

Fraunhofer Institute for Production Systems and Design Technology IPK

Case Study: Lufthansa Technik Group

Project Scan2DMU: Virtual Modification of Aircraft Cabins

We are the leading provider of aircraft maintenance, repair, overhaul and modification services for civil aircraft, from commercial to VIP and special mission aircraft. Holding international licenses for maintenance, design and production, we provide tailored maintenance programs, modification, completion and conversion as well as innovative cabin products, material pooling or engine services.

The challenge

»Virtual Modification of Aircraft Cabins« is a four-year project with Lufthansa Technik AG (LHT). One sub-project is focused on DMUs (digital mock-ups).

This contains Generic Space Allocation Models (GSAMs), such as furniture base models and their attachment points. The GSAMs are based on information provided by the aircraft manufacturer and do not correspond to the actual build condition of a delivered aircraft. As the DMU is not based on as-delivered aircraft structure data and therefore does not correspond to the real situation, it is not possible to validate the actual positioning of components in the DMU. Physical installation tests are carried out instead and the furniture is reworked accordingly.



In the Scan2DMU project, Fraunhofer IPK developed a solution that enables us to automatically compare our CAD geometries with scan data.«

Joint work

The aim was to achieve a process of automated adaptation of existing structural models to physical as-built conditions. Various scans of the real aircraft are already being carried out today to support engineering, serving as a visual check of the actual construction status.

DMU helps LHT in the integration of digitalization technologies and methods into the product development process. An initial allocation of installation space takes place in the DMU based on the placement of the furniture base models. They are placed according to the structural models. In the course of the development process, the basic models are further developed into furniture models. The attachment points indicate the coordinates at which the furniture is connected to the aircraft.

The solution

Scan2DMU was used to determine and prototypically test the basic feasibility for the automated adaptation of existing CAD data based on recorded 3D point clouds. LHT provided the 3D-scanned point clouds for this process which were then compared to the optical measurement of the real aircraft interior. The existing models in the DMU were automatically compared to their actual positions determined from the scan data and the DMU models were adapted. In the future, the process of designing and positioning the aircraft interior may be possible to achieve by only using Scan2DMU data without using other models.

Further information:

www.ipk.fraunhofer.de/scangineering-en





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Scan2DMU

allows us to use the physical as-built condition of aircraft as the basis for 3D design, which eliminates significant costs associated with inspection and rework due to tolerance issues.





About Fraunhofer IPK

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With the help of application-oriented research, we develop solutions along the entire industrial value circle.

Our guiding idea is a digitally integrated production in which man and machine interact on the basis of data and can thus adapt flexibly and proactively to changing requirements.