DDSI conducts site surveys to help architecture and engineering firms identify opportunities to expand telecommunication footprints. Their projects include mapping all underground utilities with a required subfoot accuracy. But at any given site, the field mapping conditions are unknown until the crew arrives.

Customer
DDSI Global

Location
Denver, Colorado

Industry
Telecommunications, Architecture & Engineering, Design, Construction

Partner(s)
Esri and Laser Technology, Inc. (LTI)

Challenge
DDSI needed an easier, faster way to capture subfoot utility locates at cell-tower sites, especially where trees and buildings obstructed GPS signals around buried infrastructure

Solution
Eos Arrow Gold GNSS receiver, Esri Collector for ArcGIS®, LTI TruPulse 200X, iPad Mini 4

Legacy Technology
All-in-One Handheld GPS, Total Station, Manual Drawings

Results
DDSI improved profit margins by accelerating utility locates in the field with a new RTK laser mapping solution from Eos, Esri and LTI

ARROW GOLD FOR CONSTRUCTION: DDSI INCREASES PROFIT MARGINS WITH GNSS LASER MAPPING SOLUTION FROM EOS, ESRI AND LTI

As a competitive consultancy, DDSI's profit margins depend upon turning around timely and accurate surveys of telecommunications sites. With a goal of speeding up field work to increase profit margins, DDSI looked for a new GNSS data-collection system. Their biggest challenge with legacy handheld GPS devices was signal failure under canopy, and the time-consuming alternatives of using either a total station or manual measurements.

THE CUSTOMER: DDSI GLOBAL

DDSI Global (Downtown Design Services, Inc.) is a Denver-area services provider that helps architecture and engineering (A&E) firms identify opportunities to expand telecommunication footprints. A typical DDSI project involves surveying a leased cell tower site to identify property and easement boundaries and to map underground utilities. Their work allows their clients to intelligently design wireless telecommunications expansions.

"Everything we do is about speed," DDSI Project Manager Mike George said. "We have to be as accurate and as fast as possible."

THE CHALLENGE: LITTLE ROOM FOR ERROR

DDSI performs two phases of data collection. First, field workers survey property boundaries with millimeter accuracy by using traditional survey methods. This provides the foundational map onto which topographic features can be layered.

Topographic features, mapped with subfoot accuracy, include all utilities (marked with flags at the site) and potential construction obstacles (e.g., fences, trees).

"Because these firms are expanding, they want to pull in more fiber and power, so they need to know where existing fiber and power is coming from," George said. "They also need to know where gas and water lines are, so they can design alternate locations and plan accordingly with their construction teams."

Existing gas, water and communications lines need to be mapped in order to inform future design and construction. However, legacy handheld GPS devices struggled to work under trees and near buildings. The result could be manual measurements or revisiting a site — both of which were costly.

"There's a bunch of flags, utilities all over the place, and no GPS reception under the trees. We needed an alternative solution to our field data collection methods. The difference between having to survey a site once, or twice, is often the difference between making a project profitable or breaking even."

Mike George, *Project Manager and GISP, DDSI Global*

In the past, DDSI relied on legacy handheld GPS devices to capture these features. But the handheld GPS struggled to work under trees and near buildings, where signals were obstructed.

"There's a bunch of flags, utilities all over the place, and no GPS reception under the trees," George said. "We needed an alternative solution to our field data collection methods."

In these cases, field workers typically pulled out the total station. But calibrating the total station takes time, as did switching between the two workflows depending on changing field conditions. Sometimes, neither technology worked as planned, so features needed to be measured manually.

"It made do, but it was not easy," George said. "Sometimes under a tree, we needed to use standard tape measures and then sketch into our field books. I'd have the drafter at my desk later deciphering it."

If bad data was collected, a crew had to go back to the site to correct it.

"Going back to a site twice is essentially a job killer," George said. "Everything for us needs to happen in one day. The difference between having to survey a site once, or twice, is often the difference between making a project profitable or breaking even."

THE PARTNERS: EOS, ESRI AND LTI

In 2018, a GNSS laser mapping solution from Eos Positioning Systems (Eos), Esri and Laser Technology, Inc. (LTI) made it possible to survey features from afar. The workflow utilized:

- **Collector for ArcGIS® on iOS** — for data collection
- **LTI TruPulse 200X laser rangefinder** — for laser offsets
- **Eos Arrow Gold GNSS receiver** — for GNSS location accuracy
- **Eos Tools Pro** — for offset measurements

With this setup, field crews could turn any iPad into a GNSS laser mapping device for collecting features under any conditions with submeter accuracy.

Eos Positioning Systems released "Laser Mapping for Collector for ArcGIS on iOS" in 2018. It allows DDSI to map utilities with subfoot accuracy without having to physically occupy the points, such as in GNSS-impaired environments. The result means far less manual work and fewer site revisits.

"This laser mapping solution has saved our drafters hours. In the survey world, that's the difference between the project being profitable or just breaking even."

Mike George, *Project Manager and GISP, DDSI Global*

THE SOLUTION: SEAMLESS GNSS LASER MAPPING

DDSI learned about the GNSS laser mapping solution in 2018 when Eos released it. George instantly realized the single pole setup could replace his legacy handheld devices and total station for utility locates.

"If all I needed was this one tool to map a flag under heavy tree canopy, then this would be a much better solution for us than those other ways," he said.

With the laser mapping solution, a field worker could walk the site with a rangepole, an Arrow Gold GNSS receiver Bluetoothed into an iPad Mini, Collector for ArcGIS®, and an LTI TruPulse 200X laser rangefinder. He could map utilities either by occupying them physically or by performing laser offsets from afar when trees or buildings obstructed GPS signals.

"I can get everything I need collected on the pole at the same time without having to change gears," George said. "If I want to shoot an offset feature, it's two taps in Collector, and I can select that routine. The integration of the three technologies is so seamless."

George said the accuracy was more than sufficient out of the box, though DDSI does sometimes connect to an RTK network for centimeter accuracy.

"We're getting plus or minus a foot out of the box, which is well within the threshold for utility locates," he said.

THE RESULTS: HUGE TIME SAVINGS AND ROI

With the GNSS laser mapping solution, DDSI can perform all the required utility locates in three hours of steady work, allowing them to target two site surveys per day.

"We're just cruising," George said. "It's go, go, go, collect a point, collect an offset. This tool just places a huge advantage on us to complete these jobs."

LTI Senior Product Manager Derrick Reish visited a site and commented on DDSI's efficiency.

"I could not believe how fast they were going," Reish said.

The laser mapping workflow also allows for real-time QA/QC, so bad data can be discarded in the field, and repeat trips are reduced.

"We can see right then if we got the shot we wanted or move it," George said. "And the data goes right to the drafter via the cloud, so this eliminates them having to take the time to figure out what happened in the field from a ton of traditional survey point shots. With 90 to 95 percent of the work done in the field, we've made a huge time savings and ROI on each project. That's what this Eos system does for us."

About Eos Positioning Systems®

Eos Positioning Systems® designs and manufactures the world's leading high-accuracy GNSS receivers for mobile data collection. In 2014, a technical team with more than two decades of GNSS experience founded Eos near Montreal. The team is credited with creating the world's first submeter Bluetooth GPS receiver (2001) and also the world's first RTK GNSS receiver for any device (e.g., iOS, Android). Today, the Eos Arrow Series™ GNSS receivers provide submeter and centimeter accuracy directly into any mobile app, including popular data-collection software such as Esri's Collector for ArcGIS®.

About the Arrow Series™

The Eos Arrow Series™ of GNSS receivers offer a unique balance of accuracy, affordability, flexibility, and simplicity not seen elsewhere on the market. Arrow receivers are flexible (any device, any app) and future-proof (support all new GNSS frequencies and all four global GNSS constellations). They are known for their superior tracking capability and accuracy under dense canopy, thanks to both patented technologies and the ability to maintain lock with free SBAS signals like WAAS, EGNOS, MSAS and GAGAN. In addition, the Arrow Gold RTK receiver can be turned into a base station when private RTK networks are not available or too onerous.

EOS Positioning Systems

CONTACT EOS:

1160 Rue Lévis, Suite 100
Terrebonne QC, J6W 5S6
Canada

t : +1 (450) 824-3325
e : info@eos-gnss.com

PARTNER:

esri Partner Network Silver

Laser Technology Inc. Measurably Superior®

CUSTOMER:

DDSI Design Drafting Surveying

www.eos-gnss.com