

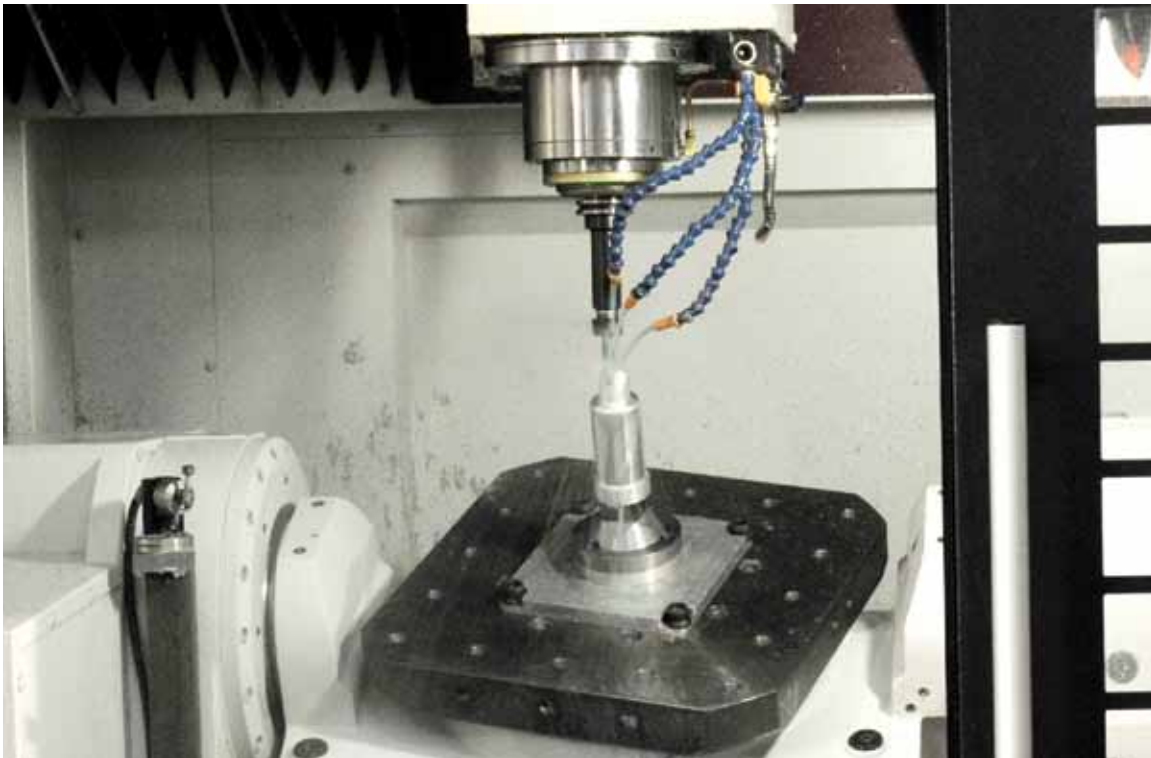
# Three Steps

## *to Improve Your Aerospace CNC Machining Results*

The aerospace and automotive industries can learn a lot from each other. The aerospace industry excels at complex structures and advanced materials. The automotive industry excels at automated production and supply-chain management. Looking at the trends in both industries and the economic realities, both industries need to learn and implement what the other industry can offer to improve their end result.

With the massive backlog of orders currently forecasted and projected aircraft demand over the next 20 years, production rates in aerospace need to dramatically increase. Every manufacturing facility must look to become more efficient today if the goal is to be competitive and not bankrupt tomorrow.

*Often-overlooked ways that processes can become more efficient and cost effective.*



### **CNC machining of an aerospace component.**

There are numerous opportunities for increased automation including robot applications for assembly and paint processes, system integration between stand-alone equipment that integrates easily with manufacturing control systems, and emerging technologies such as additive manufacturing.

The aerospace industry has always been a little slow to adopt new technologies primarily due to the long build cycles. In fact, walking through many aerospace

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## Process Improvement

manufacturing facilities today doesn't look much different than aerospace manufacturing facilities 30 years ago. Rather than becoming more efficient and using the advanced features

of the equipment already on the floor and in planned new equipment, many companies in aerospace increase manufacturing capacity by purchasing additional equipment using pre-



**There are technologies available in equipment that go unused because the programming methodology is "what you've always done."**

vious manufacturing technology. Backward compatibility is necessary in some cases due to program certification, but new programs could gain significant improvement by utilizing the newer features available in modern systems. As Henry Ford said, "If you always do what you've always done, you'll always get what you've always got." It's not that aerospace manufacturing processes have been lacking as evident by the volume of excellent aircraft produced over the years, but the processes could definitely be more efficient and cost effective.

## The aerospace industry has always been **a little slow to adopt new technologies** primarily due to the long build cycles.

In general, there are three simple steps that are often overlooked and can improve your end result by making an enormous difference in aerospace manufacturing costs and efficiency:

1. Make the manufacturing process consistent across all equipment in a facility
2. Take advantage of available technology on existing machinery
3. Improve the Request For Quotes (RFQ) of new equipment to better meet manufacturing needs

### Consistent Processes

First, the majority of part- and equipment-related issues at facilities are caused by inconsistency. Basic functions that work differently on two similar pieces of equipment sitting next to each other cause confusion and inevitably, a machine crash due to an "unexpected" event. Additionally, supporting different functionality for each piece of equipment is also very labor intensive and increases training and maintenance costs. To avoid this, do an audit of equipment functionality and parameterization. All equipment should have the same basic functionality and feature setup. You don't have to do this yourself; leading control manufacturers will do this audit for free.

### Fully Use Your Technology

Second, there are many technologies available in equipment that go unused primarily because the programming methodology is "what you've always done." Features like Tool Center Point (TCP) and smoothing algorithms like High Speed Smooth TCP with Fairing have been around for a decade or more, but very few machines are using these kinds of motion functions. Quality machine tool builders and CNC manufacturers can help you take advantage of these features. So, after doing an audit of existing equipment, contact your preferred supplier to help you optimize the equipment already installed and take full advantage of the investment. It's usually relatively easy to drastically reduce cycle time while improving surface finish if a few process changes are made and the effort is closely coordinated with the CNC experts.

### Improve those RFQs

Third, the majority of RFQs and purchase specifications are extremely vague and are the equivalent of simply specifying "a phone" or "a machine tool." If a person walks into a store and asks to purchase just a "phone" they might end up being sold a basic old rotary phone instead of a shiny new, sophisticated and feature packed iPhone. The rotary phone will work, but it will not be efficient in meeting your specific needs of today. The same holds true for machine tools. "A

machine tool" will cut parts, but will not be adequate to cut complex aerospace parts. Additionally, the ability to purchase sophisticated consumer electronics at the local store and the simplicity of setup has allowed the industry to lose sight of the realities involved with purchasing advanced aerospace manufacturing equipment.

In reality, the majority of bid specifications and signoff tests in the industry today are almost the same as they were 30 years ago. The NAS machine runoff tests are outdated and do not verify nor validate most of the modern CNC and machine capabilities. A quality CNC vendor is a great, but rarely used, resource to help develop a purchase specification and test a plan to verify if the new equipment is properly configured. Very specific CNC functionality from basic interpolation to probing must be clearly defined in the bid specification with quality testing to verify functionality prior to purchase.

Additionally, in the aerospace industry, it's rare that any two machines are identical so the serial number of the equipment is often a single digit, if not "1." Because of this, there will be a few unexpected manufacturing defects that need to be overcome in machine tools, partly due to the complexity of the equipment, and mostly because the machine is likely the first of this exact configuration. When considering a schedule for purchase and installation of a machine tool, plan a conservative window for testing functionality and to allow for the unexpected issues that will occur not due to the quality of the builder or CNC manufacturer, but the custom nature of the equipment.

Finally, partner with the best experts you can find. The quality of the machine tool builder and CNC manufacturer is evident in the availability of resources and close engagement during the purchasing process and just as important, long after the purchasing process. So, if you want to improve your end result, follow the three steps above and definitely look closely at the technology and reliability of the machine tool and control you purchase. But, look even closer at the expertise of the support team behind the equipment—your end result depends on it. ➔