

FASTTIP ENABLES COMPLEX 6-AXIS PROGRAMMING

Aircraft manufacture is complex and subject to tight deadlines. For example, various components and assemblies must be drilled with holes quickly and precisely. CENIT is supporting BAE Systems in the programming and simulation of 6-axis programming as part of the modernization of the rivet-boring system with FASTTIP and CATIA V5.

“BAE SYSTEMS has invested millions of pounds in state of the art multi-axis NC systems as part of its long term future proof strategy to stay at the forefront of technology. FASTTIP forms an important part of this long term strategy providing us with programming software and offline simulation. This gives us the ability and confidence to quickly and simply provide the production facility with collision free multi axis assembly drilling programs and all thanks to CENIT software”

Paul Thompson, Team Leader, Typhoon Major Units Build Support, BAE Systems

- ▶ Main aim
Reliable programming and simulation for drilling processes
- ▶ Highlights
6-axis programming
- ▶ Solutions/services
PIK development
Training and support
- ▶ Main advantage
Significant time and cost-saving
- ▶ Why FASTTIP?
Unique software for programming and 6-axis simulation of complex drilling processes

BAE Systems, one of the largest defence manufacturers in the world, produces the multipurpose Eurofighter Typhoon combat aircraft, amongst other things. Components such as the rear fuselage, side structures and the rudder require numerous precisely located drill holes. BAE Systems is modernizing the assembly of the Typhoon with a system from MTorres for producing rivet and fastener holes.

Two TDRILL systems have been acquired for Samlesbury, England, while there are plans for a third machine. The advanced machine technology from MTorres has 6-axis kinematics, controlled by a Siemens 840D controller. With the multi-million euro investments, the tight deadlines for aircraft manufacture should be achievable, costs significantly reduced for the large amount of precise drilling and quality increased. The new purchases should also strengthen the technological leadership of BAE Systems.

▶ CHALLENGES

The MTorres rivet-boring system requires sophisticated 6-axis programming. Following a market analysis, BAE Systems established that only CENIT AG is in a position to deliver a financially and technologically adequate solution to this

challenge. Its mastery of technology and years of experience in programming and simulating complex riveting and boring processes in the aerospace environment with FASTTIP were the crucial factors in this decision.

The solution required is designed to enable reliable programming and simulation of the drilling processes. BAE Systems also hopes to achieve significant time and cost-savings.

▶ 6-AXIS PROGRAMMING WITH FASTTIP

The CENIT software FASTTIP is a 3D offline programming solution for riveting and boring processes which is widespread in the aerospace industry. The solution is attractive due to its high quality standards and absolute reliability.

A process implementation kit (PIK) has been developed for programming and simulation with FASTTIP on the basis of the detailed specifications. After installation and approval of the PIK, all BAE Systems programmers received training in using the PIK.

Perfect change management was an important part of carrying out the project. As the system and implementation of the

PROGRAM AND SIMULATE 6-AXIS DRILLING EFFICIENTLY WITH FASTTIP

technology were still in development during the project and changes to the process, machine geometry or control have a major impact on subsequent programming and simulation, this was the only way to create the necessary flexibility.

“It was a challenge, but everyone involved stayed focused, showed initiative and was ready to implement changes quickly so as to develop the software in line with the requirements of BAE Systems. From the original idea via the concept and through to the eventual solution and implementation, the challenging schedule was adhered to and even undershot, as the project was complete before the specified deadline,” as Paul Thompson, Team Leader, Typhoon Major Units Build Support, explains the teamwork during the project.

▶ PERFECT COOPERATION: FASTTIP, CATIA V5 AND FASTCONTROL

The PIK lays the foundation for programming and simulation with FASTTIP. The development of such a PIK involves information on geometry and kinematics of the system, procedure and strategies of the production process and structure of the accompanying control program. The post-processor for issuing the control program is specially developed for this Mtorres system.

The introduction of CATIA V5 at BAE Systems is also linked with that of FAST-

TIP in Typhoon manufacture. This means that drill holes which are identified in the construction department with CATIA V5 as user-defined features (UDFs) and already include all necessary technological information (e.g. location, drilling direction, and diameter) can be used directly in FASTTIP. As a result of these integrative measures, the programming process is accelerated considerably and construction changes for drilling automatically take effect in production.

The FASTCONTROL controller emulator is used for precise and reliable simulation. This implements the underlying NC program in axis motion which can be simulated. All intended drilling or tool changes can be reliably simulated thanks to the high level of simulation accuracy. Collisions can be identified and eliminated by means of suitable strategies.

▶ USE BY CUSTOMERS

Programming the many drilling positions is very simple thanks to FASTTIP. The drilling UDFs are transferred to FASTTIP. Drilling sequences are created and access and outlet routes defined. Technological information can be used directly from the drilling UDFs.

The production of the Typhoon was successfully tied to CATIA V5. BAE Systems manages the sophisticated 6-axis kinematics with a standardized procedure in programming and simulation. Offline

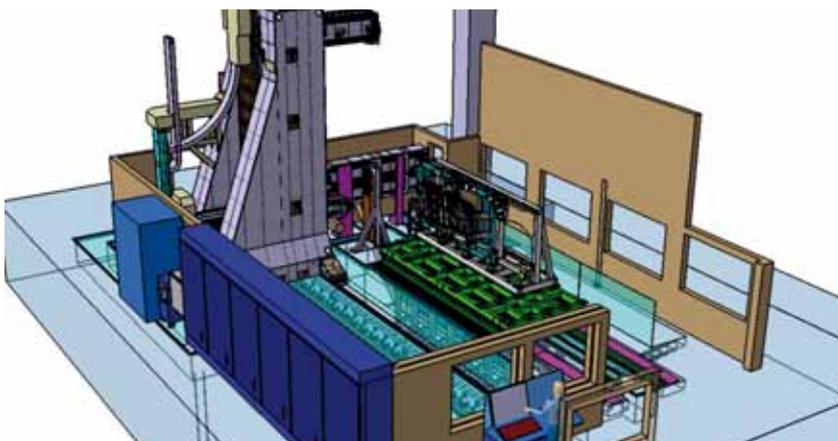
programming is an important protector of investments for BAE Systems and an indispensable prerequisite for adhering to the tight schedule, as any collisions would shut down the system for an indefinite period of time. Drilling programs can also be simulated beforehand with great precision and then drilled afterwards. This avoids manufacturing loops during production. Further time and cost advantages are achieved by the transfer of drilling data from CATIA V5 construction and by automatic NC documentation.

▶ “INNOVATION OF THE YEAR” AWARD

At the end of 2009, CENIT received the BAE Systems Bronze Award for the efficient implementation of 6-axis programming with FASTTIP in the Innovation category. The awards are presented annually to people or companies whose activities ensure that BAE Systems retains its competitive advantage.

▶ ABOUT BAE SYSTEMS

BAE Systems is one of the world's largest defence manufacturers. The company is also active in the fields of security and aerospace. BAE Systems offers products and services for military use in the air, on land and at sea. BAE Systems is involved in various defence projects. These include the F-35 Lightning II fighter and the Eurofighter Typhoon, as well as the Queen Elizabeth class aircraft carrier.



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