

# TAKING OFF SAFELY

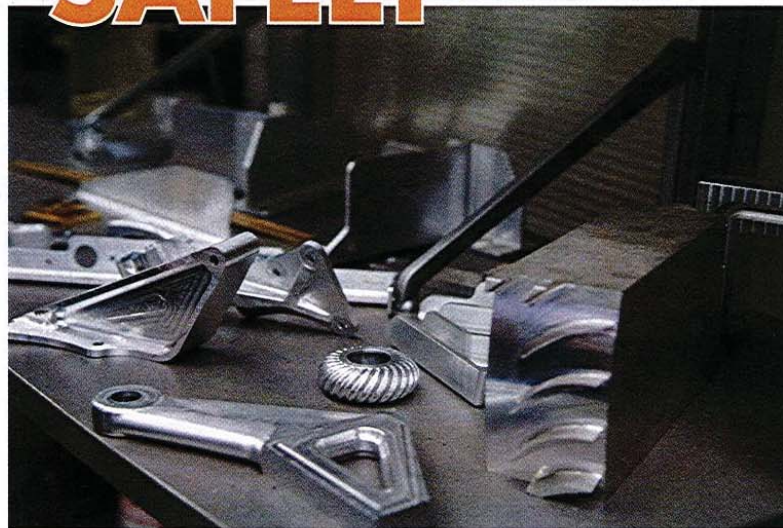
**BY LINKING CAM SOFTWARE INTO AN ADVANCED TOOL PRESETTING SYSTEM, THIS AIRLINE MANUFACTURING UNIT EFFICIENTLY MANAGES A LARGE TOOLING DATABASE AND MACHINING SIMULATION ON HIGHLY COMPLEX AIRCRAFT PARTS TO QUICKLY RESPOND TO MARKET CHANGES.**

By Dr. Karin Steinmetzer

Some of the most highly complex passenger aircraft is flown by Lufthansa Technik AG (Hamburg, Germany). Everyone knows Lufthansa, but only a few people are aware that the Lufthansa hangar in Hamburg employs some 8,000 staff for the maintenance, repairs and interior fitting of aircraft. For 50 years, over 1,000 of these employees have worked in the VIP & Executive Jet Solutions manufacturing sector that focuses specifically on taking care of VIP, business and government aircraft.

The safety of these passengers, as well as the reliability and cost-effectiveness of Lufthansa flying operations, depends on error-free functioning of components and perfect interactions of systems, all of which is accomplished by state-of-the-art technology on board the aircraft itself – and behind the scenes, in the state-of-the-art technology used to maximize the manufacturing flexibility of the “VIP and Governance” business unit at Lufthansa Technik.

The spectrum of parts manufactured is considerable in order to meet customer wishes that are extremely individual and maintenance and repair work that can be unpredictable. Because expandable systems and maximum data transparency are essential require-



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ments, Lufthansa Technik partners with CAMTECH GmbH & Co. KG (Remscheid, Germany), a master reseller for Edgcam software in Germany, Austria and Switzerland, and E. ZOLLER GmbH & Co. KG (Pleidelsheim, Germany).

Next to safety, exceptionally high quality is demanded by the mechanical manufacturing in this business unit. Individual requirements include the production of high quality components with new geometries every day. A tooling pool of approximately 2,000 different, complete tools is available for this purpose. Over the years the elaborate NC programs for these complex geometries have been programmed using Edgcam, including the milling of prismatic parts and free-formed surfaces with 5-axis simultaneous operations.

As new requirements were added, a greater variety of tool data became necessary and the distribution of this data over several databases (Edgcam, machine control, and ZOLLER) resulted in redundant data management that led to increased inefficiencies and contained potential sources of error due to repeated manual data entry.

Following the purchase of an advanced machine pool, investments were made into high-tech peripherals to not only increase process safety but also ensure maximum flexibility to respond to market changes. Prior to this only a single manual tool presetting machine was being used. Labels were still printed and data was manually entered into the machine.

The CNC-guided »venturion 450« tool presetting and measuring machine from ZOLLER has been in use since 2007. “Following a cost benefit analysis, we decided on it,” explains planning engineer Frank Pieterwas, “because of its expandability and linking to the machines.” Besides introducing a system-superimposed tool database, a number of other application details favored this system as well. “Its graphic user interface for labor-intensive presetting of fine drilling tools is one, plus the fact that I can clearly view the cutting edge with the magnifying glass,” notes Jan Horn, a CAM specialist at Lufthansa.

This basic machine was successively extended over the years and Tool Management Solutions was added. “We wanted the ZOLLER database because it is the leading system,” states Horn. “If a new tool



Jan Horn of Lufthansa Technik (left), Ulrich Rienks of CAMTECH/Edgcam (center), and Julian Lüdecke of ZOLLER.





The tool data saved in the TMS database is available in the Edgecam system as a precise 3D model. The system programs using real data, then outputs the tool data of those tools used in simulation so they can be assembled on the machine in the same way they were simulated.



is set up, it should be entered into this Tool Management database so that the name is correct, as well as the description and the T-number. Once entered, it can be found consistently by all employees and used in a standardized manner throughout the entire process."

The interface from Edgecam to Tool Management Solutions was developed in 2011. In 2013, the Edgecam system, the tool memory of the CNC machines along with the tool presetting and measuring machine, were linked via the ZOLLER database to ensure data consistency from the CAM system through to the machine. All data is saved in Tool Management Solutions and accessed by the CAM system. The measuring regulations are saved in the database directly next to the tool and are available on the measuring machine. Professional measurements are made at the push of a button and the tool data is transferred to the machine to ensure consistency and eliminate all sources of error due to manual entry. Multiple storing of data has been abolished.

The tool data is now saved in the TMS database according to

DIN4000 and is available in the Edgecam system as a precise 3D model. The system programs using real data and outputs the data of those tools with which simulation was performed. These can then be assembled on the machine in the same way as they were simulated. In the case of complex processing methods, it is particularly important to have the true tool data available for programming in order to avoid crashes. And it saves enormously on time.

After the first six months of operation, the error rate had already dropped significantly and employees were given optimal support when looking for possible tools to satisfy individual customer requirements. Of course, the savings cannot be quantified as in a series production. However, being able to efficiently search for tools is a factor. "The flexibility for the employees is, of course, a big advantage due to continuous changes on the NC machines," confirms Jan Horn.

"Everyone simply downloads their NC program onto the machine, the tools are included and have standardized descriptions," he continues. "Everyone can orient themselves everywhere and all that is occasionally needed is to retrofit a tool. I use a single set of tool data and it applies to all machines. Once I have written a program in Edgecam, then it also applies to all machines. All I need to do is change the post-processor, send the NC program, and the process is completed. A big advantage with Edgecam is the simple, subsequent change of already programmed parts to other machines."

Lufthansa Technik must often respond to market changes extremely fast. Repairs and the unique requirements of some customers are often unpredictable. High flexibility is necessary, especially to realize the external manufacturing ratio of up to 70 percent. "We have created a perspective for the future with the introduction of these systems," says Pieterwas as he summarizes the benefits of the investment. "This also allows us to actively approach the external market. We are independent of our own assembly components. Operating systems such as these allow us to respond in a flexible manner."

And customers can continue to take off safely in the future. ■



(left-right) Frank Pieterwas and Jan Horn of Lufthansa Technik, with Julian Lüdecke from Zoller and Ulrich Rienks from CAMTECH/Edgecam.

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