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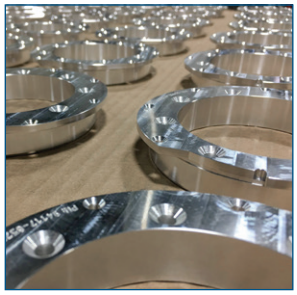
Aerospace Flying High with DATRON M8Cube

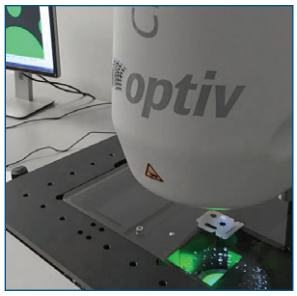
Rapid DTM was founded as a one-man shop in 2002 by President, Tim Allard. Having worked for larger companies like Hitchiner Manufacturing, he had the opportunity to hone his skills as a machinist on an impressive array of equipment including a high-speed Roku Roku, 5-axis Hermle machines with Heidenhain Controls, and some high-end Makinos. But initially, at his own company, he was doing primarily engineering work and the first piece of equipment that he purchased was a CMM machine. Allard explains, *"I figured I'd build the business from the quality side down which is sort of the opposite of the way that anyone else does it. That really kind of worked out well for me because we were able to get ISO Certified. For a shop the size that we are to have ISO Certification right out of the gate, you know not everybody has that, and very few companies our size have it at all."*



Tim Allard, President of Rapid DTM, Inc. who specializes in CMM Inspection, Reverse Engineering and Precision Machining. The company is ISO Certified and ITAR Registered.







By 2004, Allard was again researching high-speed machining technology because he saw opportunity in producing graphite for regional mold makers who had sinker machines and needed electrodes. He recalls, *"So, I was looking for a machine that was well-suited to machining graphite and that's when the DATRON came up on my radar through a web search. I went to DATRON and looked at the machine and ran the numbers but just couldn't do it at the time. I knew it was a good fit it was just getting the timing worked out."*

So, in the meantime, Allard purchased a Haas VF-1 with a 30,000 RPM spindle and a BT 30 Taper and their high-speed machining package. He explains that the work they were getting was steady but not ideal. *"In the early days, we were getting all of these big aluminum housings that we were hogging out with ¾ inch end mill. For a number of years, that's the kind of work we were getting, but we never really made a ton of money doing it."*

But, things changed quickly when his previous employer Hitchiner Manufacturing closed the division he had worked at and the 25 employees who had worked for him went on to take jobs at other companies. Allard said, *"They all became my customers and one of the guys went to BAE Systems and he's the one who originally got us in there."*

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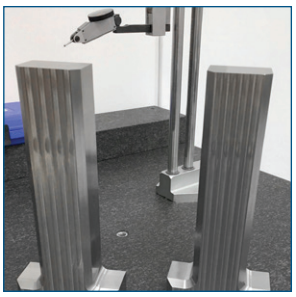
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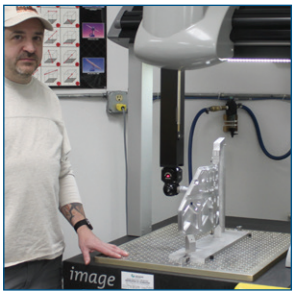
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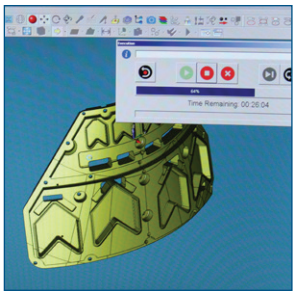
Today, BAE Systems and other aerospace industry customers like Fibertek in Herndon, VA represent 95% of Rapid DTM's business and this has proven to be very profitable for the company. So much so that in 2016, Allard decided to narrow the focus of the company exclusively on the niche business or making these small parts to the exacting specifications demanded by the industry. *"I wanted to focus on what we do well and get rid of some of this other stuff. I had two large vertical machining centers, a big Haas VF-5 and a big Doosan and I said let's get rid of these two machines and get another machine that's going to compliment our little Haas and stick with this little tiny niche-style work with these tiny cutters that are hanging out a mile, you know where you really need to be able to wind 'em up and hold some accuracy."*

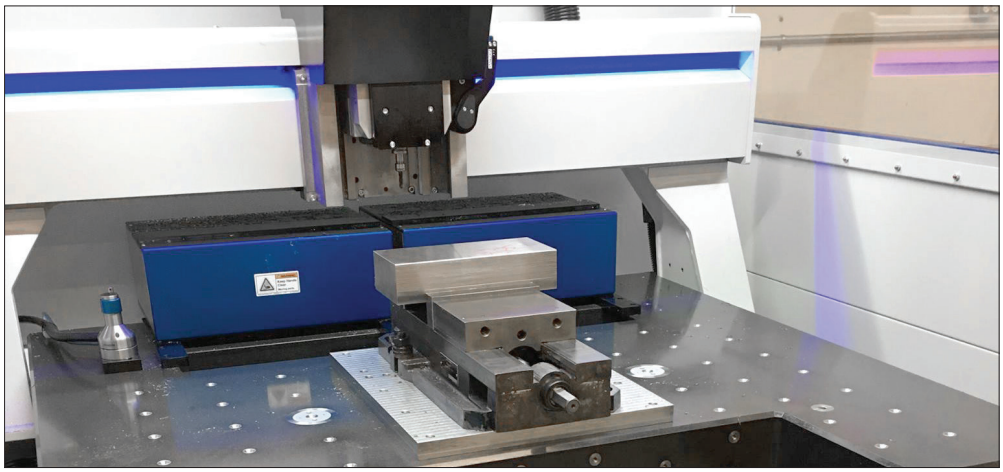


So, they purchased a DATRON M8Cube and also invested heavily in their metrology business by doubling their metrology capacity. In addition to their CMMs they now have a vision system and some of their jobs are straight metrology and CMM work. For example, DMG Mori has them checking demo parts made on their machines and they also measure parts for other machine shops. Allard has built such a reputation for his expertise in CMM that he even does CMM training for Hexagon Metrology, the company he purchases his CMM equipment from. One of Hexagon's other customers is a large machine shop, and while he was training them to use their CMM he learned that they were struggling with a milling job where they had to use very small tools to cut steel. He explained to them that at a maximum RPM of 12,000 their milling machine was not up to the task. When he told them that he had a DATRON that could mill their part they asked, "What's a DATRON?" He explained, *"The problem with doing jobs like this is that the tools wear out very quickly because they can't withstand the heat you've gotta get in there and get out especially with this type of steel that tends to work harden."* With that explanation, they suggested that Allard perform the work for them, and he responded by suggesting that they get their own DATRON machine. *It's not that I didn't want to help out, it's just that we're not really looking for more business. We're scheduled out 12 weeks right now and are busy. Our DATRON machine alone is running 10 hours a day Monday through Friday and 5 hours on Saturdays."*









DATRON M8Cube's solid polymer-concrete bed setup for one of the many aerospace jobs that Rapid DTM runs in aluminum.

In comparing the DATRON to other machines that he's run Allard says, *"Obviously, in terms of spindle speed, they're higher than what most people are putting out there. Haas doesn't offer anything higher than 15,000 RPM and other machines of this size aren't running the kind of spindle speeds*

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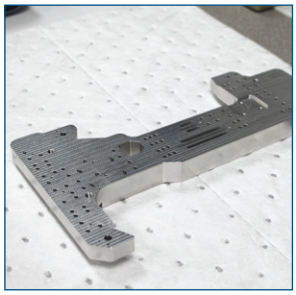
that DATRON is running. On top of that, the accuracy that DATRON has is really outstanding. You know, I check everything on the CMM, and I've posted videos showing us checking the roundness of parts that have come out of the DATRON and we're at roughly 4 microns."

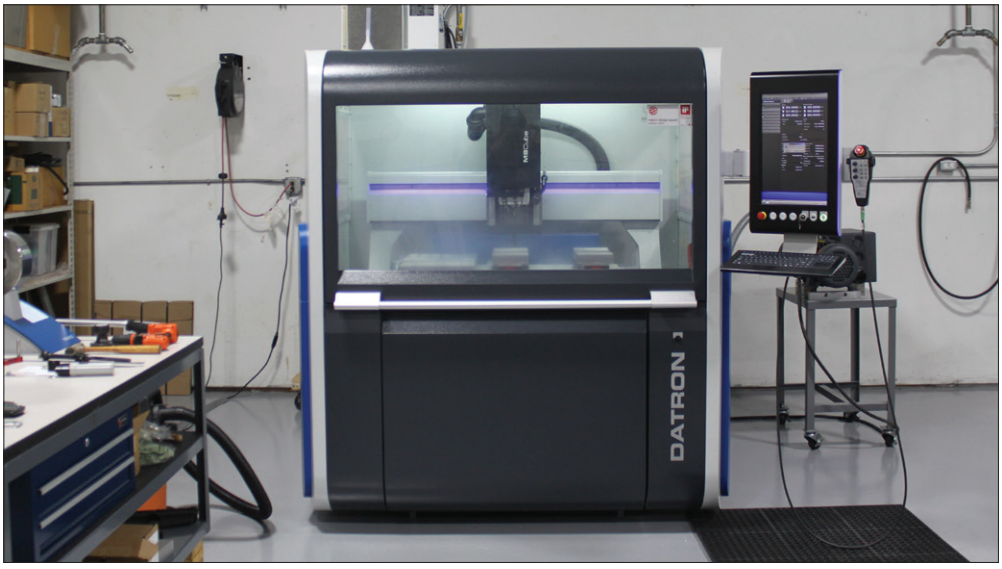


Allard doesn't feel that there's much of a difference between a job shop and a prototyping shop because even when they are just prototyping a part, there is a good chance it will turn into a short-run production job down the road. As an example, he points out a BAE part that started as 5 prototypes 2 years ago, and on this day he is running 35 assemblies. *"We made the original prototypes, so then when it came time for their production order, we were the only company qualified to do the job. Because of the nature of what the part is, and the fact that we had proven we could do it, they didn't want to give it to anyone else. It's a strange project, it's a little out of the ordinary and that's kind of what we do. This stuff might fall into the "no quote" pile for a lot of shops because it's complex, it's all 3D work, tight tolerances, low quantities, stuff that most people don't want to touch, ... and that's what I like."*

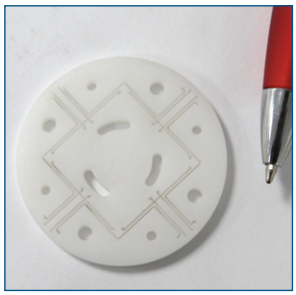


Because of their focus on the aerospace industry, Rapid DTM's DATRON machine is usually used to mill aluminum, but they also use it to machine 303 stainless, 17-4 stainless, 6AL-4V titanium, G10, and lots of Delrin according to Allard. For BAE Systems, the parts all vary somewhat but are similar in some ways - one being that they're these little aluminum blocks of MIC-6 and that are about 5 inches by 3 inches and a half inch thick. Rapid DTM mills tiny vertical slots cut into them that are fairly deep. Allard explains, *"So, we're running really small tools that are hanging out way more than you should ever hang one of these tools out – but this is the kind of stuff that I've been doing for a long time."* Years ago, when they started making these parts, it was taking their Haas machine operator about 10 hours to produce a single unit. Through evolution in CAM technology, essentially being able to do more rest machining, they were able to get that cycle time to about 5 to 6 hours on their Haas machine. Allard says, *"But when we moved the job over to the DATRON, we got the cycle time down to about 2.5 hours for more than a 50% improvement."*





Rapid DTM's DATRON M8Cube is an industrial workhorse that runs 10 hrs./day Monday through Friday and 5 hrs. on Saturdays.



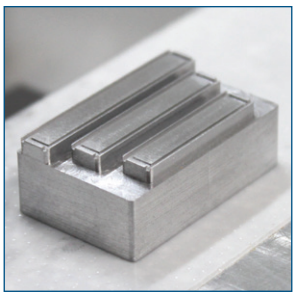
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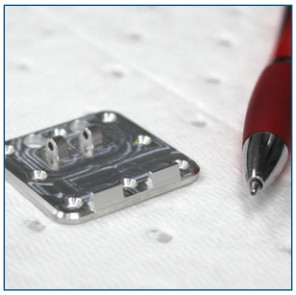
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In the case of Rapid DTM's prototyping and short-run production, many of the parts that they produce have a short cycle times, so quick setup times are critical. Allard says, *"I'm running low quantities of everything. On jobs over the last 4 days, our cycle time is 44 seconds, so, I'm loading parts in and out ... which is not my favorite kind of work. The fact that setup on the M8Cube is quick and easy helps a lot."* The machining area on the DATRON M8Cube is an ample 40" x 32" which allows for multiple setups such as vices, pneumatic clamps and vacuum chucks. This provides manufacturers with the flexibility to adapt to changing needs and to change over quickly. Rapid DTM's machine also has a cut out in the front of the bed that allows for vertical clamping to machine the ends of particularly long or tall workpieces.





Multiple setups including pneumatic clamps, vacuum table and a trunnion rotary axis installed in the "cut out" of the bed.





Regarding the large work area of the M8Cube, Allard says, *"Every couple of days there's a different job that comes in to run on the DATRON and that's the nature of what I do. That's also part of the challenge in prototyping, you have to set up vices, vacuum chucks and tooling. When the guys from BAE Systems come through and look at the M8Cube, one of the first things they mention is that for a machine this size and this weight it's got a ton of XY travel."*



Allard is also extremely impressed with the precision of the M8Cube and the quality of the integrated Renishaw probe. *"As part of our metrology business, I've been using probing technology forever and there's also Renishaw probing in the Haas. But I do a demonstration on the differences in how the two systems work and some of the advantages that the DATRON has. You can do everything that you do on the DATRON on the Haas but it might require a couple of different macros to do it. With the DATRON, there's a much larger menu for probing because there's so many more things you can do within that same cycle. For example, yesterday I was using soft jaws. So you've got two vice jaws set up with a gap in between them. So, I wanted to set a Z zero off the top of the back vice jaw. I wanted to set the X zero to the centerline of that back vice jaw and then my Y zero across the outside spanning the two jaws. With the Haas, I would have to do that as two different cycles. I could do a web X and a Z as one cycle and then I would have to move the spindle to the centerline in the Y direction and then do a web Y cycle. Whereas, with the DATRON, the way that menu is set up, you can offset X and Y to probe Z and you can offset Y to probe the X. You don't*

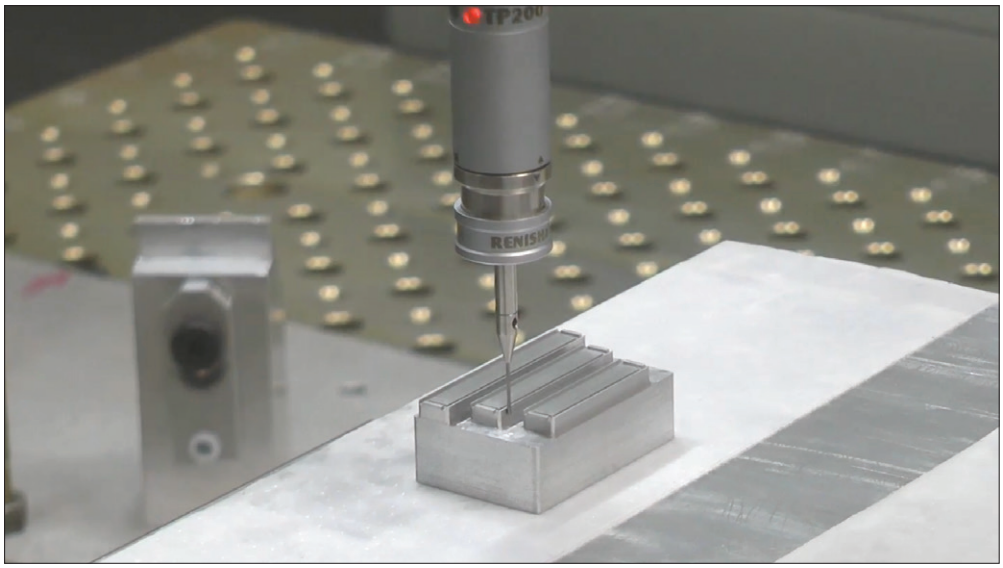
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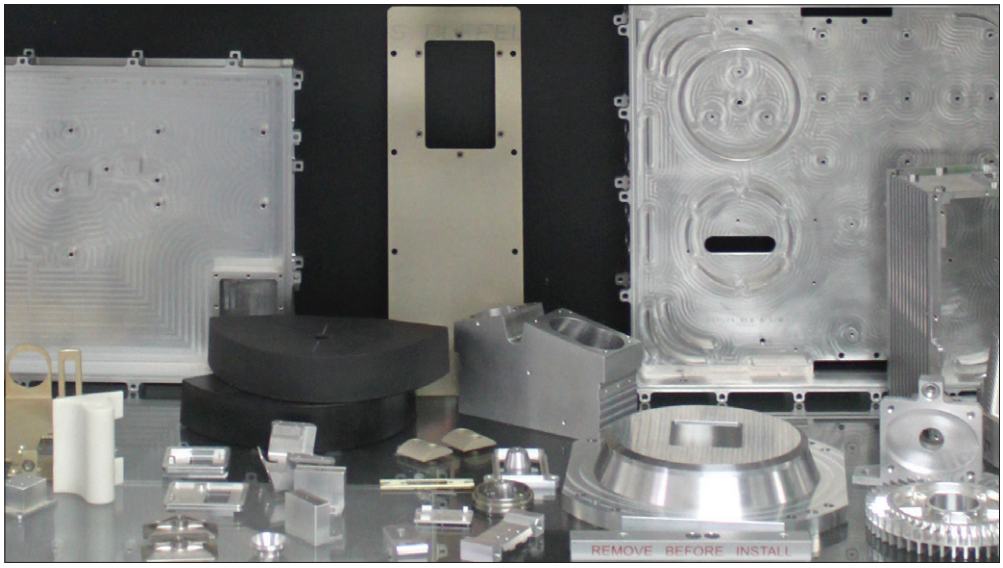
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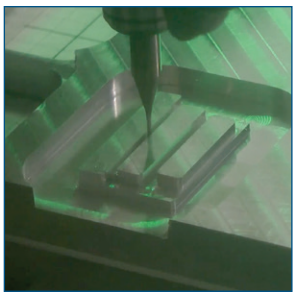
have those options in the built-in Renishaw cycles for the Haas. There's really no other probing system out there (that I'm aware of) that gives you the flexibility that DATRON probing does."



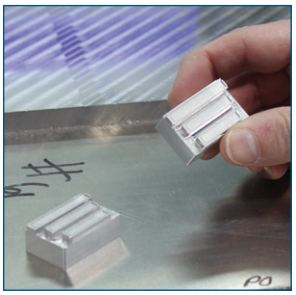
Rapid DTM's CMM verifying a 0.0003" tolerance for an aerospace part milled from MIC 6 aluminum on the M8Cube.
WATCH VIDEO: https://youtu.be/DF_XAbEJ91U



One of the many shelves of parts on Rapid DTM's "Wall of Fame".









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