

## Magnus Precision Re-Defines Its Philosophy on Efficiency



**Dominic Teague, Magnus Precision Manufacturing, shows one of the complex parts machined 'lights out' on the Mitsui Seiki HU40-T-AWC 5-axis machining center.**

Magnus Precision Manufacturing (Phelps, NY) specializes in producing difficult, tight tolerance parts for customers in the aerospace, medical, and high-end industrial markets. "Founded in 1982, Magnus has earned a reputation for making difficult parts utilizing unique technical solutions. Our highly skilled workforce and the use of the latest machine tool technology allows us to meet or exceed our customers' expectations in the area of complex part machining," said company President Al Raymond.

"Faced with the pressures of competing in a global market, Magnus is constantly looking for ways to improve efficiency while maintaining its reputation for high quality and timely delivery. We needed to redefine our philosophy and chose to look at ways to make parts complete using equipment that could run unattended," said John Hallett, Manager of Engineering. "We needed to use specific machinery and/or specialized fixture designs to make finished parts every cycle. By performing multiple operations during each cycle, machine run time can be increased and valuable operator time can be better utilized and shared across multiple machines."

Magnus carefully considered its options and looked at several different types of machine tools before choosing its most recent additions. "We realized that conventional CNC's did not allow us to leverage the skilled workers' time between different work centers," said Hallett. "In addition to having people run multiple machining centers, we also wanted to become more flexible in scheduling and to reduce

our setup costs. After reading magazines, scouring the web, and talking to equipment experts, we decided we needed to develop a 'lights out' philosophy and look for equipment capable of running for long periods of time unattended."

Magnus already had machines capable of performing the task at hand. None were more capable than the horizontal 5-axis mill from Mitsui Seiki purchased only a few years earlier. The machine has been making various aerospace manifolds since its installation. It became the test bed for 'lights out' machine trials. "This machine is equipped with 60 pallets allowing us to load up enough parts to run weekends and a 240 location tool changer allowing us to have redundant tools so that tools can be replaced as they become dull or broken. We can also have tools set up for more than one part number at a time," said Hallett. "In addition, the machine allows laser tool measurement to set the tool lengths and, most importantly, allows us to monitor tools for wear and breakage without manual input. The machine has a very capable tool management system and a pallet management system that allows us great flexibility in meeting customer requirements. Once a part has been programmed and proven out, it is possible to have lot sizes as low as one piece with no further setup time required."

After an initial learning and adjustment period, the Mitsui Seiki 5-axis horizontal mill has allowed Magnus Precision to achieve its 'lights out' goal and subsequent improvement in efficiency. "It took about a year of hard work to get to the point where we could load up the machine on Friday and have several good parts waiting for us on Monday," said Hallett. "We started working on aluminum man-



**(l-r) Alan P. Raymond, President; John F. Hallett, Manager of Engineering, Magnus Precision Manufacturing, Inc.**

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ifolds because the aluminum presented fewer tooling problems than the hardened stainless and titanium that we also run. Initially, we ran during the day with no operators. Then we started running aluminum at night while running the tougher jobs during the day. We have now reached the point where we run some operations on the titanium 'lights out' and run unattended at night and on weekends."

"We primarily run manifolds on this machine. We run only parts that have a long term requirement but can easily run small lot sizes with no setup time."

In addition, the company has been able to realize the increased scheduling flexibility it was looking for. "Scheduling is very flexible because we can run production on a difficult part during the day, when people are available to monitor the process, and then switch over to easier parts at night with no setup time and no operator," said Hallett. "Actual cycle times are similar to some of the other 5-axis machines we have, but we get significantly more product out because the machine is never waiting for an operator and requires no setup time."

Based on the success of the Mitsui Seiki 5-axis horizontal mill, the company has sought to increase efficiency further by applying the same philosophy to other equipment and by purchasing new equipment. Magnus recently purchased a Tsugami TMU1 Swiss Mill/Turn machine from REM Sales to produce a line of aerospace parts for one customer. The TMU is one of only a handful of machines in the country with 1-1/2" diameter Swiss lathe and milling capability. It features laser tool measurement, touch probe, a tool monitoring system from Caron Engineering and a 5-axis milling head with a 60-tool magazine. It is designed for low and mid-volume runs with fast setup of repeat orders and



**Magnus Precision Manufacturing capabilities include a wide variety of part sizes. The smallest is on the right side of the penny.**

automation to detect tool wear and verify part dimensions. The machine fits the company's goal of seeking out new technology to increase efficiency by making complete parts with limited operator input, while still maintaining quality. "Supporting our philosophy of running 'lights out,' the machine will be able to be set up quickly and use process monitoring and tool redundancy to achieve long runs of unattended time to make difficult tight tolerance, turned and milled parts," said Hallett.

Magnus Precision's new 5-axis machines have allowed Magnus to achieve the realization of our 'lights out' manufacturing philosophy," said Raymond. "The use of the latest machine tool technology complements our strategy of continuous improvement through leveraging our technical knowledge, state-of-the-art equipment and machining capabilities. This translates into added value for our customers, the goal we are striving to attain."

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**The new Tsugami TMU1 Swiss Mill/Turn machine capable of 1-1/2" diameter turning.**