

SPEC Services Chooses StarFire™ Positioning Over Traditional RTK For Critical Pipeline Survey Project

Faced with their largest and most demanding pipeline survey project, SPEC Services rose to the challenge utilizing NavCom's StarFire Network and equipment, delivering the project on time and under budget.

When Kinder Morgan Energy Partners (KMP), one of the largest pipeline and terminal companies in the U.S., contracted with California based SPEC Services to survey an existing 385km pipeline route amidst the rugged and challenging stretch of terrain from Phoenix, Arizona to El Paso, Texas, stringent accuracy levels and rigid timelines were crucial. Identified by KMP as a pipeline route in need of upgrade and expansion, SPEC was tasked with the job of locating the existing pipeline, creating a planimetric map based on aerial photography and designing the route for laying the new pipeline. Beyond the daunting size of the survey area – three times the size of their previous pipeline surveys – and the tight deadline required by KMP, SPEC also discovered that construction on parts of the new pipeline route had to exactly parallel and closely border the existing pipeline route.

NON-TRADITIONAL TECHNOLOGY FOR UNCONVENTIONAL CIRCUMSTANCES

While field surveyors at SPEC Services are used to navigating both manmade and nature's elements throughout the multitude of survey projects they have carried out, the sheer scope of this project led Jeff Allsbrook, SPEC's manager of surveys, to consider non-traditional methods of accomplishing the survey. "We have traditionally used RTK (real-time kinetic) GPS for our pipeline-route surveying projects but we have always been on alert for systems that could offer very similar accuracies without the need for a base station" Allsbrook explains. "I had been monitoring the growth and capability of the StarFire system for over two years, so when confronted with the challenging realities of our biggest pipeline survey, we bought the SF-2050G and StarFire subscription expressly to meet the requirements of this demanding commission." Using StarFire, NavCom's global satellite based augmentation system (GSBAS), would provide SPEC with decimeter accuracy while directly removing the wide area DGPS system glitches of ionospheric refraction and multipath effects, and at the same time remove the need for a base station, thereby eliminating the communication link failures typical of RTK systems.

UNTETHERED PRECISION SIMPLIFIES THE SURVEY

In January, 2004, the SPEC crew set out for a ten week mission during which they used StarFire to locate, survey and digitize the entire 385km of existing pipeline and to pinpoint roughly 300 aerial survey control points. Once the survey was complete with aerial targets in place, a series of aerial photographs were taken and used to complete the planimetric/topographic map. Based on this information, SPEC created a voluminous drawing package of detailed "alignment" sheets outlining the proposed route for KMP's new pipeline.



Using StarFire, the SPEC team pinpointed and set the location of about 300 aerial survey control panels.

By eliminating the base station requirement, SPEC crews could continually drive the site, survey the pipeline and simultaneously lay panels for the whole length of the pipeline, giving them total mobility and cutting the standard survey system time by one-third. "With a traditional RTK solution, you're tied to the base station because of the rover's need to continually receive its radio correction signal to maintain accuracy," says Allsbrook. "Typically, if you are eight kilometers or more from the station, the correction signal will be lost, and you'll have to return to the base station to move it and start again. In the rough terrain of the remote desert, returning to the base station and resetting it could take several hours." He continues, "Because we weren't tethered to a base station with the NavCom unit, we could just continue to drive ahead and survey. We were very mobile which saved us hours daily."

OUTSTANDING ACCURACY WITH TIME TO SPARE

Noting the obvious benefits of roaming free with the StarFire unit, Allsbrook and the crew were eager to validate the accuracy of the NavCom unit against the published values of survey monuments listed by the U.S. National Geodetic Survey (NGS). They were astonished at how close the horizontal and vertical readings matched the published NGS values – sometimes to within a couple centimeters. "The average horizontal accuracy we achieved was about 15 centimeters and vertically we achieved well under 30 centimeters. For a single unit system like this, that was outstanding and not typically achievable with a backpack DGPS unit." says Allsbrook.

Once accuracy was verified, the overall benefits of the system to SPEC were undeniable, "With so much less time spent in the field, coupled with the need for less crew, we came in about 25 percent under budget and saved about \$75,000 US," Allsbrook says. "With this one project, we were able to recoup the costs of the GPS unit and StarFire subscription cost and, most importantly, we passed on considerable cost savings to our client." Allsbrook says the StarFire solution has become SPEC's tool of choice when survey projects call for decimeter-level accuracy.



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