



Coverage map showing Earl Dudley's iNET reference network. Areas shown in red depict existing stations; lighter circles are proposed stations.

NetworkNews

Earl Dudley, Inc. saw the benefits of a reference station network early on. Now, nearly a decade after their first station, they are seeing a lot of new converts to the technology.

Equipment suppliers in a broad range of fields can often go years without a change in their product offering. Not so for suppliers of surveying equipment. In order to keep their customer base satisfied, they must continually offer new and evolving technology, regularly upgrade software and firmware to keep it current, offer instruction and support to educate their users, and more. And the truly successful suppliers don't stop there. Never content

with simply responding to a changing market, they often anticipate their customers' needs well ahead of the end-user himself. Nearly a decade ago, Earl Dudley, Inc., recognized the key role that reference station networks would one day play in both traditional and construction-based surveying and began a concerted effort to develop one of their own, first in Alabama, then throughout the region. Today, the company owns and cooperatively operates 80+ separate reference stations as part of a four-state network RTK effort it calls iNET. With additional stations being added almost weekly and new markets evolving for the highly-accurate RTK data, the future for the company—and the technology—looks extremely promising.

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>> By Larry Trojak



L-R: Technical Manager Shane “Trap” Traffanstedt, Owner/President John Dudley, Vice President Adam Arrington.

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A Better Alternative

Founded more than 70 years ago, Earl Dudley, Inc., is a full-service supplier of instrumentation for the construction and surveying industries. Initially focused on restoring customers’ instruments to exact manufacturer tolerances and standards, the company has since branched out—both literally and figuratively—to include sales, consulting, technical support and training. In 1999, according to company vice president, Adam Arrington, they began a move toward installing reference stations with a goal of making an area-wide RTK reference network available to its customers.

“We saw the tremendous benefits a CORS-type network could provide and knew that this was a technology we really wanted to pioneer here in the southeast,” he says. “Initially, though, we had to reach out to the surveyors and prove the potential this technology had for them; we did so by showing them how it could improve their onsite productivity. On a daily basis, we said, they had to go out, set up a base and a rover, find their control and often

still have to deal with UHF’s distance or line-of-sight limitations. With network RTK, on the other hand, they can get out of their truck and within a minute have a survey-grade position that is certified to lat/long, elevation and state-plane coordinates. Essentially, we showed them how tapping into the power of a network could do a day’s worth of their work in a minute. In most cases, that’s all it took.”

John Dudley, company owner and son of its founder, cites a number of additional network benefits by contrasting it with traditional single-vector GPS.

“In terms of capital investment there is an immediate savings since the surveyor or contractor no longer has to purchase a base and rover. In addition, the network overcomes one of the biggest limitations of a traditional base/rover configuration: its range. UHF transmitters have an effective working range of three to five miles—in rolling terrain it can be much less. By contrast, each network station offers an effective radius of at least 30 miles. Another problem with the single-vector approach is reliance upon traditional reference points—monuments which the customer would typically get from the



Earl Dudley’s Birmingham offices house a collection of some of the first surveying instruments that company founders began repairing back in 1938.

NGS website. Once they arrive at the actual location, however, they might find that monument damaged, destroyed or removed. Occasionally the coordinate positions might have been entered wrong, or they get to the site and another surveyor has already set his base up, in which case they are done for the day and their productivity rates have just taken a serious hit. For all these reasons, we knew a network approach was the better one.”

In 2000, about a year after first looking into establishing a network, Earl Dudley made its first substantial investment to lay the groundwork for iNET, purchasing a number of reference stations from its equipment supplier.

Rock in the Pond

To those unfamiliar with the intricacies of developing a reference station network, the process can be summed up best in one word: “daunting.” But the Earl Dudley team’s attention to detail makes each installation a personal concern—and one which, over time, they’ve gotten down to a science.

“Once we identify a location in which we feel a station is needed, and verify that we have a customer there, we call on them,” says Shane “Trap” Traffanstedt, technical manager of Dudley’s iNET effort. “Then we will Google Map it for blockage and possible reception issues, and finally, go there, to inspect their site. With any issues resolved, we talk to the major decision makers to assure them that their network link will be secure from an IT standpoint. We will then send them a contract that says we’re going to install the reference station equipment in their office, we are going to retain ownership of it, and we will maintain it. After some IT work which allows us to come in from our servers to their locations and get the raw data feed from that station, they are



Traffanstedt operates Topcon's GRS-1 receiver and field controller.

“One positive sign we are already seeing is the increased acceptance of network-based 3D machine control. Most construction sites, because they generally have excellent line-of-sight, still rely upon a conventional base/rover setup. But that’s starting to change with the improvement of radio technologies and as they learn more about how a network like iNET can benefit them.

Until recently, one of the key sticking points in reaching larger contractors was the fact that, on a large jobsite, multiple machines—a pair of scrapers and a dozer, for example—usually need to be receiving RTK at the same time. To offer an alternative to paying three separate network subscriptions, Traffanstedt says they created a ‘site license subscription.’

“We provide what we call an RTK bridge, essentially an internet-directed modem with a radio transmitter built right into it,” he says. “The bridge grabs the data from our server and rebroadcasts it to the local project site. That single unit is considerably less costly than a full GPS station, and it eliminates the cost of individual data plans. Essentially, we are giving the machine operators the equivalent of a wireless hub. Only instead of wireless it is via radio.”

Watching for Movement

Deformation monitoring is another area Earl Dudley sees as evolving and ripe for network RTK. Companies, municipalities, states, and government agencies that are responsible for monitoring the movement



At the heart of it all, Topcon's NET-G3 offers capability to track GPS, GLONASS and Galileo satellites.

of critical structures such as cooling towers, bridges, skyscrapers, dams, and so on, can install a permanent GPS station on the structure and continually monitor its movement. Being able to do so on a round-the-clock basis through a network, makes that not only possible but affordable.

“We are also really excited about the role we see RTK networks playing in the growth of survey-grade GIS,” he says. “One of the best examples of this already took place in Hillsborough County near Tampa Bay. The county hired a consultant to locate—to survey grade accuracy—more than 85,000 manholes. And they wanted it done in a year and half. The consultant used an RTK network to provide the control so they had consistent coordinate locations that were very accurate over a large area. This took a project that would have been economically unfeasible using traditional means and workforce, and made it do-able.”

Keeping it Up is Key

Given how far they’ve come, the positive response they’ve gotten from customers and the outstanding level of support Topcon has provided, the team members at Earl Dudley are understandably optimistic about the future of iNET. They are equally realistic, however, that the

The GRS-1 is a fully-integrated, multi-constellation network-enabled RTK rover system. Its small size, minimal weight and affordability have made it a popular choice for Dudley's iNET customers.

challenges lying ahead will be more and more complex.

“Topcon has really gotten behind our efforts with iNET,” says Arrington, “both in terms of straightforward technical support and by allowing us to access some of their latest technology like the NET-3G receiver which can access both GPS and GLONASS, but is also designed to track the Galileo constellation of satellites when it is up and running.”

He adds that, as the number of rover subscriptions grows, the support load has been changing with it. “Running servers, doing IT work, handling connectivity and security: all these and more keep Trap busy on an almost nonstop basis. We recognized very early on, that, because network reliability is key, we needed a single person dedicated to this facet of the business, and Trap has really risen to the occasion. The end result of all his efforts—as well as that of others in the organization—is an impressive network uptime rate of about 99.8%. We are really excited about the future of iNET and feel that it, and other GPS networks like it, represent the future of geodetic control. Because we got in on the ground floor, so to speak, we are better poised than most to meet new challenges as they arise. But, then again, we have a 70-year history of doing just that.” *A*

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