

THE American Surveyor

A FOOT IN THE PAST... AN EYE TO THE FUTURE

June 2005

IRAQ

Rebuilding Infrastructure
with technology

D-Day Mapping

The greatest collaborative
mapping effort in world history

Laser Scanning

Assessing damage in a
parking garage collapse

United States National Grid

To round or truncate;
that is the question

\$4.95



Modeled from the hands of Saddam Hussein, the notorious crossed swords mark the entrance to Baghdad's military parade grounds.



Surveying in Baghdad

*The spirit of democracy cannot be imposed from without.
It has to come from within. -Mohandas K. Gandhi (1869-1948)*

A few months ago, I received an e-mail from an engineer in Rhode Island who wanted to know if I'd be interested in an article about surveying work his company was doing in Baghdad. He wanted to tell a story that he felt was not being told by the media: that things are not as bad today in Iraq as we are led to believe. Newspapers and television broadcasts do little to convey that cities like Baghdad, a city of seven million, are full of people who just want to get on with their lives. Although unemployment figures are high, and the threat of sudden violence is real, the vast majority of people get up and go to work every day. And the Rhode Island firm of Northeast Engineers Consultants (NEC) is there to help Iraqi citizens to do just that. >>

>> By Marc S. Cheves, LS

Traditional open air market in Baghdad.
Note Arabic "Objects are closer..." lettering
on vehicle mirror.



NEC is a four-office, 65-person multi-disciplinary firm that was founded by engineer Blake Henderson in 1987. With years of land development experience in both the public and private sectors, as well as DOD contracts and homeland security projects, NEC was well equipped to handle the challenges of helping to rebuild the infrastructure in Iraq. The Corps of Engineers has funded \$18 billion for infrastructure work in Iraq, but few companies have stepped up to the plate. Henderson, a former U.S. naval officer, was serving with the multinational force in Beirut, Lebanon in 1983 when 220 Marines and 21 other U.S. service members were killed in the terrorist bombing of the Marine Barracks at Beirut International Airport. He says his experience of working in a combat zone gave him the confidence to know his company could do work in Iraq.

To limit liability for NEC, Henderson created Secure Global Engineering LLC (SGE). The U.S. government has set up an extension of workman's comp insurance for people working in

Iraq. This insurance is extremely expensive, on the order of 15% of base salary per person per year. Just getting the work is no small challenge. The Corps requires hand-delivery of proposals to the 20-square-mile Green Zone in Baghdad. Likewise, getting to the work is no small challenge. Workers fly directly to Baghdad from Beirut via Flying Carpet private charter airplanes or Royal Jordanian Airlines in Amman, Jordan. But this is no magic carpet ride—to avoid the long, shallow glide path we are all familiar with, pilots approach the airport combat style, banking the plane on its side and corkscrewing down in a white-knuckle approach to a landing. (I saw one photo of a plane with a large section missing on one of its wings after a lucky hit by a rocket-propelled grenade. Flights have also been delayed due to mortar attacks.)

Adrenalin continues to surge on the high-speed ride along the infamous airport road to the secure compound in which SGE has its 12,000 square foot office and living quarters. Because terrorists use cell phones to detonate roadside bombs—

Right: Ferris and C.J. practice a base station setup on the porch of the house in SGE's secure compound.

Below: C.J. and Peshmerga guard at compound



Right: Hyder, C.J., and Omar search for manholes near the Tomb of the Unknown Soldier.



making it difficult to time explosions—drivers travel at 100-120 mph in the hope that a bomb will go off in front of their vehicle or behind it, but hopefully not beside it. Terrorists plant their improvised explosive devices at night and then wait for a target of opportunity the next day. Henderson said one of the problems they encounter is that in an attempt to block the use of cell phones, the military often jams all cell phone frequencies, making it hard to communicate via cell phone. Travel around Iraq is always in a nondescript vehicle—certainly not a Suburban—but any ride in a vehicle is one of the passengers watching each sector around the vehicle, looking for threats. A key to survival is watching each other's back.

Guarding the Compound

SGE's secure, walled compound is located in the wealthy Mansour district of Baghdad. The compound is guarded by 30 Kurdish mercenaries known as Peshmergas who man guard posts and also provide roaming sentry patrols. SGE shares the compound with a major news network, and directly across the street is the Baghdad office of Denouvia, a firm that provides security world wide. Inside are former Special Forces personnel.

Personal security is taken seriously, and SGE employees are trained and licensed by the Americans to carry weapons—9mm Browning sidearms and semi-automatic MP4s, MP5s and

John Walsh (l) and Blake Henderson pose with a group of United States Marines.



Hyder, Ferris and Amir survey Little Venice, so named for its series of winding canals, in the Green Zone.

AK47s. Henderson recounted one instance when they were at a project site, and he asked one of his employees if they were safe. The employee replied, “The dog will bite the rabbit, but not the porcupine.” Henderson said the U.S. military is very aggressive in their job and told about one time when they were on the roof of their building taking pictures. Apache helicopters are in the air 24/7, and on this occasion, when the helicopter pilot saw them taking pictures, he swung around to investigate.

Working conditions are difficult. Many days, electricity is only available for four hours, so generators are used. SGE uses a variety of satellite communication tools, including video-conferencing and Voice Over Internet Protocol (VOIP), which allows users to route phone calls over the Internet. Because the electricity is intermittent, something as simple as flushing a toilet becomes a big deal: the septic tank in front of their building is pumped every two days.



Trust and Proficiency

Henderson described Baghdad, under Saddam, as a city of many civil servants, and all business went through them. The most important human element required for doing business is trust. Fortunately there are no building permits to deal with. Sadr City, on the other hand, is virtually a “slum” of three million people. To work in Sadr City, permission must be obtained from the clerics. Henderson says it is somewhat disquieting to lay your machine gun on the counter when working through the permission process. While SGE’s local subcontractors are not accustomed to the amount of government paperwork required to obtain work, they are very proficient and have a great advantage over the Americans when dealing with the local communities.

I asked about the single most important thing to working in Iraq, and Henderson immediately replied that it was relying on Iraqis to do the work. Before the war, Iraq had a very extensive education system, and the people are well-educated and highly-motivated to do the work that needs to be done. Henderson described his Iraqi employees as very professional. All Iraqi

SGE employees were civil servants under Saddam, or worked for state-owned construction companies, and all attended Baghdad University; one female employee is a graduate civil engineer. Their textbooks were written in English, and all of the employees speak English. Surveyor training, however, consisted of transits and tapes. Now that the Ba’athists are gone, the civil service is growing. Much emphasis has been placed on developing relationships and lines of communication. Many of SGE’s local staff have been sent for AutoCAD and GPS training. Digital cameras have proved invaluable, allowing the Iraqis to gather site info without the Americans having to visit the site.

The head of the office is Steve Johanson, PE. Johanson was president of a building restoration company in Baltimore for 17 years, and then retired. During his interview he explained his interest in the position as having been very successful in life, but “never having served his country.” Henderson says Johanson has been outstanding as SGE’s Middle East President and is starting his second year in Iraq. The staff now consists of four Americans and 16 Iraqis.



Hyder locates structures hidden by tree cover in the Green Zone's Little Venice.

C.J. Wolfe is the on-site project manager. Wolfe has an extensive background in construction, and Henderson praises him highly for his skills and the ability to get the work done under very adverse conditions. Because Americans are a target, Wolfe said the key is to send Iraqis out to do the field work. Because the new equipment they were using was causing crowds to gather as people wanted to know what the equipment was and what they were doing, one of the field crew members asked if they could paint the equipment so it wouldn't look so new and modern-looking.

Wolfe echoed Henderson's comments by saying that a critical key to success lies in hiring people that they know. Once an Iraqi is onboard, he can recommend people he knows. The Iraqis are extremely loyal, and Wolfe said they have to trust their translators. The translators know they could make a lot of money by turning SGE's people in to the terrorists, but loyalty prevents them from doing this. Likewise, the Peshmerga



A sandbagged pillbox tops the structure at an open air cafe used by the U.S. military. The mannekin figure beneath the umbrella, palm tree stools, and mural (right) add a creative touch.

compound guards are very loyal, and as Wolfe says, would die protecting the Americans they are guarding.

I thought it was a very telling comment when Wolfe said that SGE's view of Iraq, Iraqis, and working in Iraq are different than 95 percent of the American companies working there. He says this because most of the American companies doing work in Iraq have adopted the position that they have to bring Americans in to do the work because the Iraqis have a "different mentality towards business." Not so, says SGE.

SGE currently has many contracts in Iraq: the first, for Raytheon, was for improved navigational aids at the Baghdad Airport. Another is for a municipal landfill for the city of Baghdad. Another involves underground 11Kv and 33kV transmission lines. They have also done work for cell tower establishment. It recently was awarded a contract to provide a topographic survey of the Green Zone (now known as the International Zone). The work will involve locating all utilities as well as all structures. But the contract that caught my ear is for a Master Plan for the rehabilitation of Baghdad's sewer system.

6,000 Manholes

Baghdad is built on the fine-clay flood plains of the Euphrates River. The prevailing wind is from the west, and because of the fine soil, whenever the wind blows, it is constantly dusty. The airport is built on filled swampland composed of clay. High groundwater adversely affects the combined storm and sanitary systems. The sewer system encompasses 6,000 manholes, and



Below, top: Workers open a manhole for inspection at the military parade grounds.

Bottom: Palmer Hedley, Hyder and Amir discuss work in Little Venice. Hedley, an NEC surveying crew chief, volunteered to go to Iraq to train new crews.



because the city is very flat, many pump stations are required. Designed only for a one-year flood, the system fails statistically nearly every year. Pump stations are built as part of people's houses, and each household is responsible for its pumps operation.

When the sewer system work was proposed, it was first suggested that SGE simply scan the existing plans. The SGE team demonstrated why it would be much smarter to use GPS to locate all the manholes and pump stations. Just prior to the handover of power to the provisional government, President Bush had signed an order allowing the import of technology. With the lifting of State Department restrictions against the import of GPS, SGE was able to work with B.L. Makepeace, the Topcon dealer out of Boston, to import Topcon HiPer GPS equipment and Topcon total stations.

According to Henderson, SGE is the only company doing GPS in Baghdad. As a result, they've become the go-to guys for GPS positioning. So far, they've had few problems with the Topcon equipment, and SGE reports that any difficulties they've had have been swiftly resolved by Makepeace and Topcon. They use Bluetooth Recons running Carlson SurvCE software for the HiPers, and TDS software, also running on Recons, for the total stations. They have three rovers and a UHF base station antenna on the house in the compound, and are getting a 6-7 mile range with RTK. A second radio is being used as a repeater. Wolfe says the additional GLONASS satellites have been helpful.

Horizontal and Vertical Control Problems

Military concerns have been raised about the use of GPS since insurgents are using hand-held GPS devices to obtain position information for mortar attacks. Another concern for the surveyors is unexploded ordnance. According to Wolfe, horizontal and vertical control has been a problem. SGE obtained an Iraqi map of control points, but most of them have been knocked out. SGE found a U.S. military H&V control point and have been using that. In connection with looking for a control point at Baghdad University, they met with the Dean, who took a great interest in GPS. As a result, SGE will be putting on a demonstration of GPS for university students. Although maps of the same quality we have here in America were once plentiful up until the 1980s, in yet another example of how Saddam Hussein allowed the country to fall into ruin, many Iraqis have never even seen maps of Baghdad.

On the humanitarian side, SGE has created a separate foundation called Iraqi Children Aid Relief Effort (ICARE) to meet the needs of children. These include simple items like soccer balls and school supplies, but also construction to rebuild school infrastructure such as water systems, electricity and




Looking for a manhole at the Baghdad Convention Center

even windows. Henderson said that with an official unemployment rate of 30-50 percent, the needs are critical. One in eight children dies before his fifth birthday. When they arrived, American-funded projects numbered less than 250. Today that number exceeds 500. The work SGE is performing has created more than 1,000 Iraqi jobs.

As in similar cases where countries have come out from under authoritarian rule, before people had no money, but were relatively safe (as long as they didn't get crossways with Saddam's regime). Today there are more opportunities and more money to be made, but crime has also risen exponentially. Immediately after the fall of Saddam, many of us recall seeing video footage of looters grabbing any thing they could get their hands on, particularly metal. It's hard for us to conceive of metal being currency, but in a society where not very many people have anything of value, something like metal is all there is. The employees of the engineering department in Baghdad's City Hall took their computers home with them to keep them from being looted. Under Saddam it was illegal to have a satellite dish, and the possession of a satellite phone was punishable by death.

Iraqis are fanatical television watchers. During the American presidential debates in 2004, for a people who were not accus-

tomed to freedom of speech, many Iraqis were amazed that John Kerry was allowed to speak to the President the way he did. SGE employees explained that, in America, it's all about freedom of speech, and that the debates represent democracy at its best. Other Iraqis were fearful that if Bush lost the election the Americans in Iraq would cut and run. Many support Bush, and believe that he will stay and finish the job.

Success in Iraq is measured one small step at a time. As Gandhi said, democracy is not something that can be imposed, but the people SGE are talking to are gung-ho about the future of the country. SGE has capably demonstrated that by working with locals and emphasizing security, it is possible to do work successfully in Iraq. Our hats are off to them, and to their Iraqi employees dedicated to rebuilding their country from the ground up. 

Marc Cheves is Editor of the magazine

Right: Locating features in Little Venice



Hedley's going away party. Seated (l-r) are Katab, CJ, Hyder, Steve, Hedley, Ferris, and Azid. Standing are Amir (r) and Domingo (l).

Blake Henderson, C.J. Wolfe and John Walsh, armed for a trip to the International Zone, which requires leaving the secure compound and traveling on city roads. Walsh, a Harvard Business School Class of '63 retired executive, trains the SGE staff on Western best business practices.

