Michael Head, President of Schonstedt Instrument Company, shows off some old and new locators.

Schonstedt: Finding New Paths

>> By Angus Stocking, LS

We think of our profession in terms of *setting* monuments, but surely *finding* them is just as important. After all, the work of setting comes to nothing if the monument is never seen again. Setting and finding are two sides of the same coin. And that's where Schonstedt Instrument Company comes in.

Founded in 1953 by Erick O. Schonstedt, Schonstedt Instrument Company was initially a subcontractor to the aerospace industry, providing high grade magnetometers for aerospace and laboratory applications. For many years, in fact, Schonstedt magnetometers were the *de facto* standard in laboratory work. Mr. Schonstedt was said to be a "consummate engineer" and eagerly took on just about any interesting project that related to magnetics. Early ventures included forays into airport metal detectors and satellite magnetometers, and Schonstedt technology was used in many spectacular shipwreck discoveries–Erick and author/explorer Clive Cussler were good friends. But sustained profitability was elusive until the early '70s, when a surveyor's chance remark led to the development of the industry's first pin finder. It was a perfect marriage of one man's genius and an industry's need.

Like Berntsen and Sandvik–or Rittenhouse and Gunter–Schonstedt is very nearly a generic name for one of the surveyor's basic tools, the monument locator; that's because Erick Schonstedt's invention was the first of its kind and had no competition for many years. The technology of that first locator remains essentially the same in today's Schonstedts. Two "cores"–made of permalloy wrapped around ceramic–are held in perfect coaxial alignment. What is actually measured is the *difference* in the magnetic fields between the two cores. When one end is near a ferrous or magnetic object the difference in field strength is enough to register; technically, Schonstedt locators are more properly known as *gradiometers.*

This was sophisticated technology for the rugged world of surveying, and one testament to Erick's engineering bril-

liance is that he made it work so well from the beginning. Simple, sturdy and sensitive were Schonstedt watchwords from early on and locator sales quickly became the company's mainstay.

Incidentally, if you've ever wondered why Schonstedt eschewed handles for so long, it's because Erick knew that *symmetric* locators were more sensitive–and also simpler and sturdier. He knew what he was doing; some of the company's earliest locators still come in for repair, after active service lives of nearly three decades!

Manual Skill

The Schonstedt plant and headquarters are currently located in Kearneysville, West Virginia and much has changed from the early days. But one constant is the need for superior manual skill. Surprisingly for a high-tech industry, making a locator is still dependent on highly trained employees who are really good with their hands. For example, most of Schonstedt's crucial permalloy and ceramic cores are made by one woman, Jenny Snyder, who–after cutting her fingers many, many times–has mastered the tricky process of holding and wrapping with two simultaneous motions. And locator 'tuning' is still done by hand, often by factory foreman Jr. White, a 38-year employee, who carefully removes watches, keys and other metal objects from his person when making the final adjustments to completed instruments.

The whole shop floor, in fact, is filled with a dozen or so work stations that look insanely complicated to a visitor. And every station is home to employees that all seem to have the gift of concentration–they bend to their tasks with the intensity of surgeons.

A Difficult Transition

In 1993 Erick Schonstedt died, ironically and unexpectedly, at a funeral. He was 76. His passing was a surprise, but the real shocker was his will; having no heirs, Erick bequeathed ownership of Schonstedt Instruments to Augustana College, a small liberal arts school in Rock Island, Illinois. Erick was apparently something of a 'benevolent dictator'; as sole founder and proprietor he cultivated a warm but autocratic style. His surprise missive from the grave must have seemed like one more salvo to some managers. For its part, Augustana College was never more than an absentee owner and never effectively came to terms with Schonstedt's existing management. The result was predictable and business declined for a couple of years. It looked as if Erick's legacy might be lost.

Fortunately, Augustana College decided to get out of the locator business and in 1997 sold Schonstedt Instruments to Redwood Venture Group, a consortium of three venture capitalists specializing in stressed companies. Redwood brought in Michael Head as Schonstedt's President, and Schonstedt Instrument Company was reorganized into a much leaner firm.

Locator assembly and repair is still an exacting manual task.

Top left & right: Locator assembly takes place at about a dozen small work stations, all packed with hundreds of small parts and tools.

One of the first decisions was to refocus on the survey industry. Erick had been first, last, and always an engineer, and involved the company in several interesting but unprofitable ventures because he liked technical challenges. All of these were trimmed away.

Erick was also interested in total control of the fabrication process, and attempted to make everything that went into a Schonstedt locator. This emphasis on vertical integration was abandoned, and Schonstedt now concentrates on design, core technology, quality assurance, and assembly. Standard technology is now purchased from outside vendors.

Mike Head also initiated a return to Schonstedt's roots. Repair had always been one of the company's strengths but turnaround had slipped from days to months and an excellent reputation was nearly ruined. That has changed, and Schonstedt now completes 98% of repairs in two days from go ahead. In some cases, parts are no longer available for some of the oldest instruments and a trade-in is offered.

The quality assurance program was also examined and improved. All subcontracted parts are tested before use and no instrument leaves the plant unless it has been tuned and proven to work well.

New Directions

Having reestablished profitability and stability, Schonstedt now looked for ways to grow . . . and this is a company that's good at looking for things. Pipe and cable location was an obvious place to start. Actually, Schonstedt is one of the oldest names in pipe and cable–the MAC-51Bx has had a loyal following for 20 years and still sells hundreds of units annually. But the rest of the industry had moved on and Schonstedt's share in this important market verged on insignificance.

So in 1999 Mike Head convened a focus group, inviting the subcontractors who actually perform most locates to a meeting in Las Vegas. For several days (and presumably with breaks for gambling and other diversions) he quizzed these end users about what they needed in a locator. He heard a couple of requests over and over; locating had turned into a low wage/high turnover profession with a need for simpler instruments that reduced training time. And location professionals had a big problem with battery life. Continuous transmitting on multiple frequencies meant batteries had to be changed several times a day.

Schonstedt's design team, led by Guillermo Warley, took these issues seriously and went to work. Schonstedt's valuable patents in magnetics were a big help, but the team also came up with significant advances in radio control that dramatically increased search efficiency and battery life. The 2001 Tracemaster was the result, the first significant new entry in this market in many years. The TraceMaster allows *operator* control (by radio) of a transmitter placed at one

(L-R) Tylee Ulmer, Ed Maneval and Jackie Puller take a look at the Tracemaster II, Schonstedt's advanced pipe and cable locator.

end of a buried line–a breakthrough similar to robotic total stations. Other notable features include LCD display, multiple frequencies and an operational life of up to 60 hours. Taken together, the new features arguably make the Tracemaster the most sophisticated underground line locator now available. But the sophistication comes in an easy-to-use package–just two knobs and two buttons control Schonstedt's creation. A technical breakthrough (and the longest warranties in the business) meant instant success, right? Well, not quite, or at least not yet. The Tracemaster is doing well, but in the pipe and cable industry Schonstedt competes with companies that are as familiar as . . . well, as familiar as Schonstedt is in the survey industry. But expect Schonstedt to make big gains here; design expertise going back more than 50 years suits them perfectly for this market and the growth potential is too attractive to back away from.

Another obvious way to grow was to *expand* the existing customer base–surveyors–and in 2001 Mike Head convened a focus group of prominent surveyors for a weekend at Admiral Fell Inn in Fell's Point, Baltimore. It must have been a good time; the Inn is a European style boutique hotel noted for its 18th century decor, fireplaces, nice little pub and spectacular food–and all the surveyors had to do was talk about their jobs, which they probably would have done for free.

A lot of good ideas came out of that meeting but the most definite was that surveyors were really tired of carrying stuff around–if Schonstedt could come up with a smaller and lighter locator it was likely to be a hit. The design team went to work and 18 months later each member of the focus group was presented with a brand new Schonstedt XT–the first locator ever that wasn't just a 'box on a stick'. Light, truly one-handed, easy-to-use, and so small it could be holstered, the XT has been a big hit for Schonstedt. It also led to the XTpc, a holsterable pipe and cable locator intended as a little brother to the Tracemaster.

A Solid Legacy

Mike Head says, "Erick's legacy of technical expertise set a tone for us that has continued" and that's a good thing; it's nice to know that one of the surveyor's most reliable tools still embodies great engineering. Combining that expertise with growth and profitability has been a significant challenge, a challenge that Schonstedt's new owners are embracing vigorously. And that's a good thing too; the company's tremendous recovery from a difficult passage suggests that 50 years from now, when surveyors are trying to find the monuments that are being set today, they'll still be reaching into their trucks–or hovercars, or whatever–for a yellow stick and perhaps they'll still be calling it, "the Schonstedt."

After a 17-year surveying career in several states, **Angus Stocking** now lives in Paonia, Colorado where he is establishing an organic farm and a freelance writing career. He remains actively involved in surveying.