Editorial

>> Marc Cheves, LS

Military Surveying: Then & Now

As a former artillery surveyor for the U.S. Army, I have a soft spot in my heart for "82 Charlies." Until recently, 82C was the designation given to artillery surveyors, with other initials going to construction (82 Bravo) and topographic (82 Delta) surveyors. Because there was such a great need for artillery surveyors during the Vietnam war, there are more ex-82Cs than any other type of Army surveyor.

It was with great anticipation, therefore, that I drove to Newton Falls, Ohio in June for a one-day seminar about military surveying. Hosted by the Western Reserve Chapter of the Professional Land Surveyors of Ohio, the event covered the thousands of years that surveying and engineering have been an integral part of the military.

A husband and wife team, **Mike and Ann Besch**, have directed the very successful four-year surveying program at the University of Akron for many years. Mike is an ex-82C (retiring after 30 years as a Chief Warrant Officer), and Ann was an Air Force Major and cartographic/geodetic officer. Ann's brother, **SFC Robert Salladay**, is the NCOIC of the 290th Engineer Detachment, operating out of the Ohio National Guard Armory in Newton Falls.

Ann presented the history of military surveying. Since wars were first fought, armies have known that battlefield awareness is the key to success: surveyors, with their knowledge of terrain, have been responsible for topography and maps, and engineers have been responsible for fortifications.

Then

George Washington created the Geographer of the Army position in 1777. He considered West Point, on the plateau on the west bank of the Hudson River, to be the most important strategic position in America. Fortress West Point was constructed by Continental soldiers as a series of forts, batteries and redoubts. It is the oldest continuously occupied military post in America. To eliminate the country's reliance on foreign engineers and artillerists, in 1802, President Thomas Jefferson signed legislation to establish both the United States Military Academy at West Point *and* the Corps of Engineers. With civil engineering as its core curriculum, the USMA has devoted itself to the art and science of warfare. To this day, the Corps of Engineers has largely been responsible for forts and maps in time of war, and civil works in times of peace. I found it interesting that the Corps motto is the Latin word *Essayons*, meaning Let Us Try.

Jefferson sent a military escort along with Lewis and Clark on the Voyage of Discovery. Because the land that lay west of the Mississippi was largely uncharted, one of the major needs of our fledgling country was mapping and land classification, and so, in 1838, the Corps of Topographical Engineers was created. While notable explorers like Zebulon Pike and government surveyor Stephen Long reported on the vast "desert" conditions of the High Plains, little did they know the same great expanse would one day become the "breadbasket" of the nation. Their efforts marked the beginning of 50 years of mapping in the West. Four different routes for the Pacific Railroad were surveyed, with politics playing a big part in the final route selections. In 1863, the Corps of Topographical Engineers was abolished, and the responsibility for topography was turned back to the Corps of Engineers.

Many of the "topogs" became Civil War generals, including Fremont and Meade, and in particular, General Gouverneur K. Warren, a civil engineer. At the start of the war, Warren was a first lieutenant and mathematics instructor at West Point, but before that, he was responsible for the 1858 *Map of the territory of the United States from the Mississippi River to the Pacific Ocean; ordered by Jeff' Davis, Secretary of War to accompany the reports of the explorations for a railroad route.* In part, the Library of Congress description reads

THE American Surveyor
A Foot In The Past... An Eye To The Future

www.amerisurv.com

2011 Vol. 8 No. 5

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The American Surveyor (ISSN 1548-2669) is published monthly by Cheves Media LLC. Editorial mailing address: 905 W. 7th St., #331, Frederick, MD 21701. Tel: (301) 620-0784.

Subscriptions prices in the U.S.: Free for qualified professionals. Canada: 1 year $56.00 US; international subscriptions $72.00 per year (Airmail), U.S. funds prepaid. Back issues (subject to sufficient stock) are available for $4.95 + S/H.

New subscription inquiries and all other address changes should be sent to *The American Surveyor,* P.O. Box 4162, Frederick, MD 21705-4162. Fax: 301-695-1538. Subscribe online @ *www.amerisurv.com*

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"*An important map of western expansion, it utilized and lists 45 major exploration and mapping reports from the Lewis & Clark to the U.S. General Land Office Surveys.*"

Based on his knowledge of the importance of terrain, Warren is best remembered for arranging the last-minute defense of Little Round Top during the Battle of Gettysburg and is often referred to as the "Hero of Little Round Top." Some believe that had he not employed his topography skills, the Battle of Gettysburg would have ended differently. A statue of Warren stands on Little Round Top, its gaze forever fixed upon the battlefield which looks the same today as it did in 1863.

Vietnam

Mike Besch gave a spirited presentation on what it was like to survey in Vietnam. In contrast to WWII tactics of overwhelming fire and blanketing grid squares, precision fire in Vietnam used not only less ordnance, but was also more effective. This strategy required knowing the position and orientation of firing batteries and targets. When a fire base was established, the first task fell to the surveyors to establish direction. Position was established by traversing from known control points or picking coordinates from a map. Mike told about doing simultaneous sun shots from three different batteries, thereby obtaining a common direction, which enabled coordinated fire. One of the driving factors in the development of GPS was the need for positional information for firing batteries.

Eighty to ninety percent of enemy casualties in Vietnam were from artillery fire, therefore the enemy went out of its way to neutralize forward observers who called in artillery strikes. Once position and direction were established, the surveyors' work was done, making them available for other tasks. Mike spent a lot of time as a forward observer, a very risky task. Like Lewis and Clark, the surveyors were supposed to have infantry support, but often didn't, so they had to become skilled in defending themselves through the use of mortars and the Vietnam workhorse, the 105mm howitzer.

Bob Akins, the chief surveyor of the 864th Engineer Battalion, presented the construction side of surveying in Vietnam and told about surveying for roads and bridges. Because there was essentially no modern transportation infrastructure, the task was monumental. Including six months in the hospital, and two Purple Hearts, Mike was in Vietnam three different times, and Bob served 22 months incountry.

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Now

From the days of manual calculations performed using seven-place logarithms to an all-digital workflow, the Army has kept pace with technology. On display at the meeting was a set of impressive tools developed by Northrop Grumman. The Instrument Set, Reconnaissance and Surveying (ENFIRE) includes everything a military mapper needs: ENFIRE is a backpack filled with a rugged tablet PC, long distance range finder (±6,000m), short distance range finder (±1,700m), precision range finder (DISTO, ±100m), handheld military-grade DAGR GPS (capable of ±1.5cm standalone), camcorder, ADAPX digital pen, bar code scanner, printer, page scanner, external data storage drive, backpack (which fits inside the transit case), and transit case. Software includes ArcGIS and ArcMAP, Terramodel and AutoCAD Lite. ENFIRE will enable the "automatic population of field data on digital forms used for route, road, bridge, hasty minefield, and improvised explosive devices."

LTC Kirk Stemple, Commander, 112th Engineer Battalion, 16th Engineer Brigade, explained the mission of construction surveyors in today's Army. Not only do they survey and map, they also teach and train local citizens in modern methods. In addition to being diplomats for America, soldiers teach QA/QC methods that enable the locals to carry out quality construction after our military has departed.

The beloved 82 Charlie MOS (Military Occupational Specialty) is no more, and has been replaced by 13 Tango. But in looking at the job description on the Army's website, the MOS now includes more about meteorology than surveying. Meteorology is important for knowing how weather will affect ordnance trajectory. And besides, with the accuracies achievable by military-grade GPS, traditional surveying is no longer needed for position and azimuth.

All of the members of the 290th–with the exception of the unit's OIC, **CW2 Francis Amato**, who is a 120A–are 12 Tangos, or Technical Engineering Specialists. The MOS includes, in addition to surveying and mapping for targeting and troop movements, such things as materials testing, specifications, and drafting to support construction projects. Another direct connection for Mike and Ann is that unit member **Sgt. Anthony Leimeister**, a graduate from the four-year program at Akron, is an SIT party chief for the City of Alexandria, VA. My photographs of the event can be seen online in the amerisurv flickr account.

I was impressed by all the young men and women I met during our day at the 290th. Invariably polite and always helpful, these young people represent the best our country has to offer. Profits from the seminar went to the 290th's Family Readiness Group, which supports the military mission by providing support, outreach and information to family members, especially during deployments. The 290th is scheduled to deploy to Afghanistan in September. Hats off to them.