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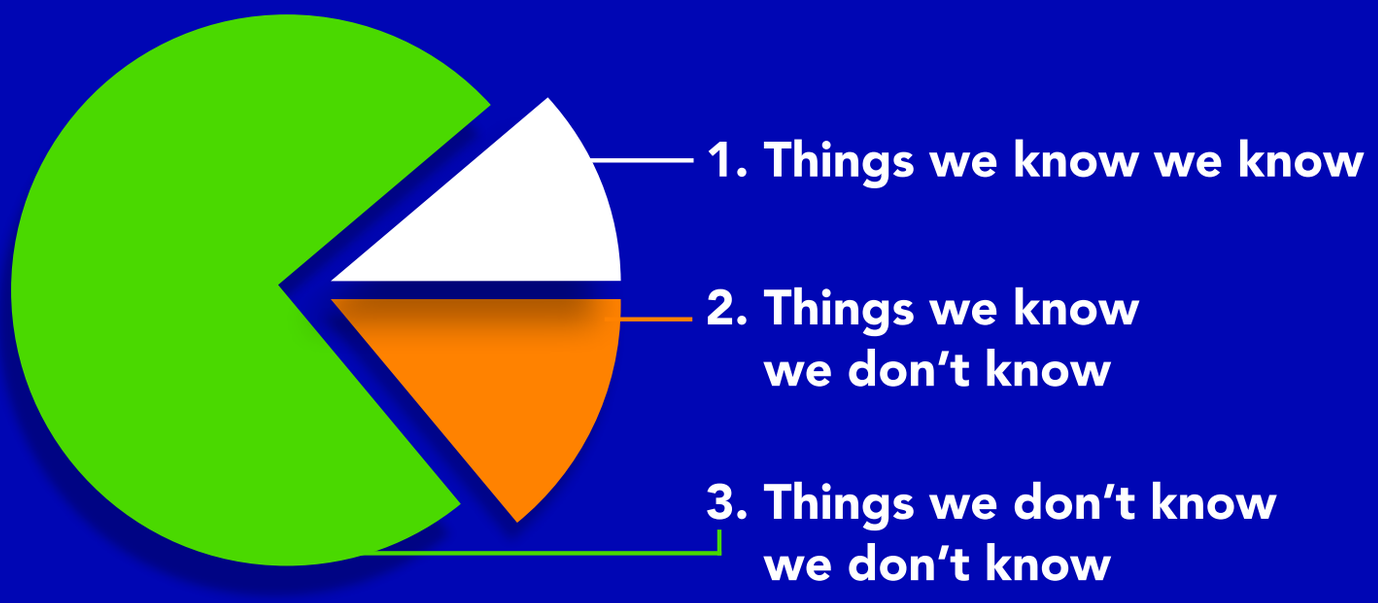
# Street Level Data reduces the cost of designing, building and maintaining fiber networks

## And helps eliminate project risk unknowns

## The concept of the Three knowns

The concept of the **Three Knowns** originates in psychology, and has been used to describe situations from security to the aerospace industry to chemistry. The idea refers to:




In applying this concept to FTTx networks, the second and third categories are often responsible for errors or oversights. This can lead to unanticipated costs and budget overruns, delays on permit approvals and other challenges. In addition, miscalculations can result in missed commitments, revenue shortfalls, unflattering stories in the media and extra attention from regulators.

To reduce the likelihood of negative outcomes, communication service providers (CSPs) historically send crews to visit and survey locations to gather ground truth "lay of the land." This traditional method is an expensive and time-consuming process. It is difficult to implement in the design phase, particularly when using automated design solutions. Moreover, manual data gathering and field surveys can introduce new errors through inaccurate and incomplete information.

However, there are proven technologies that can help CSPs not just reduce but avoid these worse-case scenarios as well as significantly cut design, build and maintenance costs of FTTx networks. These technologies are based on geospatial data, with accuracies in the fractions of inches. And by using this data to increase its knowledge, CSPs can gain a competitive advantage and a faster time to market.

## Things we don't know

Many CSPs find they lack knowledge related to the type, location, and condition of their current network assets, related utility infrastructure and conditions within the right of way. The reasons vary, but in numerous instances it's due to inheriting legacy equipment as part of a company acquisition or changes in deployment partners.

> *Combine a CSP's imperfect knowledge of its assets with that of the environment and the context in which they exist, and it's not surprising how nearly impossible it is to anticipate obstacles or factors that could aid in their design and rollout of a next-generation network.*

That's why before planning a rollout, it's essential to gather and analyze a broad base of geospatial data. In this way a CSP can produce a true inventory of its own assets as well as potential hurdles to overcome and any features that can be turned into an advantage. This includes the location and height of buildings, bridges, overpasses, lampposts, utility poles, trees and other street furniture, as well as the material and composition of sidewalks, roads and bike lanes, and even the type of soil beneath them.

## Knowing the answers and improving ROI

To help CSPs understand what's at stake, Cyclomedia engaged Accenture, a consultancy, to study fiber route planning and optimization using different methods. The opportunity they discovered in their research is the ability to not only cut the number of on-site visits, but to cut engineering costs by 20 to 80 percent by incorporating geospatial data into the design process *(Figure 1)*. These savings occur by limiting manual field work to critical areas and exceptions, rather than conducting them across the entire rollout route, eliminating manual efforts and rework and using the data as input for automated design.

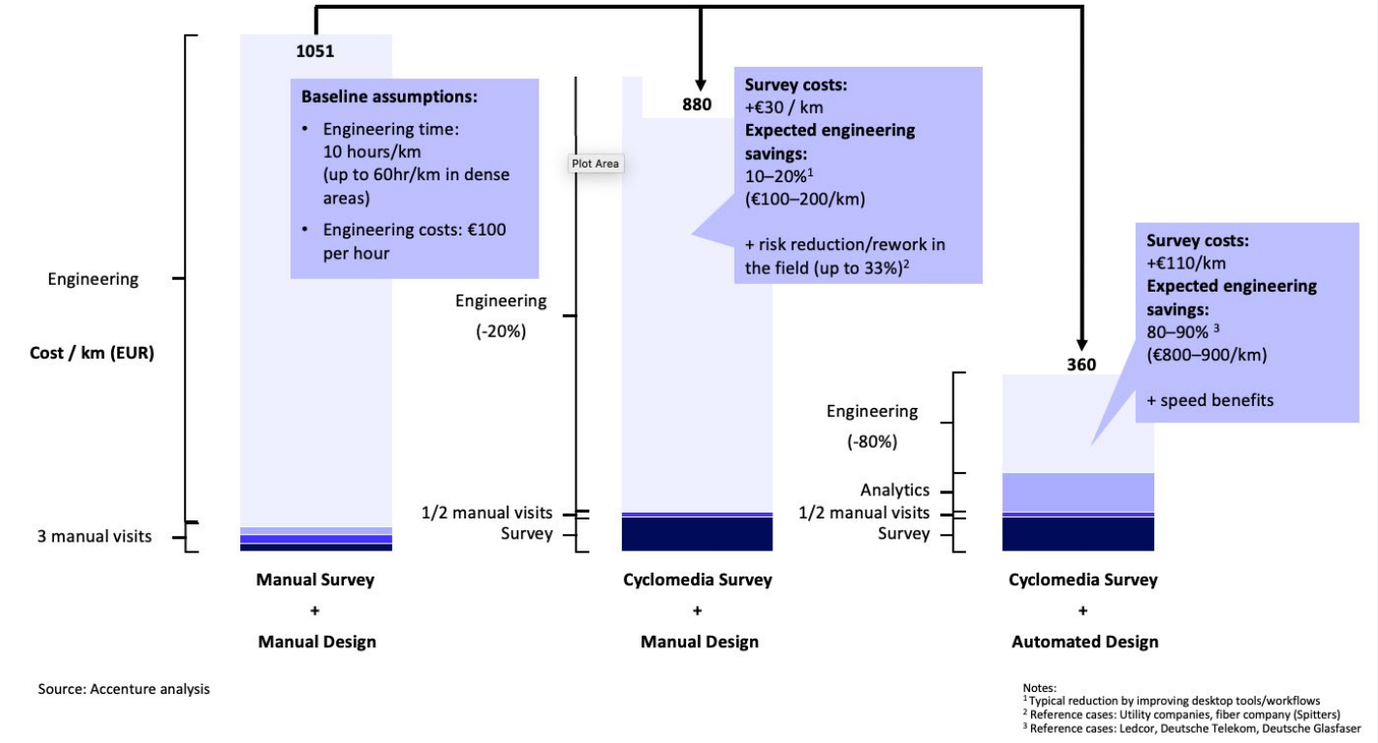



**Figure 1.** Using Cyclomedia survey data in conjunction with manual and automated design results in reduced engineering costs and other benefits.

These savings are achieved through the use of geospatial data gathered by Cyclomedia. Cyclomedia captures and records visual data in public spaces using a patented vehicle-mounted camera system that creates 360° panoramic images and captures 3D LiDAR data. Each Cyclomedia vehicle collects an average 40-50 route-miles of data per day *(Figure 2)*.

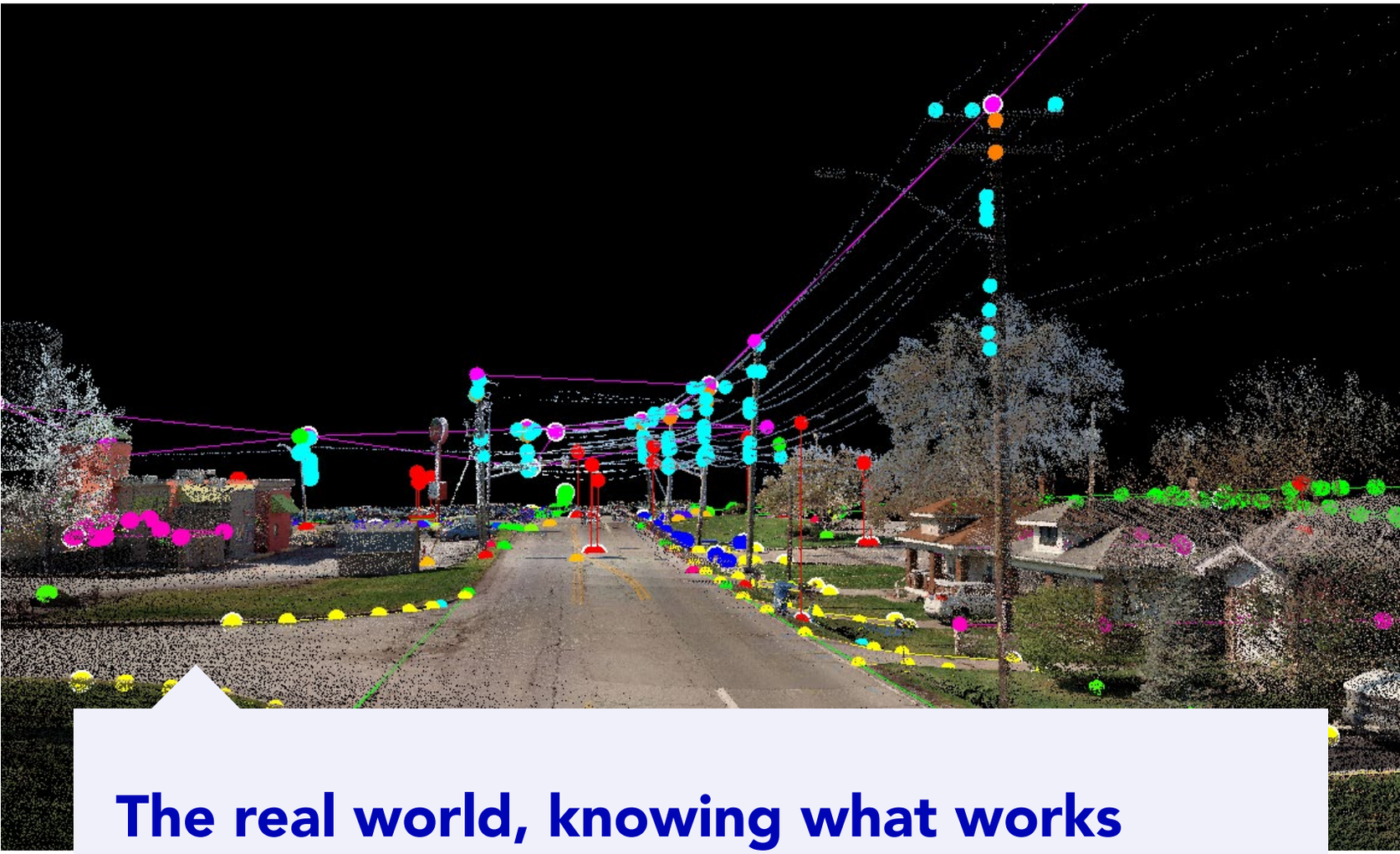
**Figure 2.** Cameras, positioning technology, a data processing unit and the LiDAR system help create a complete and accurate record.

After the data is collected, cloud-based software automatically processes it into a 3D GeoCyclorama and a LiDAR point cloud file. Cyclomedia has the ability to scale according to project needs and has successfully completed projects ranging from 300 miles to 25,000 miles. Quality control is performed throughout the process, including calibration of capturing systems and examining image quality, both during and after capture, as well as ensuring parallax-free images and positioning validation.

> *Data layers are extracted from the LiDAR data using algorithms based on object recognition. This allows for accurate inventorying and documenting of the location of poles, street furniture and other assets, as well as road surface composition and type.*

The images and data are then made accessible to the CSP and its contractors through Cyclomedia's online viewer, Street Smart™. It provides a reliable source-of-truth dataset of features using annotated imagery and LiDAR point cloud, offering positional accuracies of less than ±4 inches or better *(Figure 3)*. Additionally, Cyclomedia offers specific datasets, such as poles and surface types (e.g. asphalt, cobblestones, plates, unpaved), to tackle use cases in fiber rollout.

**Figure 3.** Street Smart enables a network designer to verify type and location of assets as well as composition of roads and walkways from the office or a mobile device.



# The real world, knowing what works

Using this process, Cyclomedia helped a diversified construction company with extensive experience in providing turnkey communication networks cut four months off 4,000 route-miles of network design work for a project in the Chicago area. All imagery and LiDAR data capture, plus cloud publishing, and the delivery of extracted asset data was completed in five months, reducing the entire timeline by nearly 50 percent. This was made possible by eliminating practically all manual on-site surveying, which would have taken a large team of field technicians more than nine months to manually collect, verify and document.

| | Manual Fielding | Cyclomedia's Automated Solution |
|---|---|---|
| Project Timeline | 9 months | 5 months |

| | | |
|---|---|---|
| **Fielding Cost*** | 25 - 40% | 5 - 10% |
| **Data Accuracy** | 3 feet | < 4 inches |

*Field cost as a percentage of the total planning and engineering project costs – "boots on the ground" vs. vehicle data capture and analytics automation.

## Knowing the new requirements and new possibilities

Municipalities today are more stringent in construction permit processing, and using geospatial data increases the probability of getting authorization and rapid turn-around times. While this may appear at first to present a greater upfront burden for CSPs, according to an engineer at a client of Cyclomedia, they save time and money through better planning.

"To get approval these days we need to show our offset from the edge of the pavement, not just the general area. But this pays off in faster, more accurate and less costly design and roll outs today as well as on future projects and maintenance."

Another benefit is the creation of digital models or "digital twins." This enables engineers to understand elements of the design in relation to each other. "The old way of doing things on paper can cause an issue to go unnoticed until the build is taking place in the field. Now any errors and gaps, like a missing value or attribute parent, are detected right away while we're still in design."

By moving to a geospatial data-centric design process for fiber rollout, everything can rapidly be tagged at the parent level. Polygons that employ analytics, based on geospatial groupings, can link all the equipment.

> *This saves time by automating tagging and building the parent-child relationships. What took a week to do manually can now done in two days by eliminating repetitive tasks.*
>
> *Senior Manager at Cyclomedia Design Engineering Partner*

In addition to saving time and money, the process cuts down on human error in which components are mislabeled. Another advantage is that the individual(s) responsible for quality checking the design can focus on optimization instead of administrative duties.

## Knowing the seasons

To build a fiber network in the spring requires designing through the winter. Companies that rely on manual surveys frequently need to resend crews into the field to measure missing portions or confirm information. Performing these additional surveys in the winter and snow is difficult and can be dangerous.

"The data we get from Cyclomedia is fresh, it's good for at least six months and often a full year," said an engineer at a Cyclomedia client. "So we can model and design in the winter without having to go out into the cold, and be ready to roll out when the weather is ideal." Another advantage of using geospatial data is if part of the network goes down in a winter storm, the planning process is not impacted.

> *Having a true picture of the fiber network and all of the assets helps CSPs quickly locate what needs to be repaired. The difference is night and day, and if the storm hits when it's dark, even more so.*

## Knowing what the tech companies are doing

As major technology firms begin to build out their own networks, they bring a high-tech approach to their designs. “Tech companies, given their relationship with data, tend to be demanding,” said a Cyclomedia client engineer. “They know that Google maps are good enough for driving directions, but not to design a network.”

When comparing Google imagery with municipal and existing CSP records, points can be off by several feet. When a designer aligns assets with Google maps or similar resources, then passes the design to a team member, they tend to be misaligned, halting the process for days or even weeks. Working with true geospatial data avoids inaccuracies and misunderstandings.

> *Big tech loves data. And the traditional CSPs are seeing this and realize how data makes things more efficient.*

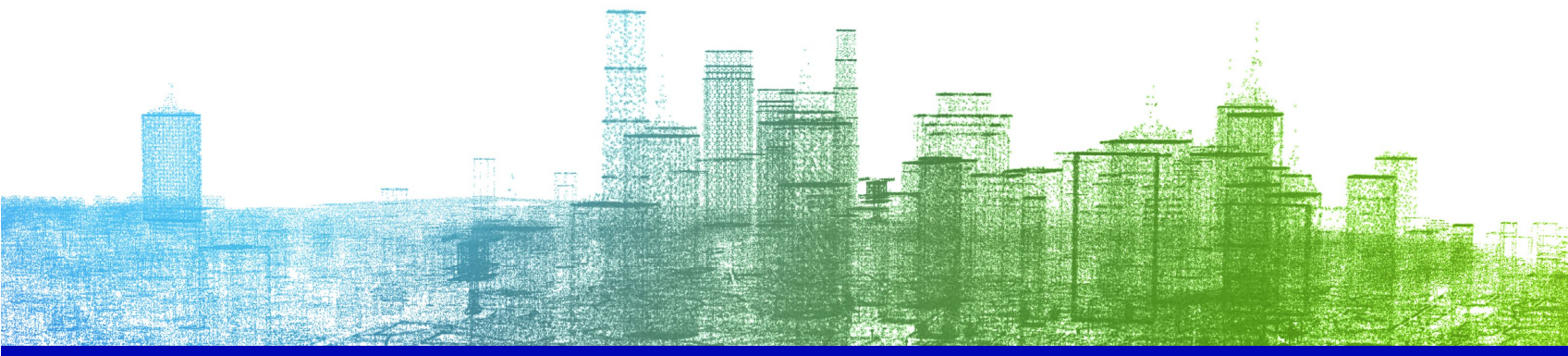
Another aspect that's driving changes in the industry is the limited space to build networks along certain corridors. In these cases, a consortium of carriers and tech companies are working together. This experience is giving CSPs a view into the benefits of using geospatial data. "More than just a view," said a client of Cyclomedia, "I'm seeing carriers piggyback on the data that's being generated, and it's driving their decision making, too."

## Learn more

ISE Webinar: A New Best Practice for FTTx Network Engineering (isemag.com)

## Ready to talk about how Cyclomedia can help you?

**Contact us**



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Cyclomedia captures data from the real world and transforms it into valuable insights, enabling you to understand the complexities of the environment around you.

Using the world's most accurate 360°street-level visualisations, enhanced by innovative AI-powered analytics, Cyclomedia delivers actionable insights. Insights that you can use today to build a better tomorrow.

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