

Success Story

Cutting, Engineering Services Company Grows With Machining

Aerodyn Engineering Vice President, Keith Yeager, displays a complex rotor part as a sample of his company’s increasing manufacturing capabilities. “We are primarily a service organization,”...

...says David Lawrence, president of Indianapolis-based Aerodyn Engineering.

Aerodyn provides instrumentation and field-testing focusing on the power generation and aerospace industries. Projects include custom data-acquisition systems for turbines in gas pipelines, pressure-measurement for aircraft engines, and determining the pressures and strains on a military helicopter fuselage during missile firing.

“Our reputation is for being able to perform very difficult tests with a high success rate,” Lawrence says.

Success has translated into growth. Established in 2002, Aerodyn’s sales were \$3.0 million in 2004. By 2010, that had nearly tripled to \$8.5 million, with projections to hit \$11.5 million by the end of 2011.

To support its testing services, Aerodyn added in-house manufacturing capabilities to provide its own components, such as slip rings used in applications that require reading and transferring data from rotating equipment.

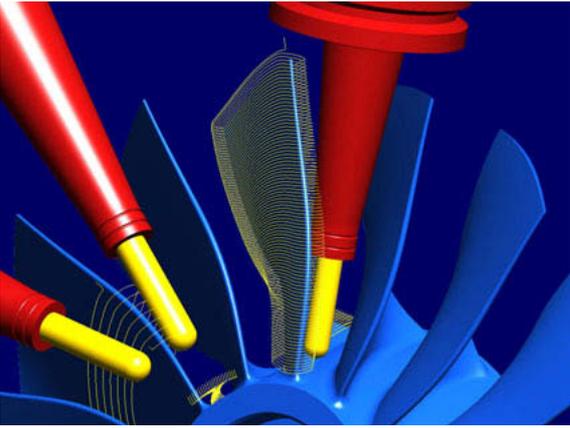
“As a testing company, the test cells we build, and the components we make, are usually one-offs,” says Aerodyn Vice Presi-

dent Keith Yeager. “And, when customers have products at the testing phase, they want the data to move into a production schedule as quickly as possible. We could outsource and find someone to make what we need, but the costs and lead times are a killer.”

Making A Decision

Stators, rotors, and blisks present significant 5-axis programming and machining

When Midland Aerospace acquired their new DMG machine they wanted to protect their investment with 5-axis software that guaranteed collision avoidance: hyperMILL®.



About Aerodyn Engineering Inc.

Aerodyn Engineering Inc. (AEI) provides unparalleled customer services and support to Aerospace, Power Generation, Automotive, and Industrial customers with high-quality instrumentation, test services, and analysis that is ISO-9001:2008 registered. They are dedicated to exceeding our customer’s expectations for response and quality.

> www.aerodyng.com

“Increased capability is one of the things our CAM software gives us.”

Keith Yeager, Vice President
Aerodyn Engineering



challenges. Aerodyn purchased an NMV-5000 5-axis machining center from DMG/Mori Seiki in the summer of 2010 and followed up with an NMV-3000 in February 2011.

“The machines were acquired to provide our customers access to the capability to machine integral aerothermodynamic rakes (bodies with integral stagnation heads) and to machine blisks and centrifugal compressor wheels,” Lawrence states. “We needed the capability to produce low quantities of very complex parts in a very time- and cost-effective way. It is very accurate to say that once customers tour our facility and realize the capabilities we have, we get opportunities to quote work we had not been considered for before. In most cases (greater than 90%), we are successful in winning the quotes and performing the work. These two machines will figure largely in our future growth. With them, we have the capability to not only offer prototyping service for new designs, but also shortrun production quantities of a few thousand per year. We are hoping to secure more P/N’s for these machines to fully utilize them.”

Stators, rotors, and blisks present significant 5-axis programming and machining challenges.



Do It Now

While Aerodyn saw the advantages in tackling more and more difficult projects, they quickly reached the limits of their 5-axis programming capabilities.

“We had parts we could not program,” Aerodyn CNC Programmer John Frandsen plainly states. “We had a complex fan rotor model we were using as a benchmark to test software packages, and we had other parts in the queue that were ten times more complex than that.”

As opportunity would have it, Yeager and Frandsen decided to take their model to the software pavilion at IMTS 2010 and challenge the vendors directly.

“We did not have the luxury of time,” Yeager says. “We would put the model in front of them and demand a 5-axis toolpath while we waited. Plenty of companies said they could, but the wait time would be a couple weeks while they took the model home and had their guru work on it. We needed a solution we could see immediately.”

Where other CAM packages could not, *hyperMILL*[®], from OPEN MIND Technologies USA Inc., could. With a history in 2D, 3D, and 5-axis programming, *hyperMILL*[®] provides a complete resource of analysis, programming, and verification tools.

“We bring competitive advantage to our customers with hands-on applications experience and knowledge of 5-axis postprocessors for every machine kinematic and control type,” says Alan Levine, OPEN MIND Technologies USA Inc. managing director. “Our customers hit the ground running and require less after-implementation support, so their focus can stay on core business.”

hyperMILL[®] includes analysis tools for determining which element properties in a component model are relevant for machining tasks. Users click on a surface and the software displays individual surface types and can automatically search all planes and radii, marking their positions and sizes.

OPEN MIND’s *hyperMILL*[®] provides toolpaths, collision checking, and verification. The extensive tool database includes tools, holders, any necessary extensions, and even the corresponding coupling systems. These items are defined, analyzed, and given a user-controlled offset for use in mathematical collision detection and avoidance routines. This is not possible in software packages where users are required to sketch tool geometry.

“The biggest thing I can say is *hyperMILL*® gets it,” Frandsen says. “We can throw a model in and get a toolpath out without having to play with it. It is very intuitive – the toolpath you see on the screen looks like the toolpath you get on the machine.”

With multi-axis machining and programming experience in his background, Frandsen praises the quality of training available to *hyperMILL*® users. “Any problems I have had in programming related to needing construction geometries, boundaries, or basic 2D skeletons that I was not aware of, I have been able to solve all of my issues over the phone or gotomeeting,” he says. Frandsen has used *hyperMILL*®’s blade-milling functions for machining blisks and impellers, and the tube-milling functions for making enclosed stators.

“My confidence in it is phenomenal,” he says of the software. “It does not do anything stupid like gouge your part while ac-

ting like that is perfectly fine. What I have programmed, I have gotten; every time.”

Growth Going Forward

In addition to 5-axis CNC milling, Aerodyn has also added turning, grinding, EDM, CMM inspection, and assembly to its capabilities, as well as opening a test facility in nearby Whites-town, IN. Yeager says the company is quickly gaining a reputation for successful machining in difficult materials such as Rene 41 (developed by General Electric for retaining high strength at extreme temperatures) and CMSX-4, used in jet engines and gas turbines. “Business is growing, and the machining aspect of our business is a significant driver in that growth. On the next generation of our website, look to see a lot more on our manufacturing capability. And increased capability is one of the things our CAM software gives us,” Yeager concludes.

Edited by Elizabeth Engler Modic. ■

About OPEN MIND Technologies AG

OPEN MIND is one of the world’s most sought-after developers of powerful CAM solutions for machine and controller-independent programming.

OPEN MIND designs optimized CAM solutions that include a high number of innovative features not available elsewhere to deliver significantly higher performance in both programming and machining. Strategies such as 2D, 3D as well as 5axis milling/mill turning, and machining operations like HSC and HPC are efficiently built into the *hyperMILL*® CAM system. *hyperMILL*® provides the maximum possible benefits to customers thanks to its full compatibility with all current CAD solutions and extensive programming automation.

OPEN MIND strives to be the best and most innovative CAM/CAD manufacturer in the world, helping it become one of the top five in the CAM/CAD industry according to the NC Market Analysis Report 2015 compiled by CIMdata. The CAM/CAD solutions of OPEN MIND fulfil the highest demands in the automotive, tool and mould manufacturing, production machining, medical, job shops, energy and aerospace industries. OPEN MIND is represented in all key markets in Asia, Europe and America, and is a Mensch und Maschine company.



We push machining to the limit

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