

This website requires certain cookies to work and uses other cookies to help you have the best experience. By visiting this website, certain cookies have already been set, which you may delete and block. By closing this message or continuing to use our site, you agree to the use of cookies. Visit our [updated privacy and cookie policy to learn more.](#)



# Quality

M A G A Z I N E

## Competition Rising in Portable CMMs

May 5, 2003

Larry Adams

The U.S. market for portable coordinate measuring machines (CMMs) is beginning to heat up.



Since the first portable CMMs made their appearance in this country about 15 years ago, the technology has been primarily associated with just a couple of vendors. But now, thanks to the entry of aggressive new competition and a range of technology improvements, the users of these versatile measuring systems are gaining access to portable CMM units that are not only more capable than their predecessors, but also significantly lower priced.

Portable CMMs have traditionally been priced in the \$30,000 to \$50,000 range. But Faro Technologies Inc. (Lake Mary, FL), for one, is set to roll out a new product this fall that will push its portable CMM pricing for the first time below \$20,000. Further, by some accounts, portable CMM prices are already being discounted industry-wide by as much as 25% to 30% below list, due to the stepped-up competition.

And for users, that's not the end of the good news. While portable CMM prices are dropping, a spate of enhancements and new product introductions by all of the major players are simultaneously bringing new capabilities to the market, including improved portable arm accuracy and a wider range of software capabilities.

While the names Romer Inc. (Farmington Hills, MI) and Faro are well associated with portable-articulated arm coordinate measuring machines, other companies are now making a push in the market. Axila Inc. (Farmington Hills) is a new U.S.-based company that has had a presence in the U.S. market for a number of years. Axila and Romer were partners, but that partnership has been severed and now both companies are vying for the U.S. market. The company that is known as Romer in Europe is called Axila in North America, and the company known as Romer in North America is called CimCore in Europe.

In addition, the German-based company Zett Mess Technik GmbH, which has previously been in the U.S. market, now is looking to expand its presence here and has named a new U.S. distributor, LDB Enterprises Ltd. (Schaumburg, IL), to market its AMPG series of portable CMMs. In addition, Brown & Sharpe (North Kingstown, RI), better known for the stationary CMMs that it produces, also markets a portable-arm CMM to round out its product line.

These choices do not include laser trackers, another option sometimes used. These units are available from companies such as API (Gaithersburg, MD), Leica Geosystems (Norcross, GA), and Faro, which acquired laser tracker supplier SMX Corp. (Kennet Square, PA) in January 2002.

### **Pros and cons**

Not surprisingly, the biggest attraction of portable CMMs -- indeed, their *raison d'etre* -- has traditionally been their portability; wherever the job is, the portable CMM can follow. Axila, for example, had an application that required the operator to strap a portable unit to his back and spelunk underground to inspect components of a hydroelectric dam.

More typical is the use of portable CMMs on the shop floor. These moveable gages are frequently used in automotive plants, for example, for jobs such as body-in-white inspections, or interior measurements on assembled or partially assembled vehicles. Portable CMMs can be used for components such as power plant turbine blades that are too large to move to a conventional, stationary CMM, or to measure small components without having to take them off the production line.

Not having to move the product off the line to measure it is one benefit. Another is that portable CMMs could replace hard gages, which are expensive to buy and maintain, says Roman Granger, president of Axila.

There are negatives. One drawback of portable CMMs is that they are manual, says David Genest, CMM product manager for Brown & Sharpe. While the arms are relatively lightweight, "after using one 35 times in a couple of weeks, you realize that you would rather have something comparable, but automatic. Also, the software is somewhat limited," Genest says.

Simon Raab, president of Faro Technologies, says that the principal market barriers for portable CMMs have been cost and accuracy, and until those barriers are breached, portable CMMs are not

anybody that has a selection of height gages, calipers and micrometers. People are used to talking in that range."

These negatives are changing. Price points are dropping and accuracies are getting better. Suppliers are improving the mobility of the units with lifts and counterbalanced arms. In addition, portable CMMs are integrating new software. Brown & Sharpe's Gage 2000A, for instance, uses the PC-DMIS software that is available on its standard CMM, while Faro's newest product has software that facilitates geometric dimensioning and tolerancing (GD&T) measurements.

"To a certain extent, when portable CMMs came out, they were cumbersome, difficult to use and the accuracy was pretty bad," says Len Belpedio, president of LDB Enterprises. "They have really come a long way. Today, they are lighter, easier to use, more accurate, and they have more available software features."

Following is a run-down of what some of the major portable CMM vendors have been up to in the market.

### **Faro gets personal**

Faro Technologies has a number of new products, including the new laser tracker and a new tripod. Its newest product, however, is a portable CMM that looks to go small, in terms of price, accuracy and the tools it hopes to replace. This fall, the Florida-based company is set to introduce its new Faro Gage, the Personal CMM that it hopes will be used in place of one-dimensional tools such as calipers, height gages and micrometers while bringing more of the 3-D capabilities of larger CMMS.

Faro has applied for 10 new patents covering virtually every element of this new articulated arm and application software. The Faro Gage has a price tag of less than \$20,000, which is significantly less than most portable CMMs on the market. The gage has a 48-inch diameter measurement range and a single point accuracy of 0.0002 inch (0.005 millimeter). To achieve this accuracy and cost structure, Raab says the company worked from the ground up on every element of the portable articulated arm CMM.

The six-axis arm has three axes with infinite rotation. It is internally counterbalanced for "neutral buoyancy," stress-free usage. It also warns the user of high-handling force through an audible alarm. "It is the only arm with feeling," says Raab.

The arm uses Faro's SoftCheck Tools, which are part-specific measuring programs that are individually developed by a Faro design team, as well as built-in statistical process control (SPC) and GD&T alignment and reporting software. The gage extracts 3-D GD&T-based measurements that can be difficult and time-consuming to gather accurately using more conventional one-dimensional tools, Raab says.

## **Romer's GridLOK**

Last December, Romer rolled out a new low-end portable unit called the Stinger. At around \$18,000, the Stinger is priced at about half that of the company's top-of-the-line 3000i, and is designed for less sensitive applications that don't require the 0.0008 inch (0.02 millimeter) accuracies of the 1.8 meter arm version of the 3000i, the company says. The 3000i is offered with 1.8, 2.4, 2.8 and 3.6 meter-articulating arms.

The Stinger introduction came on the heels of a November release of Romer's GridLok Extended Reference system, a floor-based navigation system for use with the 3000i that enables users to inspect large parts or multiple small parts while maintaining arm accuracy anywhere within its measuring area. Multiple arms may be used at the same time.

With the GridLOK, extended reference measuring accuracies are constant because all of the point references are known by the system. The system is based upon the positioning of conical seats installed in a concrete floor or an optional steel plate. The conical seats are permanently flush mounted and valued by a laser tracker. The system software then uses algorithms to recognize probe locations in order to reference into the grid coordinate system. This eliminates the need to input positional X, Y and Z data while referencing or relocating.

"This solves leap-frogging problems," says Rob Martin, North American Sales Manager for Romer. Leapfrogging errors are problems that stem from having to move the portable CMM in order to measure parts larger than the measuring envelope. With each move, the potential for cumulative errors exists.

"For the most part, what the GridLOK does for the end user is to eliminate set-up time," Martin says. "In the past, people would have to bring in a large part and that could take several hours. With the GridLok device, you simply roll the vehicle in and stabilize it and start measuring."

## **Axila's 8th dimension**

The Axila Orbital product, introduced to the U.S. market in 2000, is the first eight-axis portable CMM on the market, says Granger. The Orbital is aimed at large volume inspections. It can measure a 20-foot part within 0.006-inch (0.15millimeter) in standard deviation directly on the shop floor. Local accuracy is under 0.003-inch (0.07millimeter) in a 2.5 meter volume.

The Orbital uses the six-axis portable CMM arm, called the Arm 100. The additional two axes come from the rod that extends the Orbital's measuring envelope up to 20 feet. The Orbital is mounted on a mobile tripod and weighs 10 pounds. Taken off of the Orbital, the Arm 100 can be used to measure small parts up to 8 feet diameter with a 0.0027-inch (0.07 millimeter) standard deviation.

Orbital comes with G-Pad geometric software. G-Pad is the only Windows software that can be used without a keyboard, Axila says. The Orbital works as a 3-D mouse.

In addition, Axila offers its own version of the electronic sensor grid, called the VPS. It is a grid of sensors that is located in the floor of the measuring area with a known laser position. The position of a portable CMM is immediately known by measuring three or more sensors on the grid. As with Romer's GridLOK, the VPS also helps eliminate leapfrog problems. Several portable CMMs can be used at the same time in the grid.

### **Zett Mess says freeze**

The Zett Mess AMPG, available beginning last year from LDB Enterprises, comes in standard and precision versions with measuring diameters that range from 47.201 inches up to 141.732 inches. The standard version, which comes in six lengths, has 2 sigma accuracy ranging from 0.0039 inch (0.099 millimeter) to 0.0137 inch. (0.34 millimeter) The precision versions, which also come in six lengths, have 2 sigma accuracies from 0.00071 inch (0.018 millimeter) to 0.0029 inch (0.074 millimeter)

It features a remote control unit and electric lift of the transport wheels. Each portable articulated arm features a pneumatic brake system that can freeze the arm in virtually any position with no loss of accuracy. "You no longer need to return the arm to a rest position, simply press a button on the remote control and the arm is frozen in position," says Belpedio. "The remote controller is about the size of an automobile keyless entry remote and works on the same principle."

### **Brown & Sharpe's CAD software**

Brown & Sharpe's Gage 2000A has a measuring range of 4 feet through 12 feet and uses either a ball, touch trigger or point probe to gather dimensional data. It comes in standard, enhanced and ultra accuracy versions and in six- and seven- axis configurations. It features a counterbalanced articulated arm and an ergonomically designed pistol grip.

The arm comes with Brown & Sharpe's Reflex software for simple one-, two- and three-dimensional measurement, or the PC-DMIS measurement and inspection software. The PC-DMIS software allows users to access CAD data to create direct computer controlled inspection programs and digitizing parts, uploading the dimensional data to a CAD system for reverse engineering projects. The measurement data can be automatically transferred from the GAGE 2000A through an RS-232 serial port.

### **TECH TIPS**

- Portable-articulated arms can be used to measure parts on the shop floor or for field measurements.
- Today's portable CMMs are lighter and more accurate than ever before.
- Software has improved to include SPC, GD&T and other capabilities.

Recent Articles By Larry Adams

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.