



# AIMS

## ADVANCED INDUSTRIAL MEASUREMENT SYSTEMS

### Summer 2015 Newsletter

#### What We're All About

Unhappy and unsatisfied with the idea that CMM suppliers make their own versions of equipment vital to their own business, Dave Delph, president and founder of Advanced Industrial Measurement Systems (AIMS), set out on a different path. Armed with only a laptop, a printer, and an innovative idea, he sought to create a business that would create CMM machines that were 100% compatible with all Renishaw technology. In his eyes, he believed that Renishaw was the best product developer and most innovative company in the industry. So, with a loaned office generously provided by Silver Tool, and many positive meetings with Renishaw later, Dave was able to grow AIMS into the business it is today. With every intention of growing it into a global company one day, Dave's mission – and now AIMS' – is to always take care of your customers

by providing an unprecedented level of service and dedication to them, through thick and thin.

"The best way we've been expanding is through customers telling their friends about us," he said.

AIMS have even sold to parts of the country where it has no presence yet. With that, it is the whole of the AIMS team too that makes his dream a reality.

"It's not just me. It's Mark and Gary and Don – everyone."

#### A Revolution® is Starting

With a "Made in China" tag nagging at the back of your neck as you drive your Japan-made Toyota past a German-made BMW, you may start to wonder what American-made products are hidden in the pinhole openings created by the swarm of foreign products surrounding your everyday life.

Well, for those of you whose lives revolve working in and around machine shops, Advanced Industrial Measurement Systems' (AIMS) newest line of Revolution® HB Series CMM machines aren't just made in the U.S, they are also proudly made in our innovative city of Dayton, Ohio.

Dayton's rich manufacturing history was built from the ground up on innovative ideas and inventions that ended up not only pushing our city into greatness, but revolutionized the way our country and the world does things. To quote from The City of Dayton's website, "The number of inventions patented by Dayton inventors runs into the thousands." The airplane, cash register, digital clock, air conditioning, instant blood-glucose testing, and the self-starter for electric ignition in cars are just a sampling of the things every American came to love thanks to this city. Even the coveted football and yo-yo were patented here. Now, it's time for the Revolution® HB 5.9.4 and 8.10.6 to make its mark on history – revolutionizing the way our nation thinks of and operates a CMM.

### The Machine Itself



For starters, AIMS' Revolution® series boasts the looks of fine architecture with AIMS' trademark orange highlights, to support the latest and greatest Renishaw technology. The beauty of this machine comes from its vibration resistant, polymer cast base – the latest generation epoxy casting technology used in the machine tool industry. Its sleek looks are maintained by cast-in conduits that keep all the messy wiring internal, and not just for protection. With its shop-hardened design featuring thermal compensation and built-in vibration resistance to boot, these CMMs will

stand like unmovable walls in any harsh machining environment to provide its user with precise measurements where they need it. Two of the many utilities of this machine are its use for 110/220 volt electric outlets – there’s no need for shop air! – And, the roll-around stand it features allows it to be moved in a snap to wherever it is needed most.

### Technology from Renishaw and Friends

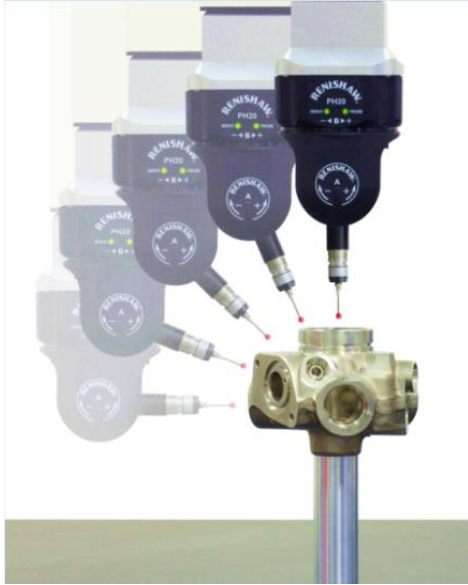
Some of the major components of the Revolution® series are its precision drive systems, which, along with its ball cage system, recirculating bearings and hardened linear guides, can be counted on to be durable and give reliable inspections even in the midst of any chaotic shop-floor condition. Lightweight bellows and covers, for reducing friction and providing smooth-running and precise performance, protect the machine’s components. Vibration can cause serious error for CMM’s, so another, yet critical component of the Revolution® series is its elastomeric vibration dampers. Reducing noise as well as absorbing vibration and shock prolongs the machine life for years to come. The vibration dampers also allow for 15 degrees of swivel to compensate for uneven floors.

You all know how a standard CMM works, right? For starters, they typically speed up the

motion of their 3 axes to measure at a faster pace. Here’s where Renishaw comes into play. Revolution’s® 5-axis touch trigger technology, utilizing Renishaw’s PH20 head motion technology, minimizes dynamic errors of the CMM at higher measurement speeds. This affords rapid touch trigger measurement by using “head-touches”, where measurement points are taken by moving only the head rather than the CMM structure. Using only the rapid rotary motion of its head, the PH20 can take faster points, with drastically improved accuracy and repeatability.

For example, imagine scanning two head gasket faces and five sections in each of eight cylinder bores. This can typically take about 55 minutes. Now, with PH20, imagine completing the entire job in only 5 minutes. If you do the math, that is 900% throughput improvement!

How is this possible? In conventional measurement methods, the CMM performs all the necessary movements to acquire surface data. However, there are great flaws in this system. Acceleration induces inertial deflections in the machine structure, which in turn induce measurement errors. Metrology manufacturers have devoted years to develop techniques to reduce those errors, but the CMM and servo’s upper speed limit aren’t able to go any higher due to the machine’s lack of flexibility. It’s too stiff!



PH20 obliterates that limit by using an articulating head that moves in two rotary axes as it measures. This frees up the CMM to allow it to do what it was best designed to do – move at constant velocity in a single vector while measuring. The head is much lighter and more dynamic than the CMM, and with significantly better bandwidth, it is quickly able to follow changes in the part geometry without causing dynamic errors. This results in a much faster surface speed and hence shorter measurement cycles. While maintaining current levels of metrology, the 5-axis technology allows the user to achieve unprecedented levels of throughput.

PH20 though, isn't the only gun in Renishaw's arsenal. Its TONiC® Incremental Encoder adds its own benefits to the Revolution® series. Being one of the smallest incremental encoders on the market, it surpasses many

others in its quality and reliability by featuring the latest generation of filtering optics for high tolerance to dust, oils, and scratches. It is also enhanced by Auto Gain Control for optimum signal stability. Don't be surprised if you find this encoder performing stunningly well in sub-optimal shop conditions – it was made to last. Readheads are reliable in demanding environments – even under highly dynamic flex conditions.

The TONiC® readhead further separates itself by delving away from glass into a stainless steel RSLM up to 5 meters long. Its accuracy is even comparable to accuracy normally associated with calibration lasers! Further, being stainless steel offers more accuracy than any glass scale on the market. With its superior motion control, TONiC® is able to boast of having smoother velocity control and solid positional stability, less vibration and ripple, less heat generation, superior image quality, and finer repeatability on ultra-precision axes, among a list of other qualities.

The encoder scale system that works in conjunction with TONiC® is Renishaw's FASTRACK®. Highly accurate, it employs the ruggedness of stainless steel and is secured in place by 2 miniature, rugged guide rails. To allow for adequate thermal independent temperature expansion, the scale is clamped at a single point. This means that FASTRACK® will

have extremely low hysteresis – even over wide temperature ranges. The other ingenuitive aspect of this scale is that if it is at all damaged, it can be pulled out of the guide rails and replaced in a snap, reducing machine downtime to nothing.

As amazing as the Revolution® series is on its own with the insurmountable benefits of Renishaw’s technology, it wouldn’t be complete without the software that is essentially the last piece to the puzzle. Acting as a powerful platform for the 5-axis technology, Renishaw’s MODUS software includes a configurable user interface allowing native DMIS programs to be developed offline, as well as drawing geometry, embedded dimensions and tolerance data from CAD, with full simulation and collision detection included. The CMM environment, the fixture, and the location of the part on the machine can all be defined, enabling full simulation and crash detection of the 5-axis measurement programs. This minimizes CMM downtime as programs arrive at the machine ready to run, with little or no prove-out time required.

MODUS software is also a future-proof investment, ensuring guaranteed availability of the latest sensor and controller technology advancements from Renishaw. This will include future sensors for the 5-axis measurement product range, which represents the biggest step-change in measurement capability ever

introduced and delivers unprecedented speed and measurement flexibility, while avoiding the speed versus accuracy compromises inherent in conventional techniques. Planned obsolescence is not an option here.

With MODUS as the backbone, and the Revolution® HB Series making its debut thanks to AIMS, a local Dayton company, it will become the next big leap in revolutionizing machine shops across the nation!

**AIMS is an Original Equipment Manufacturer (OEM) and producer of Revolution® CMM’s, which are completely equipped with Renishaw CMM technology components. A Revolution® CMM incorporates the seamless integration of Renishaw components providing the customer with a high technology CMM supported globally by numerous support teams and without the traditional CMM OEM “lock-out” of software error maps, controller service codes and commercially driven shortened life-cycle spare parts obsolescence. Our mission is devoted to building a solid partnership with each of our customers by supplying the very best technologies at a competitive price and providing expert service and training.**

## Satisfied Customer Success



Bob Smith and his S&S Machine Company in Marshfield Massachusetts supply high tolerance aerospace and defense parts using 10 CNC's and five full time employees. And as part complexity and precision grew, Bob decided to purchase his first CMM.

Starting with Hexagon Metrology, he researched Wenzel, Helmel, Nikon and Mitutoyo until he discovered Advanced Industrial Measurement Systems (AIMS) near Dayton, Ohio and their Revolution® CMM. A Coord3 frame was married to the latest generation of Renishaw probing heads and tied together with Modus software. It was a true 5 axis system that could handle everything he needed.

"They basically put the machine on the floor, gave us some training and we've been happy ever since! The PH20 head has infinite motion so you can check almost anything - usually with just one probe."

"We had one complicated part with multiple cuts and angled holes – a  $\pm$  .0001 tolerance

with a surface profile of .004" that takes 4-5 operations in a 1.5 hour cycle time. Inspection was taking 2-3 days using a sine bar and an optical comparator for surface profiling. With the "Revo" (AIMS Revolution®), we literally cut that time to 9-12 minutes!"

"It's fast and that speed is critical. I've always believed that technology pays, and the "Revo" has backed that up. It's really the trio that makes it work - Modus, Renishaw and AIMS together - In my opinion, they're ahead of everyone else in the field and the "Revo" is within the budget of any quality-oriented shop."

**S&S Machining is located in 10,000 sq. ft. in Marshfield, MA and has been in continuous operation for 27 years. S&S is a supplier of precision machined components and small assemblies for the Aerospace, Defense and Industrial markets and are ISO 9001:2008 & AS 9100 Certified. They own an AIMS Revolution 5.5.5 DCC CMM with a Renishaw PH20 and Modus Cad v1.4. Bob Smith is the founder and President.**

### A Revolution® in the Dayton AMTS Show

AIMS is proud to announce that we are taking part in the 2015 Advanced Manufacturing Technology Show (AMTS) on October 21<sup>st</sup> and 22<sup>nd</sup> at the Dayton Airport Expo Center. This year, packed to the brim with various

equipment and indomitable networking opportunities, is a must see! Along with a revamped floor plan, concessions, bar, and lounge areas, you can't miss this opportunity to see a multitude of the latest technologies and the future of the industry! So, come look for us and our Revolution® HB series! We'll see you there!



#### **A Revolution® within The 2015 Quality Show**

The Quality Show in Chicago, IL is a brand new trade show that focuses solely on quality oriented technology, equipment, and products and will be perfect for ideal networking opportunities. Taking place on October 27<sup>th</sup>, 28<sup>th</sup>, and 29<sup>th</sup>, AIMS will be showcasing the Revolution® - come and hear everything you would ever want to know about this revolutionary CMM, and more! We'll be in booth #1420.

