical knowledge. It can therefore be carried out even by construction staff!

Road pavement rehabilitation reporting

3D Photo Survey makes it possible to **survey the temporary and final rehabilitation directly with a smartphone, without taking on-site measurements.** Once the survey has been carried out, thanks to the digital models acquired and provided in the system, **the back office can carry out measurements of the rehabilitated areas autonomously.** The process is quick and accurate, and is done from the comfort of the office. The advantages? **Speed, ease and an objective measurement of the restored area,** which **avoids the overestimation** of the of the renewed areas, which would result in cost overruns.

Company GIS update

Georeferenced, three-dimensional acquisition of network facilities will return the actual location of the assets into the GIS. Tracking of networks will no longer be "lossy", but will continuously feed the company database, keeping it up-to-date.

Case studies overview

Expeditious excavation survey	Virtual surveys from the office and final reports	On site inspections in augmented reality (From second half of 2024)
Underground utilities mapping	Digital models of the networks	Automatic processing of ultra-high detail orthophotos
Production of maps to support those who will do the excavation works	Road pavement rehabilitation reporting	Company GIS update