OFFLINE PROGRAMMING OF A FLEXIBLE ROBOTIC DRILLING CELL FOR CARGO DOORS

SAAB Aerostructures realized an efficiently offline-programming for drilling cargo doors. The FASTTIP system from CENIT AG enables the comfortable reuse of parameters defined during the design of doors. The high level of automation in the field of offline-programming leads to a very efficient workflow - especially for design changes.

- **Industry**
  - Aerospace
- **Main Goal**
  - Significant time and cost savings of manufacturing of cargo doors.
- **Highlights**
  - Robot programming
  - Layer analysis
  - Reuse of design data and UDFs
- **Solutions/Services**
  - FASTTIP
  - Customization
- **Main Benefits**
  - Planning security
  - Reduced manufacturing time
  - Optimized programs for composites
- **Why FASTTIP?**
  - CATIA V5 integrated
  - Integrated programming and simulation
  - Offline-programming of robots
- **In Numbers**
  - 1200 drilling holes per door

Saab Aerostructures serves the global market with world-leading products, services and solutions from military defence to civil security. With operations on every continent, Saab continuously develops, adapts and improves new technology to meet customers' changing needs. Its most important markets today are Europe, South Africa, Australia and the US.

Saab has around 13,200 employees. The leading supplier to the international aerospace industry, including Boeing and Airbus, develops and manufactures structural assemblies that are light in weight, fulfill high static and fatigue requirements, yield low operating costs and have a very high level of quality.

HUGE AMOUNT OF DRILLING POSITIONS

New orders for the manufacturing of cargo doors caused production enlargements at Saab. The doors of Airbus´ A400M and Boeings´787 comprises three different doors with up to 1,200 drilling holes per door.

Furthermore, the doors consists of different materials like aluminium, carbon fiber laminate, titan and niro. The robot cell from BA Jaderberg GmbH was designed to efficiently automate the layer drilling process. BA Jaderberg installed a KUKA KR360 on a linear axis to serve three assembly stations. The end effector for drilling was also capable of per-

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forming measurement and marking tasks. An optimized total efficiency of this flexible robot cell could only be reached by introducing an appropriate offline-programming system. Therefore BA Jarderberg searches for a system, which was able to manage the huge amount of drilling positions. The system should offer a lot of automation functionalities in order to drastically reduce the time for program generation.

POWERFUL AUTOMATISMS

As CENIT´s FASTTIP is an established tool in the aerospace industry, the search focus was very quickly reduced to this system for drilling and riveting. The CATIA V5 integrated system is able to work directly with CATIA V5 data. Within this modern environment the users can program and simulate their drilling operations. Powerful automatisms and interactive functionalities support the users on their way to realize efficiency for program generation, e.g. multi-selection and sequencing. After customization FASTTIP interprets technology data, e.g. drilling position, orientation, rivet data, material mix and layer thickness, coming from User Defined Features (UDF) and automatically creates suitable programs.

LAYER ANALYSIS OF COMPOSITES

Drilling programs consider the different product materials. FASTTIP analyses on each drilling position the layer properties such as material conditions, each layer thickness and adapts the drilling parameters, e.g. feed rate and number of rotation, according to local properties along the drilling orientation. The end effector for drilling is also equipped with a printing device which prints riveting information beside the drilling holes. Furthermore, there is a measurement unit integrated for executing measurements at the workpiece to derive precise target positions.

The measurement task - the movement of the laser sensor - as well as the marking operation can be programmed with FASTTIP. The Complete process is handled by FASTTIP.

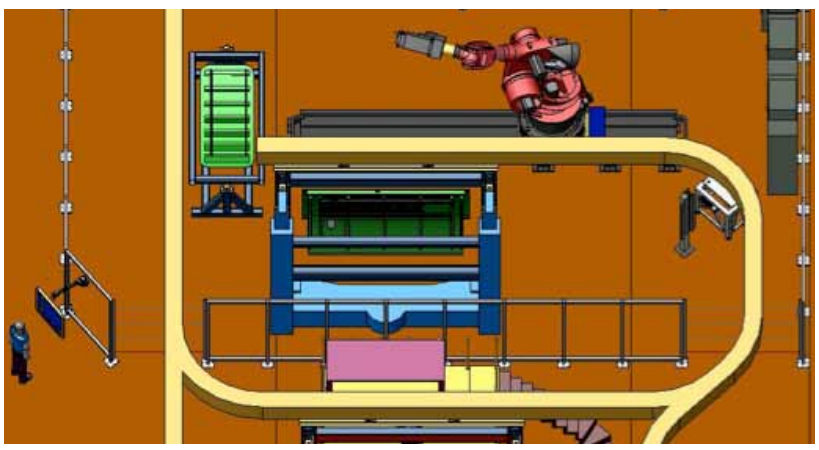
SUSTAINABLE IMPROVEMENT OF EFFICIENCY

In former times, SAAB Aerostructures was used to manually working. The automation combined with an advanced offline-programming solution was a new experience. The gathered experience was very positive. „FASTTIP sustainably improves our efficiency in the field of cargo doors.“, mentioned Johan Björklund, Manager Manufacturing Engineering NC Technique. „Most tasks are automatically solved. The spared time can be invested elsewhere.“

“Layer drilling without FASTTIP has to be a very cumbersome job.”

Johan Björklund, Manager Manufacturing Engineering NC Technique, SAAB Aero

Beside the reaching of efficiency goals, the system gives SAAB more planning security. All things considered SAAB benefits from the significant time and cost savings realized by reducing non-operation periods of the drilling cell for cargo doors.



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